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Metamorphosis-2023

Editors

Dr. N. K. Rana

Dr. S. Riyazoddin

Prof. Mohammed Wasim Khan

Prof. Faiz Muhammad Khan

April 28th-29th 2023



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Excellence and Metamorphosis



3rd International Conference on Trends n Herald in Engineering Excellence and Metamorphosis-2023

28th & 29th April, 2023

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Contents

S. No.	Paper ID	Title of the Paper	Page No.
1	CV01	A Review of Affordable Mass Housing of G+3 Building using Sustainability Approach	1
2	CV02	Surveying of Layout and Design of Elevated Railway Track at Vasai Station.	4
3	CV03	Prefabricated wall panels using red soil for low-cost housing.	7
4	CV04	Review Of Existing Pothole Repair System for Flexible Pavement	13
5	CV05	Study Of Confined and Unconfined Structural Member as Column	16
6	CV06	App-based construction material procurement system	20
7	CV07	Experimental Study on Ground Strengthened by using Geo-synthetics materials	26
8	CV08	Using Geotextile as Reinforcement to Increasing Soil Bearing Capacity of Soil	33
9	CV09	Treatment of Sugar Industry Effluent using Microbial Fuel Cells	38
10	CV10	Minimizing and Reducing waste generated in college campus	43
11	CV11	Removal Of Domestic Waste Water Impurities by Using Different Filter Media	48
12	CV12	Case Study of Building Cracks and Causes and Its Prevention	54
13	CV13	Experimental study on previous concrete made of CCW and steel slag	57
14	CV14	Effect of GGBS on Durability Properties of Concrete	63
15	CV16	Generation of Hydropower from Treated Sewage Water by Using Kaplan Turbine	68
16	CV17	Solid Waste Management	75
17	CV18	Cost analysis for shield building	78
18	CV19	Partial Replacement of cement with rice husk ash in concrete	83
19	COIT08	An IoT-based bill Distribution System	88
20	COIT25	Fruit Disease Detection using K-means Clustering Algorithm	95
21	COIT26	Real -Time Tracking and Alert System for Stolen Laptops	100
22	COIT27	A Blockchain-based Product Ownership Management System for anti-counterfeits in the Post Supply Chain.	106
23	COIT31	Colorization of Black and White Image Using Deep Learning	111
24	COIT32	Improving Efficiency of High Utility Pattern Mining Algorithm using Adaboost, Random Forest, and SVM	116
25	COIT33	Secure File System using hybrid cryptography	120
26	COIT34	Crowdfunding Using Smart Contracts in Blockchain	124
27	COIT35	Identification of Birds Species using Neural Network and Audio Signal	128
28	COIT36	Traffic Control System Based on Image Processing Using SSD Algorithm	132
29	COIT37	Prediction of water quality using ML and IOT	136
30	COIT38	Human Action Recognition System	141
31	COIT39	Tracing of fake news on Twitter using blockchain	144
32	COIT41	Potato Leaf Disease Detection Using CNN	147
33	COIT42	Student's Government a webpage system developed using HTML, CSS, JAVASCRIPT and PHP	154
34	COIT44	Blockchain-based decentralization of the KYC process	158
35	COIT45	Mood-Based MMM Suggestion System	171
36	COIT47	Food Wastage Management and Donation	179

37	COIT48	Music Streaming App using ReactNative	188
38	COIT49	Attendance system based on face recognition	195
39	COIT50	College Enquiry ChatBot Using NLP and ML	204
40	COIT51	DeepFake Detection using Deep Learning	210
41	COIT02	Code Solution - A simple solution for designing web pages & API for data based on the MERN Stack	215
42	COIT03	An Open Source, Adaptable 'Ticket' Handling framework focused on B2B applications	220
43	COIT04	Data Privacy in the AI Age: The Critical Need for Right-to-be-Forgotten Techniques & Implementations in Artificial Intelligence	226
44	COIT05	Malicious web content detection using machine learning	229
45	COIT06	Smart Attendance System Using OpenCV Face Recognition	234
46	COIT07	Smart Face Recognition Door Bell	241
47	COIT10	Pothole Management	246
48	COIT11	News Aggregator and Fake News Detection Website	251
49	COIT12	Software Based Voice Assistant for Blind Using ML	257
50	COIT13	Kisaan Buddy – A Platform to Assist Farmers	265
51	COIT15	Image Captioning Generation using LSTM Based on RNN Model	272
52	COIT16	Securing & Sharing the Document Using Blockchain and IPFS Technologies	276
53	COIT17	Image Forgery Identification Using Deep Learning	282
54	COIT21	Vehicle Accident Detection and Prevention using IOT	288
55	COIT22	Smart Luggage Carrier with Real Time Tracking System Using Raspberry Pi	293
56	COIT24	A Deep learning approach for reconstruction of images using Auto-encoder	296
57	ELCT01	Three phase Asynchronous motor using Industry 4.0 with load expedient	301
58	ELCT02	Integrated DC-DC converter-based grid-connected transformerless inverter	308
59	ELCT03	Electrical Energy Audit In Viraj Profiles Ltd. (Wire Division) MIDC Tarapur	316
60	ELCT04	Speed control of BLDC motor using IoT	322
61	ELCT05	Analysis of HEMS (EV, PV, ESS, RT Appliances) using MATLAB	327
62	ELCT06	Simulation-based In-built charging Hybrid EV with IC engine & External source	332
63	ELCT07	RFID-based Smart Public Transportation System	339
64	ELCT08	E-commerce For Artisans (Locart)	346
65	ELCT09	Court case management system	351
66	ELCT10	Why we should strive to be an entrepreneurial engineer	356
67	ELCT11	Smart Attendance Capturing System	367
68	ME01	Automatic Car Washer	372
69	ME02	Literature review on design and analysis of floater	377
70	ME03	Computation Modelling on Polygon Pin Profile Effect on the FSW of Dissimilar Material AA6061-T6 and Pure Copper	382
71	ME04	Solar Powered Water Purifier	390
72	ME05	Automated Seat Belt Integrated Hand Brake System	393
73	ME06	Advance Parking System	397
74	ME07	Refrigeration Using LPG Cylinder	400

75	ME08	Multiple functions security device for car	407
76	ME09	Design of three-wheel electric scooter a personal mobility vehicle	410
77	ME10	Design And Fabrication of Automated Lawn Mower	416
78	ME11	Ramp pump	424
79	ME12	Pollution Elimination Device	428
80	ME13	Crafting and Execution of an Artificial Limb Empowered by Vocal Commands	439
81	ME14	Cost Optimization in Designing Elliptical Bicycle	444
82	ME15	Experimental investigation of Radiator System Coolant using Propylene Glycol	451
83	ME16	Hydraulic Drainage Cleaner	456
84	ME17	Automatic Fire Suppression System in Automobiles	461
85	ME18	Envelope Shape and Material for LTA Vehicles	466
86	ME20	Recent Development in Metallurgy & Manufacturing	472
87	ME21	Power Quality	476
88	ME22	Pollution Control System of Induction Furnace Unit	482
89	COIT01	Pet Care: Pet Animals Care Management and Health Website	489
90	COIT09	Aahar: Homemade Food Delivery Application	494
91	COIT14	Automatic System for Solar Grass Cutting Using IoT	501
92	COIT18	NAS and Media Server using Raspberry Pi	506
93	COIT19	Prevention Of Drowning Incidents in Swimming Pool on Automated Vision Based Surveillance System	510
94	COIT23	A Systematic Augmented Reality based ATM model to Enhance Security and Safety	516
95	COIT28	Effective approach towards hybrid intrusion detection for cyber attacks	520
96	COIT29	Real-Time Speech Emotion Recognition using Deep-Learning	526
97	COIT30	Steel Defect Detection using Data Science Techniques	532
98	COIT40	An Open-source Portfolio Builder using MERN stack	536
99	COIT43	Digital Assistance for Elder People	541
100	COIT46	Online Bidding Using Mern	547
101	ELCT12	An Improved Method for Face Recognition with Incremental Approach in Illumination Invariant Conditions	555

A Review of Affordable Mass Housing of G+3 Building using Sustainability Approach

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Abstract: With an emphasis on environmentally friendly methods, this research study provides an in-depth examination of current trends and approaches in low-cost mass dwelling. The severity of the reasonably priced housing shortage and the need for long-term remedies are made plain in the research. The papers that have been printed in renowned magazines are also considered when performing a thorough investigation. When designing G+3 building projects, eco-friendly practises such appropriate air movement, utilising natural daylight, rainwater collecting, and energy-saving inventions are carefully considered. The study includes a thorough evaluation of the current situation about inexpensive mass housing projects as well as an analysis of the strengths and weaknesses that exist in this area. The paper provides suggestions and a sneak peek at planned low-cost housing complexes to hasten the adoption of sustainable construction techniques. This study contributes to the field of constructions and aids in understanding strategic planning, location choice, material choice, probable problems, quantitative evaluation, cost forecasting, and design methodology.

Keywords— *Affordable housing, Sustainable approach, Mass housing, Eco-friendly materials, Cost-effectiveness*

1. INTRODUCTION

Emerging nations in Asia, Africa, and Latin America face challenges of poverty, population growth, and a lack of affordable housing. With an estimated 66% of the world's population becoming urbanized by 2050, there is a need for eco-friendly and affordable building solutions. G+3 structures are a common design for mass housing, but they often waste energy and harm the environment. This research aims to show that G+3 structures can be both environmentally friendly and affordable using sustainability methods such as green roofs, solar power, rainwater collection, and energy-saving equipment. The goal is to provide a large population with pleasant and affordable living quarters while having as little impact on the environment as possible.

2. CASE STUDY OF AFFORDABLE HOUSING

In 2022, Lee See Wen et al. conducted a study in Johor, Malaysia, with the goal of addressing the problem of budget overruns in residential constructions. Poor scheduling was the main factor, which impacted profit. The best material management, workforce planning, and education were among the solutions. [1]. The study conducted by Sahil Gandhi focuses on the expansion of slums in Indian cities, particularly in Mumbai, is attributed to population growth and poor policy frameworks. Only a small percentage of households can afford housing under current regulations. The essay argues for the implementation of economic laws and the inclusion of existing informal organizations to address the issue. [2]. In India's rapidly expanding metropolitan regions, the study by Sophia Immanuel et al. advocates textile reinforced concrete (TRC) as a cheap and environmentally friendly housing alternative. Instead of using typical steel reinforcement, TRC uses non-corrosive textiles, making it ideal for reworking and modernising existing buildings. To encourage sustainable growth, the report advises looking into TRC as a structural component for low-cost prefabricated houses [3]. Native materials minimise CO2 emissions, cooling capacity, building costs, and operational temperature, according to a study by B. Solomon et al. that used Energy Plus modelling to look at the thermal environment of a housing complex in a research area. The expected time in a hot environment has been extended to nine months [4]. The purpose of this project is to suggest an affordable materials for construction for the commercially less robust part. Research explored the price and durability of several slab-building materials, including EPS, coconut shell, foundry sand, and fly ash. The findings demonstrate that EPS with normal reinforcement surpasses the traditional slab and is the most durable

and cost-effective substance, followed by EPS Geogrid [5]. A sustainable residential program must consider technology, environment, culture, and economics. The research by Renuka Singh et al. examines 10 factors to promote sustainability and accessibility while minimizing adverse effects on humans and the ecosystem. [6].

Application of Mass Housing

Wong (2010) argues modern mass housing plans fail to adapt to evolving tenant requirements, leading to economic waste. To prevent this, public housing planning should adopt a research-based strategy, using open architectural principles and in-depth study of tenants' spatial behaviour to inform design. [7]. E. Adinyira et al. found in their studies that many building sites and intricate distribution networks are just two of the ten unique characteristics of mass housing projects (MHPs) that this research recognized as contributing to management deficiencies. It's crucial to comprehend these traits in order to create effective organizational systems and strategies. It is advised to conduct further research to develop a management programme that is more useful. [8]. Gholamreza Heravi et al. In his paper found that underlying cause analysis, testing, inspection, redesigns, and corrective action were determined to be the most common quality-related processes in a study on Iran's mass housing projects. With the potential to cut expenses by approximately 10%, a new product can evaluate the value of quality and its optimum level. The strategy might be applied to different facets of construction and aid management consultants in organising quality assurance [9]. According to Ayush et al., the GHTC and Lighthouse programmes of the Indian government support alternative construction methods. However, consumer loyalty and policy prioritisation are essential, as are participatory reviews and improvements in building standards. Due to existing challenges, adoption might be gradual, but there are considerable long-term advantages. The public and business sectors must take action right away [10].

3. STUDY OF SUSTAINABILITY

Table 1: Tabular representation of reviews on Sustainability

Authors	Methodology	Summary & Findings
Gaurav Gangwar et al. (2020) [11]	The paper examines contemporary issues related to urbanization and sustainable development in India. It analyses Census of India data to understand urban infrastructure and basic amenities within slum settlements. It also reviews sustainable urban development practices.	Five categories for sustainable design concepts are found by researchers, which analyses three Indian ways of evaluating sustainable housing and provides case studies. The Elements of Design can be used as a reference by designers to produce high-quality buildings.
Hindavi R. Gavali et al. (2018) [12]	The paper discusses the method for choosing appropriate masonry materials and construction orientation utilising eight alignments and seven masonry variations for an urban poor house in India. It suggests using Building Information Modelling (BIM) to produce sustainable urban poor houses.	The study looked at a brick constructed from recycled paper that had a 19% reduction in peak cooling capacity and a 13% reduction in embodied energy. In comparison to the basic scenario, the RPMW brick masonry had an embodied energy reduction of 15% and a cost reduction of 16%.

4. CONCLUSION

The literature analysis highlights the importance of implementing sustainable design and construction methods, particularly for G+3 structures, in creating affordable mass housing developments. Sustainability components such as energy efficiency and basic facilities availability can enhance the quality of life for residents while benefiting the environment. However, financial and institutional constraints must be overcome to incorporate sustainable practices in mass housing projects. Future studies should focus on innovative solutions to increase the availability and affordability of ecological mass housing for low-income communities while considering regulatory backing, consultation, financial viability, and community involvement. The success of affordable mass housing projects depends on a holistic and transdisciplinary approach, taking into account sustainability in social, economic, and environmental factors.

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Surveying of Layout and Design of Elevated Railway Track at Vasai Station – A Review

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Abstract: A better transportation system is one which caters the need of all the consumers in time and with minimum level of comfort. Although the condition of Western Mumbai local trains from Borivali to Virar which are overly crowded during peak hours. The need of Elevated Railway track arises due to the existing conditions of Railway stations as the destruction or dismantling for new rail lines at grade level will result into inefficient and uneconomical construction. This paper reviews and discusses the research carried out in planning and development of railway bridges over the past years. The various case studies throughout the world for different types of railway bridges are summarized in this paper. Also the most recent technologies and modern methods used in construction of bridges and rail transportation are also highlighted.

Keywords: *Transportation, Elevated rail bridges, Mumbai Locals.*

I.INTRODUCTION

Rail Transportation is one of the most important, commonly used and very cost effective modes of commuting and goods carriage over long as well as short distances. India's rail network is the largest in Asia and the second largest in World, wherein the Mumbai Suburban Railway is a mass Transit system. It is divided into 2 Zonal railway networks viz., Western Railway and Central Railway runs the huge suburban local train network. Mumbai population has almost tripled from past few years indirectly turning the rail network as the lifeline of the city. Though it effectively handles the highest passenger density compared to any other mass transit system in the world it seems a bit crowded. Focusing on Mumbai's Western Railway transportation which is severely impacted by the city's growing population and migration which leads to concerns regarding congestion and overcrowding while travelling. Especially the Vasai-Virar region contributes a significant amount of people to Mumbai's population. Because of this the mode of transportation such as rail and roadways fall short of meeting the requirements for space and frequency out of which rail transportation is a prime option, hence by increasing number of track lines in Vasai-Virar will ultimately minimize the issues like congestion, overcrowding and pollution. The Mumbai Railway Industry possesses a variety of Transportation problems that can be rectify and solved using various approaches in Civil Engineering.

This Paper presents review on planning and development of rail transportation. The reviews are segmented in two sections II, III, followed by References. Section II reviews the case studies about Various Railway Bridges. The Construction Methods of Different Railway Bridges are briefly reviewed in Section III.

II.CASE STUDIES ON VARIOU RAILWAY BRIDGES

“The Kalka Shimla Railway” (2007) paper gives the description about the railway line constructed in 1903[1]. The location for the project is in the state of Haryana (Panchkula District) and Himachal Pradesh. It is a hill passenger railway having single narrow gauge which is 96.6 km long. It was planned to server the town of Shimla having altitude more than 2000 m. It required 20 years to complete the project, the consultation were taken from TICCIH. The track was re-laid and retaining walls rebuilt; a single masonry multi-arch bridge was built and then it was replaced by metallic girder bridge in 1935. In all the paper represents the description and the overall information about the Kalka Shimla Railway project.

In paper “**Design and Construction of Pre-Tensioned of Sutlej Bridge in Punjab**” Author V.N Heggade, describes the design and construction of high level bridge across Sutlej river having approaches connecting Nakodar and Jagraon[2]. There are precast pretensioned concrete beams spaced at 2.15m centers. The superstructure of the bridge is 35.20m span. The width of the carriageway is 7.50m. For foundation, soil investigation was carried out to find characteristics along

bridge alignment, most of well foundation were constructed. RCC piers of wall type with concrete grade of 35 N/mm² were planned. The superstructure of 35.40m long precast pretensioned beam were there which were held by 200mm thick RCC deck slab. The beam is designed using pressure line concept of prestress. The loading test of superstructure was also done according to the IRC.

The author Anupam Das in his report “**Construction of foundation and Sub-Structure of Bogibeel Rail-cum Road Bridge over River Brahmaputra**” gives a brief description about the construction of foundation and superstructure for BogiBeel Bridge[3]. BogiBeel Bridge is the fifth bridge across river Brahmaputra, approximately 17km downstream of Dibrugarh town. It is being constructed for double line BG track and three lane road. The bridge is constructed of well foundation of type Double D. In his report he had also mentioned the Erection process of BogiBeel Bridge in brief and also mentioned the challenges faced during the construction process across Brahmaputra river. In short the completion of BogiBeel Bridge has ushered an era of prosperity and development for Assam and Arunachal Pradesh.

The report “**Assessment Report of Scherzer rolling Lift Bridge, Pamban**” gives records to the assessment of the bridge based on existing condition which requires maintenance, due to corrosive environmental conditions the section of bridge losses are wide spread[4]. The bridge is balanced cantilever truss bridge. It is balanced by the steel girders with concrete pier foundation into sea bed the survey done for the loss of cross section. All structures of the bridge were examined. Material samples collected got tested and also drone survey was conducted to examine the inaccessible areas of bridge. NDT method was carried out, by this method only the thickness of accessible members were recorded. Main aim was to minimize the corrosion of both strengthened and existing members. From the assessment it is clear that the bridge can't support the design train loads under the current condition.

The author Yan Bin and Miao Su in their research paper “**Case Study of Twin Cable-Stayed Bridges for High-Speed Railway in china: Design, Analysis and Construction**” described the detail construction process of the bridge[5]. The construction of Twin Cable-Stayed railway bridges was undertaken near Changsha station of Shanghai-Kunming High Speed Railway in china. The swing method was chosen so that the construction process does not interrupt the operation of the existing line. The twin Cable-Stayed Bridges are designed with two asymmetric spans (112 and 80m) suspended from a single pylon. The total length of the main bridge is 224m. The Pylon is designed in inverted Y-shape both in longitudinal and transverse directions in order to improve the structural stiffness of the bridge without increasing the self-weight of the pylon. Hence this study highlights the design and construction of twin bridges on the Shanghai-Kunming HSR line.

P. Pulkkinen and A. Jutila in their research paper “**Conceptual Design of Chenab Bridge in India**” describes mainly the conceptual design, but partly also the structural design of this Bridge[6]. The Chenab Bridge was the construction of new railway line in the state of Jammu-Kashmir, from Udhampur to Baramulla. The alignment crosses a deep gorge of Chenab river, which necessitate construction of Long-Span Bridge. In the design the National Codes of India, Indian Railway Standard (IRS), Indian Railway Congress (IRC) recommendations along with International standards like British Standards (BS), standards of the International Union of Railways (UIC) and some national codes. The paper explains how the Bridge was designed to achieve a consistent level of reliability for all load cases, and that the design standards match the construction standards.

III.CONSTRUCTION AND DESIGN METHODS FOLLOWED IN RAILWAY BRIDGES

Deepak Prasad and Jyoti Yadav (2022) in their research paper “**Analysis of Design on Long Span Metro Rail Bridge Structure Under Construction Project (Delhi-Meerut RRTS)**” provides a study

on comparison between two kind of bridges: Prestressed Concrete Bridges and Plate Girder Bridges using MIDAS software [1]. The Delhi-Meerut Regional Rapid Transit System is a semi-high-speed rail route linking Delhi, Ghaziabad and Meerut that runs for 82.15 KM. They had carried out Linear Analysis with direct Integration Analysis method using MIDAS civil which concludes that even though pre-stressed bridges offer greater advantages over plate girder bridges under the same arbitrary conditions, it has been determined that in situations of lighter traffic, mild environmental conditions and relatively insignificant transportation, plate girder bridges must be used due to fewer design stipulations.

The author Vivek Abhyankar (2009) in his report based on “**Construction of Longest Railway Bridge at Cochin**” explained how the construction work was carried out for substructure and superstructure[2]. Cochin being the important city in the state of Kerala where the 4.62 Km of long railway bridge has constructed connecting Vallarpadam island across Vembanad Lake. The paper provides the information about the technique used for launching girders, construction sequence followed, type of concrete mix and shuttering used, shape of PSC girder etc.

The author Dande Gangasekhar and Sri B Ramakrishna (2018) in their paper proposed a “**Design of Rail Over Bridge using STAAD PRO**” [3] with a main purpose to reduce the travelling time of road traffic and as well as trains which ultimately increase the speed of traffic and avoiding the stopping of road traffic during passing of trains. The paper provides information about selection of Proper superstructure depending on span length, also they have evaluated the reinforcement for components of rail over bridge such as Deck Slab, Girders, Hammer Headed Bed Block, Pier and Footing, hence they concluded that by using Staad pro software the design and the analysis values are nearly the same.

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Prefabricated Wall Panels Using Red Soil for Low-cost Housing – A Review

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ABSTRACT

Natural resources are being heavily exploited to generate traditional building materials like bricks, cement, and reinforcing bars as a result of the growing population. This causes an exponential rise in their pricing while also harming the environment by producing a lot of greenhouse gases. Therefore, creating affordable and long-lasting infrastructure is necessary. In this work, a prefabricated fibre-reinforced wall panel made of red soil that is advantageous for affordable housing is presented as an alternative sustainable infrastructure component. Strength study, cost estimation, and environmental effect analysis were all done for these panels in order to assess their potential in the building business. In comparison to brick partition walls, it was found that these walls are stronger, lighter, and more affordable.

Keywords: Prefabricated, Wall panel, Low-cost housing, Red soil, Fibre reinforced

I. INTRODUCTION

Even if industrialization began a century ago, humanity still isn't able to offer shelter to everyone. Millions of people globally, particularly in emerging nations, lack housing, and the situation is at an alarming level. According to the Ministry of Housing and Urban Poverty Alleviation's assessment, the country of India itself has an estimated 18.78 million housing deficit at the start of the 12th Five Year Plan (2012–17). Natural resources are already being heavily exploited because to the ever-increasing population, which has significantly raised the cost of conventional building materials. Millions of people worldwide lack adequate housing and live below the poverty line. This puts a lot of pressure on the government to offer this population a low-cost alternative solution.

A single piece of building material, usually flat and rectangular in shape, is called a wall-panel board. It is frequently constructed elsewhere and then transported to the installation site as a finished piece. This building material is typically constructed of concrete, wood, brick, and other materials. The area between two neighbouring supports or joints, which offer stability and containment, is filled with the hardened flat materials. Concrete wall panels made of cement, sand, and gravel are among the easily accessible building supplies. To give specialised qualities like decoration, lightness, thermal insulation, and soundproofing, other building elements are added to the concrete mix. In addition, the manufacture of traditional building materials like steel, cement, and bricks requires a significant amount of energy and results in the emission of greenhouse gases that harm the environment. Globally, the average temperature has risen to worrisome levels, melting glaciers and raising sea levels as a result. As a result, many coastal areas are on the edge of submerging. Due to global warming, some nations, like the Maldives, have already lost a large portion of their land. It was determined at the UN conference on climate change to restrict temperature increases to 1.5 °C over preindustrial levels, which calls for significant reductions in atmospheric carbon dioxide emissions. Therefore, there is a tremendous need to search for alternative building materials that are affordable, sustainable, environmentally friendly, and have good structural qualities. Compounding extruders and other traditional polymer processing machinery cannot be used to create continuous fibre-reinforced composites. Any type of screw-based processing apparatus in the traditional sense cannot be used because of the long fibres and high fibre loading (often between 60 and 65 percent by volume). Instead, continuous carbon fibre-reinforced materials must be made using a procedure that combines carbon fibres and polymer with little to no shear, as doing otherwise would cause considerable fibre breakage. The polymer is essentially melted and pressed among the carbon fibres that are either woven in a fabric shape or are positioned axially in parallel in the case of continuous reinforcement.

The qualities in the hardened state are the main focus, while properties in the fresh form are also discussed because they are pertinent and affect the behaviour in the hardened state. It is elaborated how mix design, production technique, and the resultant structural behaviour interact. Among the

benefits offered by fibre reinforcement are increased concrete ductility and crack resistance. Other advantages mentioned in the literature include increased residual tensile strength and enhanced resistance to abrasion, fatigue, impact, and blast loading. Additionally, there are advantages such as improved ultimate shear and flexural strengths, enhanced toughness, and better stress redistribution in the concrete composites when comparing fibre reinforced concrete (FRC) to traditional mesh/rebar reinforced concrete.

There are very few reports on using red clay to create a non-load bearing structural board with the aforementioned composites of fibre. The usage of fibres in the red clay hasn't yet been reported elsewhere, as far as the authors are aware. In order to create a wall-panel board, a red clay paste that contains fibre was used in this investigation. The impact of various fibre content on paste was examined in terms of the wall-panel board's mechanical, thermal, and physical characteristics. The study specifically had four goals. First, it evaluated how the various alkali activator concentrations affected the red clay paste's mechanical and physical characteristics. The study's objective to describe the impact of different amounts of fibre added to the red clay paste on its physical (density) and mechanical qualities (flexural). I Third, it assessed the thermal conductivity of the geofibre using fibre content. In the end, the study created a red clay and fibre composite panel board prototype.

II. PREFABRICATION OF PANEL

Fabrication of a Wall-Panel Board Using Rice Husk and Red Clay-Based Geopolymer by Johari M. Raki, Kenson Lovel M. Villagracia, Ruben L. Menchavez, [1]. According to this study, a wall-panel board was created using a geopolymer based on red clay and rice husk. With a fixed ratio of $\text{Na}_2\text{SiO}_3/\text{NaOH}$ at 2.5, the geopolymer paste was examined at various molarities of alkali-activator solution. As the precursor for the aluminosilicate, calcined red clay was utilised in a mass ratio of 1:1 to the activator solution. The geopolymer paste was cooked in a standard oven for 12 hours at 80 °C, and it was then aged for seven days at room temperature. The greatest flexural strength of 5.48 MPa was discovered to be provided by geopolymer paste containing 12 molars of NaOH. Then, depending on the paste's mass, the rice husk was added to the geopolymer paste in varied percentages, ranging from 10 to 20% by weight.

Development of a prototype fiber Reinforced Polymer – Concrete Filled wall panel by John Andrew Wattick, An Chen, [2]. This study describes the creation of a novel, prototype Fiber-Reinforced Polymer-Concrete Filled (FRP-CF) sandwich panel that is designed to be utilised for building walls and has much higher strength in both in-plane and out-of-plane directions. Two parts make up the FRP-CF wall panels: prefabricated Concrete fills the voids between the core and facesheets of a FRP sandwich shell that has two facesheets and a core. The FRP shell is made to be built quickly on site, with concrete added after it has been constructed and braced.

Thermodynamic and acoustic behaviors of prefabricated composite wall panel by Liu Peng, Luo Xiaoyong, Chen Ying, [3]. On the basis of heat transfer and acoustic principles, the thermodynamic and acoustic behaviours of prefabricated composite wall panels were explored. Additionally, by deducing the solving for the thermal conductivity of the prefabricated composite wall panel based on thermal conductivity equivalence method thermodynamic parameterization process. Experimental testing and numerical simulation were used to investigate changes in the sound reduction index and sound pressure level (SPL) of the prefabricated composite wall panel with sound frequency range.

Energy absorption behaviour of bamboo concrete composite wall panel by Ashish Kumar Dash, Supratic Gupta, [4]. When compared to traditional, non-green walling materials, the use of renewable, natural building materials like bamboo for walls offers many advantages. With its environmentally friendly construction, the woven bamboo striped cement mortar plastered walling system, also known as Bamcrete panel technology nature. This has long been the conventional method used in India's north-eastern regions while building "Assam style houses." But modern building does not use this wall technique.

Behaviour of Lightweight Concrete Wall Panel under Axial Loading: Experimental and Numerical Investigation toward Sustainability in Construction Industry by Muhammad Ekhlaur Rahman, Timothy Zhi Hong Ting, [5]. Waste materials like oil palm shell (OPS) are now used in the making of concrete as a result of increased awareness of sustainability in building. At the material level, there has been much research on the viability of OPS as an alternate aggregate in concrete. Nonlinear concrete

material is still available. The axial capacity of walls made of lightweight concrete is underestimated since attributes are not taken into account in the typical concrete wall design equations. This study examined the buckling behaviour of an OPS-based lightweight self-compacting concrete (LWSCC) wall in the context of sustainability and technological issues. Experimental evaluations were done on failure mode, load-deflection responses, and ultimate strength.

III. MATERIALS AND METHODS

Fabrication of a Wall-Panel Board Using Rice Husk and Red Clay-Based Geopolymer by Johari M. Raki, Kenson Lovel M. Villagracia, Ruben L. Menchavez, [1]. To assure the amorphous structure of red clay, the calcination process was carried out. The rice husk was sun-dried for a day at Tamparan, Lanao del Sur. In the experiment, unground rice husks with particle sizes of less than 2000 microns were used directly. The alkali-activator was a mixture of liquid sodium silicate and sodium hydroxide (solid). The former was purchased from Tri-Marketing GL's in Poblacion, Iligan City, while the latter from Joelmar's Trading in Rabago, Iligan City.

Development of a prototype fiber Reinforced Polymer – Concrete Filled wall panel by John Andrew Wattick, An Chen, [2]. Unsaturated polyesters are used to make polyester resins. They are clear liquids with a low viscosity that dissolve in a reactive monomer. This resin was chosen because of its great performance-to-cost ratio. Aside from the cost savings, polyester resins have strong UV resistance to structural degradation. This property is advantageous when exposed to harsh elements, such as a retaining wall or foundation wall. Mat made of chopped strands of e-glass Glass fibres are flexible, lightweight, and cheap, with normal glass qualities. Glass fibres have identical stiffness values but differ in strength and environmental deterioration. Electrical glass (E-glass) fibres combine mechanical strength, corrosion resistance, and low cost. Discontinuous fibres were employed due to their low manufacturing cost. Polymer concrete is a type of surface finish that is used to create an abrasive surface. Using different sized aggregates, different levels of surface roughness can be created. Flint rock chips are typically utilised and added after the fabric has been wetted out but before the resin has cured. After the part has set, polymer concrete can be applied by abrading the surface, applying a thin coating of resin, and then distributing the chips over the wet resin.

Performance Evaluation of Ferro Cement Sandwich Wall Panels with Different Infills by P. Balaji, Dr. S. Arul Selvan, 2018 [7]. Ferro cement is a type of thin-walled reinforced concrete that is typically made of hydraulic cement mortar reinforced with closely spaced layers of continuous and very tiny diameter wire mesh; the mesh can be metallic or other suitable materials. Ferro cement is defined as a cement-based mortar mix reinforced with steel wire mesh. A larger definition of Ferro cement, on the other hand, includes the use of skeleton steel in addition to the mesh system. Portland pozzolana cement, fine aggregate (m-sand), 10mm coarse aggregate, and water as needed make up the hydraulic cement mortar mix. The materials must meet criteria similar to those used in quality reinforced concrete construction. 8 mm HYSD steel bars are used in Ferro cement in the form of a grid of steel rods with 8 mm diameter strands. Skeletal reinforcement is required to form the shape of the building to be built; mesh layers are bonded around the structure. Steel wire chicken mesh is used as primary reinforcement. Square woven or welded meshes, chicken (hexagonal/aviary) wire mesh, expanded metal mesh, and so on are examples. In this investigation, galvanised chicken wire mesh with a hexagonal opening of 12mm and a wire thickness of 1.2 mm was used. The cement must meet a comparable quality; it must be fresh, consistent in consistency, and devoid of lumps and foreign substances. It should be stored in dry conditions for as little time as feasible. Grade 53 Portland pozzolana cement is utilised. Normal weight fine aggregate shall be utilised in Ferro cement (m-sand). It must meet an equal criteria. It must be clean, inert, free of organic matter and harmful compounds, and low in silt and clay. The aggregate used in Ferro cement must be retained in a sieve with a screen size of 10mm. It must meet an equal criteria. It must be clean, inert, and free of organic matter and harmful compounds. Infill materials in the wall panels include manufactured sand (M-sand) and red soil.

Development of new prefabricated wall constructed using wood-wool cement composite panel by Md. Noh, Ahmad, [8]. In this study, prefabricated wallets were made primarily from wood-wool cement composite panel (WWCP). It is manufactured from wood-wool that has been shredded from a piece of the Kelampayan, a locally quick-growing timber species. Local manufacturers make WWCP in conventional panel sizes of 600 mm wide by 2400 mm long with thicknesses ranging from 25 mm to 100 mm. In this study, two different panel thickness types—50 mm and 100 mm—are taken into

consideration. the WWCP's strength characteristics. The EMACO R1 premix mortar has been applied as a surface plaster and a bonding agent during the production of wall panels. Local producers also produce the EMACO RI mortar, which comes in a bag containing 25 kg of a dry mix of cement and fine sand. The hardened mortar mix's strength qualities. In modern building procedure, the walls were built by vertically stacking the panels in running bond and holding the panels in place using steel bars inserted between panels and U-nails fastened at the connection points.

Utilization of polystyrene waste for wall panel to produce green construction materials by Suprpto Siswosukarto, Ashar Sapurta, [9]. The research process was divided into three major stages: material evaluation, specimen fabrication, and specimen testing. The examination technique involved assessing the state of the cement and determining the unit weight of polystyrene. The second stage of research includes a trial mix to determine the appropriate proportion of PPC cement and polystyrene, formulating procedures for mixing and preparing specimens to investigate the mechanical properties of polystyrene concrete used for research, and preparing specimens to investigate the mechanical properties of polystyrene concrete used for research. The final stage involved testing to look into the mechanical qualities as well as the strength of lightweight polystyrene wall panels. Portland Composite Cement (PPC) with proportions of 250kg / (m³) and 300kg / (m³) and water cement ratio 0.3 were employed in this study. The water cement ratio is calculated using prior research findings. The use of a greater water cement proportion in the pre-compaction process will result in more bleeding during the pre-compaction. The polystyrene utilised in the study is a rigid and stiff form of polystyrene trash from the packing of electronic items. The polystyrene was shredded into tiny shredded shapes with an average length of less than 1 cm using a shredding machine. The shredded polystyrene is almost weightless, allowing it to be easily blown by air and kept dry until the previous mixing procedure. The casting specimen mould is made of steel plate with a thickness of 6mm and measures 80 cm long, 30 cm wide, and 30 cm high. The resultant specimen of polystyrene concrete panel is 80 cm x 30 cm x 1 cm after pre-compaction at 2 MPa. When the specimen is ready for testing, it is kept in a humid area for at least 28 days to cure.

IV. TESTING OF PANELS AND THEIR RESULTS

Fabrication of a Wall-Panel Board Using Rice Husk and Red Clay-Based Geopolymer by Johari M. Raki, Kenson Lovel M. Villagracia, Ruben L. Menchavez, [1]. The flexural strength and bulk density of the solidified composites decreased as the number of rice husks increased. The measured flexural strengths ranged from 4.21 to 3.13 MPa, while the bulk densities ranged from 1.84 to 1.51g / cm³. The addition of rice husks at 15% wt. in the geopolymer composite resulted in a reduced thermal conductivity of 0.297W / m - K. The addition of rice husks above this level had a negligible effect on the thermal conductivity of the geopolymer composite. Finally, in the construction business, the manufactured wall-panel board made from rice husk and red clay-based geopolymer is a potential lightweight and insulating material.

Thermodynamic and acoustic behaviors of prefabricated composite wall panel by Liu Peng, Luo Xiaoyong, Chen Ying, [3]. To begin, the thermodynamic parameters of the materials were investigated in order to further understand the thermodynamic performance of the prefabricated composite wall panel. The thermal conductivity of EPS is around 0.0368 W/mK, indicating that it provides adequate thermal insulation. Concrete's thermal conductivity is around 1.5275 W/mK and is proportional to its moisture content. Water fills the holes in concrete with a high moisture content, whereas air fills the pores in dry concrete. Because air has a far lower heat transfer coefficient than water, concrete with a higher moisture content has a higher thermal conductivity. The link between moisture content and thermal conductivity of concrete was explored in order to better characterise the changes in thermal conductivity of concrete with moisture content. As can be observed, the thermal conductivity of concrete is highly dependent on moisture content. Particularly, as the moisture level of concrete increases, the thermal conductivity increases rapidly and forms a transition point at 50% moisture content. The reason for this is that there are numerous micro pores filled with water in low moisture content concrete, but huge pores or micro cracks will be filled with water vapour as moisture content increases. An index function can express the relationship between thermal conductivity and concrete moisture content:

$$\lambda = a \cdot \exp(p/t) + b$$

where a, b and p are the fitted parameters, respectively.

Energy absorption behaviour of bamboo concrete composite wall panel by Ashish Kumar Dash, Supratic Gupta, [4]. Bamcrete panel mechanical characteristics under drop ball impact force. The fracture pattern revealed that the majority of the cracks in the panel were constrained closer to the hitting areas. Little concentric cracks developed on the top surface of the panels, while extensive spalling of mortar plaster was detected on the back face. The monotonic test results are shown alongside the specimens' absorbed impact energy. The overall energy dissipation at various displacement levels is represented by the area under the load-deflection curve. The failure mode of static loading panels indicated progressive cracks with increasing deflection level. The behaviour of the Bamcrete panel is unaffected by the variety in bamboo species. As compared to other panels, the panel with three vertical strips had the maximum load-carrying capability and energy dissipation. The strength level of non-skinned bamboo 2VNS24 N and 2VS24TRN panels was much lower. Despite the huge displacement, the area under the energy dissipation was naturally lesser.

Behaviour of Lightweight Concrete Wall Panel under Axial Loading: Experimental and Numerical Investigation toward Sustainability in Construction Industry by Muhammad Ekhlasur Rahman, Timothy Zhi Hong Ting, [5]. T60 series wall specimen failure characteristics. On both sides of the wall panel towards the middle, a big horizontal break was discovered. T60-AR5.3SR23 specimen primarily failed by buckling in a single curvature shape with highest deflection in the middle. The specimen had a slenderness ratio of 23 and was regarded to have a slender wall since it bended at mid-height. This is consistent with the findings of Fragomeni and Mendis, who discovered that concrete walls with a slenderness ratio of 20 or greater could typically fail by buckling with horizontal fissures at mid height. The structural deformation response of a concrete wall under loading is given by the axial load versus lateral deflection. The load versus lateral deflection profile of the wall at top-quarter, mid-quarter, and bottom-quarter height for specimen T60- AR5.3SR23, whereas the load vs lateral deflection curve at mid height for T25 series specimens. These graphs illustrate that the concrete wall specimens display ductile behaviour, with c_{12} increasing with increasing load. The curves exhibit linear behaviour in the first loading zone before transitioning to a nonlinear curve up to the ultimate failure load. The greatest deflections related to the ultimate failure load are recorded. For comparison, the deflections are given as a deflection ratio. Due to similar geometry ratios, specimens T60-AR5.3SR23 and T25-AR5.3SR23 have similar deflection ratios. When the slenderness ratio is increased from 17 to 23, the deflection ratio for T25-AR1.8SR17 and T25-AR1.8SR23 increases from 0.0045 to 0.0053, respectively. This is because a larger length provides more flexibility.

Mechanical Performance of Prefabricated External Wall Panel Horizontal Displacement by Ying Xu, Shuai-Ying Wang, Lei Chai, [6]. When test findings were compared to FEM simulation results, it was discovered that test results were substantially comparable with condition three finite element analysis results. Unfortunately, there was a significant divergence between the finite element analysis results and the test result trend after the peak load. Meanwhile, the peak loads of the finite element analysis results were frequently higher than the test results. The causes include that the loading mechanism was not stable enough in the testing, allowing breaking of the joint contact to occur easily. Brittle cracking is more common following interface failure, resulting in a rapid loss of lateral stiffness of overall wall panels after interface cracking. The lateral stiffness of wall panels is gradually lowered with the gradual extension of joint interface failure in finite element analysis models, and their interface stress development process is somewhat idealised. At the same time, the irregularity of the materials will cause certain variances.

V. CONCLUSION

Finite element analysis models of scaled prefabricated wall panel testing were constructed based on study results on the performance of bond interfaces. The test findings were largely compatible with the finite element analysis results for condition three. Unfortunately, there were significant disparities between the finite element analysis results and the test results following the peak load. At the same time, the finite element analysis results' peak loads were often higher than the test results. The overall lateral stiffness of wall panels will approach complete joint consolidation conditions before the peak load as the tangential contact stiffness of joint surfaces gradually increases. Yet, when the tangential contact stiffness of joint surfaces grows to a certain extent, the initial lateral stiffness changes little.

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Review of Existing Pothole Repair System for Flexible Pavement

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Abstract : Pothole can be defined as pit or hole produced by wear or weathering in a road surface or Pavement. Development of potholes on roads and streets of India has become common phenomenon nowadays. Quite often, Potholes are repaired with antiquated techniques such as placing soil or aggregate, Concrete, Hot mixed Asphalt, Cold mixed Asphalt, Concrete Paver Blocks etc. The traditional methods are not reliable these days because some of them require large amount of time. The quality of repairing is also not up to the mark and are neither cost effective nor Eco-Friendly. In this research, Survey has been conducted by us to identify causes of Pothole, traditional repair methods, design of Paver blocks and their cost. In the instance of literature review it was found out that Patching potholes technique using Paver blocks replacing the key constituent, entire percentage of Aggregate with Demolition waste in addition of 25% of Fly ash with 75% of Cement. Various tests on the materials and composite are conducted. Comparison was done on the basis of Engineering Properties, Performance, Cost and Sustainability of the Paver blocks made from Demolition debris to Standard used Paver Blocks. Based on a survey of the literature, paver blocks perform best when they are replaced with Construction Waste and Fly ash since they are more optimum.

Keywords— *Pothole Repair, Pavement, Paver Blocks, Demolition Waste, Flyash*

I. Introduction

The level of traffic on the roads is high today, and traffic intensity has been increasing quickly. To ensure acceptable riding quality and to accommodate future traffic, the road network needs to be enhanced. However, there are several elements that lead to road failure and inconvenience for users. Potholes are one significant element that seriously damages the road pavement. It is a pit or hole created by weathering or wear in a road surface. Tyre and suspension damage to vehicles is possible if they become big enough. Roads with loose gravel and potholes present a risk for accidents when a moving vehicle drives over them. Potholes can be a serious threat to road safety standards and, due to the force of contact, result in significant vehicle damage and repair costs. According to the most recent data provided by the government in Parliament, more than 2,000 individuals in India lost their lives on average in road accidents caused by potholes in 2018–19, and more than 4,000 others were hurt in more than 4,800 such accidents. Therefore, it is crucial to focus on developing a variety of practical methods for treating potholes and lengthening the lifespan of roads.

Paving block pavers, when made and installed properly, are versatile, aesthetically pleasing, practical, affordable, and require little to no care. Most concrete block pavers built in India have performed satisfactorily, but there are two main issues that need to be addressed: inadvertent failure caused by severe surface abrasion, and discrepancy in block strength. The world's natural resources are running out at the same time as waste produced by industry and habitation is exponentially growing. Utilizing novel and unconventional materials, recycling trash to make up for the depletion of natural resources, and looking for alternate methods to protect the environment are all part of the sustainable development of the construction industry.

II. LITERATURE STUDY

Jeonghyun Kim and Namho Kim (2022) found out that with increased replacement ratios, partial replacement of natural sand with RB and RC decreased the properties of concrete mixtures (unit weight, compressive strength, flexural strength, and water absorption);

- At a replacement ratio cap of 30%, the addition of RG improved the properties of the concrete mixtures with the exception of water absorption.
- UPV may be used to predict the compressive strength of concrete mixtures containing RB, RC, and RG, with a coefficient of determination of 0.87; in an unusual finding, the water absorption increased with an increase in the replacement ratio of RG.

All concrete mixtures consisting of RB, RC, and RG with replacement ratios of up to 30% complied with Korean Industrial Standards under various usage scenarios.

Rohit Gondhali and Mayur Dhirde (2020) in their paper attempts to evaluate focused on four advance techniques (Bituminous Rubber, Bituminous Plastic, Concreting, and cold mix asphalt) to resolve the problem of pothole. The fly ash and fine and coarse aggregates (10–15 mm) used in asphalt concrete were purchased from a local Navi Mumbai market. Plastic waste was gathered from roadways, garbage trucks, dumps, or composting facilities; it was also collected through school collecting programmes.. Rubber scraps were gathered from nearby tyre shredders. They concluded bitumen costs significantly more than plastics, and that using it in asphalt concrete also conserves natural resources.

When it comes to the four materials, bituminous rubber is thought to be superior. Though more expensive when utilised in building, concrete is thought to be more durable than plastic and rubber.

Although it was less cost-effective than rubber and plastic, Cold Mix had the strongest stability when exposed to water.

Jerome G. Egbe1

Godwin A. Akeke (2016) in their paper Evaluation and analysis of material for repair of potholes- A case study makes an attempt to distinguish between the major functions of road maintenance, such as maintaining the quality of our roads and their capacity to carry the intended traffic. Additionally, this study covers pothole repair methods that are pertinent to the Calabar metropolitan and offers a guide to determining the sources of the problem type and root cause.

Zafar and Jagdeep Singh (2021) in their study, poly ethylene polymers (PE) were added to bitumen in concentrations of 4%, 6%, 8%, and 10%. It was discovered that the mixture works best at 8%. As a conclusion, debris from the demolition of aggregate was used to completely replace the original aggregate. Demolished aggregate underwent some basic tests, and it was discovered that it may be used in bitumen mixes for district highways and village roads.

S Nienaber and MJ Booyesen (2015) in their research suggested, in order to locate potholes using a window-mounted camera, a computer vision approach based on a vehicle. The literature currently available on pothole detection makes use of either theoretically derived models of potholes or video captured from opportune angles and at a slow speed, rather than footage shot inside a moving vehicle.

III. Materials AND METHODOLOGY

Ordinary Portland Cement (OPC) of grade 53 conforming to IS: 10262-2009 was used for the studies. Alkali activators serve as a binding agent in addition to replacing the cement-based geopolymer mix with fly ash. Fine aggregate with a maximum size of 20mm and a specific gravity of 2.59 was used, which was locally available. Demolition waste is trash left over after a building has been destroyed. Bricks, wood, metal, and other salvageable materials are recycled in India, but concrete and masonry waste, which makes up more than 50% of all waste, is not. The regulatory authorities lack a defined manual for the efficient management of construction and demolition (C & D) waste. Aggregates (6mm to 20mm), crushed stone dust, ordinary Portland cement, water, admixtures, colours, and the coating required to make the surface glossy are the materials used in the construction of paver blocks. Purely drinking water below the level acidity is used in this concrete mix.

Rubber moulds will be used to cast paver blocks of appropriate dimensions, thickness, shape, and mix design. A table vibrator will be used to ensure proper mixing and compacting. The bottom layer of a concrete paver block contains cement, coarse and fine aggregate, and the top layer contains a mixture

of cement, crushed sand, and coloured pigment. Crushed concrete waste completely replaced coarse aggregate. According to IS, compression test blocks will be casted and tested after 14 days and 28 days on a set of three blocks (15658:2006). Similarly, three blocks will be cast and tested for water absorption. Similarly, each of three blocks will be casted and tested for tensile splitting, flexural strength, and abrasion resistance.

IV. Conclusion

- Mix design for paver block has been done according to IS code and standard value provided by BIS for mix design.
- Even after entirely replacing the aggregates, compressive strength is anticipated from the compression test as the chosen grade of mix design.
- As advised by IS, water absorption should be less than 7%.
- The replacement of coarse and fine aggregates should yield results in accordance with the IS specifications for the abrasion resistance test, flexural strength test, and tensile splitting test.
- Cost optimization is possible.

V. Acknowledgment

The timely completion and accuracy of the work has been possible due to the guidance of our mentor Prof. Vikrant Kothari who imparted his knowledge regarding the topic. We are also thankful to the Department HOD Dr. Ajay. S Radke for his continual motivation, and to our parents for providing us with all possible resources. We would also like to thank Mr. Sunil Bitro for giving his valuable time out of his busy schedule and allowing us to visit his Company for our research purpose. We also thank our college Vidyavardhini's College of Engineering and Technology for providing us with a platform and the necessary facilities.

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Study of Confined and Unconfined Structural Member as Column¹Shubham Sankhe*, ¹Shawn Mathias, ¹Nikita Shivdas, ¹Durga Shelake ¹Ajay Radke,¹Vidyavardhini's College of Engineering and Technology, Vasai, India.

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ABSTRACT:

Traditional steel ties reinforcement cannot provide superior confinement for reinforced concrete (RC) columns due to the constraints on tie spacing and disturbance of concrete continuity. Columns in any Framed Structure are most important as they carry heavy loads of Slabs, Beams and various lateral loads, and channelize these loads evenly to the Foundation. Additionally, because concrete is weak under tension, the column needs extra reinforcement to retain enough ductility, which may be done by adding Confinement Reinforcement. The specimens will be cast in vertical position simulating the construction field and they were tested under concentric compression till failure. We will be casting 3 unconfined column and six confined column in which three will be of welded wire mesh with spacing of 1inch and remaining three will be of 0.5 inch. We will also cast total 9 column of size (7500 x 250 x 250mm). The results will indicate that the columns, confined with proposed lateral reinforcement, revealed significant improvement in the strength and ductility and test under universal testing machine. The results might indicate that the columns, confined with proposed lateral reinforcement, revealed significant improvement in the strength and ductility.

INTRODUCTION

Reinforced concrete is the commonly used material for the construction of structures which are designed in accordance to the specifications given in the standard codes to meet the service life. Based upon these specifications, the loads are taken into account for the design of the various elements of the structure like beams, columns and slabs. During the service life if the loading conditions change due to purpose of use of the structure, this can result in non-performance of the structural elements for which it was designed earlier. The structures are also susceptible to deterioration due to earthquake, flood, cyclone, carbonation, chloride attack, environmental pollution, deficiencies of the material used, inadequate design and faulty construction. The environmental stresses/factors like high humidity, air and water pollutants also cause corrosion and develop cracks leading to the failure of structural elements.

A concrete structure is designed taking various forces into consideration that are intended to resist safely throughout its life span and also taking economy into account.

- Modes of failure

column may damage because of earthquake, disasters, excess loading and fire also, reason for it have limited strength & ductility of the concrete sometimes failure of column can results in collapse of this structure.

Failure in column is

- Compressive Failure.
- Buckling Failure.
- Shear Failure.

Compression failure is the crushing or yielding of material itself and not the whole column. Shorter and wider column normally fails under compression failure when the axially loaded stress exceeds allowable stress. Compression failure occurs when then concrete starts to fail or bulge.

To prevent brittle shear failure, there are many available methods that could be used to strengthen short columns such as using reinforced concrete jacketing, steel jacketing or using carbon fibre reinforced polymer (CFRP)

8 Types of Column Failure Methods

- Pure Compression Failure.
- Combine stress failure.
- Buckling Failure.
- Shear Failure.
- Failure by confined reinforcement

- Torsional Failures.
- Failures due to construction defects.
- Failures due to errors in the Construction
- Confinement of columns

A concrete which has closely spaced special transverse reinforcement Which restrains the concrete directions perpendicular to the applied stress.

Column confinement is the most common and effective method used to enhance the capacity and ductility of vertical RC or masonry members. Due to construction errors or antiquated design codes in seismic regions, many column elements are in need of retrofit to satisfy the latest design codes. Confinement provided can be of two types it can external and internal.

Methods for confinement of Concrete

- FRP (Fiber Reinforced Polymer)
- Welded Wire Mesh.
- Steel Jacketing

2. LITERATURE REVIEW

General

Several analyses are conducted to determine whether the confinement reinforcement that is built into the columns is effective enough to be used in the real world of construction. Such studies are primarily concerned with preserving the column's ductility, which can be done by minimising concrete cover spalling and maximising concrete's bonding to the structural element. FRP (Fibre Reinforced Polymer), ferro cement jacketing, adding extra lateral ties, and other measures are researched for this purpose. The concrete must only be bonded to the structural component in order for the energy generated by earthquake vibrations to be dissipated successfully. The following list of literatures was consulted to gain a quick overview of these provisions.

Literatures studied

1.Failure of short columns, Mahammad Qassem Esmael, UNIVERSITY of byblon:

When an axial load is applied to a reinforced concrete short column, the concrete can be considered to behave elastically up to a low stress of about $1/3 f_c$. If the load on the column is increased to reach its ultimate strength, the concrete will reach the maximum strength and the steel will reach its yield strength f_y . Two different types of failure occur in columns, depending on whether ties or spirals are used. 2.Improved Confinement of reinforced concrete columns, Ahmed M. El-Kholy, Hany A. Dahish, 9th January 2015, Ain Shams Engineering journal (2015):Due to the restriction on tie spacing and disruption of concrete continuity, the lateral reinforcement that is given in the columns to resist lateral deflection is occasionally insufficient to impart the necessary amount of ductility. Thus, the internal confinement of the concrete is suggested in this work. This is done by enclosing the nominal reinforcement with EMM (Expanded Metal Mesh).What do we know about confinement in Reinforced Concrete Columns? Koji Sakai & Shamim A. Sheikh, ACI Structural Journal, Technical Paper, March-April 1989:This technical paper attempts to identify various constrained concrete qualities and, as a result, the future direction of work, including the revision of codal provisions in accordance. The influence of various factors on the confinement mechanism, the behaviour of a section and that of the column, and the potential for plastic hinging in columns are only a few of the topics covered in this work. Also, the paper offers various changes to the ACI code. 3.Performance of high-strength concrete Columns confined by medium strength of spirals And hoops :Evaluation of tightly enclosed, axially compressed tests on high-strength concrete columns. The primary goal of the research is to understand how spirals and hoops with medium strength (400 mpa to 600 mpa) affect the behaviour of constrained high-strength concrete columns. Concrete strengths and steel-specific limitations served as the study's parameters.

3. METHODOLOGY

3.1 Problem statement

If you look at the performance of the column when responding to earthquakes and significant axial loads, it is clear from the literature studies that restricting the column produces positive outcomes. As it aids in maintaining the column's appropriate level of ductility after the elastic limit. Although earlier literature has explored a variety of confinement reinforcement kinds and shapes, it is important to take

into account their affordability and convenience of construction when evaluating their practical application. A relatively inexpensive material is therefore required. With all these factors, using welded wire mesh turns out to be a better choice. The purpose of this research is to compare how well a rectangular column performs with and without welded wire mesh (1-inch spaced grid). This paper aims to assess the confinement reinforcement's performance in terms of load carrying capacity, lateral deflection, and vertical deflection in the rectangular column. Induced stresses and strains in the columns are also crucial for this purpose. The Methodology is chosen as a result. The following are the column configurations used to study performance.

TRC stands for Traditional Reinforced Column

The letter "1" in CRC1 stands for welded wire mesh with a half-inch spacing.

CRC2 stands for Confinement Reinforcement Column; the number 2 denotes welded wire mesh with an inch-spacing.

Table1: Specimens Details

	Specifications	Specimens		
		TRC1, TRC2, TNRC3	CRC1a, CRC1b, CRC1c	CRC2a, CRC2c, CRC2b,
Column	Height	750 mm	750mm	750mm
	Breadth	250mm	250mm	250mm
	Depth	250mm	250mm	250mm
	Material	M25	M25	M25
A Main reinforcement	Diameter	8mm	8mm	8mm
	Number of bars	4 nos.	4 nos.	4 nos.
	Materials	Fe415	Fe415	Fe415
Lateral Reinforcement	Diameter	8mm	8mm	8mm
	Spacing	150mm	150mm	150mm
	Material	Fe415	Fe415	Fe415
Confinement Reinforcement	Welded wire mesh spacing	nil	nil	nil
	Material	nil	G.I.	G.I.

3.2 Materials

Cement, sand, and aggregate needed for casting the columns were proportioned using concrete mix design in accordance with IS 10262:2009. Three 150mm x 150mm x 150mm cube specimens were cast in accordance with the specification that the proportion of concrete for M25 grade be 1:1:2. Moreover, galvanised iron serves as the material for the welded wire mesh and the steel reinforced employed in the Fe415 bars.

3.3 Reinforcement Arrangement



Fig.1: Reinforcement On TRC



Fig.2: Reinforcement On CRC1



Fig.3 Reinforcement On CRC2 (Welded Iron Mesh)

4. CONCLUSION

1. After comparisons of experimental and software results following conclusions are derived.
2. Comparing the experimental results, it can be concluded that use of Welded wire mesh increases the Load carrying Capacity of the Column and also reduces the vertical and lateral deflections.

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App-Based Construction Material Procurement System

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ABSTRACT

Construction industry is one of those industries of the world in which require fund in bulk. Investment of any project determine strategy of the work and more than 60% of the total cost is only used in the material and dependent upon the type of project. But, delay in the material supply can affect project time as well as project capital. Effective construction procurement management is the key to success of construction project. The procurement method on construction site plays vital role to minimize the losses

One of the features of the construction industry over the last three decades or so has been the use of various procurement methods for project such as management contracting, project management and design and build method. With growth in the use of these methods the number of research have investigate the criteria for selection and performers in the term of time, cost and quality. However there is lack of reporting in on association between procurement method and advanced related issues. The e-procurement system can solve these a lot of problems in construction. With the help of app-based material system we can analyze all materials and respective rate, vendors. App -base material procurement system gives a platform for all common construction firm.

Keywords - *e-procurement, construction industry, contracting, Material management, procurement system.*

1. INTRODUCTION

Procurement is the process of finding and agreeing to terms, and acquiring goods, services, or works from an external source, often via a tendering or competitive bidding process. The construction project may be regarded as successful if the building is completed as scheduled, within budget and quality standards as well as achieving a high level of client satisfaction. Increasingly, the fulfillment of these criteria has been associated with the problem of procurement method for construction. In short, the selection of the appropriate method can shape the success of the project. The construction industry different from material supplying, manufacturing industry. Material demand problem sometimes occurs due to external events, such as delays in permit, inspection, material quality, availability of material, labor, weather, etc., that can affect the project completion date. Different construction phase specified requirements and project delay in any event-based influence the planning phases. The construction major to the two common constrain limitations resource availability and work availability. Work availability process in construction project internal or external depended. The nature related of work dependence normally not control. If as the construction management not fulfill the resource management, the resource management enormous number of resource management and procurement studies. The use of the internet for the construction industry has been mainly used for communication rather than for many other things the platform has to offer. The purpose of this study is to examine the characteristics of a app-based integrated material Procurement system for construction project delivery.

There are three main procurement methods, which are as follows:

1. **General Contracting (Traditional Method)**
2. **Design and Build**
3. **Construction Management.**

By considering above challenges and facts above methods of procurements are very lengthy and required a lot of time, Which are the not suitable for every type of the procurement therefore to develop the app based material procurement system.

With the help of app based material procurement system we can compare various vendors/ suppliers and rates of different material for construction. By using app based material system we can analyses

various vendors/ suppliers of particular region. Therefore this tool will provide enhanced interaction between the builder and the vendors / Suppliers.

2. METHODOLOGY

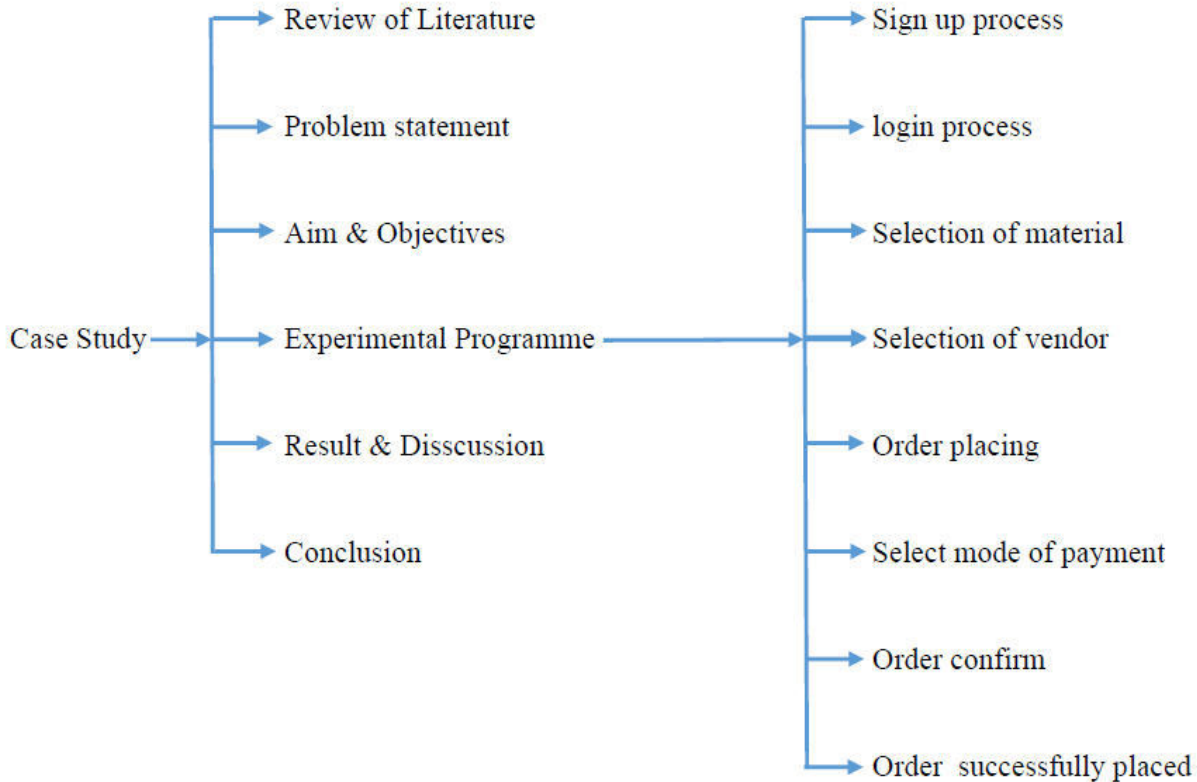


Fig. 1: Methodology

Step 1: Sign up process :

The web based material procurement system in which first have to registration either as seller or as buyer, in which some information can put up as input and sign up initially. If using this application as a buyer then fill up given inputs as given in fig. First of all can enter mobile number, password, confirm password then there are two option buyer and seller select buyer and then sign up .

Step 2: Log in process:

If it can be using this application as a seller then fill up given inputs as given in fig.

First of all enter mobile number, password, confirm password. then there are two options buyer and seller select seller and then sign up.

Step 3: Selection of material and vendor:

In this stage there are various construction materials with their brand names ,rate and unit. can be selected particular material and compare according to vendors, brand names, rates and feasibility.

Step 4: Order placing: After selection of material and comparing vendors Selection of mode of payment there are two options for a payment.

1. Pay online
2. Cash on delivery

Fill up details regarding payment and click on the PLACE ORDER

Step 5: Order Done

After placing order by selection of mode of payment then click on DONE which indicate order successful complete.

3. RESULTS AND DISCUSSION

For the purpose of the material procurement as a seller and as buyer results & discussion as given below.

1. Seller – If it can be using this application as seller then in first step sign up as seller and in second step the product details are filled as shown in the fig. like enter Material Name-Steel, vendor name-S.S. Enterprise, address –sanpada, Mobile no., brand name-tata, rate 65, unit-kg. Put up all the information as shown. Click on the ADD PRODUCT.

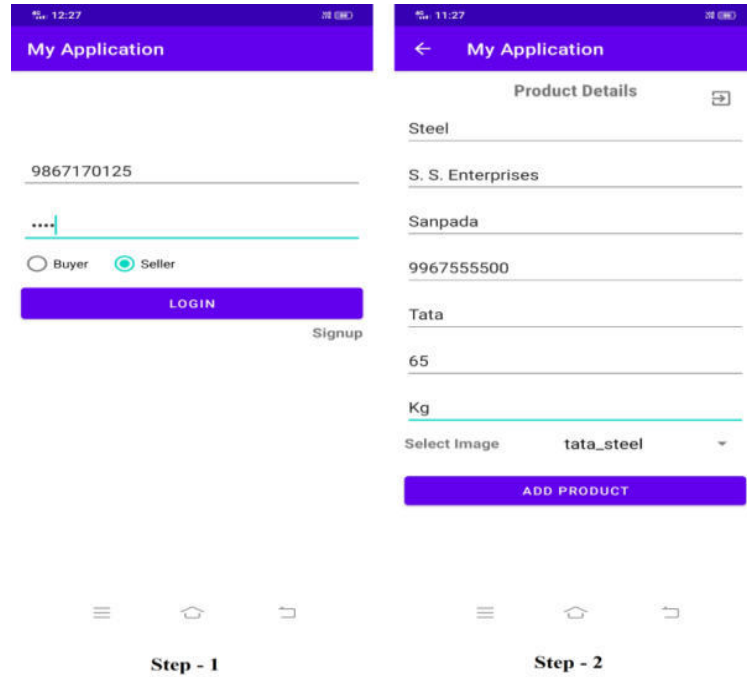


Fig.2: Steps for Signup

2. Buyer –Step-1 & Step-2
 As buyer using this application, there are six steps in that first step enter mobile no and login first as buyer.
 In second step there is option of all material we selected Brick 4” there are various brick vendors as shown in fig. So according to rate, brand & feasibility selected Aradhya Enterprises

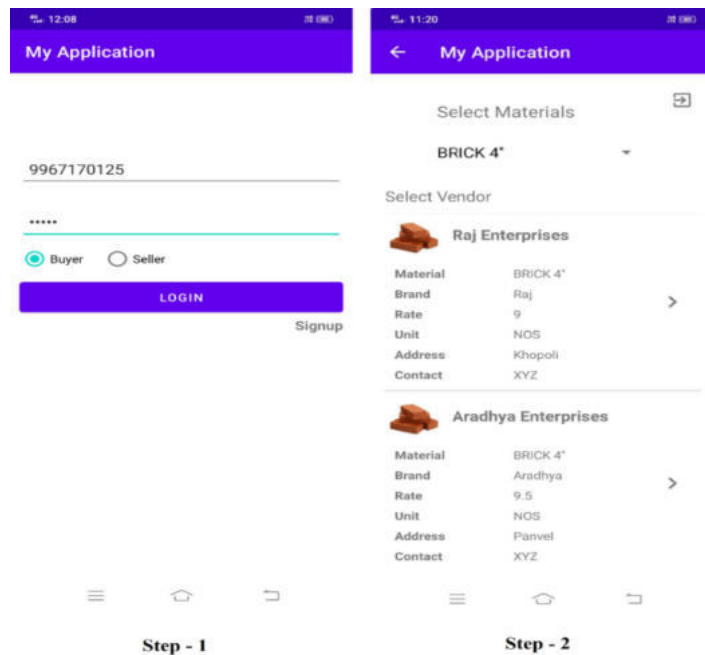
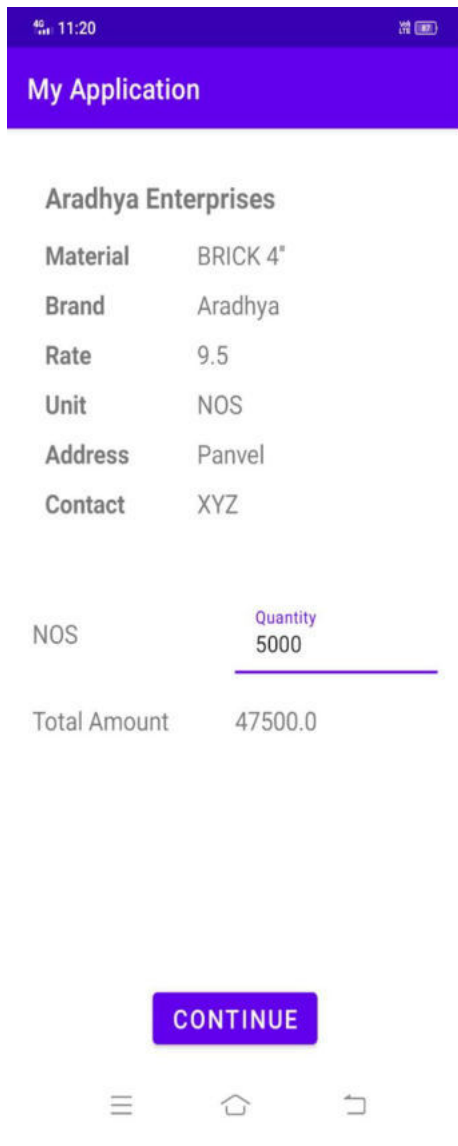


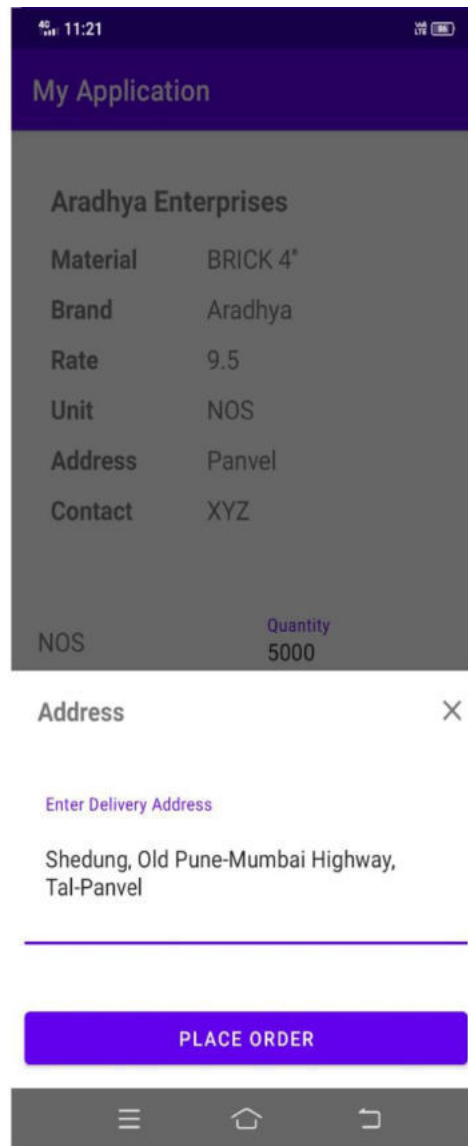
Fig.3.Steps for Selection of Materials

Step-3 & Step-4-Details of Aradhya Enterprises as shown in fig ,placed quantity of

5000 bricks , got amount 47500/-
 Clicked on CONTINUPUS and placed address-Shedung old Pune-Mumbai highway ,Tal- Panvel. And clicked on PLACED ORDER



Step - 3



Step - 4

Fig.4.Placing of Required Materials

Step-5 & Step-6 – In step- 5 there are two payment option we selected Pay Online . Filled up all of debit card/credit card and clicked on PLACED ORDER
 In step -6- clicked on DONE and order successfully done. As shown in fig.

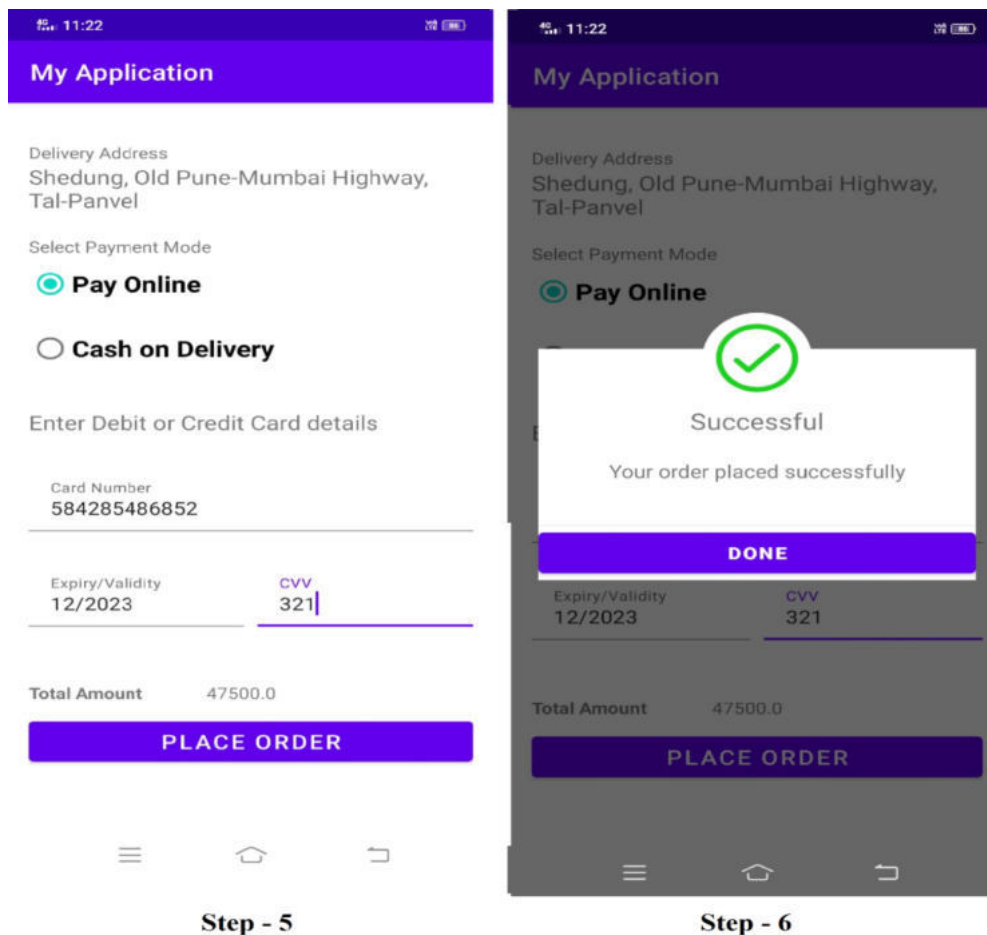


Fig.5.Steps for Payment

3. DISCUSSION:

There are various methods for procurement of material in the construction industry. But, every time all methods are not suitable for each and every construction company. There are various methods, software's used for material procurement but these are not always affordable for all construction firms. So, web-based material procurement systems are affordable for all small and large construction firms. With the help of this web-based system, a lot of options for selection are available. Any construction firm or any contractor can compare material, vendor, and rate of respective material. It is the fastest and time-consuming procurement system. The most important thing is that it can achieve all vendors in a particular region which is nearby us and can order immediately. As a buyer and as a seller can use this system. The web-based procurement system gives a platform for all buyers and sellers in a particular region and brings them to the same platform.

4. CONCLUSION : In the construction field, there are various methods for procurement of material, but every time each method is not suitable for every contractor or vendor/supplier, but a web-based material procurement system gives an efficient and convenient platform.

- This Android-based application for a web-based material procurement system is successfully developed, which is efficient and economic for buyers and sellers.
- It provided a platform for comparing various materials, brands, and their rates of various suppliers and buyers according to their convenience.
- This developed web-based material procurement system increased various business opportunities for small construction firms, vendors/suppliers.

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Experimental Study on Ground Strengthened by using Geo-Synthetics Materials

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ABSTRACT

For pavement like highway construction, fine-granular soils are not suitable due to their weak properties, such as poor grading, low bearing capacity and more plasticity, ability to swelling and shrinkage. To improve these soil properties various soil stabilization techniques are needed. Using Geo-synthetics are one of the materials used in soil stabilization. This experimental study has been carried over to improve the strength of soft soil (from Nanded-NH361) by using artificial geo-synthetics material like Geo-Textile, Geo-composite, and Geo-grid. In this experimental study, index properties and engineering properties of soft soil and stabilized soil sample with geo-Synthetics materials were determined. Samples are subjected to various Laboratory tests which have been used to determine the engineering properties of soil. The laboratory tests, such as the standard proctor compaction test (SPT), California bearing ratio (CBR) test had been done to determine the properties of the samples. Geotextile and geo-grid materials have been shown to improve the strength and bearing capacity of soils, as well as reduce the formation of ruts in unpaved roads. Tests have found the higher CBR values and improved stress distribution. Ground improvement with geotextiles depends on the soil type, with clayey soils responding more positively to geotextile reinforcement than sandy soils. The results of the study demonstrate that the geotextile-reinforced soil samples exhibit significant improvement in their strength and stability properties when compared to the unreinforced samples. The geotextile layers help to distribute the load and increase the bearing capacity of the soil. The CBR value of the geotextile-reinforced soil samples is found to be higher than that of the unreinforced samples, indicating an increase in the soil's load-bearing capacity.

Keyword: soil stabilization, Geo-Synthetics, bearing capacity, Geo-Textile

1. INTRODUCTION

A well-developed transportation infrastructure, including a strong road network, is crucial for the growth and development of a country. It facilitates the movement of people and goods, spurs economic activity, and contributes to overall quality of life. Improving the quality of service provided by roads can greatly enhance the transportation experience and promote the growth. Ground improvement methods are techniques used to modify the properties of subgrade soils to improve their load-bearing capacity and stability, thus reducing the likelihood of deformations and extending the service life of roads built on these soils. Some common ground improvement techniques used are soil reinforcement and the geo textile method. The choice of method depends on the type of soil and the desired end result. The goal is to provide a cost-effective solution with a long service life, while also reducing maintenance costs and avoiding disruptions in traffic service. Geo-synthetics are synthetic products used in soil stabilization and reinforcement. They include geo-textiles, geo-grids, geo-nets, geo-foam, geo-membranes, geo-composites, and geo-composites. Non-woven natural and synthetic fibers, such as polyester, polyamide, polyethylene, and polypropylene, can also be used to reinforce soil. Geo-synthetics improve the soil's bearing capacity, shear strength, stiffness, and permeability, reducing differential settlement. They have high tensile strength, better elongation, and high stiffness. Soil reinforcement with geo-synthetics result in 30% to 50% of cost savings, and a quicker installation when compared to rigid structures.

2.LITERATURE REVIEW

A. Al-Tamimi in (2010) observed that increase in the percentage of the PF resulted in increased angle of internal friction and ductility of sand. **M. V. Chincholkar (2014)** investigated the reinforcement effect of geotextile in sand by conducting direct shear tests. The results showed that geotextile reinforcement significantly improved the soil's strength and reduced its deformation. Geotextile reinforcement significantly increased the strength and stiffness of the soil and decreased its deformation,

according to the findings. **A. S. Soganci (2015)** observed that as the PF content increased, the unconfined compressive strength was found to increase thus concluding that stabilization of expansive soils with PF is an effective method. **Mohammadehsan Zarringol (2016)** determined the impact of sand-clay bond in geo-grid and geo-textile on bearing capacity. They examined clay-geo-synthetics, sand-geo-synthetics and clay-sand-geo-synthetics samples using direct shear tests. The friction between clay and reinforcement was provided by encapsulated-sand system. **B.M Patil (2017)** in this study Soil reinforcement results in 30 to 50% savings in cost, considerable saving in time due to rapid installation and was also able to withstand deformations and foundation settlement problems in a better way compared to rigid structures. **Hyeon-Su Ham (2018)**, investigated by carrying out the model test realizing the case in which soft surface ground improvement and depth improvement are simultaneously applied. And it was intended to understand the effect of the thickness of surface layer, the diameter and length of the improvement body on the reinforcement effect of geo-grid. The result showed that the effect of the surface layer thickness is greater than the effect of the deep layer diameter. Moreover, when the surface layer is reinforced with a geo-grid, the strength of the surface layer part is enhanced and this effect of a geo-grid reinforcement caused the reduction of surface settlement. **R. A. Joshia Issac (2021)** investigated that for the design of pavement structure the subgrade soil and its properties are important as it gives adequate support to the pavement. To increase the life of pavement the subgrade must be able to support loads transmitted from pavement structure without excessive deformation under adverse climatic and traffic conditions.

3.MODELLING AND TEST PROCEDURE

In this Experimental study, Soil sample collected from ongoing site (Nanded-Latur) NH361 work at Wadi Phata, Nanded district in Maharashtra was used in the experimental work. Tests such as wet sieve analysis, specific gravity test, Consistency tests, Standard proctor Compression Test and California bearing ratio tests were conducted in the laboratory to determine the index properties and engineering properties of the soil. At Initial stage Soil was classified as per Indian Standard Classification System (ISVS) based on the index properties of the soil. Geo-synthetics material such as geotextiles and geo-grids were purchased from the market and were used for improving the engineering properties of soil.

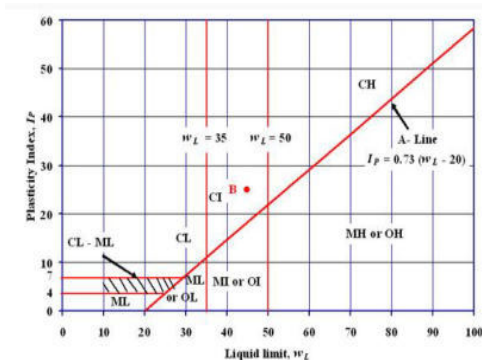


Fig. 1 Plasticity chart (ISCS)



Fig. 2 Standard Proctor

Compression test

The Standard Proctor Compaction test (SPCT) was conducted on Virgin soil (VS) to determine the maximum dry density (MDD) and optimum moisture content (OMC). And soaked CBR test and unsoaked CBR were conducted on VS, on soil samples with varying percentage of polypropylene fibers (PF) (i.e. 0.5%, 1 % & 1.5%) and on soil with geo-synthetics such as geo-grid placed at various depths (i.e. D/4, D/2 and 3D/4 depths from top of soil). Based on the experimental results, the soil's optimum percentage of PF was determined using the soaked CBR test to observe strength gain. The optimum depth of placement of geotextiles or geo-grids in the soil was also determined, which resulted in the maximum strength observed in the soaked CBR test. Additionally, the increase in strength of soil with PF and the soil with geotextiles or geo-grids was evaluated and compared to the strength of the virgin soil.



Fig. 3 CBR test construction



Fig. 4 Geo-textile (PF) in road construction

4.RESULTS AND DISCUSSION

The following is a list of the outcomes of the tests used to ascertain the index properties of the soil: the specific gravity test, wet sieve analysis, liquid limit test, and plastic limit test. The results of the soaked CBR test on reinforced and unreinforced soil, as well as the OMC and MDD obtained from SPCT, are also listed below

Soil Classification

The soil sample was categorized in accordance with Indian Soil Classification system (ISVS) based on the index properties of the soil. We found the specific gravity =2.74, Liquid Limit=43%, Plastic Limit=23%, therefore Plasticity Index= 20%, From Wet Sieve analysis Gravel=1.3%, Sand=39.7% and Clay=59%. From these result and Indian Soil Classification System the Soil Classify as CL-MI.

Standard Proctor Compaction Test on VS

In order to obtain MDD and OMC, dry density values and moisture content from SPCT on VS were plotted in a graph.

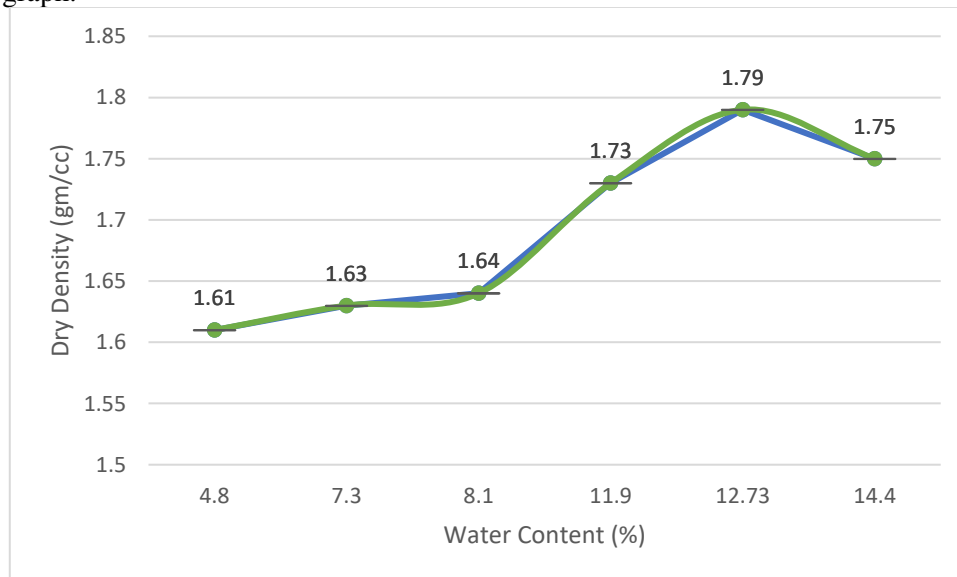


Fig 5. Graph of Moisture content v/s Dry Density for VS

OMC was found to be 12.73 percent and MDD was found to be 1.79 gm/cc from SPCT. Based on the OMC and MDD obtained from SPCT, moulded soil specimens for soaked CBR test were prepared at 97% relative compaction.

Soaked CBR Test on soil with varying percentage of PF

Fig. 6 depicts the load penetration curve derived from a soaked CBR test on VS and soil specimens containing varying amounts of PF prepared at 97 % percent relative compaction.

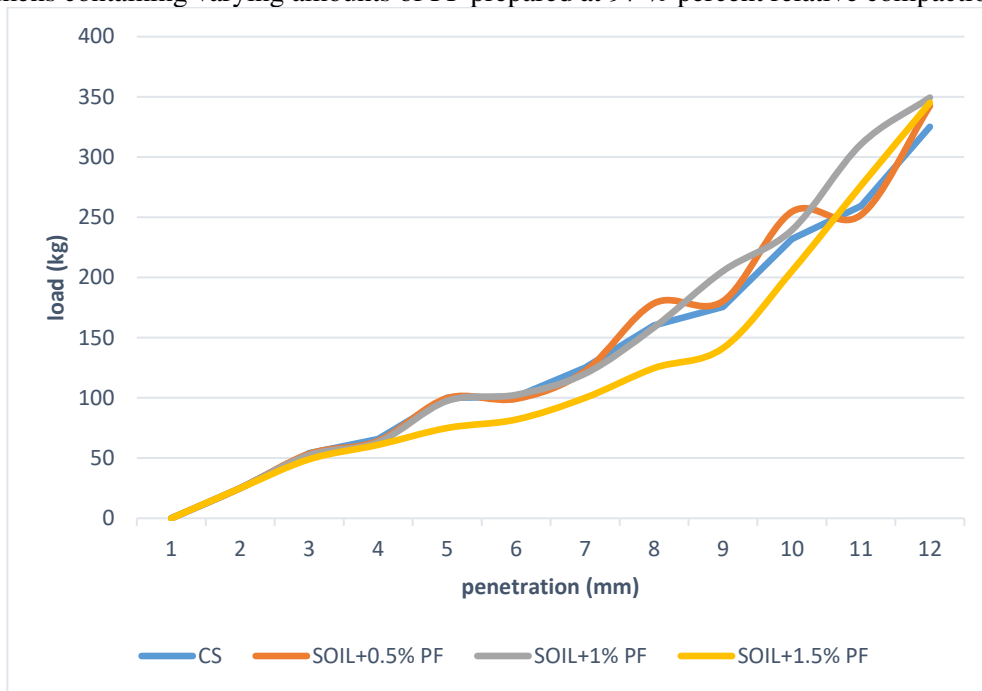


FIG 6. Load Penetration Curve from the Soaked CBR Test

The soaked CBR values for the soil with varying percentages of PF are shown in Table I.

Table 01: Soaked CBR Values of Soil Specimen With Varying Percentage Of PF

Soil Specimen	Soaked CBR value (%)	Increase in soaked CBR w.r.t. VS
VS soil	6.82	-
Soil + 0.5 % PF	9.3	1.36 times
Soil + 1 % PF	10.2	1.5 times
Soil + 1.5 % PF	9.6	1.41 times

According to the findings, the soaked CBR value of the soil specimen increased from 6.82 percent for VS to 10.2 percent for soil with 1% PF, after which it decreased, as the percentage of PF increased from 0% to 1.5%. This decrease in the soil's CBR value may have been caused by PF interfering with the interlocking of the soil grains when it was added beyond 1%, which reduced the soil's CBR value. The soaked CBR value of soil with 1% PF was found to be 1.5 times higher than that of VS. As a result, it is possible to draw the conclusion that the soil's maximum gain in CBR strength when compared to VS can be achieved by adding 1% of PF to the soil.

Soaked CBR Test on soil with Geo-synthetics placed at varying depths

Fig. 7 depicts the load penetration curve derived from the soaked CBR test that was carried out on a soil specimen that had been reinforced with geotextiles, geo-composite, and geo-grids that were positioned at varying depths from the soil's surface.

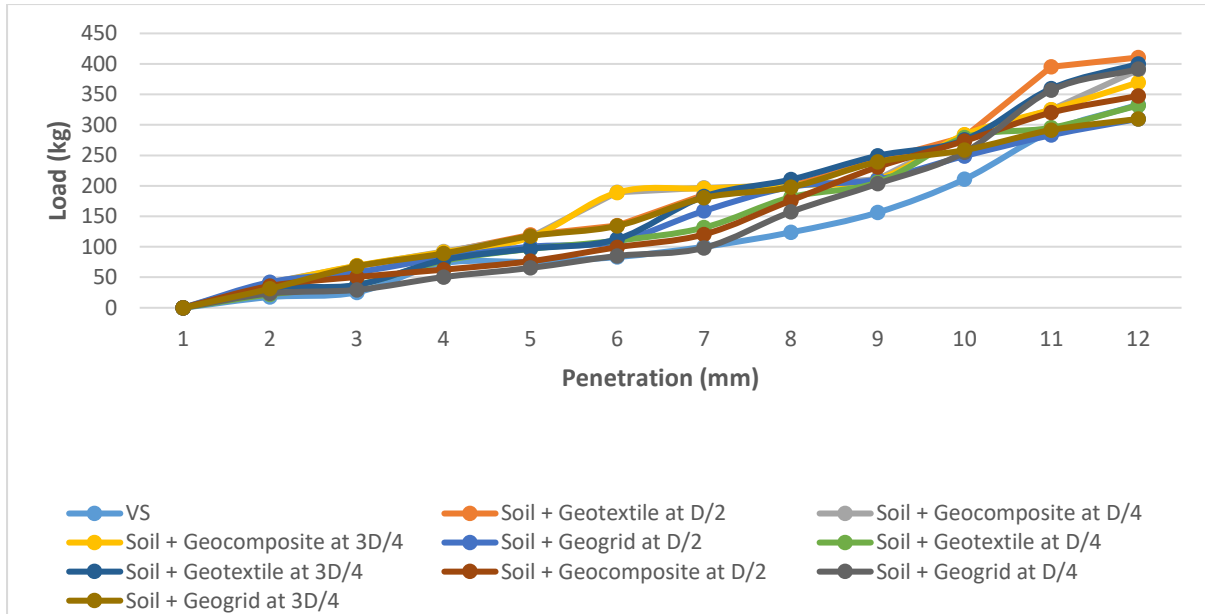


Fig 7. Load Penetration curve of soaked CBR test for soil with geo-synthetics placed at varying depths from the top

Table 3 displays the soaked CBR values for the soil with geotextiles, geon-Composites, and geo-grids placed at varying depths of D/4, D/2, and 3D/4 from the top, as well as the corresponding increase in soaked CBR values in relation to VS. This is the load penetration curve of the soaked CBR test. Fig. The soaked CBR values presented in Table 3 are depicted graphically in Figure 4.

Table 02: Soaked CBR Values of Soil with Geosynthetics Placed At Varying Depths from the Top

Soil Specimen	Soaked CBR value	Increase in soaked CBR w.r.t. VS
VS / Unreinforced soil	6.82	-
Soil + Geotextile at D/4 from top	10.5	1.54
Soil + Geotextile at D/2 from top	11.1	1.63
Soil + Geotextile at 3D/4 from top	11.7	1.72
Soil + Geo-composite at D/4 from top	9.3	1.36
Soil + Geo-composite at D/2 from top	10.76	1.58
Soil + Geo-composite at 3D/4 from top	11.35	1.66
Soil + Geo-grid at D/4 from top	9.86	1.45
Soil + Geo-grid at D/2 from top	10.3	1.51
Soil + Geo-grid at 3D/4 from top	11.1	1.63

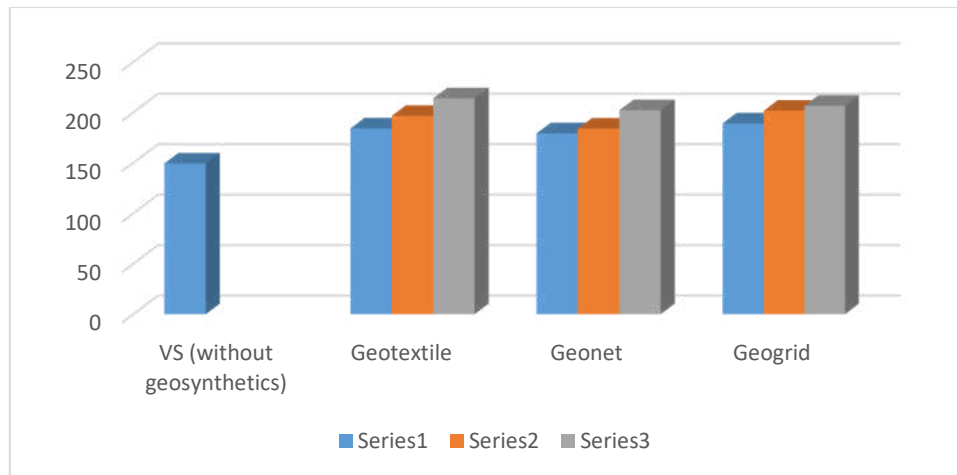


Fig. 8. Soaked CBR values of soil with geo-synthetics placed at varying depths from the top

The findings indicate that soil reinforced with geo-synthetics improved its soaked CBR strength by approximately 1.36 to 1.72 times that of VS. The soaked CBR value of the soil also increased when the depth of placement of geo-synthetics was increased from D/4 to 3D/4 from the top of the soil. As a result, the present study suggests that geotextiles, geo-composite and geo-grids should be placed at a depth of 3D/4 from the soil's surface. In addition, soil reinforced with geotextiles outperformed soil reinforced with geo-composite and geo-grids in the soaked CBR test. The stress distribution on the soil sample was improved and surface penetration and deformation were reduced as a result of the introduction of geo-grid reinforcement. Compared to unreinforced soil, the base course thickness of soil reinforced with geo-synthetic materials was reduced by up to 40%.

5.CONCLUSION

For soil with 1 % PF maximum soaked CBR value was found to be 10.2 %. Compared to virgin soil, CBR value increased by 1.5 times. Thus optimum percentage of PF that can be added to soil is 1 % at which the soil showed maximum strength gain. Soil reinforced with geo-synthetics, showed an increase in strength of about 20% to 44% compared to soaked CBR strength improved by 1.36 times to 1.72 times the soaked CBR value of unreinforced soil. Soaked CBR value of soil was found to increase as the depth of placement of geo-synthetic was increased. In the present study, three fourth the depth from top of the soil can be considered to be the optimum depth of placement of geotextiles, geo-Composite and geo-grids. Soil reinforced with geotextiles showed maximum strength gain in soaked CBR test compared to soil reinforced with geo-grids and geo-Composite.

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Using Geotextile as Reinforcement for Increasing Soil Bearing Capacity

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ABSTRACT

Geotextiles are generally used for tensioning and separation in road construction to prevent relocating and intermingling materials and thus enabling the free movement of water. The geotextile network should be stable enough not to difficulties would arise in porting, installation and repairs in the future. It is commonly divided into two categories Woven and non-woven geotextiles. Properties of geotextiles such as ductility, tensile strength, diffusion permeability, flexibility are largely influenced by its molecular weight. Polyamide, polypropylene, Polyester and polyethylene are the four main raw materials used in the manufacture of geotextiles.

Keywords: Geotextile, Flexibility, Elongation, Strength, Bearing.

1. INTRODUCTION

Road pavement, as part of the road infrastructure, plays a very important role in road performance and in constructing safe and smooth surfaces. The subgrade layer of the road may be a compacted layer of dike, available natural or improved soil. The subgrade material is prepared according to the geotechnical properties and the first layer of pavement is placed over it. The subgrade which is ultimately considered as the pavement foundation and bears the entire load of the pavement body and vehicles. Therefore, it is of utmost importance to construct pavements with high bearing capacity and life span as well as to maintain them in proper working condition. A pavement body is usually composed of several layers including subgrade, sub-base, base and asphalt.

2. LITERATURE REVIEW

In a check of numerous papers, all authors have concentrated on study the use of geotextiles in civil construction systems for soil filling to ameliorate soil characteristics. To make poor soil more manageable. Enabling construction in otherwise unsuitable locations. Finding the load per soil settlement and managing the sediment content and size of soil particles in the sub base layer. In[1] experimental study was conducted to improve the bearing capacity of soils using geotextiles. In this study, goutte (gunny bag) is used as geotextile, while sand is used as soil medium. This research presents the results of laboratory load tests on model square foundations supported on a reinforced sand bed.[2] Reinforced soil foundation construction for shallow foundation support has considerable potential as a cost-effective alternative to conventional foundation support methods. In this technique, one or more layers of geosynthetic reinforcement are placed under the base to create a composite material with improved performance characteristics.[3] small-scale model tests to evaluate the potential benefits of reinforced soil under shallow foundations. Since the ability of the geotextile to reinforce such systems is derived from the friction at the soil-geotextile interface, the tests were performed using sand as the backfill material.[4] This study investigates the improvement of the bearing capacity of a clayey soil with a thin layer of sand on the surface and the placement of geogrids at different depths. Model tests were performed for a rectangular foundation resting on soil to establish the load versus settlement curves of the unreinforced and reinforced soil system.[5] and [6] Soil stabilization methods for modifying and improving the physical and engineering properties of soil to achieve a set of predetermined goals. In many engineering applications, the use of geotextiles is considered an effective method for soil improvement. Research results indicate that when geosynthetics are placed between the subgrade and subgrade, the bearing capacity of fine-grained subgrades is increased.

3. METHODOLOGY

3.1 Materials and Methods

According to IS 2720 (Part 16): 1987 Soil test methods: Laboratory determination of CBR (Second revision). Reaffirmed - December 2016.

Target CBR is the statement expressed. The properties of the soil and geotextile materials used for the tests are listed below.

A) Soil Has an optimum moisture content and a more than dry density of 17.7% and 1, respectively, according to the standard Proctor test.

652 g/cm³ respectively. California Load Factor (CBR) of 29 at 2.5mm penetration.

B) Geotextiles Nonwoven geotextiles have high elongation, high creep and low strength, which makes them unsuitable for use as soil reinforcement. Therefore, woven geotextiles were considered for the experiments. For woven geotextiles, a multifilament was chosen because of its high tensile strength. For the experimental work, the geotextiles were supplied by KT International Limited, a local manufacturer in Mumbai. Here are the characteristics of geotextiles.

- Type of geotextile: Woven multifilament.
- Type of fiber: Polypropylene.
- Brand name: GWF (T) 52 – 240.
- Weight: 240 g/m².
- Pore size: Less than 75 microns.
- Maximum elongation: 27%.
- Tensile strength (peeling method): Warp 55 KN/m: Weft 43 KN/m
- Bursting strength: 5500 KPA.
- Permeability: 31 l/m²/s.

3.2 Procedure

A) Preparation of test sample:

1. Modified sample: The test material must pass through the 19 mm IS sieve and remain on the 4.75 mm IS sieve. The dry density for the improvement shall be the ground density or the maximum dry density value estimated by compaction tests (heavy compaction tests according to IS 2720 (Part 8) 1983 for railway formations). The compaction water content should adopt the optimum water content or field moisture according to the situation.

2. Dynamic Compaction: A representative sample of soil, approximately 4.5 kg or more for fine-grained soil and 5.5 kg or more for granular soil, should be taken and thoroughly mixed with water. If soil is to be compacted to maximum dry density at optimum moisture content, it is necessary to accurately measure the mass of soil required and add the amount of water necessary to ensure the moisture content of the sample of soil is equal to the optimum moisture content determined.

3. Fix the extension ring and the base plate to the formwork. Put the spacers on the base. Place the filter paper on the spacer.

4. Grease the inside of the mold. Compact the soil mixture with a heavy compactor. that's to say. The soil was compacted in 5 layers, each layer was compacted 55 times, the 4th layer.89 kg pestle.

5. Remove the extension ring and use a ruler to carefully cut the compacted soil horizontally on top of the form. Any holes formed in the surface of compacted soil by the removal of coarse-grained material should be filled with smaller-sized material.

6. Remove the bottom perforated plate, spacers, and filter paper, and note the quality of the mold and compacted soil samples.

7. Mount the tripod of the expansion meter on the edge of the mold and record the initial dial gauge reading. Record daily readings based on reading time. During the entire period, a constant water level must be maintained in the tank.

8. At the end of the soaking period, record the final dial indicator reading and remove the pressure gauge from the tank.

9. Remove the free water collected in the mold and allow the sample to drain for 15 minutes. Remove the perforated plate and the top layer of filter paper. Weigh the soaked soil sample and record the weight.

B] Penetration Test Procedure

1. Place the mold assembly with specimen on the penetration tester base plate. To prevent soil rotation in the feeder hole, a 2.5 kg ring weight should be placed on the ground surface before adjusting the penetrating piston and then the rest of the feeder.

2. Place the penetrating piston in the center of the sample with the least possible load, but in no case more than 4 kg, in order to establish complete contact between the piston and the sample.
3. Set the load and strain gauge readings to zero. Apply a load to the piston such that the penetration rate is approximately 1.25 mm/min.
4. Record load readings at 0.5, 1.0, 1.5, 2 penetrations. 0, 2.5, 4.0, 5.0, 7.5, 12 Average 10.5 millimeters.
5. Lift the plunger and release the mold from the loader. Take about 20 to 50 grams of soil from the top 30 millimeters and measure the moisture content.

4. RESULTS OF LIGHT COMPACTION

4.1 Proctor Test

Table 4.1: Proctor Test

Weight of mould – 41560gm Trial	Weight of mould + soil in gms	Weight of empty can in gm	Weight of can + wet soil in gm	Weight of can + dry soil in gm
1.	5935	8.689	39.623	32.684
2.	6010.5	9.178	41.789	34.027
3.	5987.5	11.607	54.775	44.225
4.	5980	9.767	40.210	30.656
5.	5912	8.870	42.550	33.956

Calculation

$$W = \frac{W_2 - W_3}{W_3 - W_1}$$

Where,

W = Water content

W1= weight of container

W2= weight of container + wet soil

W3= weight of container + dry soil

Result: Water content of soil is 13

4.2 Results of CBR Test on Soil Without Geotextile

Table 4.2: CBR Test on Soil without Geotextile

Sr No.	Penetration mm	Proving ring Division(X)	Test load(kg) (a)= (X × 5)	Load intensity (a/Area of plunger)	Corrected load intensity	CBR %
1	0.5	3	15	0.38		
2	1.0	5	25	0.64		
3	1.5	22	110	2.80		
4	2	30	150	3.82		
5	2.5	40	200	5.09	6.1	8.71
6	3	45	255	5.73		
7	3.5	53	265	6.74		
8	4	60	300	7.64	8.1	7.71
9	4.5	71	355	9.04		
10	5	80	400	10.19		
11	5.5	84	420	10.70		

Calculation

Area of plunger = 39.27 mm²

CBR value = (Test load to chosen penetration × 100) / (Standard load for same penetration)

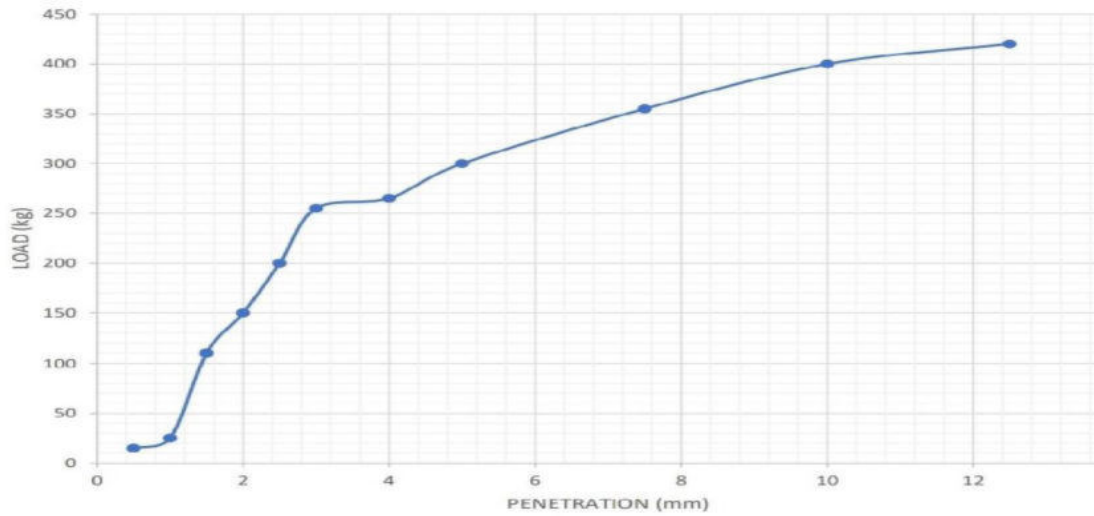


Figure 4.2: CBR Test on Soil Without Geotextile

4.3 RESULTS OF CBR TEST ON SOIL WITH GEOTEXTILE

Table 4.3: CBR Test on Soil with Geotextile

Sr No.	Penetration mm	Proving ring Division(X)	Test load(kg) (X × 5)
1.	0.50	2.00	10
2.	1.00	5.00	25
3.	1.50	9.00	45
4.	2.00	12.00	60
5.	2.50	16.00	80
6.	3.00	21.00	105
7.	4.00	33.00	165
8.	5.00	45.00	225
9.	7.50	77.00	385
10.	10.00	106.00	530
11.	12.50	122.00	610

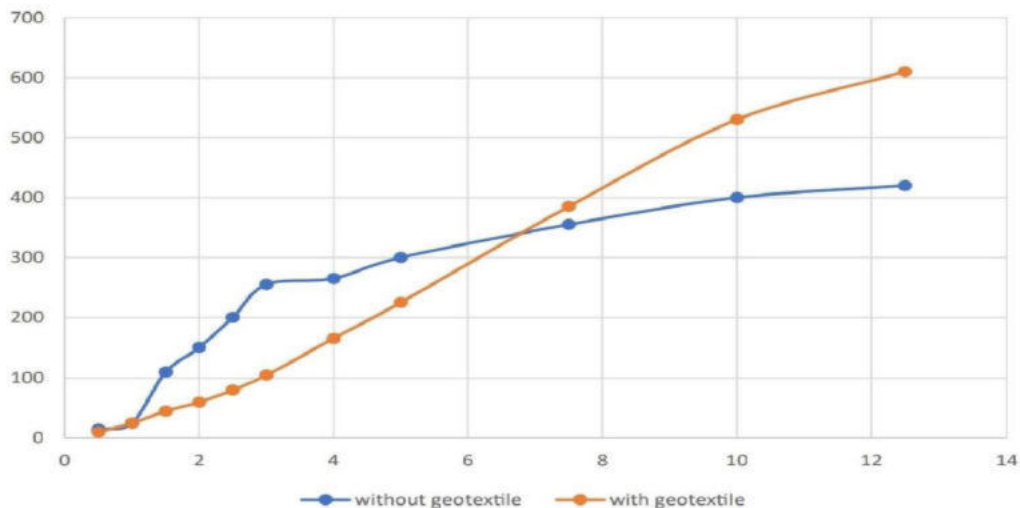


Figure 4.3: CBR Test on Soil with Geotextile

5.CONCLUSIONS

- 1.The global geotextiles market is therefore expected to grow over the forecast period. geotextiles cost effectively solve most road geotechnical problems and design engineers should fully understand the problem and use it relatively to solve it.
- 2.Geotextile have proven to be an excellent tool in the hands of civil engineers to solve major geotechnical problems.
- 3.Geotextile offer an important solution for subsoil improvement and soil protection.
- 4.It can be proved that geotextile are beneficial when used with soil or used for road construction as compared to convention method.

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Treatment of Sugar Industry Effluent using Microbial Fuel Cells

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Abstract— Water pollution on a global scale is a severe problem. When contaminants are put into the natural environment, such as lakes, rivers, seas, and groundwater, they cause waterborne illnesses. Businesses that contribute to water pollution include those in the chemical and pharmaceutical industries, sugar firms, steel plants, coal, soap and detergent companies, paper and pulp companies, distilleries, tanneries, food processing facilities, and others. India is both the world's greatest user and the second-largest producer of sugar.

Because of this, the volume of wastewater produced by the sugar industry has also grown. Heavy metals, sulphates, chlorides, and oil and grease nutrients are all present in the wastewater from the sugar industry. The "Microbial Fuel Cell" Treatment Method was used to decrease the numerous contaminants found in the synthetic waste water of the sugar industry.

Due to the high cost of proton exchange membranes, Salt-bridge is a more affordable choice for constructing a microbial fuel cell. The efficacy of microbial fuel cells was assessed by altering the agar concentration during the formation of a salt-bridge using sugar industrial effluent as the substrate.

Keywords—*Microbial Fuel Cell; Salt Bridge; COD, BOD, and TDS*

1.INTRODUCTION

Rapid industrialization and urbanisation have a detrimental effect on the collection, handling, and disposal of effluents in emerging countries like India. This has serious implications for environmental concerns and public health. Components of unmanaged organic waste from industries, governments, and the agricultural sector poison the land, water, and air on a massive scale. Trash management and disposal is currently the largest environmental problem the world is facing.

Due to their high organic content, agricultural waste, residential garbage, and industrial waste are the finest substrates for energy generation. The use of microbial fuel cells (MFCs) is one of the approach for wastewater treatment that shows promise. Due to its efficiency and capacity to generate bioelectricity from renewable sources like wastewater, MFC have grown in significance over the past few decades. A potential technique for concurrent energy generation and wastewater treatment, microbial fuel cells (MFCs) are special devices that may use microorganisms as catalysts to transform chemical energy into electricity under anaerobic conditions.

In MFCs, electricity has been produced from a variety of organic substances, including proteins, fatty acids, and carbohydrates. During product manufacture and processing, the sugar business produces undesired leftover liquid waste. Each tonne of crushed sugarcane produces around 1000 litres of effluent in the sugar industry. Sugar industrial effluent has a high BOD concentration, which lowers the dissolved oxygen content of water bodies, making them unhealthy for both aquatic life and human usage. Its impact on pollution is one of the most important environmental problems. Numerous clean up techniques have been used, and innovative bioremediation methods are being considered for the treatment of wastewater from the sugar sector.

In terms of wastewater treatment, the MFC stands out for three reasons: energy savings, a reduction in sludge generation, and a reduction in energy consumption. The ability to remediate various wastewaters has been thoroughly investigated in several studies. Multiple pollutants, including biological wastes, heavy metals, polyalcohol, petroleum product colours, phenol and phenolic compounds, furan, quinolone, and pyridine derivatives, have been shown to be removed using MFCs. However, real wastewater must be used to test MFCs' performance before they can be put into use.

2. REVIEW OF LITERATURE

Reference Paper	Authors	Contents
GENERATION OF ELECTRICITY USING SUGAR MILL WASTEWATER BY MICROBIAL FUEL CELL	Alterman, P, K. Rabaey, P. Clauwaert and W. Verstraete., 2006	Microbial fuel cells have been researched and are emerging as an effective method of treating wastewater. Investigated is the effectiveness of potential energy conversion. The rates of energy recovery are investigated and evaluated.
	SC Santra et al., 2014	According to studies, MFC produces energy without the need of fossil fuels. In MFC technology, microorganisms are used to convert chemical energy into electrical energy. MFCs are self-sustaining and very effective because they don't require fossil fuels but rather sewage and food waste as their primary sources of energy.

2.METHODOLOGY

- Sample collection

The Aditi Sugar Trader. discharge channel outlet at Sideshwar Bhawan Girgaon, Mumbai District, Maharashtra, India is where the industrial effluent from the sugar industry is collected for bioremediation. Using distilled water, the polythene container is completely cleaned before sampling the effluent. Following effluent sampling, the effluent sample is transferred to the lab and kept there at room temperature for further examination using established procedures.

- Mfc components

Electrodes, anodic and cathodic chambers, and salt bridge make up the majority of an MFC, . Ion transport is facilitated by the salt bridge that connects the cathodic and anodic chambers (protons). Anode and cathode materials utilised were carbon and steel rods.

A. Procedure to Prepare Salt Bridge

- Pour 100ml of distilled water into a pan from a measuring flask. Heat it for a specific amount of time till bubbles form.
- Pour 5 grammes of NaCL into the pan.
- After the NaCL has dissolved, add 5 grammes of agar and stir until the powder has completely dissolved.
- Transfer the dissolved agar to a 10 cm PVC pipe, position the pipe in a dark area, and wait 24 hours for the agar to solidify.

B. Construction of MFC

- First, we take two 2.5-lit boxes and drill a hole in each of them so that the PVC pipe can be attached.
- Agar was already formed in the PVC pipe so that we could use araldite to connect the PVC pipe in the center of the boxes.
- Place 1 lit of waste water in the anode and 1 lit of distilled water in the cathode boxes.
- Electrical cables that are linked to a multi-meter that measures current have copper or stainless-steel rods attached to them.
- Run this for 10 days, then collect the waste water and test the COD after water treatment.

C. Water quality analysis

Sample from waste water from the sugar industry was used for Microbial Fuel Cells' treatment. Two bottles are used in the procedure; one contains a sample of waste water, and the other contains distilled water. Each bottle has a rod dipped in copper or stainless steel, and a salt bridge is linked between the bottles. Samples were collected after the treatment to calculate the chemical oxygen demand. The closed reflux technique was used to assess the COD. The outflow was collected and evaluated for the aforementioned characteristics every 48 hours when the MFC was in use.

D. Electrical measurements

The line between the anode and the cathode was attached to a digital multimeter, which was used to measure the current (mA). The matching current flowing over the resistor was time-stamped.

3.RESULTS AND DISCUSSION

3.1General: According to the Central Pollution Control Board (CPCB), India, the initial BOD and COD concentrations were considerably high compared to their acceptable limits for the wastewater characteristics indicated in Table 1.1. BOD and COD concentrations were determined both before and after the batch-mode treatment of the wastewater. The key operational parameters for the current investigation included pH, the molar concentration of the salt bridge, various electrode materials, variable wastewater concentrations, and agitation speed. These factors are explained in more detail below.

TABLE 1.1 INITIAL CHARACTERISTICS OF WASTE WATER

Sr. No	Parameters	Values	Unit
1.	Physical Colour	Dark Brown	-
2.	Odour	Unobjectionable	-
3.	pH	9.5	-
4.	Temperature	25	°C
5.	BOD ₅ , 200C	7650	Mg/lit
6.	COD	15340	Mg/lit
7.	TDS	1046	Mg/lit

3.2EFFECT OF BOD REMOVAL EFFICIENCY:

Initially, Sugar wastewater had a BOD of 7650 mg/l. In an MFC setup, BOD was analysed over 15 days.

The effectiveness of BOD removal increased for MFC from 9% to 70%. Efficiency in BOD removal was seen in MFC. At the ninth day of the procedure, the highest voltage generated was 525 mV.

TABLE 1.2 BOD REMOVAL EFFICIENCY

Day	BOD (mg/lit.)	% Removal Efficiency	Voltage (mV)
Initial	7650		270
1	6946	09	330
2	6546	16	350
3	6111	22	362
4	5706	78	373
5	5396	33	420
6	4896	39	463
7	4390	45	478
8	3790	51	488
9	3365	56	495
10	2925	60	510
11	2385	62	518
12	2085	64	525
13	1735	66	480
14	1595	68	476
15	1395	70	470

From the first to the fifteenth day, the BOD removal effectiveness rose from 9% to 70%, respectively. Thus, MFC showed up to 70% BOD removal effectiveness.

3.3 COD REMOVAL EFFICIENCY:

The ability of sugar wastewater to remove COD demonstrated the role of the bacteria present in the wastewater in metabolising the carbon source as electron donors. Experimental results indicated some compatibility between current generation and COD reduction. In MFC, continuous COD elimination has been seen.

The COD removal efficiency in MFC increased from 8% to 71% on the first and fifteenth days, respectively. After 4-5 days in terms of time, COD efficiency for varied feed concentrations reached equilibrium. The highest voltage produced was around 530 mV.

TABLE 1.3 COD REMOVAL EFFICIENCY

Day	COD (mg/lit.)	% Removal Efficiency	Voltage (mV)
Initial	15340	00	280
1	14302	08	342
2	13889	15	362
3	13074	20	377
4	12355	25	438
5	11470	30	466
6	10520	36	480
7	9908	40	490
8	8923	46	505
9	8120	50	535
10	7416	54	512
11	7030	57	495
12	6380	61	488
13	5820	65	484
14	5090	69	484
15	4780	71	480

From Table, it can be shown that on the first and fifteenth days, respectively, the COD removal efficiency in MFC ranged from 8% to 71%.

3.4 TDS REMOVAL EFFICIENCY:

From the first to the ninth day of observation, the total dissolved solids removal efficiency ranged from 5.25% to 47.50%. The highest voltage produced was 520 mV on the fifth day.

TABLE 1.4 TDS REMOVAL EFFICIENCY

Day	TDS (mg/lit)	% Removal Efficiency	Volt. Generate (mV)
1	1046	5.25	290
2	945	11.78	322
3	895	19.03	395
4	795	29.37	465
5	720	35.08	525
6	655	42	495
7	596	46.24	485
8	588	46.98	480
9	580	47.50	476

The removal effectiveness of total dissolved solids was found to range from 5.25% to 47.50% from the first day to the ninth day of observation, according to the data in Table 1.4 above. Efficiency of TDS removal decreased after the seventh day.

4. CONCLUSION

The "Microbial Fuel Cell" treatment technology was used to decrease the numerous contaminants found in the waste water of the sugar industry.

A salt bridge is filled with various concentrations of agar, such as 5gms, For the passage of electrons in the salt bridge, 5gms to 10gms, and NaCl are also utilised.

To produce power and lower pollution levels, two distinct types of rods are employed, including copper and stainless-steel rods. The number of contaminants decreases as current generation increases.

The MFC has to be further examined for enhancements in its performance and capacity to treat waste water with high organic loads since it is a resource with great potential for the future.

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Minimizing and Reducing Waste Generated in College Campus

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ABSTRACT

Waste management is an integral part of the supply chains that we rely on. Due to exponential growth of population, there has been a remarkable increase in everyday waste wherein important our country where safe and sustainable practices are scarce and waste management has not been adequately regulated.

This paper examines the technical, economical and environmental aspects of waste management that can be practiced at educational campus in Boisar. This study emphasizes the collection and management of waste at college campus itself and then converting the waste into a sustainable energy resource. This study also suggests the use of Bio-gas plant at college campus for organic waste management, a separate E-waste recycling plant for e-waste management and a plant which can convert paper waste into other useful items. This study states that this practice will also lead to zero waste generation in campus and also the biogas can be used in campus canteens, the manure released can be used as fertilizer for plants and the paper waste can be converted into food plates and glasses etc. This study states that this practice will not only reduce the generation of waste to some extent but also convert it into a sustainable energy. Which can be used in college campus. This study also states that if these practices are adapted by other universities, it could create a significant impact on waste generation.

Keywords: *Waste management, Biogas, College campus.*

1. Introduction

The reduction of garbage produced on college campuses is a critical issue since it not only contributes to environmental protection but also helps to conserve resources and cut costs. Many techniques, such as recycling, composting, reducing food waste, and introducing sustainable practices, can reduce waste on college campuses. Recycling is one of the most efficient strategies to reduce waste on college campuses. Recycling bins should be positioned in conspicuous areas around the campus, and faculty and staff should be urged to properly utilize them. To make sure that the right materials are put in the right bins, recycling containers should be clearly labelled.

Composting is a further efficient way to cut trash on college campuses. Composting may produce nutrient-rich soil for gardening and landscaping from organic waste such as paper, garden trimmings, and food leftovers. By segregating their organic waste from other types of garbage, colleges can set up composting facilities on their campuses and encourage employees and students to participate.

Another crucial component of waste reduction on college campuses is the decrease of food waste. This can be accomplished by encouraging staff members and students to just take what they actually need and refraining from overserving meals. Food that is still usable can be given to charities or food banks in your community.

In addition to these actions, universities can take sustainable ones including adopting energy-saving appliances and lighting, conserving water, and using eco-friendly cleaning supplies. By promoting the use of reusable water bottles, encouraging students to take public transit or carpool, and offering instruction on sustainability and waste reduction, colleges can further encourage students to embrace sustainable practices.

Overall, minimizing and eliminating trash produced on college campuses is crucial for sustainability and environmental protection. Colleges may conserve resources, cut expenses, and foster a more sustainable environment for their employees and students by putting effective waste reduction policies into practice.

2.Literature review and Objective:

[1]. Abhilash Krishna, Krishna Nandan, Case study of solid Waste Management at the College campus, (Date 2013)

In this paper, an in-depth study of the waste management at the college campus has enabled us to obtain a clear picture of the magnitude of waste generation, present management techniques and the methods that can be employed to tackle the problem of waste. The raw data obtained can be effectively used to devise better solutions that are economically, socially and environmentally viable. The study has opened the eyes to alternative management techniques which are already suggested above. This paper serves as a base with which waste management practice can be emulated elsewhere.

[2]. Shiva Shankar Y and Rachit Khandelwal, Sustainable waste management strategy for a campus, (Date 2016)

Campus sustainability has been issue of concern in present global scenario with increasing environmental issues related to pollution. Higher educational institutions have an important role in this aspect by reflecting the principles of sustainability in management and educating the students about the need for resource conservation. Particularly in a country like India, waste management has been the least bothered area for public which is an important sector that needs sustainable approach to view the waste as a resource. Hence campuses by adopting the principles of integrated waste management principles have responsibility to reflect it to the students.

[3]. Irina Safitri Zen, Waste minimization initiatives in campus sustainability: The experience of university teknologi Malaysia, (Date 2014),

This article shows an example of how waste management works in the context of campus safety of UTM. It seems to be part of an effort to explain the responsibilities of waste reduction and educate the school community. While informing about the collection, management and recycling of wastes, these activities are supported by waste generation and the behavior studies of the students become a part of life. This is an example of how to increase the capacity of the road in the laboratory to reduce waste use in the context of school sustainability. This study also shows the need to support the organization for the management of sustainability through innovation and creativity to accelerate the transition to school programs. for security organizations, especially in large university organizations.

This research has the potential to be a model for reducing waste in school development.

[4]. Om Prakash, A review on Biogas Plant (Date 2015)

The study about biogas production has shown that municipal waste that is available in huge quantity everywhere can be a good source of energy if the government seriously works on it. In this area lot of scope is available for entrepreneur to start the biogas production plant near the industrial area to fulfill the need of energy requirement of industry and residential area and also maintain the city neat and clean.

3. Methodology

3.1 Biogas plant

An anaerobic digestion process can take place in oxygen-free circumstances at a biogas plant. Simply described, it is a man-made technology that allows garbage to be converted into environmentally friendly fertilizer and sustainable energy which is methane gas.

The three main components of a biogas plant enable the production of biogas plant.

- A reception area
- A digester
- A gas holder tube



Fig.1 Mini Biogas plant developed

In this model we had taken a container in which we collected organic waste which was been collected from college canteen. The waste was kept air tight in a container.to make the process of methane gas generation even faster we had kept cow dung for 15 days mixed with water and allow to generate microbes in it. Further we mixed the cow dung with the organic waste and sealed it in the air tight container. Further to collect the methane gas we had used a tube which would store the gas.



Fig. 2 Organic waste collected from canteen

3.2 Paper waste

Around one-third of the solid garbage produced in our campus is made up of paper waste. In the past, paper trash was either burned or dumped in landfills that took up a lot of room. Paper is burned via incineration, which emits carbon dioxide and upsets the equilibrium of the atmosphere. Because of the increasing greenhouse effect, which contributes to global warming and climate change, landfill disposal and incineration are inappropriate and destructive methods for managing paper waste.

Recycling paper is an environmentally friendly way to handle paper waste. Paper waste is transformed into recyclable paper and other useful items through the recycling process. Colleges produce a significant amount of waste paper. An enormous burden of waste management can be reduced if paper trash is managed on college campuses. College paper trash can be recycled and made into paper straws,

paper plates, and paper glasses, among other products. This can be used in place of the standard procedures at college canteens.

The following steps are involved in the recycling of paper waste:

- **Collection:** On the college campus, recyclable bins can be placed in various locations to collect paper waste such as answer sheets, printer paper, files, etc.
- **Sorting:** Following collection, the trash is divided into various piles based on the type and grade of the paper used. After being compacted into bales, the piles are utilized to make recycled paper.
- **Shredding:** Waste paper is cut into small pieces and then further broken down into fibers during the recycling process.
- **Re-pulping:** The pulp is created by combining the fibers with water. This pulp could include a variety of undesirable materials, including dirt and outdated inks.
- **De-inking:** The pulp is rinsed, separated, sieved, and rotated. As a result, sludge which is then thrown away consisting of dirt and ink is removed from the pulp. The clean pulp can later be used to make recycled papers and other goods including fruit trays, paper plates, glasses, straws, and cardboard.

3.3 E-waste

E-Waste also known as electronic waste, is a rapidly growing problem worldwide. With the constant advancements in technology, electronic devices are becoming obsolete at a faster rate, leading to the disposal of large amount e-waste. This waste contains toxic chemicals and heavy metals that pose a threat to the environment and human health. Therefore, proper management of e-waste is necessary to mitigate these dangers. This report aims to evaluate the e-waste management practices at a college campus of the Theem college of Engineering.

The assessment revealed that the college campus uses a significant number of electronic devices, including computers, laptops, tablets, smartphones, and printers. The disposal methods employed by the campus include selling, donating, and recycling. However, there were some areas of concern in the e-waste management practices.

Based on the assessment, the following recommendations are proposed for the college campus:

1. **Awareness campaigns:** To raise knowledge of the dangers of e-waste and the correct disposal techniques, the college administration should arrange awareness programmes. These initiatives ought to be directed at employees, faculty, and students.
2. **Collection stations:** On campus, the college needs to establish centralized collection points for e-waste. These collection places must be visible and easily reachable. Sending the collected e-waste to approved recyclers is recommended.
3. **Recycling:** The college needs to guarantee that e-waste is recycled by certified recyclers. The recycling procedure must follow the instructions given by the municipal authorities.
4. **E-waste audits** should be conducted on a regular basis by the college to evaluate the success of the e-waste management procedures. The audit should evaluate the types and amounts of e-waste produced, the disposal techniques used, and the level of understanding of the dangers associated with e-waste. E-waste must be managed properly to safeguard both the environment and human health. The evaluation showed that the college campus's e-waste management procedures need to be improved. Campaigns to raise awareness, consolidated collection stations, appropriate recycling, and e-waste audits are among the suggested suggestions. To put these suggestions into practice and make sure that e-waste is properly disposed of, the college administration should be proactive.

4. Results

- Amount of waste collected: - 3 kg of kitchen waste.

- Time required for microbes' formation: -13-15 days.
- Time required: -15 days for a single tube to fill methane gas completely.
- By products obtained: - Methane gas, Carbon dioxide, fertilizers.
- Quantity: - 1.2 kg of methane approx.
- Time required for gas formation: - 10 days.

5. Conclusion

In this paper we have tried to manage the waste which is generated in college campus of "Theem college of Engineering" within the college campus itself. We had designed a mini-Biogas plant which is capable of managing the organic waste collected in campus. Not only it will reduce the waste generation but also it will generate methane gas which can be utilized in college canteens.

In this study we had collected 3 kg of organic waste and stored it in a container mixing it with cow dung which we kept in aerobic condition for 15 days. We mixed the cow dung and organic waste and kept it in an air tight container. After 15 days a tube was filled completely with methane gas. On the other hand, the manure which was released from outlet pipe can be used as fertilizers.

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Removal of Domestic Wastewater Impurities by using Different Filter Media

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ABSTRACT

Domestic wastewater, also known as sewage, is a byproduct of human activities and contains a variety of organic and inorganic pollutants. These pollutants come from sources such as toilets, showers, sinks, washing machines, and dishwashers. The composition of domestic wastewater varies depending on the source and the activities that take place within the household. Domestic wastewater contains a large amount of organic matter, nutrients (such as nitrogen and phosphorus), pathogens (such as bacteria and viruses), and suspended solids. If not handled properly, these pollutants can contaminate waterways, causing waterborne diseases, eutrophication, and environmental degradation. The treatment of domestic wastewater is essential for the protection of public health and the environment. The most common treatments include physical, biological, and chemical processes. Physical treatment includes the removal of large particles by sieving and sedimentation. The biological treatment uses microorganisms to break down organic matter, while chemical treatment uses chemicals to remove nutrients and disinfect water. The efficient and sustainable management of domestic wastewater is a serious challenge for many communities around the world. Proper wastewater treatment and disposal prevent the spread of disease and conserve natural resources. Additionally, recycling resources such as water, nutrients, and energy from domestic wastewater can help build more resilient and sustainable communities.

KEYWORDS: *Sewage, Nutrients, Pathogens, Eutrophication, Biological*

1. INTRODUCTION

Domestic wastewater is the wastewater generated by families, industrial buildings, and institutions inclusive of colleges and hospitals. This kind of wastewater usually incorporates a spread of natural and inorganic contaminants, inclusive of human waste, meal waste, detergents, and chemical substances. If left untreated, domestic wastewater can pose a widespread hazard to public health and the environment. it could result in the spread of waterborne sicknesses and purpose pollutants in natural water bodies, which could have unfavorable impacts on aquatic ecosystems. therefore, the treatment of domestic wastewater is essential to guard public fitness and the surroundings. Wastewater remedy approaches can remove contaminants from domestic wastewater, making it safe for discharge into the environment or reuse for non-potable functions along with irrigation. domestic wastewater treatment may be carried out via diverse strategies, which include bodily, chemical, and organic remedy procedures. the choice of the appropriate treatment method depends on the specific characteristics of the wastewater and the remedy targets. Standard domestic wastewater remedy performs an important position in making sure the sustainability of water sources and protecting public fitness, and its miles a critical thing of modern sanitation and environmental control.

2. OBJECTIVE

The primary objective of domestic wastewater treatment is to remove contaminants and contaminants from wastewater generated by households, commercial businesses, and institutions before it is discharged into the environment. The treatment process is designed to reduce levels of organic matter, suspended solids, nutrients, and harmful pathogens in wastewater to protect public health and prevent pollution and environmental degradation.

Treated wastewater can be used for a variety of purposes such as irrigation, industrial processes, and in some cases even for drinking water supply, but requires additional treatment to ensure its safety and quality. In general, the main objectives of domestic wastewater treatment are to protect the environment, and public health and to preserve natural resources for future generations.

3. LITERATURE REVIEW

Domestic wastewater is water discharged by households and contains a variety of pollutants such as organic matter, nutrients, pathogens, and other harmful substances. Domestic wastewater management is essential to maintaining human health, protecting the environment, and promoting sustainable development. This literature review provides an overview of current research on domestic wastewater. Several studies have examined the effectiveness of different domestic wastewater treatment technologies. A common approach is to use artificial wetlands, which have been shown to remove a wide range of pollutants. Another technology is the use of membrane bioreactors, which have proven effective in removing organic matter and pathogens. Some studies also focus on the impact of domestic wastewater on the environment. For example, domestic wastewater can lead to eutrophication, which can have adverse effects on aquatic ecosystems. Domestic wastewater can also contain micro plastics, which can accumulate in the environment and have harmful effects on wildlife. Finally, several studies have investigated the attitudes and behavior of households in the management of domestic wastewater. These studies have shown that education and awareness campaigns can be effective in promoting responsible behaviors, such as the proper disposal of hazardous waste and the reduction of water consumption. In conclusion, the management of domestic wastewater is essential for the maintenance of human health and the protection of the environment. Ongoing research and development of effective treatment technologies, as well as education and awareness campaigns are needed to promote sustainable domestic wastewater management.

4. METHODOLOGY:

4.1 Materials:

- Washed coal
- Sugarcane bagasse(dry)
- Coconut shells
- Rice husk
- Course aggregate (2-20mm)
- Fine sand
- Crush sand

4.1.1 Filter media

The selection of suitable filter media is an important part of the design of the operation and multimedia filter process to meet the required effluent quality. Removal efficiency increases with decreasing filter media size and increasing filter bed depth. Filter media provides a large surface area to enhance microbial growth. Therefore, it plays a key role in maintaining a high amount of active biomass and a variety of microbial populations. In the multimedia filter, three different types of media were used such as activated carbon(coal), rice husk, and sugarcane bagasse.

Activated carbon (coal): Activated carbon filters are effective at removing organic compounds and some dissolved solids from wastewater. The carbon adsorbs the contaminants, which can then be removed from the filter.

Rice husk: Rice husk filter media can be a cost-effective and eco-friendly option for domestic wastewater treatment. Rice husks are a byproduct of the rice milling process and can be used as a filter media due to their high porosity and ability to adsorb pollutants.

Sugarcane bagasse: Sugarcane bagasse can also be used as a filter media for domestic wastewater treatment. Sugarcane bagasse is a byproduct of sugarcane processing and is widely available in many countries. It has high porosity, good adsorption capacity, and can effectively remove pollutants from wastewater.

Coconut shells: Coconut shells can also be used as a filter media for domestic wastewater treatment. Coconut shells are abundant in tropical countries and can be an effective and eco-friendly option for removing pollutants from wastewater.

Multimedia Filters: These filters consist of layers of different media, such as fine sand, crushed sand, and coarse aggregate. The different media layers remove different types of contaminants, resulting in more effective filtration.



Fig 1 Activated carbon



Fig 2 Rice husk



Fig 3 Sugarcane bagasse



Fig 4 Coconut shells

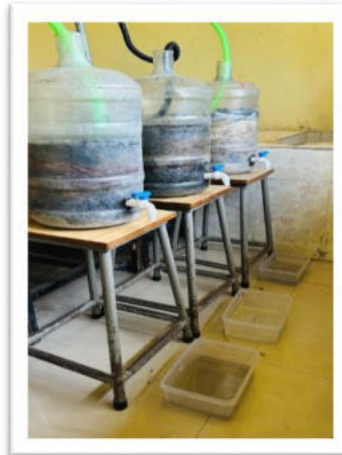


Fig 5 Experimental setup

The choice of filter media depends on the specific requirements of the domestic wastewater treatment system and the quality of the influent wastewater. A combination of different filter media may be used for optimal results.

4.2 ANALYSIS

Analysis of domestic wastewater typically involves various solid parameters suspended solids, total dissolved solids (TDS), chemical oxygen demand (COD), and biological oxygen demand (BOD). The pH value is an important parameter to measure because it affects the solubility and toxicity of various substances in wastewater. Domestic wastewater typically has a pH of 6.5 to 8.5. TSS and TDS are measures of total suspended and dissolved solids in wastewater, respectively. These parameters are important because they can affect water clarity and cause problems in downstream treatment. COD and BOD are measures of the amount of oxygen needed to oxidize organic matter in wastewater. High

concentrations of COD and BOD indicate the presence of organic pollutants in wastewater, which can cause environmental damage. Finally, analysis of domestic wastewater is important to ensure safe discharge into the environment. Commonly measured parameters include pH, Color, Odor, turbidity, TSS, TDS, COD, and BOD. By monitoring and controlling these parameters, the impact of domestic wastewater on the environment and public health can be reduced.

4.2.1.OBSERVATION TABLE

Table 1: Reactor 1 Rice husk @ flow rate 1hr\100ml

SR NO	PARAMETER	INITIAL READING	4Hrs	8 Hrs	12 Hrs	24 Hrs
1	PH	8.78	8.70	8.59	8.48	8.36
2	COLOR	GREY	-	-	LIGHT GREY	LIGHT GREY
3	ODOUR	NON OFFENSIVE	-	-	-	-
4	BOD	48.86	46.56	43.20	40.17	38.20
5	COD	225	220	210	202	208
6	TDS	166.28	164.16	161.18	158.80	156
7	TSS	200.16	198.10	186.09	179.80	174.2
8	DO	3.2	3.1	2.9	2.7	2.6

Table 2: Reactor 2 Coconut shells @ flow rate 1hr\100ml

SR NO	PARAMETER	INITIAL READING	4Hrs	8 Hrs	12 Hrs	24 Hrs
1	PH	8.70	8.75	8.60	8.63	8.48
2	COLOR	GREY	-	-	LIGHT GREY	LIGHT GREY
3	ODOUR	NON OFFENSIVE	-	-	-	-
4	BOD	48.86	46.70	44.78	42.85	40.80
5	COD	225	223	229	217	210
6	TDS	166.28	164.80	162.20	160.10	158.18
7	TSS	200.16	198.70	187.20	180.20	178.20
8	DO	3.2	3.1	3.0	2.8	2.7

Table 3: Reactor 3 Sugarcane bagasse @ flow rate 1hr\100ml

SR NO	PARAMETER	INITIAL READING	4Hrs	8 Hrs	12 Hrs	24 Hrs
1	PH	8.85	8.76	8.62	8.54	8.49
2	COLOR	GREY	--	--	LIGHT GREY	LIGHT GREY
3	ODOUR	NON-OFFENSIVE	--	--	--	--
4	BOD	48.86	47.10	45.80	43.20	41.10
5	COD	225	223	220	214	213
6	TDS	166.28	165.10	163.30	161.90	154.75
7	TSS	200.16	199.85	188.10	182.18	179.30
8	DO	3.2	3.1	2.9	2.8	2.7

Reactor 1 Rice husk filter media is a more effective filter media than **Reactor 2** coconut shells filter media and **Reactor 3** sugarcane bagasse filter media because rice husk filter media can be a cost-effective and eco-friendly option for domestic wastewater treatment it removes the pollutants and oil because of high porosity

5.CONCLUSION

- There are a variety of filter media that can be used to remove impurities from domestic wastewater. Sand and gravel filters are typically used to remove suspended solids and organic matter, while rice husk filters are used to remove dissolved organic compounds.
- Rice husk effectively removes organic matter and converts it to carbon dioxide and water. Membrane filters are very effective at removing suspended solids, dissolved solids, and pathogens. The choice of filter media depends on the specific impurities present in the wastewater and the level of treatment required.

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Case Study of Building Cracks and Causes and Its Prevention

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ABSTRACT

This case study focuses on the causes and prevention of building cracks. We conducted a site visit and analysis of a newly constructed commercial building in a coastal area that had developed cracks on its walls and floors. Our investigation revealed that the causes of the cracks were due to foundation issues, weathering, and poor construction practices. To prevent building cracks, we recommended preventive measures such as proper site investigation, foundation design, concrete curing, and the use of appropriate materials. The implementation of these measures will ensure the safety and longevity of the building. Building owners and contractors can use this case study to understand the importance of following proper construction practices and implementing preventive measures to prevent building cracks.

1. INTRODUCTION

Building cracks are a common issue in the construction industry that can have significant implications on the safety, structural integrity, and functionality of buildings. Cracks can occur in different parts of a building, including walls, floors, ceilings, and foundations, and can result from various factors, such as improper design, use of low-quality materials, inadequate reinforcement, and lack of regular maintenance. Building cracks can also be caused by natural factors, such as soil settlement, thermal movements, and seismic activity.

The consequences of building cracks can be severe and can include reduced structural integrity, water damage, and potential collapse, leading to property damage, injury, and even loss of life. Therefore, it is crucial to understand the causes of building cracks and implement preventive measures to avoid their occurrence.

This case study aims to investigate a building that experienced cracking and examine the underlying causes. The study will explore the various factors that contributed to the development of cracks and investigate the prevention measures that could have been implemented to avoid the problem. The study will also evaluate the effectiveness of repair methods used to restore the building's structural integrity. The case study will provide valuable insights into the importance of proactive measures in preventing building cracks, as well as the need for appropriate repair methods that can effectively address the root causes of the problem. By highlighting the importance of investing in high-quality construction practices, regular maintenance, and effective repair methods, the study will help ensure the safety and longevity of buildings.

Case Study: conducted a case study on a newly constructed building in a coastal area. The building was a 10-story commercial complex and had been in use for only six months. The building owner reported the appearance of cracks on the walls and floors of the building.

2. LITERATURE REVIEW AND OBJECTIVE

1. Case study on building cracks and causes and its prevention. (Date 2019) **P. Swapna**. This investigation offers understanding to sorts of splits, reasons for breaks and counteractive action of breaks. Different methods for treatment of breaks are examined in this investigation. We can abridge that however it isn't practical to affirmation against splitting yet endeavors can be made to limit advancement of break. And furthermore, not all sort of split requires same dimension of thought. The likely explanations of split can be controlled if legitimate thought is given to development material and system to be utilized. If there should be an occurrence of existing breaks, after detail study and investigation of split parameters, most suitable technique for rectification ought to be received for viable and proficient fix of split. Initial segment involves essential presentation about breaks and about the past endeavors which are made by the examination researchers, second part contains the contextual investigation, visual recognizable proof of splits and causes with preventive measures and third part contains systems to fix break. The

potential reasons for break can be controlled if legitimate thought is given to development material and procedure to be utilized. In the event that we center on the significant causes to breaks in our structure and take their preventive measures at first, we will ready to limit the issue of splitting in our structure

2. Building cracks – causes and remedies. (Date 2015). Grishma Thagunna. This research work concludes that though it is impossible to guarantee against cracking yet attempts can be made to minimize development of crack. And also, not all type of crack requires same level of attention. The potential causes of crack can be controlled if proper consideration is given to construction material and technique to be used. In case of existing cracks, after detail study and analysis of crack parameters, most appropriate method of correction should be adopted for effective and efficient repair of crack.

3. Study on Causes of Cracks & its Preventive Measures in Concrete Structures (Date 2015). Pooja Nama et.al. This paper is divided into four parts. First part comprises of basic introduction about cracks and about the previous attempts which are made by the research scholars, second part contains the case study, visual identification of cracks and causes with preventive measures and third part contains techniques to cure crack. The potential causes of crack can be controlled if proper consideration is given to construction material and technique to be used. If we focus on the major causes to cracks in our building and take their preventive measures initially, we will able to minimise the problem of cracking in our structure.

4. Methodology for Prevention and Repair of Cracks in Building. (Date 2018). Dimpay B. Patel et.al This research work concludes that though it is impossible to guarantee against cracking yet attempts can be made to minimize development of crack. Some prevention could be taken care of during the construction process itself. Any lack of attentiveness can lead to a cause for damage in the building in its future, which can also lead to the failure of structure. And also, not all type of crack requires same level of attention. Cracks may occur due to various reasons, as discussed earlier. The occurrence of cracks cannot be stopped but particular measures can be taken to restrict them to reduce the level and degree of consequences. The potential causes of crack can be controlled if proper consideration is given to construction material and technique to be used. Generally speaking, for causes and prevention of cracks in particular case it is necessary to make careful observations. In case of existing cracks, after detail study and analysis of crack parameters, most appropriate method of correction should be adopted for effective and efficient repair of crack.

5. A Brief Study on Causes of Cracks, Prevention and Pattern of Cracks on Concrete. (Date 2018). Nidhi Pise et.al. This paper can be divided into four sections. The first sections considers the presentation of cracks and approximately the researchers has to be tells that previous attempts at the second part. The third section contains types of cracks. The last section contains the causes of the cracks and its preventive measures to be followed to treat cracks before construction from any type of structure. Considering the proper structure of building materials and the appropriate steps to be taken to control cracks. We focus on the main causes of cracks and preventive measures should be taken in the first place, our structure should be safe.

6. Development of cracks in concrete, preventive measures and treatment methods: A review. (Date 2016). Rajveer Singh Narwaria et.al. This paper comprises of four parts. First paper gives information about the introductory part of cracks. Second part says about causes of cracks i.e. what are the reasons by cracks are generated, what are the various causes which enhances cracks formation. Third part says about how the prevention can be done so that the cracks are not generated. And fourth part gives information about, what are the treatment measures by which the cracks can be treated as such. Lastly it can be concluded that if proper care and supervision is taken then the formation of cracks can be prevented and if the formation still occurs then according the cracks suitable measures can be done to treat it. Epoxy based resins is one such resins if properly used to treat cracks then epoxy treatment serves good as compare to the damaged parts.

3. METHODOLOGY

To conduct this case study on building cracks, we followed the following methodology:

Site Visit: We conducted a site visit to the commercial building in a coastal area to identify the location and extent of the cracks.

Interviews: We interviewed the building owner, contractor, and construction workers to gather information on the building's construction process, materials used, and any other relevant information.

Inspection: We conducted a detailed inspection of the building's foundation, structure, and construction materials to identify any potential causes of the cracks.

Analysis: We analyzed the data gathered from the site visit, interviews, and inspection to identify the probable causes of the building cracks.

Prevention Strategies: Based on our analysis, we recommended preventive strategies to address the identified causes of the building cracks.

Implementation: We recommended the implementation of preventive measures to the building owner and contractor for future construction projects.

3.1 causes:

After a detailed investigation, we identified the following causes of the building cracks:

Foundation Issues: The building was constructed on a reclaimed land area, which had not been adequately stabilized. This caused the foundation to sink and shift, leading to cracks on the walls and floors.

Weathering: The coastal area experiences high humidity, salt spray, and extreme weather conditions, which caused the concrete to expand and contract, leading to cracks.

Poor Construction Practices: The contractor did not follow the recommended curing process, which led to premature drying of the concrete, causing cracks.

3.2 Prevention:

To prevent building cracks, the following preventive measures can be implemented:

Proper Site Investigation: A detailed site investigation should be carried out before construction to identify any potential hazards, such as unstable soil or weak subsoil layers.

Foundation Design: The foundation design should consider the site investigation findings and be designed to support the structure adequately.

Proper Curing of Concrete: The concrete should be cured correctly, following the recommended curing process, to ensure its strength and durability.

Use of Appropriate Materials: The building materials should be selected based on the site conditions and weather patterns to prevent any adverse reactions.

4. CONCLUSION

Building cracks are a common occurrence that can be prevented by following proper construction practices. In this case study, we identified the causes of building cracks and suggested preventive measures to ensure the safety and longevity of the building. Proper site investigation, foundation design, concrete curing, and use of appropriate materials can prevent building cracks and ensure the structural integrity of the building. We can't eliminate cracks but we can repair and reduce it. We have used old school method for crack repairing. As India lies in seismic zone hence cracks are formed.

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Experimental Study on Pervious Concrete Made of CCW and Steel Slag

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ABSTRACT

A unique kind of concrete known as "pervious concrete" is made to easily allow water to pass through it. By allowing the water to recharge groundwater supplies, this helps to reduce runoff from a site. It is also referred to as porous pavement, permeable concrete, no fines concrete, and porous concrete. Because larger aggregates and less fine aggregates are used to make pervious concrete, the concrete is filled with numerous tiny holes. Water can seep through these pores in the concrete and into the ground below. The concrete has a high void content of roughly 30% because it contains less fine components. Pervious concrete is a green building material that helps to solve a variety of environmental issues. In this study, the feasibility of using crushed concrete waste (CCW) and steel slag (SS) in the production of pervious concrete was investigated. Crushed concrete waste and steel slag used as partial replacements for coarse aggregates. The fresh and hardened properties of pervious concrete were evaluated by conducting tests on mixtures with varying percentages of CCW and SS. In addition to the sustainable advantages of using waste materials in concrete production, the use of CCW and SS also helps reduce the environmental impact by diverting waste from landfills and reducing the consumption of natural resources. This study emphasizes the potential of using CCW and SS as sustainable alternatives to traditional construction materials in practices and material the production of pervious concrete. It also highlights the importance of sustainable construction s in addressing environmental concerns and promoting sustainable development. The water-cement ratio was kept at 0.40 and the mix proportions with aggregates size (12.5mm to 16mm) respectively. Properties of pervious concrete e.g. compressive strength and permeability test at 7&28 days have been studied experimentally.

Keywords: Pervious concrete, Crushed concrete waste (CCW), Steel Slag (SS) Mix proportion, Permeability, porosity, Compressive Strength.

1. INTRODUCTION

With the use of modern procedures, we can now build structures in just one month thanks to fast advancements in our methods. Notwithstanding these developments, concrete is still necessary for building structures at a reasonable cost. The Latin root of the term "concrete" means "to grow together." It is created by combining cement, aggregate, and water, and when a chemical process known as hydration takes place, it hardens. Compared to cement, the amount of water determines the strength of concrete the most. Concrete can bleed excessively and become weaker if there is too much water present. We must mix the concrete with the appropriate volume of water to ensure that it is sturdy.

High-performance concrete usually contains ordinary Portland cement, but the concrete industry commonly uses various sub-products in cement-based materials. Pervious concrete is a network of voids to allow air or water to pass through. This allows water to drain through and replenish groundwater, unlike traditional concrete. This innovative material is sometimes referred to as No Fines Concrete. Pervious concrete is unique because it doesn't a unique material made of coarse aggregate, cement, and water, with little to no sand, creating contain sand or fine aggregates, allowing it to have 15-30% void space. The pores in pervious concrete range from 0.08 to 0.32 inches (2-8mm), which permits water to flow through without causing any damage. Due to climate change, many areas are experiencing water scarcity, which is why more and more communities and businesses are switching to pervious concrete. This material offers durability and low life-cycle costs similar to traditional concrete, while also allowing storm water to flow through and replenishing local water systems.

The global economy has always benefited greatly from the construction sector. However, one of the most widely used construction material is concrete. Concrete, is produced with a significant amount of carbon emissions. Concrete can now be produced in alternative ways, one of which is pervious concrete,

which is created by combining steel slag and crushed concrete waste. Steel slag is a by-product of the steel industry, and crushed concrete waste is a by-product of construction and demolition work. Utilizing these leftover materials in the creation of pervious concrete reduces waste as well as the need for new materials, lowering the carbon footprint associated with the production of concrete.

The advantages of using pervious concrete, which is created from crushed concrete waste and steel slag, will be discussed in this paper, along with its potential for use in a variety of construction projects, durability, and environmental impact.



Fig 1. Pervious concrete.

2. LITERATURE REVIEW

This chapter provides an overview of the research that has been done in the field of concrete, specifically relating to the creation of pervious concrete structures. In order to create a pervious concrete structure with the right level of permeability and strength, several factors need to be taken into account such as the amount of water and cement used, the type and size of aggregate, and the method of compaction. Over the past few decades, many researchers have conducted numerous experiments comparing these various elements to determine the best combination for creating optimal pervious concrete structures.

S.T. Borolo et.al. (2016) in their paper entitled “Replacement of Fine Aggregate by Steel Slag”. In this Research paper M30 concrete with high volume steel slag Replacement for fine aggregate is studied to examine the Changes in properties of compressive strength, flexural Strength and split tensile strength. After comparison with Conventional concrete property results shows that replacing About 0%, 25 % and 50% of steel slag aggregates by that of Fine aggregate will not show any harm and any adverse effect to the durability and strength. The test is carried out after 7 and 28 days of curing.**Sultan A. Tarawneh, et.al. (2014)** in their study entitled “Effect of using Steel Slag aggregate on Mechanical Properties of Concrete”. In this experiment their investigation is to evaluate the physical and mechanical properties and Characteristics of steel slag aggregate concrete in comparison with the typical crushed limestone stone aggregate concrete. After proper investigation they finds that compressive Strength at the stage of 7 days shows much more strength as Compared to that of 28 days. They conclude that the added slag Show good results at early age. Hence steel slag could be 23 Utilized as partial replacement.**Shiva Kumar et al (Jun-2014)** In their paper on (Use of building demolished waste as coarse aggregate porous concrete). Conducted an experimental study in which they have Evaluated the mechanical properties of concrete for nominal mix and the mix design as per mix design codes IS 10262-2009 and IS 12727-1989. In this paper, 40:60, 50:50 and 60:40 ratio of coarse aggregates and building Demolition wastes are used with w/c ratio 0.4 to 0.48. Compressive strengths for 28 days as average of three Samples. By their study it is found that porous concrete results are encouraging and has been found to be Comparable to the conventional concrete. This paper gives idea about the mechanical properties to be Determined for my hardened pervious concrete.**S. Shukla et al (2009)** In

their work on (Performance of pervious concrete with recycled concrete Aggregates) have presented the characteristics of pervious concrete having optimum quantity of (RCA).

3. MATERIALS AND METHODS

3.1 Materials for Trial Mix

Cement- Ordinary Portland Cement, grade 43 confirming to IS 8112: 1989 is used in this project.

Crushed Concrete Waste (CCW) - Locally available crushed concrete waste aggregates of nominal size 12.5mm and 20mm are used for the trial. Following table shows the physical properties of CCW aggregates.

Table 1. Properties of CCW

Nominal maximum size (mm)	20mm
Bulk density (kg/m ³)	1250
Specific Gravity	2.53
Open porosity (wt. (%))	5.03
Absorption (wt. (%))	3.67
Moisture content (wt. (%))	1.57

Steel Slag- Steel slag is the waste slag discharged in the process of steelmaking. Steel slag is mainly composed, of calcium, iron, silicon, magnesium and a small amount of oxides such as aluminium, manganese. Steel slag is a kind of industrial solid waste with large displacement, and its discharge amount is about 15% – 20% of the crude steel output.

Water- For casting and curing water used is free from organic matter and portable water is used as per clause no. 5.4 of IS 456- 2000.

3.2 METHODOLOGY

The methodology adopted and material characterization and design mix is carried out is presented in the form of flow chart and parameters.

- Collection of Crushed Concrete Waste (CCW) from construction site.
- Sieve analysis of CCW and steel slag.
- Mix Design Calculations.
- Preparation of mix design proportion for pervious concrete.
- Casting of pervious concrete with CCW waste aggregates. Then replace CCW (10%, 20% and 30%) With steel slag aggregate.
- Casting of cubes with different percent of steel slag.
- Demoulding after 24 hours and cured till the day of testing.
- Curing of cubes for 7 days & 28 days.
- Determination of hardened properties of pervious concrete.
- Determination of compressive strength.
- Determination of permeability coefficient (k) mm/sec.



Fig.1: Material Characterization and Design Mix

3.3 Mix Design Calculations

Mix Proportion for M30 Grade of Concrete:-

Stipulation for Proportioning:

- Mix Grade: M30
- Type of cement use: OPC 43 grade confirming as per IS 269:2015

- Maximum nominal size aggregate: 20 mm
- Type of aggregate: Crushed concrete waste aggregate
- Specific gravity of cement: 3.15
- Specific gravity of CCW coarse aggregate: 2.53
- Condition SSD.

Step-1 Target Strength for Mix design:-

IS 10262: 2009(from page no-1) the target Strength is given by,

$$F/Ck = fck + 1.65 \times S$$

Where:

F/Ck = target mean compressive strength at 28 days in N/mm²

Fck = characteristic of compressive strength at 28 days in N/mm²

S = standard deviation in N/mm²

1.65 is tolerance factor

The value of standard deviation can be assumed from Table 8 of IS 456:2000 or from Table 1 of IS 10262:2009.

$$F/Ck = fck + 1.6 (S)$$

$$F/Ck = 30 + 1.65 (S)$$

$$F/Ck = 38.25 \text{ N/mm}^2$$

Step-2 Determination of water cement ratio:-

From Table 5 of IS-456:2000.

Maximum water/cement ratio is 0.45

We are adopting W/C ratio as 0.40

Step-3 Determination of water content: -

- Water content depends upon the maximum size of Aggregate
- From Table 2 of IS 10262:2009
- Maximum water content for 20 mm size aggregate Is 186 litres
- The obtained 186 litres is for slump value of 25-50 mm (IS 10262:2009 Clause 4.2)

So, we have to be increase the total of 15% in order to achieve 175mm slump,

$$186 + 15\% \text{ of } 186 = 213.9 \text{ litres}$$

If we use admixture, the water content can be reduced by 15%,

∴ Actual water content = 213.9 – 15% of 213.9 = 181.8 litres.

Step-5 Calculation of cement content: -

As Per Table 5 IS 456:2000

Water cement ratio = 0.40

Actual water content is 181.8 litres

Cement content = Water content / “w-c ratio” = 181.8 / 0.40 = 454.53 kg/m³.

Step 6 Mix design calculation per unit volume of the concrete:-

- Volume of concrete is 1 m³
- $$\text{Volume of cement} = \frac{\text{mass of cement}}{\text{specific gravity of cement}} \times \frac{1}{1000}$$

$$= \frac{454.53}{3.15} \times \frac{1}{1000}$$

$$= 0.144 \text{ m}^3.$$
- Volume of water = 181.8 Litres = 0.1818 m³
- Volume of voids assuming (15%) = 0.15 m³
- Volume of CCW aggregate:-

$$= \text{Total volume of Conc.} - (\text{volume of cement} + \text{volume of water} + \text{volume of voids})$$

$$= 1 - (0.144 + 0.1818 + 0.15) = 0.5193 \text{ m}^3$$
- Mass of coarse aggregate:-

$$= 0.5193 \times 1 \times 2.53 \times 1000 = 1313.82 \text{ Kg/m}^3$$
- Mass of steel slag aggregate:-

[1] Replacing 10% of CCW aggregate with Steel slag:-
Specific gravity of steel slag as 2.67
10% of 1313.82 Kg/m³ = 131.382 kg.

[2] Replacing 20% of CCW aggregate with Steel slag

20% of 1313.82 kg/m³ = 262.764 kg.

[3] Replacing 30% of CCW aggregate with Steel slag

30% of 1313.82 kg/m³ = 394.146 kg.

MIX PROPORTIONS FOR TRIAL: -

Water / Cement Ratio = 0.40

Water content = 181.8 Litres

Cement content = 454.53 kg

CCW Coarse Aggregate = 1313.82 kg.

4. RESULTS AND DISCUSSION

4.1 Compressive Strength Result:

Table 2. Compressive Strength for different Mix

Mix	Water Cement Ratio	Day of Curing 7 day	28 day
Mix-1 (10% steel slag)	0.40	8.0 N/mm ²	18.26 N/mm ²
Mix-2 (20% steel slag)	0.40	11.77 N/mm ²	23.11 N/mm ²
Mix-3 (30% steel slag)	0.40	10.88 N/mm ²	20.44 N/mm ²

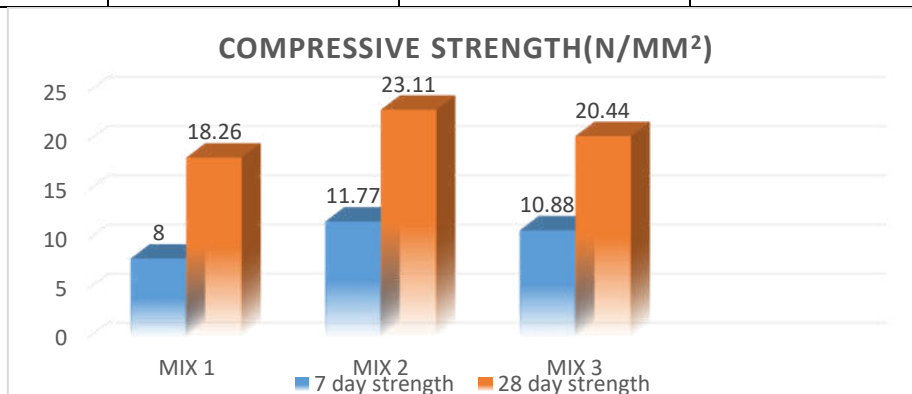


Fig.2: Comparison of Compressive Strength.

4.2 Permeability Test Results:

Table 3. Permeability Coefficient (k)

MIX	Permeability Coefficient k mm/sec
Mix-1 (10% steel slag)	5.85
Mix-2 (20% steel slag)	6.32
Mix-3 (30% steel slag)	6.11

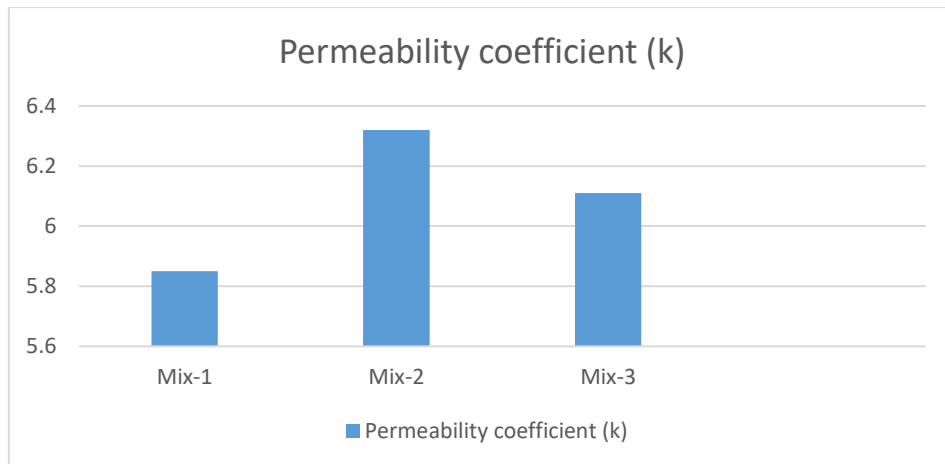


Fig.3: Coefficient of Permeability (k)

5. CONCLUSIONS

As a result, the use of pervious concrete made from steel slag and crushed construction waste (CCW) has demonstrated promising results in terms of its mechanical and permeability properties. In pervious concrete, the addition of CCW and steel slag as substitutes for traditional aggregates can efficiently reduce waste disposal and minimise the use of natural resources while improving the material's overall performance.

Furthermore, by reducing storm water runoff and fostering groundwater recharge, the use of this type of pervious concrete in construction projects can aid in reducing the negative effects of urbanisation. It's crucial to remember that additional study is required to fully comprehend this material's long-term resilience and sustainability, as well as its potential for widespread commercial use. Overall, pervious concrete made from CCW and steel slag is a promising method for building resilient and long-lasting infrastructure.

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Effect of GGBS on Durability Properties of Concrete

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ABSTRACT

For high rise buildings and design of important structures the high strength and high-performance concrete is widely used universally. Many researchers largely focuses on only strength factor and less focus for durability and serviceability of structure while designing. Normally design life of reinforced concrete structure is around 70 to 100 years but many times it may not be achieved due to various factors, and one of them is material properties. The properties of materials used for design of high-performance concrete need to check according to Indian Standard to fulfill strength criteria. But by using conventional materials may not fulfill durability criteria, for that need to use some cementitious materials to increase strength and durability property of concrete. Many researchers used different cementitious materials such as Micro Silica (MS), GGBS, Colloidal silica, Fly ash, etc. in concrete and studied durability property of concrete by various tests as RCPT, Water absorption, water permeability, effect of temperature on concrete properties. Now a days due to urbanization the skyscrapers constructed in metro cities. fire is one of the major factor to damage the concrete when concrete comes in to contact of fire. So, to observe properties of concrete during and after fire we need to focus on durability of concrete after fire. This paper focused on to study various durability properties of concrete for different percentages of GGBS.

Keywords - Strength, Durability, Fire, Concrete.

1. INTRODUCTION

Concrete is being used extensively in the construction sector each year, and it is projected that demand will rise soon[1]. Cement is the main ingredient in concrete, which is one of the most often used building materials. Concrete is more and more in demand as a building material. The output of cement is projected to just have jumped of around 1.5 billion metric tons in 1995 to 3.2 billion metric tons in 2016[2]. Regrettably, employing cement causes environmental harm and depletes the supply of raw materials (limestone). Worldwide, Portland cement manufacturing is rising 9% yearly. Today, the manufacture of Portland cement provides about 1.5 millions of tons of greenhouse gas emissions annually, or 7% of all emission of greenhouse gases to the earth's atmosphere[2]. In general, since the turn of the century, ground slag has been exploited as a cementitious material in concrete[3]. In instance, ground granulated blast slag seems to be the basis of a study from several studies on various partial cement replacement materials (GGBS).

1.1 Application of GGBS

In the United States and Europe, correspondingly, blast furnace residue (BFS) and steel ash and blast furnace (SFS) have a strong tradition of usefulness as industrial by products going back at least almost 100 years and 150 years, including both. For many years, concrete has used ground granulation blast furnace slag (GGBS) as a cementitious element and in composite cements. The fabrication of bricks from unground, granulate blast furnace slag was the first industrial, commercial employment (about 1859). (GBS). By the end of the nineteenth century, the first cements containing GBS had only been manufactured after it first cementitious characteristics were established in the second half of the century. From either the late 1950s, it has become increasingly popular to employ GGBS as a separately ground product added to the mixer along with Portland cement. Pure GGBS is often to as "slag cement" in some countries[8]. GGBS is being utilised as a weight-for-weight equivalent alternative for Portland cement. It is combined with regular Portland cement and/or similar pozzolanic ingredients to create sturdy concrete constructions. Because to its greater concrete durability, which increases a building's lifespan from fifty to one hundred years, GGBS is extensively utilised in Europe, and is being used more and more in the Americas and Asia (especially in China, India, Japan, and Singapore). In China, GGBS is primarily used as a clinker substitute in the manufacturing of blended slag and regular cement as well as a supplemental

cementitious material in the production of primed and site-batched concrete[9]. Benefits from cost reduction are now the primary and primary factor behind the implementation of GGBS. GGBS is used to make high-quality, enhanced slag cements, such as Portland Electric Arc furnaces Cement (Friendlier) and High Slag Coal Combustion Cement (HSBFC), with GGBS contents that generally range from 30 to 70%. They are also used to make durable ready-mixed or site-batched concrete. GGBS has stronger resistance to chloride intrusion, which lowers the danger of reinforcing corrosion, and offers high resistant to assaults by sulphate and other chemicals[10]. It also lessens the risk of damages brought on by the alkali-silica reaction (ASR). Unground GBS is acceptable as a standard weight concrete aggregate in addition to the features listed above. In the building of roads, it is also utilised as a foundation layer material. BFS aggregates are no longer utilised for surface layers, only for pavement surface bases and sub-bases due of their poor porosity. This slow rate of cementation is one of the main advantages of employing slag material in a stabilised pavement. Depending mostly on binder, the road material can be worked again for a period of two days or above after the initial mixing without losing any final strength. The degree of material fineness, which in turn influences the efficacy of both Gbm and GGBS in stabilizing Economics plays a role in turn. A compromise must be struck between the cost of creating a finer degree of both GBS and GGBS and the lesser amount of slag stabilising binder required to achieve an equal level of strength[8].

2. EFFECT OF GROUND GRANULATED BLAST SLAG ON THE CONCRETE

A. Effects on Fresh Concrete

This section gives a quick overview of how GGBS affects the characteristics of newly mixed concrete and how much of an impact it has. First of all, it should be highlighted that the effect of GGBS varies greatly depending on how much replacement is added to concrete mixes.

- **Setting Time**

While GGBF slag is utilized as a temporary replacement to Portland cement in conventional concrete, an increase in setting time is often anticipated. The quantity of the mix used, the ratio of water to cementitious ingredients, the properties of Portland cement, and the beginning warmth of the concrete all have an impact on how long it takes for the concrete to set[11]. Concrete made using GGBS often takes longer to set than concrete made with Portland cement. In general, setup time rose as GGBS content increased[6]. According to "Peter W.C. Leung," GGBS concrete needs more time to cure than concrete made with Portland cement, most likely because of the clean and glassy particle shapes of GGBS. As the percentage of GGBS replacements grows, so does the setting time. Low ambient temperatures can affect how quickly GGBS concrete sets[5].

Similar to this, "S. Arivalagan" claimed that the impact would be more noticeable at high concentrations of GGBS and/or cold temperatures. A longer setting time is helpful since there will be fewer joints because the concrete will be usable for longer. In warm weather, this is particularly helpful[12].

Hardy and Ait-Aider (1995) looked at how GGBS additives affected cement consistency and setting times. We utilised GGBS from one supply and cement from three other sources. 70% of GGBS was used to replace 40% of the cement. They came to the following conclusions: (i) consistency and cementitious materials results were nearly identical for all sample cement sources; (ii) participation of GGBS affected cement consistency, which decreased with increasing Weight fraction; and (iii) determining of cements increased with increasing GGBS content[6].

- **Workability**

In-depth research on workability was conducted by Fulton (1974), who proposed that a cement matrix including slag cements displayed enhanced workability as a result of the paste's higher paste concentration and higher cohesiveness[7]. According to Wood (1981), concrete with GGBF slag produced better workability and placement qualities than concrete without GGBF slag. He added that the GGBF slag's surface properties, which produced flat slip patterns in the paste[11], were to blame for this outcome. By partially substituting cement with 20%, 30%, and 40% GGBS at various ages to explore the workability elements of fresh concrete, S. Arivalagan discovered that the concrete's degree

of workability was typical, increasing from 26 cm to 27 cm to 28 cm. and it increased with the addition of GGBS[12].

In-depth research on workability was conducted by Fulton (1974), who proposed that a cement matrix including slag cements displayed enhanced workability as a result of the paste's higher paste concentration and higher cohesiveness[7]. According to Wood (1981), concrete with GGBF slag produced better workability and placement qualities than concrete without GGBF slag. He added that the GGBF slag's surface properties, which produced flat slip patterns in the paste[11], were to blame for this outcome. By partially substituting cement with 20%, 30%, and 40% GGBS at various ages to explore the workability elements of fresh concrete, S. Arivalagan discovered that the concrete's degrees of workability was typical, increasing from 26 cm to 27 cm to 28 cm.

Sun-Woo Kim and others. In his study, he used experiments to look at how GGBS affects a concrete's capacity to be worked. The outcomes were contrasted with the control concrete, which was regular Portland Cement concrete devoid of GGBS. The growth of compressive strength in concrete with GGBS resulted in a slower rate of development at an early age, according to the results. Yet as a comparison with the control mix, the strength growth after 91 days reveals a larger strength improvement[15].

"Asha Philips et al." advised utilising GGBS cemented for structural purposes after researching the mechanical characteristics of geopolymer concrete made with GGBS.

B. Effect on Hardened Concrete

This section gives a quick explanation of how GGBS affects the characteristics of hardened concrete and how much of an impact it has.

• C.Compressive Strength

In order to study the strength & strength efficiency characteristics of hardened concrete, "S. Arivalagan" substituted 20%, 30%, and 40% GGBS for cement at various ages. The specimens examined at 7 and 28 days demonstrated an improvement in strength properties for just a 20% replacement of cement, as shown in the table below. After 20% cement substitution, the concrete's split tensile and flexural strengths also increased[12]. Vinayak Awasare investigated the strength properties of M20 concrete grade with GGBS substitution at levels of 30%, 40%, and 50% and compared it to normal concrete. Nowadays, manufactured sand is utilised to produce synthetic sand, thus the goal of this study is to determine the appropriate replacement % utilising both natural and crushed sand. the M20 grade crushed sand and OPC cement used to make the plain cement concrete. The highest compressive strength at 30% GGBS replacement is 29.78 Mpa, while the compressive strengths at 20%, 40%, when 50% of concrete are 27.11 Mpa, 26.37 Mpa, and 22.22 Mpa, respectively, as opposed to the 25.61 Mpa value of ordinary concrete made from cement over 28 days[16].

"B.Mangamma et. al." look at GGBS's partial substitution in the manufacturing of concrete. By substituting GGBS for 10%, 20%, 30%, 40%, and 50% of both the reinforcing agent for M20 and M30, he tested the strength development of a concrete. B.Mangamma draws the conclusion that the cement substitute of GGBS both increases and decreases strengths at 10%, 20%, and 30%[17].

Also, "Santosh Kumar Karri et al." chose 30%, 40%, and 50% as different cement amounts and cured the concrete specimens of grades M20 and M40 for 28 and 90 days, respectively. He discovered that when the GGBS replacement level rises, concrete becomes more workable. He noted that for the two types of M20 and M40 grade concrete, the concrete stress strength, split tensile strength, and flexural strength are reached at 40% cement substitution, after which the strength marginally declines.

"Maitri Mapa et.al" state that. The impact on strength loss brought on by GGBS inclusion is lessened by lengthening the cure days. This might be as a result of the GGBS replacement's first delayed pozzolanic reaction, which is mostly dependent on the presence of hydroxide and silica. The process of gaining strength for the Coarse aggregates mixed cement takes longer since this response rate may have accelerated with age. Nevertheless, in CEM20GS plaster specimens for all days and in CEM40GS mortar specimens after 28 and 90 days of curing, the effect of replacing GGBS in the test of compressive strength is not as noticeable[18].

The impact strength of concrete mix significantly reduces at young ages with the higher replacement ratios of GGBS in cement, while the adverse effect of GGBS removal on mechanical properties has been found quite notably for 60 % and 80 % replacement. With CEM20GS, the strength declines by 9.58% at day one, 15.87% at day three, 20.75% at day seven, 9.11% at day twenty-eight, and only 4.08% at day ninety in contrast to control cement cubes. In contrast with control cement mortar cubes, CEM40GS mortar cubes demonstrate a strength decline over time of 14.25% on the first day, 31.16% on the third day, 30.45% on the seventh day, 12.75% on the 28th day, and 6.62% on the 90th day. As compared to control cement mortar cubes, the strength of CEM60GS mortar cubes weakens by 61.70%, 64.96%, 64.03%, 43.59%, and 28.11% at the first, third, seventh, 28th, and 90th days of curing, respectively[18]. In general, the influence of GGBS marginally raises the elastic properties of concrete for a particular compressive strength as opposed to PC concrete since the elastic module of concrete is proportional to its compressive strength

1. Permeability and Chemical Stability

The geometry of the concrete matrix becomes denser when GGBS is present in concrete, improving its durability properties[12]. In "Dongqing Zhang et. al.," the chloride permeability of concrete containing fly ash and binary slag (20, 30, and 40% of binder) is researched (the ratio of slag and fly ash 5:5, 4:6 and 6:4). The findings demonstrate that concrete containing fly ash has a lower chloride ion permeability than reference cement (without mineral admixtures). The chloride conductivity is quite low, especially when fly ash level is 20%. In general, fly ash plays two significant functions when it is admixed into concrete in place of some cement: (1) a possible pozzolanic interaction with calcium hydroxide; (2) the filling of the pores with micro-aggregate. Moreover, tests on the chloride penetration permeability of concrete made with slag revealed that the permeability substantially reduces as the amount of slag increases[21].

3. CONCLUSIONS

Following are some pertinent findings based on research from several researchers on using GGBFS to partially replace cement:

- All pozzolanic materials work well to lower concrete's permeability much below the regulated level.
- As GGBFS replacement level rises, concrete's usability rises as well.
- The water/binder ratio lowers in terms of workability as the GGBS concentration rises, indicating that the GGBS has a beneficial impact on workability.
- Compressive strength often declines with an increase in GGBS % at a young age but increases with an increase in GGBS percentage at a later age.
- Split tensile strength and flexural strength also decreases with the increase in percentage of GGBS at early age but it increases with increase in percentage of GGBS at later ages.
- The strength grows up to a certain level of replacement, then it starts to decline, and eventually, as people age, the strength increases. This is because the interaction between GGBS and Ca(OH)₂ occurs slowly.
- The heat of hydration for GGBS cement is slower, which reduces the possibility of shrinkage cracking and makes this cement more suitable for use in hot building zones.
- When the amount of GGBFS grew, concrete's resistance to chloride and sulphate increased.
- GGBS fails the first absorption test, demonstrating that the concrete mix surfaces were essentially impermeable.
- As GGBS costs roughly the same as cement and reduces the amount of cement in concrete, it helps to lower the cost of building 25 - 50% less than that of OPC.
- Reusing the slag reduces pollution to the environment (reduced CO₂ emission)
- The action of GGBS improves the mechanical properties of concrete somewhat for a given compression strength when compared to PC concrete, making it resistant to the effects of

carbonation and the inclusion of sulphide.

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Generation of Hydropower from Treated Sewage Water by Using Kaplan Turbine

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ABSTRACT:

Increased Urban migration is one the main causes of generation and discharge of both domestic and industrial Waste water. This has successively led to the establishment of Treatment units. Waste water treatment processes are requiring energy & power consumption. Hence it becomes imperative to identify an alternate cost effective and sustainable way to reduce dependence fuel consumption also it consequently minimizing harmful carbon emissions. The treated Wastewater, being produced and processed in large volumes can also be considered to be a source of renewable energy.

The growing demand for the Industrial Revolution would drive development as well. At the beginning of the Industrial Revolution in Britain, water is main source of power for new inventions such as Richard Arkwright's water frame. Although the use of water power gave way to steam power in many of the larger mills and factories, it was still used during the 18th and 19th centuries for many smaller operations, such as driving the bellows in small blast furnaces and grist mills, those built at Saint Anthony Falls.

Keywords: Sewage Water, Hydropower, Kaplan Turbine.

1. INTRODUCTION

Sewage treatment is the process of removing contaminants from wastewater, primarily from household sewage. Physical, chemical, and biological processes are used to remove contaminants and produce treated wastewater that is safer for the environment. A by-product of sewage treatment is usually a semi-solid waste or slurry, called sewage sludge. The sludge has to undergo further treatment before being suitable for disposal or application to land. Sewage treatment may also be referred to as waste water treatment.

Sewage is generated by residential, institutional, commercial and industrial establishments. It includes household waste liquid from toilets, baths, showers, kitchens and sinks draining into sewers. In many areas, sewage also includes liquid waste from industry and commerce. These parathions and draining of household waste into grey water and black water is becoming more common in the developed world, with treated grey water being permitted to be used for watering plants or recycled for flushing toilets. In highly regulated developed countries, industrial effluent usually receives at least pre-treatment if not full treatment at the factories themselves to reduce the pollutant load, before discharge to the sewer. This process is called industrial waste water treatment or pre-treatment. The same does not apply to many developing countries where industrial effluent is more likely to enter the sewer if it exists, or even the receiving water body, without pre-treatment.

Industrial waste water may contain pollutants which cannot be removed by conventional sewage treatment. Also, variable flow of industrial waste associated with production cycles may upset the population dynamics of biological treatment units, such as the activated sludge process.

2. LITERATURE REVIEW

“Hydropower Opportunity in the Sewage water” American International Journal of research in Science, technology, Engineering and Mathematic, ISSN: 2328-3491, Archana Tamara, S.K. Pandey and, S.C. Dubey [5-6]. They provided an overview of the nature of hydropower that can be produced from environment friendly sewage treatment process. Theory of classification of hydropower generated, evaluation of the materials to be selected, selection of turbines, generators, pressure valves, minimum head requirement which was considered to be 2 m. This paper tried to promotion of reliable, highly stable source of power supply and its feasibility. “Reliable energy recovery in an existing municipal wastewater treatment plant with a flow-variable micro hydropower system” Elsevier, Kyu-Jung Chae, In-Soo Kim, Xianghao Ren, Kyeong-Ho Cheon. [5-7]. Compared their liable renewable technologies and energy generated from treated sewage water. The major highlight of this paper was the applicability

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3. MATERIALS AND METHODS

3.1 Methodology Adopted for Study

The general methodology adopted to determine the possibilities for hydro power generation from treated wastewater included selection of a potential site with appropriate discharge. After identification of the source, Discharge-time studies were conducted for certain duration. With the obtained parameters, Design of the Kaplan Turbine and other components of the system was carried out. Based on power output feasibility of project was determined such as power generated per year, Benefit cost ratio, payback period.

3.2 Selection of Waste Water Treatment Plant

Secondary Wastewater Treatment Plant that serves for treatment of institutional water and storm water. The process design involves physical and biological process, treatment capacity of 18000 liters.

3.3 Determination of Water Quality

The Water quality characteristics were determined by adopting the Electrical Conductivity of Water samples. Material used is Self-Contained Conductance Instruments (Conductivity Meter), Thermometer, Conductivity cells etc. Reagents used are Conductivity water samples, Standard Potassium Chloride Solution etc. The Calibration of the cell is carried out after thorough rinsing and dipped into the required solution to obtain a steady reading. The temperature of the sample is also simultaneously recorded.

3.3.1 To determine the Ph of Water Samples

Apparatus used are Burette, pH meter, glass beakers, buffer tables etc. Reagents used are Standard Buffer solutions etc. The Calibration of the pH meter is carried out after thorough rinsing, by fixing the temperature to 25°C. The electrodes are then dipped in a buffer solution of pH 4, and the meter is calibrated. The procedure is repeated with the second standard buffer solution and the instrument is calibrated. Further, it is dipped into the required solution to obtain a steady reading.

3.3.2 To Determine the Turbidity of water samples

Apparatus required is Nephelo Turbidity Meter and Reagents Required is Standard Stock Solutions for Nephelo Turbidity test. The sample holder is filled up with distilled water and placed in the instrument for adjustment to zero Reading. The Standard solutions are then kept in the sample holder and adjusted

to 150 NTU. Turning the switch rage to 500. To know the turbidity, the unknown water samples are kept in the sample holders and are measured.

3.3.3 To determine Total Acidity and Alkalinity of water

Apparatus Required: Burette, pipette, conical flask, measuring jar, volumetric flasks Reagents Required:

- For Total Alkalinity: 0.02N Sulphuric acid, Methyl Orange Indicator, Phenolphthalein Indicator, Sodium Thiosulphate 0.1N

- For Total Acidity: 0.02N Sodium Hydroxide Solution, Methyl Indicator, Phenolphthalein Indicator, Sodium Thiosulphate 0.1N Methodology Adopted for Total Alkalinity: The 25 ml of the Sample is taken in a conical flask with Methyl orange indicator added. It is titrated against sulphuric acid and the end point is obtained at pale yellow to pale pink. The Procedure is repeated to obtain concurrent readings.

For Total Acidity: The 25 ml of the Sample is taken in a conical flask with Phenolphthalein indicator added. It is titrated against sodium hydroxide solution and the end point is obtained at colourless to pale pink. The Procedure is repeated to obtain concurrent readings.

3.3.4 To Determine the Density of the water samples

Apparatus Required: Weighing balance, measuring cylinder of 100 ml capacity Methodology Adopted: the empty weight of the measuring cylinder is taken, then the weight of the cylinder with water is measured. The density of the sample is obtained by using the simple mass and density relationship given by: $\text{Density} = \frac{\text{Mass of the water sample taken}}{\text{Volume of the water sample taken}}$.

3.3.5 To determine the viscosity of the water samples

Apparatus required: Ostwald's Viscometer, Beakers, Methodology adopted: the viscometer is filled up to a certain level on one side of the bulb, after thorough cleaning. After releasing the pressure and suction note the time required for the fall of the liquid to the bottom meniscus.

3.4 Kaplan turbine

Kaplan turbines have been developed to be the most employed type of turbines for low heads and comparatively large discharges. The Kaplan turbines are fairly suitable for the purpose of three main reasons.

- Relatively small dimensions combined with high rotational speed
- Favorable progress of the efficiency curve
- large overloading capacity

The runner has only a few blades radial oriented on the hub and without an outer rim. The water flows axially through. The runner blades have a slight curvature and cause relatively low flow losses.

Kaplan turbine is most appropriate for operation with a low head and a large amount of discharge. Owing to adjustable runner blades it offers the significant advantage to give high efficiency even in the range of partial load, and there is little drop in efficiency due to head variation or load.

Kaplan turbine is axial-flow reaction turbines, generally used for low heads. The Kaplan turbine has adjustable runner blades as shown in Fig.4 and may or may not have adjustable guide vanes. If both blades and guide-vanes are adjustable it is described as double-regulated. If the guide-vanes are fixed it is single-regulated. Unregulated propeller turbines are used when both flow and head remain practically constant.

3.4.1 Advantages of the Kaplan Turbine

- This turbine works more efficiently at low water head and high flow rates as compared with other turbines.
- This is smaller in size.
- The efficiency of the Kaplan turbine is very high as compared with other types of hydraulic turbines.
- The Kaplan turbine is easy to construct and
- The space requirement is less.

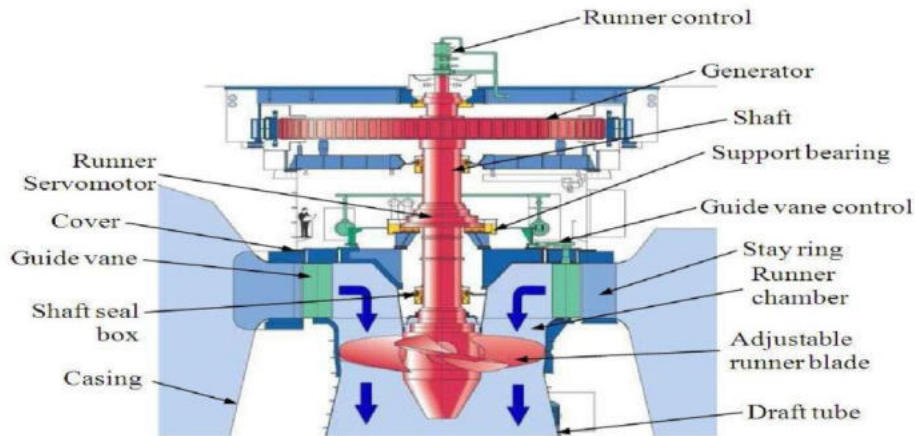
3.4.2 Disadvantages of Kaplan Turbine

- The position of the shaft is only in the vertical direction.
- A large flow rate must be required.
- The cavitation process is the most significant disadvantage. Due to pressure drops in the draught tube, this occurs.

3.4.3 Main Components of Kaplan Turbine

Main Components and Functions of Kaplan Turbine:

The main components of the Kaplan turbine are shown in Figure. As having adjustable runner blades, the construction of Kaplan turbine becomes naturally a bit complicated. The runner blade operating mechanism consists of a pressure oil head, a runner servomotor, and the blade operating rod inside the shaft etc.



Complete Assembly of Kaplan Turbine

4. RESULTS AND DISCUSSION

4.1 Design of the turbine

The different experiments are conducted on water with different degrees of treatment. It provides the details of the maximum power generated and also a comparison of the performance the turbine at both constant head and constant speed analysis. The Results obtained from Experiments are shown in table 1.

Hydroelectric potential is calculated from design discharge power required for generation of 8000 watts. Guide vanes are designed to find out the Length of Guide blades, Outlet diameter and Number of blades required. Draft Tube also designed to know the inlet & outlet diameter. Design of Blade Profile is required to know the Energy Savings per year. Result data of main characteristics are shown in table 2.

4.2 Estimation of Project Cost

Cost of Kaplan turbine = 4, 60,000

Intake structure and Penstock = 25,000/-

Power House = 70000/-

Total Expenses = 5, 55,000

Assumptions from other micro hydro power project.

- 1) Operation cost = 20% of total cost
- 2) Maintains cost -- 0.5% of civil work cost
2% of Hydro mechanical electrical cost
- 3) Annual depreciation charges = 2% total cost
- 4) Life of project 20 Year after commencement
- 5) Duration of project 1 year completion
- 6) Operation cost = $0.2 \times 95000 = \text{Rs } 19000$
- 7) Malignance cost
 - a) 10% of civil structure cost $0.1 \times 95,000 = 9500$
 - b) Depreciation charges = $0.02 \times 95000 = 1900$
 - c) Interest charges = $0.1 \times 95000 = 9500$
 - d) Miscellaneous Incidental charges = $0.02 \times 95000 = 1900$

Therefore, total annual expense Rs. 32300 Consider 10% losses in the transmission and other losses of energy

Annual revenue = Total units \times selling price per unit = $123187.5 \times 5 = 615937$

Benefit cost Ratio = annual revenue / annual expenses = $72445.2/32300 = 2.24$

Pay Back Period = Total investment cost / Savings per year = $587300/615937$

=0.95 therefore, 1 year

5. CONCLUSION

Everyone is here to make things simple and it is only possible when we analysed every concept to apply in real world. In this paper we have presented detailed assessment of hydro power generation from treated sewage water using Kaplan turbine. Installing micro-hydropower plant in Sewage treatment plant is very useful concept because electricity generated from turbine is going to use for working of sewage treatment plant. The cost of installation is more but it can be recovered within a short period. The cost benefit ratio is 2.24 whereas the payback period is 1 years approximately. The Installation of this concept will also result in annual savings. Thus, it is concluded micro hydro power plants is a renewable, efficient and environmentally friendly solution.

ACKNOWLEDGEMENT:

It gives us an immense pleasure to present the report of the Project undertaken during B.E. Academic Year 2022-23. We especially thankful to Prof. Akram Mansuri & Prof. Santosh Kinayekar (Project Guide & Co- Guide), for their constant support, guidance and encouragement which brought enthusiasm and boosted our moral to complete the project. We are grateful to express our profound gratitude for their guidance.

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We also express our thanks to all staff of Civil Engineering Department for the support. Last but not the least, we acknowledge our friends for their contribution in the completion of the Project.

TABLE AND FIGURES:

Table 1: Represents the Different tests conducted on water samples

Tests Conducted	Name of the Sample	
	Standard water	Treated water from STP
Density (kg/m ³)	1000	1250
pH	7.20	7.56
Turbidity	0.4	3.1
Total Acidity	8	24
Total Alkalinity (mg/l)	36	72
Viscosity (poise)	0.010	0.018
Total Dissolved Solids	181	582.0
Conductivity	0.34	0.70

Table 2: Relationship between Head and Turbine Type

Type of Turbine	Limit of Head	Specific Speed
-----------------	---------------	----------------

Pelton turbine	300 to 2000 m	4 to 70
Cross flow	10 to 100 m	40 to 200
Francis	2.5 to 450 m	60 to 400
Kaplan, Propeller	1.5 to 70 m	300 to 1100
Fixed blade	1.5 to 30 m	1000
Propeller		

Table 3: Design Details implemented for the design of turbine

DETAILS:
1. Design Discharge (Q) = 0.5m ³ /s
2. Pipe diameter (inlet and outlet) = 2"
3. Propeller diameter = 6.9m
4. Number of blades = 5 (fixed blades)
5. Hub diameter = 0.28m
6. Shaft diameter = 1.99m
7. Blade angle = 72.56 degrees from the vertical plane
8. Tank capacity = 6*4*2.5m
9. Centrifugal Pump of 2 HP, Generator 220V

Table 4: Result Data of Main Characteristics

Parameter	Symbol	Value	Unit
Power	P	8.27	MW
Gross Head	H	1.5	M
Hydraulic Efficiency	η_h	0.9	-
Flow Rate	Q	0.5	m ³ /s
Net Head	H _a	1.35	m
Specific Speed	N _s	800.13	rpm
Runner Speed	N	307.91	rpm
Flow Speed	φ	0.7	-
Velocity of Flow	V _f	3.79	m/s
Whirl velocity	V _w	1.19	m/s
Runner Diameter	D _e	0.69	m
Hub Diameter	D _i	0.282	m
Number of runner blades	N _g	5	Nos
Length of guide vane	L	0.320	m
Height of guide vane	B	0.41	m
Guide vane inlet angle	α_1	72.56°	-
Runner inlet angle	β_1	20.89°	-
Runner outlet angle	β_2	24.77°	-
Water Circulation	τ	2.4	m ² /s

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Solid Waste Management

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ABSTRACT:

Solid garbage is the unwanted, harmful, and wasted substance includes all kinds of food wastes, domestic wastes and operational wastes, The term solid waste management mainly refers to the complete process. Of waste generation, storage, collection, transport, treatment and disposal, solid waste issue is the biggest challenge to the authorities of both small and large cities' in developing countries like India. This is mainly due to the increasing generation of such solid waste and the burden posed on the municipal budget. In addition to the high costs, the solid waste management is associated lack of understanding over different factors that affect the entire handling system. there is also a need for a long term strategy to address the future challenges of solid waste management in Indian cities. This publication is to high light economic suitable technic & tools for waste management.

1.INTRODUCTION

India generates 62 million tons of waste each year and the biggest challenge to the authorities of both small and large cities' in developing countries is sustainable management system. This is mainly due to rapid urbanization, booming economy, and the rise in the standard of living in developing countries have greatly accelerated the rate, amount and quality of solid waste generation [1] & generation of solid waste and the burden posed on the municipal budget. In addition to the high costs, the solid waste management is associated with a lack of understanding over different factors that affect the entire handling system. An analysis of literature and reports related to waste management in developing countries, showed that few articles supplied quantitative information. The objective of the mentioned studies was to determine the stakeholders' action/behavior that have a role in the solid waste. In recent era, cooperation between the state, business, and informal sectors is apparent, and it is optimal to coordinate environmental education and public participation for successful implementation through one of these networks [2][3]The general practices related to urban solid waste management from the point of generation before final disposal can be divided into the six functional components.

- Generation of waste
- Storage of waste
- Collection of waste
- Transportation of waste
- Process of segregation
- Disposal of waste

2.CURRENT CHALLENGES OF SOLID WASTE MANAGEMENT IN INDIA

- **Burning Of Mixed Waste:** In India, plants burn mixed trash. When chlorinated hydrocarbons like PVC are present, dioxins and furans are released when the waste is burned at less than 850 degrees Celsius.
- **Emissions that are harmful:** Dioxins and furans are recognized carcinogens that can cause immunological, endocrine, neurological, and reproductive system dysfunction.
- **Poor compliance:** These not comply with the National Green Tribunal's requirements.
- **Environmentally Unsustainable:** Even under ideal conditions, incineration releases large amounts of flut glasses, mercury vapor, and lead compounds, and there is always about 30% residue from incineration in the form of slag (bottom ash) and fly ash (particulate matter), both of which are known to be serious air and water pollutants.
- In addition, facilities in India are inefficient in producing electricity.

- In India, the municipal waste contains a significant percentage of biodegradable (wet) waste, ranging from 60 to 70% of total waste, compared to 30% in Western countries. Our waste has a high moisture content and a low calorific value as a result of this.

3. BIO DECOMPOSER

It is a solution developed in which crop residue can turn into manure in 15 to 20 days instead of 3 months using bio decomposer. There are varieties of bio decomposer bacteria, fungi, protozoa etc. They are capable to degrade cellulose by depolymerizing cellulases which hydrolyze lignocelluloses. Most commonly known decomposer is fungi which include Humicola, Trichoderma, Penicillium aspergillus. Market sale value of this manure is high. Researchers have been able to identify multiple and isolated types of bio decomposer.

4. METHODOLOGY

4.1 INTEGRATED WASTE MANAGEMENT

Integrated waste management is a framework for the design and development of modern waste management and disposal systems and the study and optimization of current waste disposal systems. Within this definition it is important to examine all technological and non-technical elements of management schemes together [4]. Currently, with the introduction of new legislation, laws, and waste management sector as an enterprise, non-technical elements like public involvement and awareness are necessary and essential to the successful adoption of many recycling and recovery schemes. A classic example is the general resistance to incineration services around the world largely due to the perception that incinerators are the origin to dioxins, which also underlines the efficiency of incinerators in reducing waste quantity and waste disposal levels. Therefore, in managing pollutants reaching the atmosphere, advances in emissions abatement mechanisms and gasification techniques [5].

Modern integrated waste disposal is needed for sustainability needs to be incorporated into all materials, taking into account the material supply and demand. It's unavoidable that waste is a tool now and it's the duty of people if people use it. As is obvious from past experience, if people really find the Planet as "our home" it is not convenient, but not difficult.

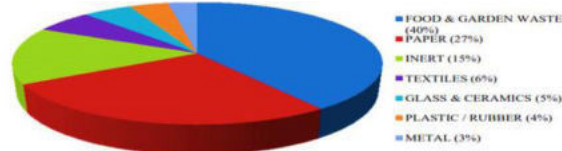


Fig. 2: Waste Management chart

The waste management hierarchy witnessed changes in the recent decade and currently recycling and recovery is focused more than the land filling.

4.2 WASTE MANAGEMENT PROCESS

There is different method of solid waste management the method which are suitable is bio process which generate nontoxic foam.

- land fill: landfill is commonly used disposal method fig.2 in which organic waste are collected and thrown in depth or there are two efficient methods involved in landfill .1 collection of waste in confine and very small place.
- Compaction of collected waste by compactors and bulldozer.

Figure2 Composting is defined as the process of decomposition of complex waste organic matter in to a simpler molecular compound, these smaller molecular compounds further decompose and form soil humus.

5. CONCLUSION

Despite the techniques that are land filling is still the common practice in India. Creation and closure

of landfills may contaminate groundwater, and air quality due to released gases for proper care and monitoring is required.

- India is country of villages there is a manual separation type of solid waste at the dumpingsite in villages, it is the most effective way to obtain the recovery and reuse of materials such as metal, plastic, glass and rubber etc. Frame work should be based on rules on environmental protection (reduction, recycling, reuse, and recovery).
- From composting manure can sale in market, using decomposer biodegradable matter decompose rapidly.
- Annual collection strategies of solid wastes shall have to be formulated.
- Provision of litter bins at public places shall be installed and there should be practice of segregation at all the sources.

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Cost Analysis of Shield Building

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ABSTRACT

Earthquakes are the most hazardous forces for any structures which results in human and economic loss. Hence to reduce loss due to seismic action the Shield structure is introduced in this paper. Shield is made of many layers of concrete and plastic ring built under the ground which absorb or transfer the waves in another direction and does not allow the seismic waves to enter near the structure. The method of using plastic and concrete helps in achieving economy and also make structure environment friendly. In this paper the cost comparison of shield building with respect to other RCC structures. The obtained results reveal a gradual increase in cost with increase in number of shields. The cost of shield layer increases with respect to number shields layered Thus, it is concluded that provision of shield will increase the life and safety of building with small increase in cost on RCC structure being 3% to 5% of the entire building cost.

Keywords—*Earthquake, shielding, Seismic invisibility cloak, safety, Cost analysis.*

1. INTRODUCTION

Earthquake are the shaking of earth surface which releases energy in earth crust in the Form of seismic waves. It is moment which releases stored up elastic strain energy in the form of seismic waves which is propagate through the earth and cause ground surface to shake. Seismic waves are waves of acoustic energy travels through the earth. It causes due to earthquake, landslide or Manmade explosion produces low frequency acoustic energy. Effects of Seismic wave's results in ground shaking, faulting, ground failure & less commonly Tsunamis.

Frequently such waves vary from high range (greater than 20) to low range (lower than 20 hertz). In India have Five seismic zones. Namely, Zone 5: This is the highest risk zone, which includes the areas that are most vulnerable to earthquakes. The states in this zone are Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh, Assam, Nagaland, Manipur, Mizoram, Tripura, and the Andaman and Nicobar Islands.

Zone 4: This zone has a high risk of earthquakes and includes areas such as Delhi, parts of Jammu and Kashmir, Himachal Pradesh, Uttar Pradesh, Bihar, West Bengal, parts of Gujarat, and the entire northeastern region except for Assam and some parts of Arunachal Pradesh.

Zone 3: This zone has a moderate risk of earthquakes and includes areas such as Punjab, Haryana, Rajasthan, parts of Uttar Pradesh, and the remaining parts of Gujarat and West Bengal.

Zone 2: This zone has the lowest risk of earthquakes and includes areas such as Kerala, Goa, Lakshadweep, and some parts of Tamil Nadu, Maharashtra, Karnataka, and Andhra Pradesh. Shield buildings is a way of counteracting forces in which buildings can deflect & reroute energy from earthquake. It is based on "seismic invisible Clock" innovation which involves creating clock of concentric Plastic and concrete rings surrounded along Buildings & buried under foundation of the building. Building collapse & structural damage is a Primary cause which occurs during earth-quake. due to increase amount of earth-quake in recent years it is now very Important to start working toward disaster. This project will give us a tool to tackle This natural disaster and potentially saves Human loss & destruction of property. We cannot prevent natural earthquakes from occurring but we can significantly Mitigate their effects.

2. OBJECTIVES OF THE PROJECT

- To implement idea of shield buildings in India.
- To study effect of shield structure interaction with building.
- Research on how we can minimize its cost.

The Main aim of our Project is to introduce the concept of shield building in India. As India has started facing a lot of earthquakes in recent years so it is very important to start having solutions to these

problems and shield building is one of its solutions. Another objective to take up this topic was to study the effects of seismic waves on the structure. Other objective is to minimize the cost by adopting environment friendly materials in order to protect the environment. In our case we have used Reusable plastic in the concrete to increase its strength.

3.LITERATURE REVIEW

Qinghong Z. et.al (2020) Explained application of new isolation Technologies to prevent earthquakes & huge Energy affecting the building structure. They suggested common technical solution Such as laminated steel plate rubber bearings which has good characteristics & advantages but its own cost when used in wide range of Applications. Friction dampers which ensure Structural anti seismic of modern buildings & maximize the effectiveness of vibration Control technology but it is difficult to timely & effectively absorb & process the energy by Earthquake at different levels. Soft steel & alloy damper when implemented on Modern buildings it gives good seismic Effects which are necessary for reasonable Use of vibration control technology. Lead Damper which is generally good due to its own physical properties & very strong Adaptability characteristics. They conclude Basic purpose of suggesting anti seismic& vibration control technology use in Modern buildings are to achieve effective Resistance to earthquake and minimize economic losses. These technologies not Reduces the harmful effects caused by earthquake but also provides to the stability of building own structure and avoids serious safety accidents. **Wang j. (2020)**, Evaluated a seismic shielding structure which can be buried around buildings. They investigated vibration isolation performance of structures and adopted Spectral element method. Furthermore, influence of both Geometric and mechanical parameters on the attenuation potential is analyzed. They analyzed many case studies such as for the (Barks and Serkan 2011) suggested seismic materials than can attenuate seismic waves (Kordell Theme and Dorado 2015) evaluated Photonic crystals which can precisely use. To generate seismic metamaterial. (Finocchio et al 2014) introduced a seismic metamaterial which is composed by chain of mass able to filter the S- waves of an earthquake). They concluded that seismic shielding structure reduces the seismic wave energy. Structure contrary to traditional structural foundation isolation strategies which can cause shift in the fundamental Vibration frequency of civil engineering and reduces the seismic wave energy by means of bandgaps attenuation mechanisms. **Palmero A.et.al(2016)** Designed artificial metamaterial to interact with propagating waves, have been suggested for shielding large urbanized areas to protect from seismic waves. Introduced as seismic metamaterials inspired by Physical concepts of photonic crystals an acoustic metamaterial established to control wave propagation. They resulted that photonic crystals made of cylindrical holes in sedimentary soil can reflect seismic elastic energy achieving attenuation of ground accelerations at a frequency range around 50Hz They proposed Sub wave length shielding structures to isolate buildings with incoming seismic bulk waves. They concluded a feasible and effective seismic meta barrier in which soil embedded surface resonators used to redirect surface waves into bulk. **Sugisawa M.et.al (1995)**,Introduced buckle restraining unbonded braces, steel plate, shear panel and other earthquake technologies and new directions in structural steels are described and introduced earthquake vibration isolation Steel dampers and studied energy Absorption system. The results from these comparative studies shows various metallic. Materials as components of energy absorption systems. They concluded the devices related to earthquake resistance, vibration control and isolation based on steels and advanced materials. In development of energy absorption system of a building optimum combination of design manufacture and fabrication is implemented as material development.

4. CASE STUDY: RANN OF KUTCH, GUJARAT

We analysed different states which falls under zone 5 which includes Jammu and Kashmir, some parts of Ladakh, Himachal Pradesh, Uttarakhand, Rann of Kutch in Gujarat, some parts of North Bihar and Andaman & Nicobar. we selected Rann of Kutch in Gujarat which falls under seismic zone 5. After that we have analysed different structures situated in Rann of Kutch and studied different structures which can be constructed according to the zone. we have designed a building of G+10 for Rann of Kutch where shield building can be applied and executed. In order to test our project Firstly, we have designed a residential building G+10 on staad-pro We did analysis of the structure and did the load calculations We did the cost analysis of our building according to the local rates.

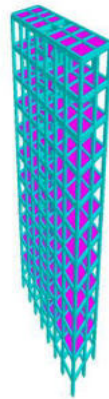


Fig.1: 3D view of RCC frame Structure

5. COST ANALYSIS OF THE BUILDING

We have selected local rates for the cost analysis according to the region.

1. Reinforcement steel (Fe 500 grade): 65,000 - 70,000 per metric ton
2. Cement (M30 grade): 350 - 400 per 50 kg bag
3. Bricks (Red clay bricks): 4 - 6 per piece
4. Sand: 1,500 - 2,000 per cubic meter
5. Aggregate (20 mm): 2,500 - 3,000 per cubic meter
6. Water: 30 - 40 per cubic meter
7. Labour: 400-600 INR /Day
8. The built-up area of a G+10 building with a size of 11 x 24 meters would be approximately 2,904 square meters.

Reinforcement steel (Fe 500 grade): Assuming 3 kg per square foot of built-up area, the total cost of steel would be approximately 29.8 million - 32.1 Lakhs INR.

Cement (M30 grade): Assuming a consumption rate of 0.4 cubic meters per 1,000 square feet of built-up area, the total cost of cement would be approximately 45-50 lakhs.

Bricks (Red clay bricks): Assuming 500 bricks per 100 square feet of built-up area, the total cost of bricks would be approximately 11-17 lakh INR.

Sand and Aggregate (20 mm): Assuming a consumption rate of 0.5 cubic meters of sand and 0.6 cubic meters of aggregate per 1,000 square feet of built-up area, the total cost of sand and aggregate would be approximately 75-85 lakhs INR.

Water: Assuming a consumption rate of 2,000 liters per 1,000 square feet of built-up area, the total cost of water would be approximately 11-15 lakh INR.

Labour: Labour cost for this project could be around 1.19 crore - 1.29 crore INR.

Therefore, the approximate cost of the building should be in between 4.5-5 crores INR

(Note: these values are calculated according to the local rates of the region, the cost may vary)

6. 3D VIEW OF SHIELDS DESIGNED ON SKETCHUPPRO

For the design and better understanding of the project it was very important to have a 3d model of our concept. Through the model you can see the role of shields and its importance for the life of the structure. We are going to attach a snippet of the model below.

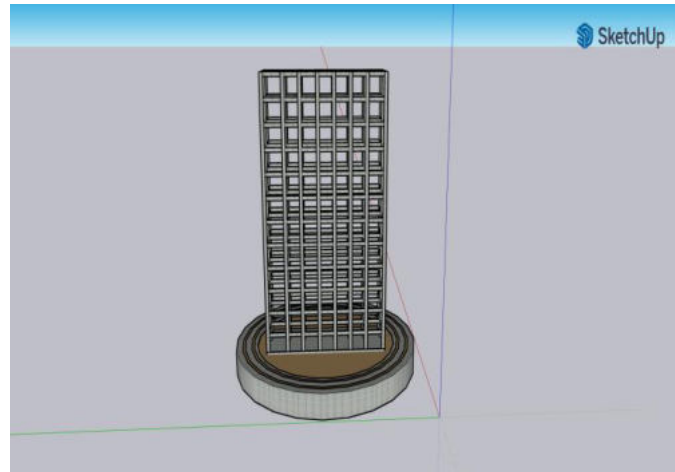


Fig.2: View of Shields

7. COST ANALYSIS OF SHIELDS

The shields are need to be provided in circular form around a building. In this case we have considered 25m as the distance between the building and first layer of shields. The second layer is constructed 50m away from the building. The layers can be increased according to the zones and the space available for construction.

Thus, the estimated cost of constructing a circular concrete barrier with a radius of 10 meters, a height of 4 meters, and a thickness of 0.5 meters around the G+10 building of 11x24 dimension, using M30 grade concrete and considering labour and other expenses, is approximately **5-6 Lakhs** INR for First Ring. This is calculated considering cost of labour as 300 INR per cubic meter. For the second ring which is placed 20 m from the first ring the cost would be around **10-11 Lakhs** INR for the second ring. The total cost of the Shields would be around **15-17 lakhs** INR for both the rings.

(NOTE: -The Amount may vary according to the different regions)

Our shield would work in the following manner as shown in the picture below. The waves will be transferred away from the structure. The shields will absorb or divert the seismic waves.

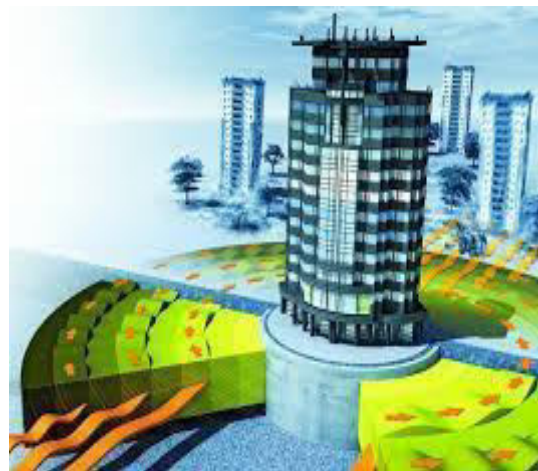


Fig3: Cost Analysis Of Shields

8. TESTING OF CONCRETE

We did the testing of concrete of shields to know its strength. We have added 5% Reusable plastic as a material in the concrete to increase its strength and use plastic which is form of waste in the environment. This will also help our project to be eco-friendly. We took three blocks of concrete of M30 for testing and added 5% Reusable plastic in it and do tests on it to check its strength. We did CTM tests and here are the results of it The compressive strength of M30 grade concrete was tested using a CTM (Compressive Testing Machine), and the following readings were obtained: 350 kN/m³ at 3 days, 489 kN/m³ at 7 days, and 728 kN/m³ at 28 days. These results indicate that the concrete gains strength over time, with the highest strength achieved at 28 days. The data suggests that the M30 grade concrete is exhibiting a typical strength development pattern, where the strength increases significantly

between 3 to 7 days and continues to improve up to 28 days. These were the readings of blocks of concrete without reusable plastic. Now, we tested the strength by adding plastic. Following was the results. The obtained readings were 355.25 kN/m³ at 3 days, 498.20 kN/m³ at 7 days, and 740.84 kN/m³ at 28 days. These results reveal a gradual increase in strength over time, with an approximate increase of 1 to 3% from 3 to 7 days, and a further increase up to 28 days. This data suggests that the concrete mix is exhibiting a favorable rate of strength gain, which may indicate good quality and proper curing practices.

9. CONCLUSION

Due to ever increasing earthquakes in the recent times it is very important to tackle the earthquakes and protect the loss of structures and human loss. Thus, adapting to such techniques is very important. Shield building is a unique concept and it is not applied anywhere as of now. Thus, it was very important to introduce this concept for India as the number of earthquakes have increased significantly in recent times. We have introduced some eco friendly means in order to decrease its cost of construction by using reusable plastic in the concrete which increases the strength by 1-3% and the plastic is utilized as well. The general cost of the shield building would be around 15-17 lakhs and it would provide security against seismic waves.

10. FUTURE SCOPE

- To test out working of our model by testing it on a software or physically creating a scenario.
- To design shields for an entire city or a region covering various buildings all together.
- To decrease the cost of construction even more and adopt eco friendly means to do so.

Acknowledgment

Special thanks to our Guide Ms. **Mrunalini Deshmukh** for assisting us to partially complete our project on “Design of Shield Buildings”. Her expertise and talent in circuit designing and troubleshooting and logical regression helped us effectively to partially complete this project. We would also like to thank our Head of Department Dr. **Ajit Patil** for providing us facility and labs, which helped us constantly in increasing our technical knowledge, and to write this report. We are also thankful to our Principal **Dr. Deven Shah** sir for his continuous encouragement throughout the process. Now, last but not the least special thanks to all the staff of **Civil Engineering Department** for their technical support and constant motivation, without which this work would not have become successful.

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Partial Replacement of Cement with Rice Husk Ash (RHA) in Concrete

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ABSTRACT

Self-compacting concrete (SCC) is a concrete with a very low yield strength, high deformability and medium viscosity (there is no need to use external pressure to ensure uniform suspension of solid particles during transportation and standing time). SCC is the best performing concrete with very good strength and durability. However, the mixing ratio and flow property test method are very different from ordinary concrete. SCC is a concrete that is able to flow under its own weight and completely fill the formwork, without the effects of vibration, while being cohesive enough to handle without bleeding. It ensures good packing and good structural resistance to small spaces and strong structural elements. SCC usually requires high levels of binders and chemical additives. The construction industry emerged in the early 2000s. Large-scale national and international projects are taking place dramatically around the world. Self-compacting concrete for its high resistance, workability, durability and reduced labor.

Keywords: *Self-compacting concrete, Durability, Workability*

1.INTRODUCTION

Due to economic progress and development, concrete has been identified as the national infrastructure resource. strength and even beyond life. It can account for more than 5% of global carbon dioxide emissions Portland cement production. To reduce OPC limitations, it can be partially replaced RHA substance. Many green materials have been investigated Partial replacement of cement in the form of fly ash and peanut shells has been successful. Cement is gaining momentum in this project and the growing demand for cement is increasing day by day. Finding alternative materials with similar properties to cement is a very important aspect for engineers. RHA is one such material and is used as an additive. The use of mineral additives in the production of SCC not only provides economic benefits, but also reduces the heat of the water. In this work, the main factors were the amount of rice husk powder (15%, 20%) and the binder content. The parameters that remained stable were the measurements of fine aggregate, coarse aggregate, water, ash content, w/w ratio and the range 5%, 10%, 15%, 20%). The main point of this review is to investigate the possibility of using rice husk as an additional cementitious material and RHA as a swelling material in SCC by examining the fresh and hardening properties of rice husk. The test results showed that the properties of concrete were significantly affected due to RHA. This paper focuses on the partial replacement of cement with rice husk ash (RHA). India is Main rice producing countries. Worldwide, about 600 million tons of rice are produced, The annual production of rice husk is 120 million tons. In most cases, it is dandruff Water from rice processing is burned or disposed of as waste. Rice husk ash Contains 90-95% active silica. The world rice harvest is estimated at 588 million tons Every year, India is the second largest producer of rice in the world with 132 million tons per year and per year.

2.LITERATURE REVIEW

Most of these studies have been conducted to determine effectiveness of RHA. Effect of particle size on calibration of Portland density using rice husk ash mixture Cement concrete was discussed by Bowie et al [1]. They found that it partially replaced cement 20% RHA by mass increases the early compressive strength of spatially scaled adhesives mix Analysis of the optimal replacement of concrete strength and durability. It has been discussed by Ganesan et al. [2] and Gemma Rodríguez de Sensale [3] and Hwang Chao-Lung et al. review Ravandi Kishore discusses the strength properties of high-strength rice husk concrete [5]. They found that increasing cement replacement with RHA in concrete decreased. The workability of the concrete was reduced by 27% and the compactness by 9%. optimal level of substitution for concrete grades M20 and M30, rice husk ash is 10%. Tashima, MM and others [6] The possibility of adding rice husk ash (RHA) to concrete was discussed with Rama Rao of GV [7] discuss high strength concrete with RHA as mineral admixture. Whitish neutral carbon Rice husk ash as a substitute for white cement has been discussed in part by Rossella, M. Ferraro et al. [8]. In that due to

the presence of high amorphous silica and a large specific surface area, RHA is an effective pozzolanic that can also be used as a cement additive material Percentages of OPC, up to 15% by weight, can be replaced by RHA without causing it. Adverse effect on strength characteristics. The rice husk ash reaction was discussed by James J et al. [9] observed that the addition of RHA to cement reduces and protects the formation of Ca (OH)₂ Concrete is resistant to weathering, sulfate attack and chloride attack. alternatives to cement in rural areas Discuss the issue of housing Dipa Nair v. et al [10], showing only about 90-95% of the reactant The presence of silica in RHA is responsible for the pozzolanic behavior of rice husk ash. Rowed Khan talks about minimizing environmental concerns by using rice husk ash in concrete et al [11], who concluded that concrete admixtures containing 25% RHA can replace OPC It has the same strength as 100% concrete containing OPC. Effect of micro silica on carbon Nanotube-based cement composites fabricated by K.M. Mini et al.

3.METHODOLOGY

3.1Materials

3.1.1 Cement:

Cement is a binder, a substance used in construction that hardens and hardens and can bind other materials together. The main types of cement are used as a component in the production of mortar and concrete, which is a combination of cement and cement. altogether to form a strong building material.

3.1.2 Water

Potable water was used for mixing and curing

3.1.3 Rice Husk Ash

Waste RHA was collected from Paddy fields of Kulgam, J&K. It was then sun dried and burned so as to convert it into ash. The ash was sieved through 90 micron (90 μ m) Indian Standard sieve. The specific gravity of waste rice husk ash was found to be 2.6. Chemical composition of RHA is presented in Table1. shows RHA.

Table1: Chemical Composition of RHA

Oxides	SiO ₂	Fe ₂ O ₃	Al ₂ O ₃	CaO	MgO	SO ₃	Al ₂ O ₃ +Fe ₂ O ₃	Na ₂ O	K ₂ O
Percentage	92.99	0.43	0.18	1.03	0.35	0.1	0.61	3.56	0.72

3.1.4 Superplasticizer

Is a chemical compound used to increase the workability, without using any additional water. The Superplasticizer used in this paper is Aura mix 400 and is from Forsook Chemicals (India) Pvt.ltd.

3.2 Test on Ingredients

- **3.2.1 Fineness Test On Cement**

Weight of cement=300g

Weight of passing cement=292g

Weight retained =4.5g

- **3.2.2 Consistency test**

Weight of cement=300g

Cement consistency =30%

- **3.2.3 Initial and Final setting time**

Weight of Cement=300g

Weight of water=0.85 \times 0.3 \times 300=76.5g

Initial setting Time=38min

Final setting Time=2h 47min=167min

- **3.2.4 Soundness of Cement**

Initial distance=1 cm

Weight of cement=100g

Weight of added=0.78×0.3×100=23.4g

After 24hrs d1=1.6 and d2=1.4

After 3hrs boiling D1=1.8 and D2=1.7

Soundness= ((D1-d1) + (D2-D2))/2=0.25cm=2.5 mm

- **3.2.5 Specific Gravity Test**

Weight of cement=50g

W1= Weight of empty flask =108

W2=Weight of flask + cement =159

W3= Weight of flask +cement +diesel=395g

W4= Weight of flask + diesel =358g

S.G = (W2-W1)/((W2-W1)-(W3-W4))×0.92=3.1

- **3.2.6. Test on coarse aggregate**

Sieve analysis of coarse aggregate

Weight of sample tested=3.454Kg

- **3.2.7 Water absorption of CA**

The WA of CA used is 0.48%

Specific gravity of coarse aggregate

The specific gravity of coarse aggregate used is 2.56

- **3.2.8 Testing of fine aggregate**

Water absorption of fine aggregate

The water absorption of fine aggregate being used is 1.2% 30

- **3.2.9 Specific gravity of fine aggregate**

The specific gravity of fine aggregate being used is 2.74

3.3 Experimental Analysis

- **3.3.1 Mix ratio-** The standard IS 10262 was used in the design of the concrete mixture The grade of concrete used was M-25. W/C ratio 0.5. Details are shown in Table2.
- **3.3.2 Experiment with fresh concrete:** The workability test conducted as per IS 1199-1959.
- **3.3.3 Tests for hardened concrete:** Determination of compressive strength of 7 days and 28 days as per IS 516-1959. Details are shown in Table3
- **3.3.4 Light weight character** Average dry weight of concrete cube samples containing 5%, 10% and 15% RHA waste. cement was compared with the average dry weight and percentage of normal M-25 concrete cube samples the decrease in dry weight was measured.

Table 2: Mix Proportion

Rice husk ash %	W/c ratio	Water (kg/m ³)	Cement (kg/m ³)	Fine aggregate (kg/m ³)	Rice husk ash (kg/m ³)	Coarse aggregate (kg/m ³)	Slump (mm)
0	0.45	191.6	425.80	543.5	0.00	1199.36	60
5	0.45	191.6	404.51	543.5	21.29	1199.36	20
10	0.45	191.6	383.22	543.5	42.58	1199.36	15

15	0.45	191.6	361.93	543.5	63.87	1199.36	10
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Table 3: Compressive strength test results

Waste RHA %	Aveg load@7days (KN)	Aveg load@28days (KN)	Aveg compressive strength@7days (N/MM ²)	Aveg compressive strength@28days (N/MM ²)
0%	498	678	22.13	30.13
5%	530	690	23.55	30.67
10%	580	700	25.78	31.11
15%	490	670	21.78	29.78

Table 4: Water absorption test results for cube specimens

Waste RHA %	Avg. Dry weight of cube (gm)	Avg. Wet weight of cube (gm)	Water absorbed (gm)	Percentage water absorption
0%	8390	8480	90	1.07%
5%	8350	8450	100	1.197%
10%	8225	8340	115	1.398%
15%	8110	8240	130	1.603%

Table 5 : Lightweight test results for cube specimens

Waste RHA %	Avg. Dry weight of cube (gm)	Avg. dry density of cube (KN/m ³)	Percentage change in weight as compared to reference (%)
0%	8390	24.86	0%
5%	8350	24.74	- 0.483%
10%	8225	24.37	- 1.971%
15%	8110	24.03	- 3.339%

Conclusion

Based on the obtained results, the following conclusions can be drawn:

1. Replacing cement with 10% rice husk ash showed an increase in compressive strength of 16% in 7 days. and an increase in compressive strength of 3.25% after 28 days.
2. The optimum value of cement replacement is 10% as shown in curve 2.

3. As the ash content of rice husk waste increases, the percentage of water absorption increases. As the ash content of rice husks increases, the average weight decreases by 3.3 % in the 15% mixture. The ash content of rice husk waste turns rice husk ash into lightweight concrete.
5. The workability of the concrete mixture decreases as the ash content of rice residues increases. 6. The use of rice husk in concrete can be economical because it is free.
7. Using rice husk ash eliminates its disposal problem and thus reduces carbon dioxide emissions turns out to be environmentally friendly, paving the way to greener concrete.

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An IoT Based Bill Distribution System

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Ahmed

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Abstract— As the world gets more computerised, it is becoming increasingly necessary to maximise energy usage and save natural resources. Urban apartments and social housing are one setting where this is crucial because of how much gas, electricity, and water are used there. For more information, visit the website. The invention uses IoT-enabled devices to continuously monitor the quantity of water, energy, and gas utilised in terms of units. The device is programmed to calibrate a unique bill for the amount of units utilized. The obtained data, such as the amount of units utilised and the bill of consumption. IoT-based utility monitoring and billing device or apparatus comprises of water flow sensor, gas flow sensor, and electricity sensor assembled with a microprocessor/controller programmed to monitor flow readings. This concept is used to allow service providers and customers to continuously monitor the consumption of power (in watts) and water usage. If the usage reaches the minimum amount, the system would automatically alert the consumer to recharge through a smart phone.

Keywords—IOT, Billing System, Distributed

I. INTRODUCTION

The IoT model is experiencing a rapid increase in population density, resulting in many living and non-living things becoming connected to the internet in one way or another. The popularity of wireless technology such as Bluetooth, RFID, Wi-Fi, and embedded sensors has propelled the IoT beyond its initial stage and is poised to transform the current fixed internet into a more advanced and feature-rich future Internet. Currently, there are almost nine billion interconnected devices, with estimates suggesting that this figure will reach nearly fifty billion by 2020. However, this growth is not without its challenges, with energy and water crises being the most pressing issues facing society today.

To address these challenges, reducing energy consumption and water usage in households is essential. The increasing number of consumers places a significant burden on electricity providers. The concept of IoT offers an ideal solution to facilitate consumers in managing their energy and water usage. IoT refers to the ever-expanding network of physical objects featuring an IP address for internet connectivity and the communication that occurs between these objects and other internet-enabled devices and systems.

Low-power wireless connectivity is the key technology that connects smart objects to the internet and the cloud. However, wireless connectivity is not dominated by a single technology. Different hardware and software integration requirements must be considered based on application needs or technology constraints. Wi-Fi and Bluetooth are the main wireless connectivity schemes.

Consider a digital prepaid energy meter based on two microcontrollers and a single-phase energy meter IC. This meter does not have any rotating parts and calculates energy consumption using output pulses from the energy meter chip. The ATmega32 stores the energy consumption (KWh), maximum demand (KW), total unit recharge (KWh), and remaining units (KWh) to ensure accurate measurement.

The most important contribution of other related methods is to ensure that consumers know how much energy they use. In this prepaid electricity billing system, the present billing system is entirely eliminated, and a new system called the prepaid billing system is introduced for embedded applications that overcomes the drawbacks of the current billing system. If this system becomes a part of daily life, it will be beneficial for both the government and the public. When the user pays money, the meter starts counting the number of units, reducing the amount, and automatically disconnects the line upon completion of the amount.

An Advantages of IoT based Bill distribution system are:

An IoT (Internet of Things) based billing system offers several advantages over traditional billing systems:

Real-time billing: IoT devices can collect and transmit data in real-time, which means that billing can be done immediately, rather than waiting for a monthly billing cycle. This helps in reducing payment delays and ensures prompt payment.

Accurate billing: With IoT devices, data is collected automatically and accurately, which eliminates the possibility of manual errors. This results in more accurate billing and fewer disputes between the service provider and the customer.

Cost-effective: IoT devices are cost-effective, which means that implementing an IoT-based billing system is more affordable than traditional billing systems.

Improved efficiency: An IoT-based billing system reduces the need for manual intervention, which results in improved efficiency. This leads to faster processing of bills and reduced administrative costs.

Better customer experience: With IoT devices, customers can view their usage data in real-time, which enables them to manage their usage and make informed decisions. This enhances the customer experience and improves customer satisfaction.

Overall, an IoT-based billing system offers many benefits over traditional billing systems, making it a smart choice for businesses looking to improve their billing processes.

II. LITERATURE SURVEY

In this study, they propose a cost-effective and efficient solution for quantifying energy consumption in Mexican households. Our approach involves the use of IoT technology to develop a real-time electricity bill that allows customers to monitor and manage their energy usage on an ongoing basis. To accomplish this, they have designed a low-cost energy meter using inexpensive sensors and the Particle® Photon electronic board. The resulting prototype is compact, easy to install, and meets all safety requirements for use in residential settings. The energy meter provides real-time measurement data, which is processed by an algorithm to determine the accumulated kWh. Customers can access this information through a user-friendly HTML interface, which provides them with valuable insights into their energy consumption habits. The interface also offers recommendations for reducing energy usage and alerts customers if their consumption is abnormal or unusually high.

The proposed system allows customers to access their bills as and when required. The primary objective of implementing an Email service is to facilitate better communication with customers, and Email is the ideal mode to achieve this goal. As soon as the billing is processed, the billing details are sent to the customers via Email, in real-time. The system employs wireless data transmission and reception techniques, which enable wireless meter reading at the same cost. This system effectively safeguards the distribution network from power theft. It leverages power theft detection mechanisms to identify any unauthorized consumption of electricity from the distribution lines. The proposed system is implemented within the distribution network of the electrical power supply system. The existing system is incapable of identifying the precise location of consumption or tapping. In contrast, the proposed system not only detects the occurrence of power theft but also pinpoints its location.

Electricity plays an essential role in our daily lives. As people's standard of living has risen, so has their electricity consumption. Nearly all household and industrial devices rely on electrical energy. Therefore, it is crucial to use this energy efficiently to save it for future generations. The primary objective of this project is to raise awareness of energy consumption and promote efficient use of home appliances for energy savings. The proposed system provides information on the number of units consumed, the bill amount, and sends notifications when energy consumption exceeds the specified limit, using IoT. This system aims to reduce human dependency and minimize human errors in the billing process, eliminating the need for monthly readings. One significant advantage of this system is that

users can monitor the power consumed by electrical appliances in real-time and take steps to control them, promoting energy conservation

The utilisation of the Internet of Things (IoT) is rapidly increasing, and its importance and sophistication are also on the rise. In the real world, electricity bills are typically calculated by the electricity board and then sent to the user via mail or EB card. A more effective power monitoring technique, on the other hand, has been suggested. It uses a sensor to identify the current at the heap and a circuit to assess voltage; power is then calculated using these two variables. The control parameters are stored in a cloud database. The voltage sensor receives the input from the live power source via a non-intrusive current transformer sensor, which then transmits the value to the Nodemcu and stores it in the cloud.

III. PROPOSED SYSTEM

The objective of the proposed system is to provide a centralized platform for managing all the users associated with an organization. Additionally, the system offers valuable insights by presenting the data in visually appealing formats like pie, bar, and line graphs, showcasing the total bill generated. As a result, the system eliminates the need for manual record-keeping via a diary or book, mitigating the risk of data loss. This platform allows users to manage everything from a single location, irrespective of their location worldwide.

To comprehend the system's functionalities, we can break it down into multiple modules and

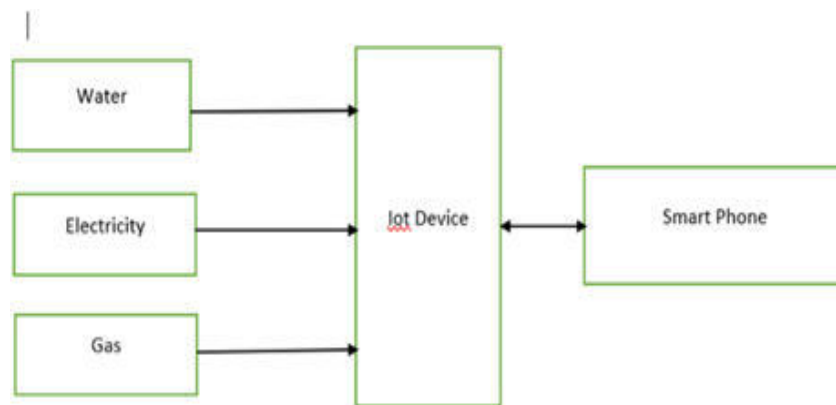


Fig 1: working of system Objectives of the proposed work are

examine each of them individually.

- To learn about different energy metre reading systems.
- To study and understand the various approaches and models utilised by various researchers for energy smeter reading systems.
- To avoid human intervention in the process of creating bills
- To take the required steps to make the solution dependable, strong, and effective.

An IoT-based bill distribution system can be designed to automate the process of distributing bills to customers. Here's a proposed system:

IoT Devices: Install IoT devices such as sensors, cameras, and meters in households or offices to collect data on energy consumption, water usage, or any other utility usage. The IoT devices can be connected to a central server that stores the data.

Data Analysis: The collected data can be analyzed to generate bills for each household or office based on their usage. The analysis can also help identify any abnormal usage patterns, which can be communicated to the users through a mobile app or web portal.

Automated Billing: The bills can be generated automatically and sent to the users through email or SMS. The system can also be integrated with a payment gateway to enable online payment of bills

Customer Service: The system can include a customer service portal where users can submit queries or complaints. The queries can be addressed through a chatbot or a support team.

Dashboard: A dashboard can be created for the administrators to monitor the overall usage patterns and track the revenue generated. The dashboard can also provide insights into the energy or water consumption patterns of the households or offices.

By implementing an IoT-based bill distribution system, the process of bill distribution can be streamlined, automated, and made more efficient. The system can help reduce errors, eliminate paper-based processes, and enhance the overall customer experience.

IV. WORKING SYSTEM

The implementation of smart meters provides an innovative way to manage electricity consumption. The process consists of five essential steps.

Firstly, the smart meters installed in households or businesses will capture and transmit real-time data on electricity consumption to a central server. This data will allow for accurate and efficient monitoring of energy usage.

Secondly, the central server will receive the data transmitted by the smart meters and process it using a billing algorithm based on the tariff structure established by the electricity provider. The server will use this algorithm to generate the electricity bills, ensuring accuracy and consistency.

Thirdly, the generated bills will be sent directly to the consumers via a mobile application. This feature provides convenience and transparency, allowing users to access their bills quickly and conveniently.

Fourthly, consumers can make payments for their electricity bills through the integrated payment gateway on the mobile application. This easy and secure payment method ensures that customers can complete transactions efficiently and effectively.

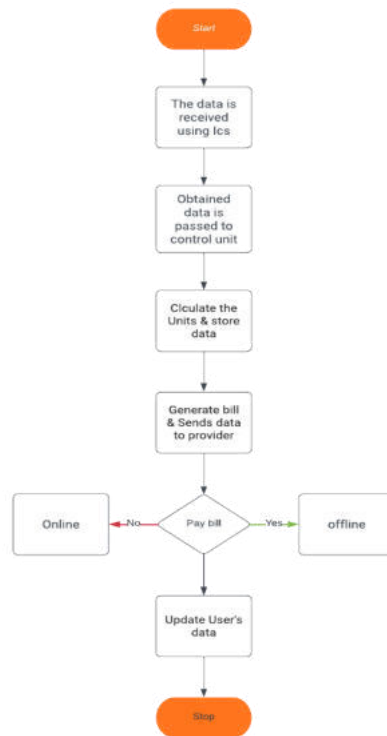


Fig 2: Flow Chart

Finally, the central server will store the data collected from the smart meters for future reference and analysis. This stored data can be used to generate reports on electricity consumption patterns, enabling the electricity provider to improve the efficiency of the billing system and optimize the energy distribution network.

V. TECHNOLOGIES USED

Our system prioritizes the user experience and is designed with various technologies in mind to ensure its robustness and longevity. Our goal is to create a scalable product that benefits both the user and the company. To achieve this, we have selected MySQL as our database. MySQL is a powerful database that can efficiently manage large volumes of data and is an ideal choice for a distributed database that can be connected to a company's data centers to maintain data integrity.

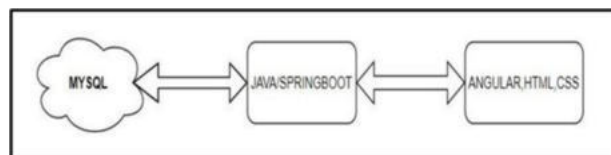


Fig 3: Technologies used

We have also implemented Spring Boot, an open-source Java-based framework, to create microservices that are standalone and production-ready. Developed by the Pivotal Team, this framework has been instrumental in fulfilling our API requirements and various other functionalities. It is versatile and easy to understand, making it an excellent choice for our needs.

For the front-end, we have utilized Angular, HTML, and CSS. Angular has made the creation of our front-end a breeze, resulting in a GUI that is precise, easy to navigate,

and user-friendly. Our UI design is intentionally simple and accessible, even for those without technical backgrounds.

The registration screen is the first point of contact for the user. It is designed to be intuitive and straightforward, allowing for seamless registration. The second screen shows the total bill generated, with a clear breakdown of the cost and easy payment options.

- A. Hardware Requirements
 - System: Pentium 4, Intel Core i3, i5, i7, and 2 GHz Minimum
 - RAM: 4GB or above
 - Hard Disk: 10GB or above
- B. Software Requirements
 - Operating System: Windows 7, 10 or higher versions
 - Front end: HTML, CSS, javascript, react
 - Backend: springboot, junit5, Mockito, jmeter
 - Programming Language: Java

VI. CONCLUSION

An innovative IoT-based electric billing system that promises to revolutionize the way we consume electricity. This cutting-edge technology aims to offer a more efficient and accurate way of billing for electricity consumption. The proposed system eradicates the possibility of manual errors and provides consumers with a convenient method to view their bills and make payments.

Moreover, the system can collect data that can be utilized to enhance the overall billing system's efficiency, leading to a reduction in energy waste. The Corporation Billing System, a well-designed solution for smart corporation billing, utilizes the IoT platform to predict energy and water demands for smart cities.

The suggested system is an all-encompassing monitoring, management, and invoicing system that can track water and power use, measured in liters and watts, respectively. If the consumption of electricity and water reaches the minimum level, the system will automatically notify the client via their smartphone to recharge.

The Smart Corporation Billing System provides a sophisticated solution for efficient billing and forecasting of energy and water usage in Smart Cities, utilizing an IoT platform. This proposed system entails continuous monitoring and control of power (in watts) and water (in liters) consumption, along with billing. In case the consumption of power and water reaches a minimum threshold, the consumer will receive an automatic alert on their smartphone, prompting them to recharge. The entire system model is monitored and controlled using NodeMCU.

The implementation of IoT technology facilitates improved management and conservation of energy and water resources. This system eliminates the need for human involvement in Corporation/Municipality Monitoring, as the Billing system can continuously monitor power and water consumption through smartphones, without requiring consumers to manually check their energy/water meters. The smartphone application displays real-time readings of power and water consumption, along with the corresponding billing amount in rupees.

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Fruit Disease Detection using K-means Clustering Algorithm

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Abstract: Fruit diseases are consistently regarded as a notable problem in the global farming industry. The requirement for a manual checking framework arises from this. Agriculturists need to manually analyze fruits in this way. However, continuous manual watching does not provide sufficient outcomes, and they often need for professional direction. The agribusiness sector is the main driver of the global economy, but its growth is slowing when compared to the rise in intrigue, and this ratio of intrigue to creation is expected to remain high in the next years. For the purpose of diagnosing fruit illnesses, clustering and fruit picture segmentation algorithms have recently been created. By using different estimations, an algorithm plot is examined to show its significance. Fruit diseases have a severe impact on global agricultural industry productivity and financial losses. This study proposes and experimentally validates an adaptive strategy for the detection of fruit illnesses

Keywords – K-means clustering algorithm, SVM classifier, image processing, natural language processing.

I. Introduction

India is second in the world for fruit output. Given that it accounts for 17% of India's GDP overall and employs more than 60% of the country's workforce, agriculture is an important sector of the Indian economy. The traditional method of illness detection and fruit identification relies on the exposed eye perception of the experts, however in some developing countries, consulting with specialists is expensive and time-consuming due to their dispersed locations. In the modern world, it is past time to take care of the farming fields. However, due to ongoing climatic and other changes, crop yields and farming productivity have shifted to some serious problems that are a source of legitimate concern. India is the second-largest producer of fruits, producing 44.04 million tons of fruit annually, making it the "green land." India makes up 10% of the fruit produced worldwide. Apple, banana, citrus, grape, mango, guava, papaya, and watermelon are just a few of the fruits that Indian ranchers grow. When a fruit tragedy occurs, it will superficially take into account water-soaked wounds and convert the low-resolution photos to high-resolution images. This was either fully or partially recognized in the entire fruit image. At the early stage, there is squeezing discovered at a manageable speed. The meeting costs of competent experts are considerable, and it is also impossible to prompt them on time in a faraway area. A customized fruit unpleasant location framework is thus required in the immediate aftermath of the disaster. Ranchers typically observe the visual effects of fruit distress Authorities might keep an eye out for fruit with disaster-like visuals. Experts could easily analyze the catastrophe or it could have faith in laboratory research. The majority of the future methods for the Republic of India's fruit disaster location framework will include trained eye-tracking technology or ultrasound, technology The Using photographs from far-off farm fields, the methodology presented in this research can be used to create automatic systems for agricultural processes. With constantly evolving computing systems, computer-based image processing is evolving quickly. The market's specialized imaging systems, which can be used to obtain results by pressing a few keys, are not very adaptable and, more significantly, they are expensive.

II. Problem Statement

The output of very valuable fruits has declined as a result of the poor fruit quality, lack of maintenance, and manual inspection. Fruit disease decreases the amount and type of cultivating resources. Competent

experts require expensive meetings, and it is impossible to reach them in time in a distant location. Therefore, in the immediate wake of the disaster, a specialized fruit uncomfortable location framework is needed

III. Literature Survey

India is an agricultural nation, hence farming provides the majority of its income. As a result of the fruit's short shelf life when it is at its peak of ripeness, the fruit market is one that is extremely flourishing and volatile. Through the use of image processing and k-means clustering, this technology enables us to comprehend and recognize fruit deformities or diseases.

Milos Ilic, Sinisa Ilic, Srdjan Jovic ,Stefan Panic. “Early cherry fruit pathogen disease detection based on data mining prediction”In this paper authors use different mathematics-based techniques for data processing and prediction of possible fruit disease infection. Six significant weather variables and one variable representing the month in the year are selected as predictor variables Data processing, representation, unusual case location,and modification were all done using MATLAB systems.Md. Rasel Howlader, Umme Habiba, Rahat Hossain Faisal and Md. Mostafijur Rahman.“Automatic Recognition of Guava Leaf Diseases using Deep Convolution Neural Network” The proposed model applies to classify major diseases of guava leaf such as Algal Leaf spot, and Rust. As per our insight, this is the first time to use D-CNN based model to recognize guava leaf diseases. General observation system by farmers perhaps time-consuming, expensive and sometimes inaccuraten.

Dr. Kamaljit Kaur, Manpreet Kaur, “Prediction of Plant Disease from Weather Forecasting using Data Mining”The proposed system uses segmentation techniques such as k-means clustering and deep neural network learning to predict the disease based on weather feature of the orange plant. This system helps the farmer to understand the disease of orange plant and also increase the yield of orange plant.This study gave results which were highly accurate but would only limit to 1 fruit and various different factorschanged the results and gave different results for minor data change.

Bindhu, V., “Biomedical Image Analysis using Semantic Segmentation” The proposed method involves the semantic segmentation model for the biomedical images by utilizing the encoder/decoder structure to down sample the spatial resolution of the input data and develop a lower resolution feature.

IV. Requirements

I) Software Requirements:

- Windows System
- Python IDE
- VS code

II) Hardware Requirements:

- System (i3 Processor, 4GB ram, 120GB HDD)
- Lan Cable
- USB Cable

V. Methodology

Various means required during the time spent identification and characterization of diseases of fruit. At first, the establishment of the info image is ousted and the contaminated part is gotten by applying an image division system to the information image. In the accompanying stage, the extraction of highlights is done utilizing highlight extraction methodologies. A while later, utilizing arrangement procedure diseases are requested.

The basic algorithm that will be implemented for working of this proposed system is as follows:

Step 1: Start

Step 2: On the UI, click on "Select Image File" and attach the image

Step 3: After the input image has passed the set criteria

Step 4: Click on Upload Button

Step 5: The image is then pre-processed by the system and feature extraction takes place.

Step 6: The SVM classifier then compares the images with database images

Step 7: K-means clustering algorithm clusters the image features and processes the result

Step 8: The result will be displayed whether the fruit is infected or not

Step 9: Stop

V.I Flowchart

A flowchart is a diagram that depicts a process, system or computer algorithm. They are widely used in multiple fields to document, study, plan, improve and communicate often complex processes in clear, easy-to-understand diagrams.

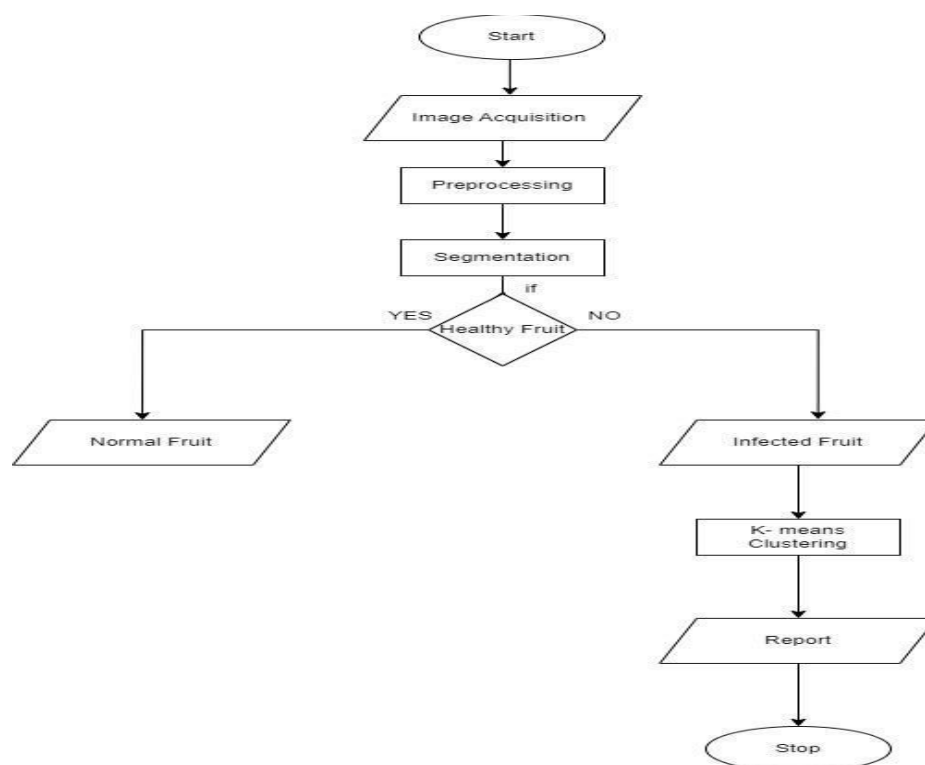


Fig: Flow Chart for FDD

VI. Results

The procurement of an image is reliably the fundamental condition for the work methodology course of action of processing of an image. The image acquired is all-around ordinary.

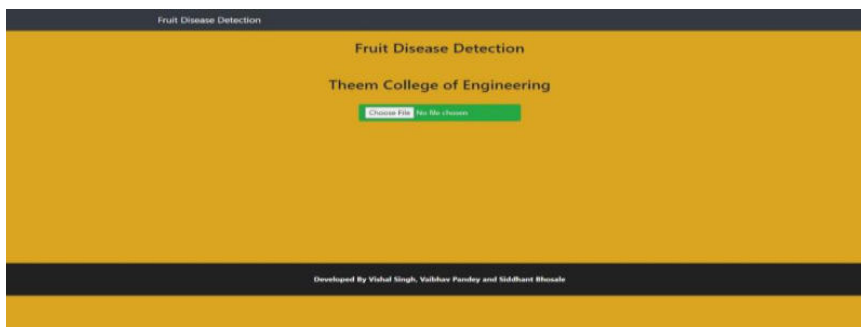


Fig: Home page of FDD

We have used Bootstrap for building the Main UI of the system where the user will interact and provide input to the system in the form of Image



Fig: Image Selection page of FDD

In this section particularly the Image would be sorted and selected with the pre-defined standards and once it meets the requirement. It would be selected and hence forth ready for the test. As we will be taking the input in the form of images, we have already set the protocols for JPEG, PNG etc. Also the set size is 256*256, to meet the standards and keep the test uniformed

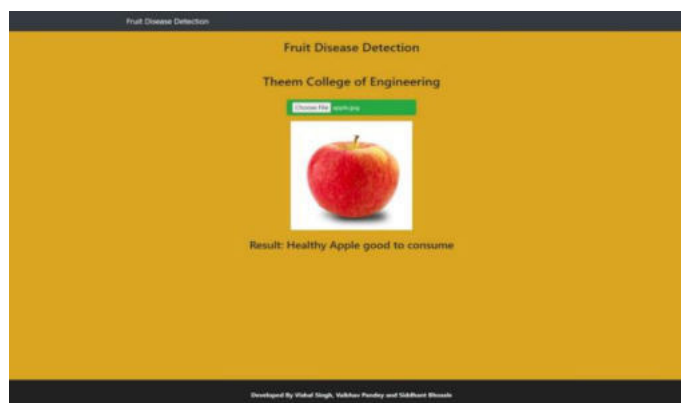


Fig: Result screen of FDD



Fig: Mobile UI of FDD

Once the test is started the input image is pre-processed. The system follows a clear and straightforward way to deal with a bunch of a given instructive assortment through a specific number of groups (expect k groups). The k -means algorithm moves the comparing data tests from their unique group to the new group. These centers should be set in a smart way by taking different territory into account with assorted result. A mobile user interface (mobile UI) of F.D.D System is on a mobile device that allows the user to interact with the FDD system and use its features, content and functions.

VII. Conclusion

The findings of the project demonstrate completely distinct levels of sickness identification accuracy that are supported by both the quality of the input image and the stages of the illness. Thus, by enabling farmers to demand the necessary preventive and corrective action on their crop, this strategy moves closer to encouraging farmers to practice good farming and enabling them to make choices for a more robust output. The correlation chart between the probability ratios of the Existing-K-Means Neighbor, E-K-Means Clustering, and Support Vector Machine (SVM) algorithms demonstrates the distinct properties. Number of data points in hub x and Probability Ratio in hub y . The following two algorithms cannot compare to the E-K-Means Clustering technique. The Existing-K algorithm's evaluation ranges from 40.6 to 66.9, and the E-K-Means clustering algorithm's evaluation is from 55 to 86. The K-Means clustering technique consistently produces amazing results.

Acknowledgement

We would like to express our gratitude to everyone who took part in the study and voluntarily contributed their time and wisdom. The calibre of this manuscript has been significantly raised by their inputs.

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Real Time Tracking and Alert System for Stolen Laptop

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Abstract: Electronic device theft, which includes the loss of laptops, mobile phones, and other gadgets, has been an ongoing issue for people around the globe. A laptop's value is not the only factor that might be lost. Unfortunately, it also involves the loss of any stored sensitive and private data. The valuable data may occasionally end up in the wrong hands. Many personal gadgets, like cell phones and computers, are being used more often every day. Our risks of misplacing or losing our laptop rise as we use it more frequently. The approach for locating a stolen laptop using GSM and sensors is part of the proposed solution. We provide an innovative strategy for preventing laptop theft. In the event that the stolen laptop is used by someone other than the user, sensors on the sides of the device will identify a small movement and trigger an alert. There is an alarm sound system accessible to increase security. That will cause a would thief to reconsider taking the laptop with him. By interacting with the GSM modules built inside the laptop, the user of the stolen laptop may track its current location using a smartphone.

Keywords: GPS, GSM, Laptop, Misplace, Thief, Alert, Location, Trigger, Sensors.

I. INTRODUCTION

Real-time tracking and alert system for stolen laptops is a project that aims to develop a system that helps users to locate and recover their stolen laptops. The project involves the use of hardware and software components to track the location of the stolen laptop, send alerts to the user, and assist law enforcement in the recovery of the laptop. The hardware component of the system involves the installation of a tracking device in the laptop. This device will use GPS technology to track the location of the laptop in real-time. The software component of the system will be a user-friendly interface that allows the user to track the laptop's location, receive alerts, and take necessary action to recover the laptop. Location tracking will use GPS technology to track the location of the stolen laptop. The location data will be transmitted to the user's account on the system's server in real-time. Alert system will send alerts to the user via email, text message, or push notification, informing them of the laptop's location and other relevant information. Remote data wiping will allow the user to remotely wipe data from the stolen laptop to protect sensitive information. Recovery assistance will assist law enforcement in the recovery of the stolen laptop by providing them with location data and other relevant information.

The project will require expertise in software development, hardware integration, and GPS technology. It will also require collaboration with law enforcement agencies to ensure that the system complies with the relevant laws and regulations. Additionally, the system can act as a deterrent to theft, as potential thieves are less likely to steal a laptop that can be easily tracked and recovered. In summary, the motivation for developing a real-time tracking and alert system for stolen laptops is to provide a solution to the rising incidence of laptop theft, protect sensitive information, and provide users with a means to recover their stolen laptops quickly and efficiently. By using GPS technology to track the location of stolen laptops, users can recover their laptops and protect their sensitive information. The location data would be sent to a central server, where it would be analyzed and displayed on a map. If the laptop is moved outside of a designated area or if it is reported stolen, the system should be able to send alerts to the owner via text message. The alert should include the location of the laptop, as well as any other relevant information, such as the time and date of the alert. The system should have a user-friendly interface that allows the owner to view the location of the laptop, configure the alert settings, and take action in the event of a theft. The software scope of the project includes ensuring that the software is compatible with multiple operating systems, user-friendly, and secure.

The implementation scope of the project includes integrating the hardware and software components, testing the system's accuracy, and ensuring that the system is scalable and can handle a large number of

devices. The implementation scope of the project also includes training the end-users on how to use the system and providing technical support. The user interface scope of the project involves developing a user-friendly interface for the dashboard, which is easy to use and provides clear and concise information to the end-users. The data security scope of the project involves ensuring that the system is secure and complies with data privacy regulations. This includes implementing strong data encryption algorithms and ensuring that user data is stored in a secure database. The business model scope of the project involves identifying potential customers, conducting market research, and developing a marketing strategy for the product. This scope also includes identifying potential revenue streams and developing pricing models for the product. Overall, the scope of a project on a realtime tracking and alert system for stolen laptops can be vast and may require the integration of multiple areas, including hardware, software, implementation, user interface, data security, and business model.

II. LITERATURE REVIEW

Real-time tracking and management of laptops has been a field of interest for many researchers and a lot of research work has been done for tracking systems. Recently various anti-theft modules are introduced.

Montaser N. Ramadan, Mohammad A. AI- Khedkar, Sharaf A. AI- khedkar^[3] Intelligent Anti- theft and Tracking System for Automobiles describe that it collects the transmitted Information by SMS and processes it to format on Google Earth. Due to which there is delay of sending and receiving data via GSM network.

Pankaj Verma, J.S. Bhatia^[5] Design and development of GPS, GSM based tracking System a describes GPS is one of the technologies that are used in a huge number of applications today. One of the applications is tracking vehicle and regularly monitoring them. This tracking system can determine the location and route travelled by the vehicle, and that information can be viewed from any other remote location. It includes the web application that gives you the exact location of target. This system can track target in any weather conditions. This system uses GPS and GSM technologies. Main aim is to design a system that can be easily installed and to provide platform for further enhancement.

Sameer Darekar, Atul Chikane, Rutijit Diwate, Amol Deshkmukh^[6] Tracking System using GPS and GSM. In this paper the main objective is that to find the assert tracking on GSM and GPS. The main disadvantage in the paper is that the system is complicated and costly.

III. OBJECTIVE

The objectives of real-time tracking and alert system for stolen laptops using an accelerometer, GSM, GPS and Microcontroller are as follows:

- To design a practical and efficient system for tracking stolen laptops in real-time and alerting the owner via SMS.
- To develop a low-cost solution for laptop tracking and alerting that can be easily implemented by individuals and organizations.
- To implement an alarm system on the laptop to deter theft.
- To evaluate the system's accuracy, reliability, power consumption, and cost-effectiveness.
- To determine the feasibility and practicality of the proposed system for use in various settings, such as personal and professional environments.
- To contribute to the existing literature on theft prevention and tracking systems and provide insights for future research in this area.

By achieving these objectives, the system aims to provide a practical and reliable solution for

protecting personal and professional data and preventing financial losses due to laptop theft.

IV. MATERIALS AND METHODS

Methodology:

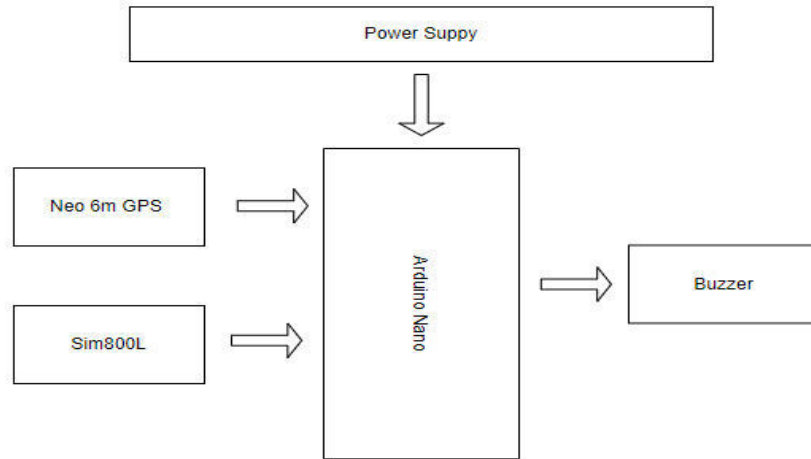


Fig 1: System Architecture

Methodology outlines the steps taken to design and implement the proposed real-time tracking and alert system for stolen laptops using an accelerometer, GSM, GPS module, and Microcontroller. The methodology includes the following steps: **Hardware Selection:** The first step in designing the system was to select the appropriate hardware components. Accelerometer, GSM, GPS, and Microcontroller were chosen based on their functionality, cost, and availability. **Hardware Interfacing:** The next step was to interface the hardware components with the Microcontroller. Accelerometer and GPS were connected to the Microcontroller via the I2C and serial communication protocols, respectively. The Sim800L module was connected to the Microcontroller via serial communication. **Software Development:** The software development involved programming the Microcontroller to perform the tasks outlined in the software implementation section. The code was developed in the Arduino Integrated Development Environment (IDE) and uploaded to the Microcontroller. **System Integration:** Once the hardware interfacing and software development were complete, the system was integrated by connecting the hardware components to the Microcontroller and uploading the code. **Testing:** The final step was to test the system's functionality. The system was tested for its ability to detect changes in the laptop's orientation and movement, track its location in real-time, send SMS alerts to the owner's phone when the laptop was detected to be outside the safe zone, activate an alarm on the laptop to deter theft and enter a low power state to conserve battery life. **Evaluation:** The system was evaluated for its performance in terms of accuracy, reliability, power consumption, and cost-effectiveness. The results of the evaluation were used to determine the feasibility and practicality of the proposed system.

Flowchart:

This flow chart shows the various stages in the project's functionality, from the start of the application to the various features available on the main page. The user is required to log in before being directed to the main page, which has four main options: track the laptop's location, stop tracking, capture a photo, and enable/disable the anti-theft alarm. The track function retrieves the laptop's location and sends it to the database, while the stop function stops the tracking. The capture function takes a photo and saves it to the database. The anti-theft alarm can be turned on/off using the toggle switch. If the alarm is triggered, an alert is sent to the user's phone, and the user can stop the alert from the main page.

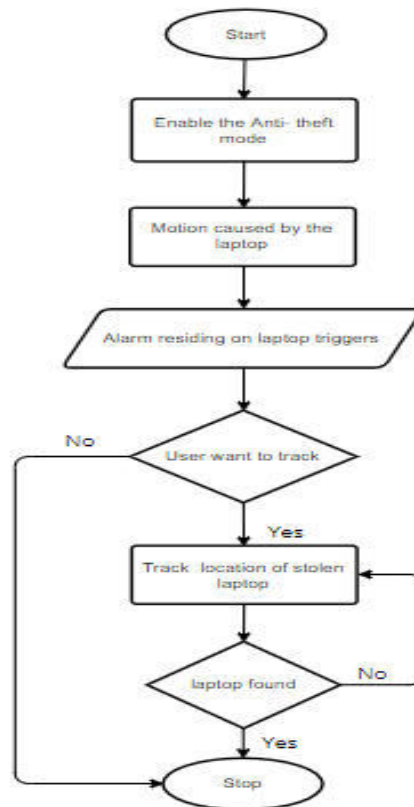


Fig 2: Flow chart of Realtime tracking and Alert system

V. RESULTS AND DISCUSSION

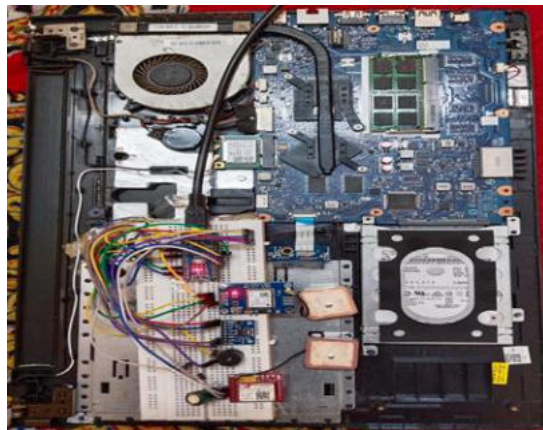


Fig 3: Realtime hardware system

The first user should log in with their registered email address and password. It will then redirect to the page with the anti-theft mode switch enabled. Once that switch is turned on, you will be sent to the main page, which offers four alternatives. Specifically, Track, Stop, and Capture. The Track button sends a message to the laptop's integrated sim, which replies with the user's longitude and latitude. The message will be read automatically by the program, and clicking the link below will take us to a Google map with the same longitude and latitude. The Stop button will stop the alarm. If the user clicks the capture button, a message is sent to that number to capture the image of the individual attempting to open the laptop (thief). If the laptop is turned on and connected to the internet, it will

email the thief's image to the owner. Hardware module has the Arduino Nano, GPS module, Sim800L and ADXL 345, Battery and Buzzer.

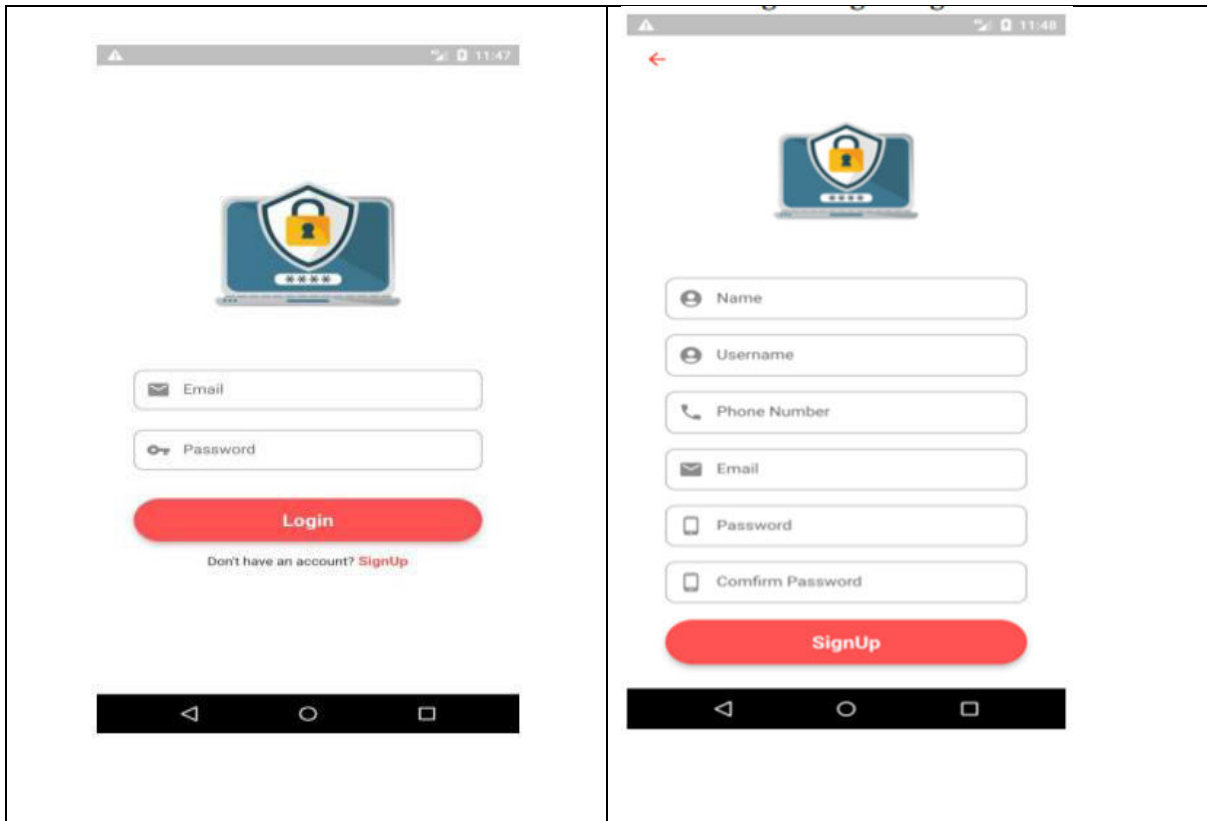


Fig 4: Login and Registration Page

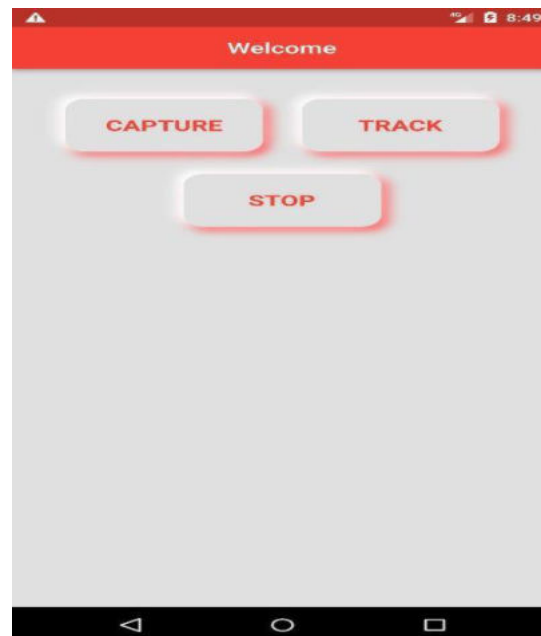


Fig 5: Home Page

VI. CONCLUSION

The proposed real-time tracking and alert system for stolen laptops has been successfully designed, implemented, and evaluated. The system is a practical and efficient solution for preventing laptop theft, safeguarding personal and professional data, and alerting the owner in real-time via SMS. The system utilizes accelerometer and GPS sensors to detect and track the movement of the stolen laptop, and the Sim800L module sends SMS alerts to the owner's mobile phone. The system also features an alarm to deter theft and a low-power mode to conserve battery life. The evaluation of the system showed that it is accurate, reliable, cost-effective, and feasible for use in various settings, such as personal and professional environments.

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A Blockchain-based Product Ownership Management System for anti-counterfeits in the Post Supply Chain

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Abstract: Counterfeit products in the post-supply chain pose significant risks to consumers' health and safety and can damage the reputation of manufacturers. Current anti-counterfeit solutions, such as security labels or holograms, are often ineffective, and the counterfeiters can easily replicate them. Therefore, there is a need for a more secure and reliable solution to combat counterfeiting in the post-supply chain. In this paper, we propose a blockchain-based Product Ownership Management System (POMS) for anti-counterfeits in the post-supply chain. The system provides a decentralized and transparent way of tracking the movement of products through the supply chain and verifying their authenticity. The POMS allows all parties in the supply chain, including manufacturers, distributors, retailers, and consumers, to access and verify the product's information securely. The POMS uses blockchain technology to ensure that the product's information is tamper-proof and secure. It provides a secure authentication system that allows only authorized parties to access the product's information. The system ensures data privacy by complying with all data privacy laws and regulations to protect sensitive information. The POMS is designed to be scalable and user-friendly, with a simple and intuitive interface that can seamlessly integrate with existing supply chain systems. The system's scalability allows it to handle large volumes of data and transactions without compromising its speed or efficiency. In conclusion, a Blockchain-based POMS for anti-counterfeits in the post-supply chain can provide a more secure and reliable solution to combat counterfeiting. The system's decentralized and transparent nature, secure authentication, data privacy, integration with existing systems, scalability, and user-friendly interface make it a promising solution for the post-supply chain. This system has the potential to enhance trust between different parties in the supply chain and provide a more secure and reliable way to verify the authenticity of products.

Keyword: Blockchain, Product, Product Ownership Management System, Quick Response Code.

I. INTRODUCTION

Counterfeiting is a global problem that affects businesses, consumers, and economies alike. In the post-supply chain, counterfeit products can enter the market through various means, such as theft, diversion, and unauthorized production. This not only results in financial losses for businesses but also poses a significant risk to consumer safety.

To address this issue, a blockchain-based Product Ownership Management System (POMS) can be implemented to track and manage product ownership throughout the supply chain. A POMS is a decentralized system that uses blockchain technology to record and track the ownership of a product, from the point of production to the point of consumption.

By leveraging the transparency and immutability of blockchain, a POMS can provide a tamper-proof and auditable record of a product's ownership history. This can enable businesses to authenticate the ownership of their products and prevent the entry of counterfeit products into the market.

In addition to preventing counterfeiting, a blockchain-based POMS can also offer other benefits such as improved supply chain visibility, increased efficiency, and reduced costs. It can enable stakeholders in the supply chain to track the movement of products in real-time, identify bottlenecks, and optimize processes.

Overall, a blockchain-based POMS can provide a secure, transparent, and efficient solution for anti-counterfeiting in the post-supply chain.

II. Problem Statement

Counterfeit products in the post-supply chain present a significant challenge to manufacturers and consumers. These products can harm the health and safety of consumers and negatively impact the reputation of manufacturers. The current anti-counterfeit measures, such as security labels or holograms, are often ineffective, and counterfeiters can easily replicate them. Thus, there is a need for a more secure and reliable solution to combat counterfeiting in the post-supply chain. Blockchain technology can provide a potential solution to this problem by creating a decentralized and transparent system for tracking product ownership and verifying authenticity. However, existing blockchain-based supply chain solutions are often complex, difficult to implement, and lack integration with existing systems. Therefore, a new blockchain-based Product Ownership Management System (POMS) for anti-counterfeits in the post-supply chain needs to be designed, which is scalable, secure, user-friendly, and integrates with existing supply chain systems to address the challenges of counterfeit products in the post-supply chain.

III. LITERATURE SUREVEY

Jinhua Ma^[1], Shihya Lin and Xin Chen^[2], In this study, a completely automated Block chain system is proposed a working anti-product fraud mechanism. The drawback of this system is that it does not uses smart contract to maintain the ownership of the user so it become very difficult as the database expands.

Tejaswini Tambe^[1], Sonali Chitalkar^[2], Manali khurud^[3], In this paper, Customers can scan the QR codes that are issued to a product to obtain all the necessary information, including transaction history and the current owner, which the enduser. The diversity of features is lost due to the fixed receptive field of the convolution kernel. The same scale feature maps extracted from the convolution kernel with different receptive fields are semantically different

Naif Alzahrani^[1], Nirupama Bulusu^[2]. In this paper, we have proposed a new supply chain using blockchain technology. This Block-Supply chain can detect modification, cloning, and tag reapplication attacks in addition to tracking products without a centralized managing server. Furthermore, this paper has introduced a new truly decentralized consensus protocol utilizing anonymous, dynamic mapping and randomness.

IV. Methodology

We developed a blockchain-based Product Ownership Management System (POMS) for anti-counterfeits in the post-supply chain by conducting a literature review and designing a system architecture that integrates blockchain technology, data privacy, and secure authentication. We used simulation and testing to evaluate the feasibility and scalability of the system. The POMS allows for decentralized and transparent tracking of product movement through the supply chain, providing a secure and reliable way to verify product authenticity.

V. Requirement Analysis

Software Requirerment

A. Blockchain

1. Meta Mask : Crypto Wallet.
2. Ganache : Create private Ethereum blockchain to run tests
3. Ethereum : Blockchain Network
4. Solidity : Smart Contract

B. Website

1. HTML - Markup language for creating web pages
2. CSS - Style Sheet Language

3. JavaScript - Scripting Language for web pages
4. Bootstrap - Templating

VI. RESULTS AND DISCUSSION

The blockchain-based Product Ownership Management System (POMS) was found to be a feasible and scalable solution for anti-counterfeiting in the post-supply chain. The POMS provides secure and transparent tracking of product ownership, enabling reliable verification of product authenticity. The system was designed to be user-friendly and easily integrated with existing supply chain systems. The use of blockchain technology ensures data privacy, secure authentication, and tamper-proof product information. The POMS has the potential to enhance trust between different parties in the supply chain and provide a more secure and reliable way to combat counterfeiting in the post-supply chain.

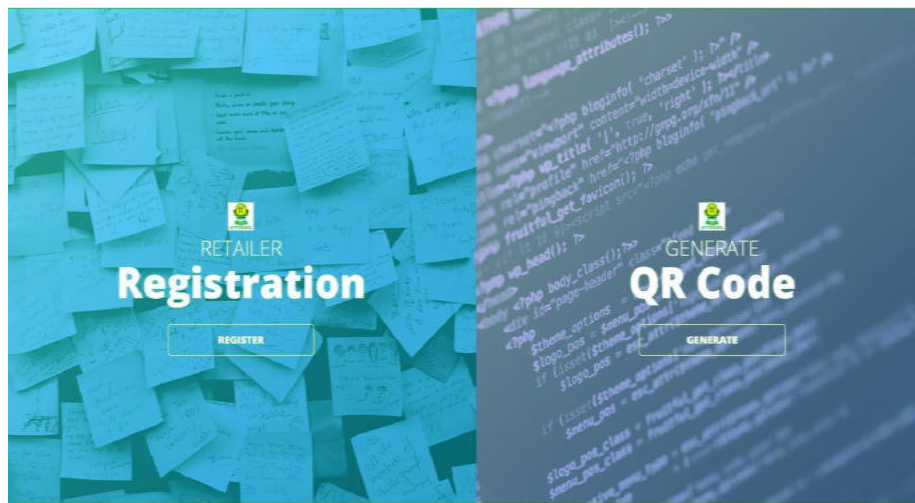


FIG 1 Home page

FIG 2 Generate QR Code for Product

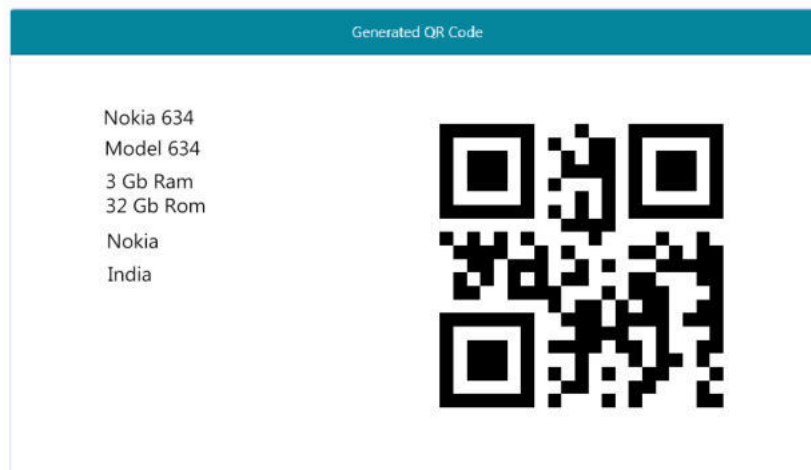


FIG 3 Generated QR Code for Product.

FIG 4. Retailer Registration

VII. CONCLUSION

The system would begin with a unique identification number or code being assigned to each product at the point of manufacture. This code would then be recorded on the blockchain, along with information about the product's ownership, movement, and status throughout the supply chain. When a product is sold to a distributor or retailer, the ownership information would be updated on the blockchain, and the new owner would be recorded. Similarly, when a product is sold to a consumer, the ownership information would be updated once again. The blockchain's immutability ensures that the information recorded cannot be altered or deleted, making it an excellent tool for maintaining an accurate and reliable record of a product's ownership and movement. This record would be accessible to all parties involved in the supply chain, from manufacturers to retailers to consumers.

ACKNOWLEDGEMENT

We would like to extend our appreciation to the participants who took part in this study and generously shared their time and insights. Their contributions have greatly improved the quality of this manuscript

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Colorization of Black and White Image Using Deep Learning

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ABSTRACT: The main objective of this paper is to colorize black and white images, which are only in black and white. We implement image colorization using CNN algorithm in Deep learning where we have used all 4 layers of CNN which are not used in existing papers, which resulted better output than deep hybrid model. These layers will be written in prototxt file. While leveraging pre-trained models for better feature extraction and compare the performance of these models. Colorization of gray-scale images has become a more researched area in recent years, thanks to the Deep Learning and Convolutional Neural Networks. Image features can be automatically extracted from the training data using deep learning models such as Convolutional Neural Networks (CNN). The Image Net dataset used and random selected image have been used to construct a mini dataset of images that contains 1.2k images spitted into 80% training and 20% testing. We attempt to apply this concept of the colorization of gray-scale images obtained from deep learning. We aim to compare each variant based on results obtained as individual images. It has been attempted using Photoshop editing, but it proved to be difficult as it requires extensive research and a picture can take up to one month to colorize.

KEYWORDS: Image colorization, Grayscale images, Convolutional Neural Networks(CNN)

I. INTRODUCTION

Image coloring is the process of assigning colors to grayscale images to make them visually pleasing and perceptually meaningful. This is a very complex task and often requires prior knowledge of the image content and manual adjustments to achieve artefact-free quality. Also since objects can have different colors there are many ways to assign colors to pixels in an image. So there are several ways to solve this problem. There are two main approaches to colorizing an image. One is to ask the user to color specific areas and spread this information across the image. Another way is to learn the color of each pixel from color images of similar content. This article uses the latter approach. Extracts color information from one image and transfers it to another image. In recent years researchers in computer vision and image processing are paying more and more attention to deep learning. As a representative technique Convolutional Neural Network (CNN) has been well studied and successfully applied to various tasks such as image recognition image reconstruction and image generation. CNNs consist of layers of small computational units that process only part of the input image in a feed-forward fashion. Each layer is the result of applying a different image filter to the previous layer and each filter extracts specific characteristics of the input image. Thus each layer can contain useful information about the input image at different levels of abstraction.

In this work, we trained a Convolutional Neural Network (CNN) to associate a black and white image input with a colour output. In doing so, we use a pre-trained CNN model that can be retrieved using Python. Our idea is to use a fully automated approach that produces decent and realistic colorizations. Deep learning is an existing feature of AI that works similarly to the human brain. Image colorization has become a popular method for making images look more interesting and dynamic. By augmenting an image with colours, users can add a sense of life to images that would otherwise be static and dull. This can be helpful in creating more engaging content, as well as making images easier to understand and remember. In this blog post, we will discuss how deep

learning can be used to colorize black and white images. By using deep learning algorithms, we can create colorizations that are accurate and pleasing to the eye.

1.1 Problem Statement

The problem that we are trying to solve is the colorization of black and white images using deep learning. The reason why this is a problem is because it is difficult to accurately colorize an image without any prior knowledge of the colors that were originally in the image. This is where deep learning comes in, as it can learn the relationships between the colors in an image and then map those relationships to new images.

II. LITERATURE SURVEY

R.Shiva Shankar^[1], G. Mahesh^[2], K V S S Murthy^[3], D. Ravibabu^[4]. a Novel approach for GrayScale-Image Colorization using Convolutional NeuralNetwork. This model has increased the efficiency in both coloring and processing. The model which we developed has accuracy and performance is also increased.

Sanae Boutarfass^[1], Bernard Besserer^[2]. Improving CNN basedcolorization of B&W photographs. illustrates the fact that colorization byCNN of images from traditional photography leads to mistakes if the CNN is trained using color images.

Richard Zhang ^[1] proposed an optimized solution by using enormous dataset and single feed-forward pass in Convolutional Neural Network. Their major motive lies on training part. Human subjects were used to test the output and was able to fool 32% of them and had multiple number of neurons. The many attempts used various architectures.

III. REQUIREMENTS

Software Requirements

- Windows 7, 8, 10, 11
- Python 3.10.0
- PyCharm Community Edition

Hardware Requirements

- Intel 2Ghz Processor
- 200 GB Hard Disk
- 4 GB RAM

IV. METHODOLOGY

Considering the pixel color is highly reliant on the features of its adjacent pixels, use of CNN is a satisfactory option for image colorization. The condition of having only a gray-scale or black and white image, detecting the exact color is complicated. The information is not enough for a network to evaluate the pixel colors. For instance, consider a car image which is in gray form. There are a number of acceptable options for car color. To guess a suitable color, we require more information to study the model to match a gray-scale input image to the equivalent color of the output image. In the past few years, the Convolutional neural network is one of the most successful learning-based models. CNN verified spectacular capabilities in image processing. In such a manner, a CNN-based model is proposed by us for automatic image colorization. By using Convolutional Neural Networks, we decided to ambush the issues of image colorization to “hallucinate” what an input black & white image would appear after colorization. For training the network started with the ImageNet dataset and all images

were transformed from the RGB color space to the Lab color space. Like the RGB color space, the Lab color space has three channels. But like the RGB color space, the Lab encodes color information differently.

Proposed System

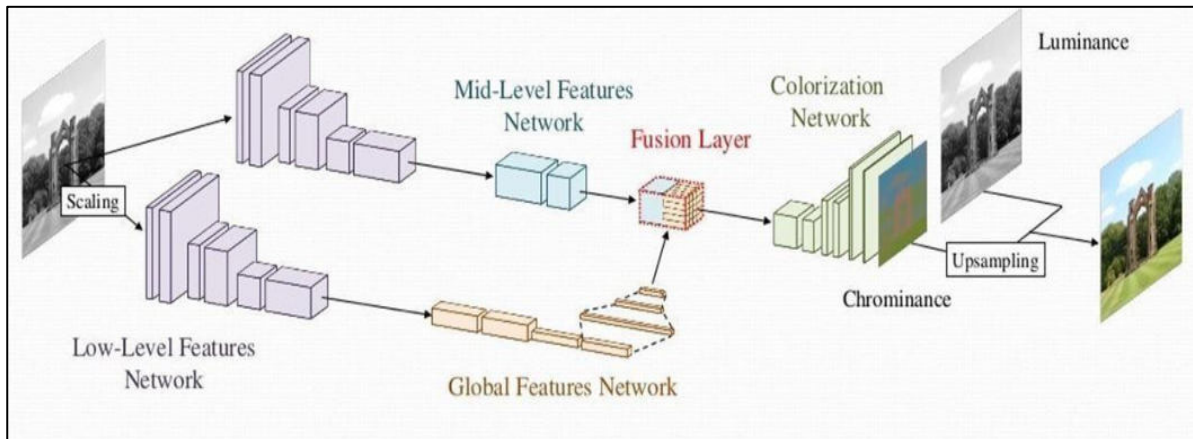


Figure 4.1 Proposed System

Implementation procedure of our model is as follows:

Step 1: Start

Step 2: Input Greyscale image is taken

Step 3: Input image is encoded and converted into small block

Step 4: Input images are compared to the trained images which are already stored in training Dataset.

Step 5: The image is feature extracted with the help of fusion layer

Step 6: Fusion layer decode the image into colored image

Step 7: Stop

Convolutional Neural Network (CNN):

A Convolutional Neural Network (CNN) is a type of Deep Learning architecture commonly used for image classification and recognition tasks. It consists of multiple layers, including Convolutional layers, pooling layers, and fully connected layers. The Convolutional layer applies filters to the input image to extract features, the Pooling layer down samples the image to reduce computation, and the fully connected layer makes the final prediction. The network learns the optimal filters through back propagation and gradient descent. Figure 1 shows an example of CNN architecture.

Dataset

The dataset used in this, is the ImageNet dataset. ImageNet is an ongoing research project to provide an accessible images database for the researchers around the world. The ImageNet is organized according WordNet hierarchy. Each class in the ImageNet contains 1.2k images. Figure 2 shows sample images from imageNet.

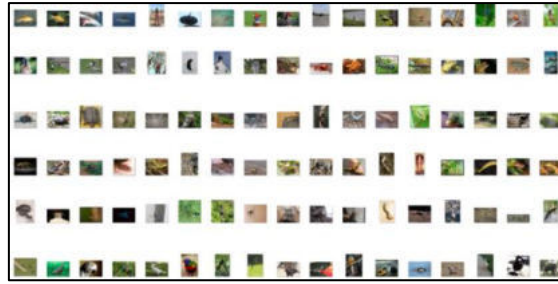


Figure 4.3 ImageNet Dataset Images

V. RESULT

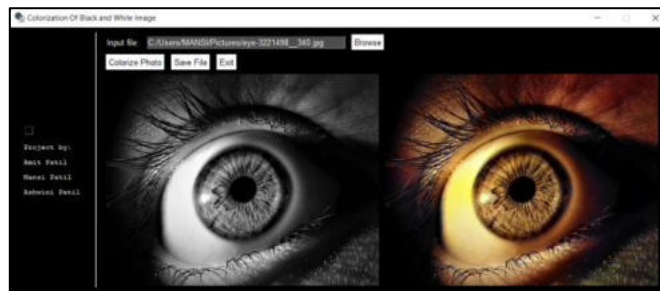


Figure 5.1 Result of Model

In the above Figure (Fig. 4) are shows input image and output obtained from our model. Our model generates 86-95% accuracy which is more accurate than previous model respect to some of the properties like quality, colour and accuracy etc.



Figure 5.2. (a): Grayscale image, (b): Output of our model

Results obtained from the model on some of the images from the validation set. The (a) columns represent input grayscale image, the (b) columns are colorized outputs

Model	RMSE
-------	------

Previous Model	15.57
Our Model	6.81

VI. CONCLUSION

It is Conclude that, we presented a reliable method for colorizing greyscale images that uses a CNN algorithm to extract colour information from an image and transfer to another image. We showed examples of generated images. Our model generates 86-95% accuracy. Results indicate that the presented method can be used as a creativity tool to assist human artists in near future.

Acknowledgement

I also thank to our project guide Prof. Shaikh Sharique Ahmad and Project Coordinator Prof. Sonali Karthik for giving us the constant source of inspiration and help in preparing the project personally correcting my work and providing encouragement throughout the project, and my group members for steering through the tough as well as easy phases of the project in a result-oriented with concern attention.

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Improving efficiency of high utility Pattern Mining Algorithm using Adaboost , Random Forest and SVM

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ABSTRACT : High utility pattern mining has been effectively researched within the data mining field. The traditional pattern mining cannot absolutely think about attributes of databases used in real world. Moreover, database volumes are larger bit by bit gradually in many applications similar to sales data of retail markets and association information of internet services. The general strategies for static databases are not reasonable for preparing dynamic databases and removing helpful data from them. Many incremental utility pattern mining approaches have been proposed, past methodologies require more scans for incremental utility pattern mining regardless of using any structure. In any case, the methodologies with various scans are really not sufficient for stream environments. The algorithm uses the retail transactional database and to increase the efficiency of the proposed system we add the constraints like length, item, date which helps for more accurate prediction.

Keywords-: Data mining, SVM, Random Forest, AdaBoost , High utility pattern mining.

I. INTRODUCTION

Main purpose of data mining is to find useful data sets from raw data. The technique of finding interesting, unexpected, and useful data patterns from large databases. In these algorithms various Algorithms are used. When the number of transaction dataset increases then it also increases its complexity, algorithms are being developed to match this development. In this we are taking input as a transaction dataset and after that we process that dataset using preprocessing step and remove noise from the dataset. next process is data splitting in which we split dataset in two phases training and testing and next step in which we classified Adaboost , random forest ,SVM algorithm using those algorithm it boost the performance and increase the accuracy. This approach can solve the limitation of traditional pattern mining that cannot fully consider characteristics of real world databases.

II. PROBLEM STATEMENT

The problem statement is, To design a method for constraint based utility mining with databases, given threshold minimum utility by user and addition of constraints like length, item, date for analyzing the patterns in decision making process.

III. LITERATURE SURVEY

In [1] J.C.-W.Lin[2],P. Fournier-Viger[1] Survey on High Utility Oriented Sequential Pattern Mining. Sequential pattern Mining ,Time interval based Sequential Pattern Mining , Utility Mining and by observing it, strong conclusion can be derived that there is an opportunity for hybridization of more than one area by means of satisfaction of more than one constraint(Time, Utility etc.) In [2]Unil Yun[1],Heungmo Ryang[2] An efficient algorithm for mining high utility patterns from incremental databases with one database scan. This approach can solve the limitation of traditional pattern mining that cannot fully consider characteristics of real world databases. database volumes have been getting bigger gradually in various applications and connection information of web services, and general methods for static databases are not suitable for processing dynamic databases. In [3] U.Yun[1], D.Kim[2] Mining recent high average utility patterns based on sliding window from stream data. The representative utility pattern mining technique, high utility pattern mining (HUPM) However, such utility measures for patterns in HUPM have a drawback in which patterns with long lengths tend to have utilities sufficient to become high utility patterns. In [4] G.Lee [1], U . Yun [2] New efficient

approach for mining uncertain frequent patterns using minimum data structure without false positives. State-of-the-art methods based on tree structure can cause fatal problems in terms of runtime and memory usage according to the characteristics of uncertain databases and threshold settings because their own tree data structures can become excessively large and complicated in their mining processes. [5] J.Liu [1]Mining utility pattern in one phase without generating candidates. High Utility Datasets(HUDs) mining is a popular technique in data mining, which relates to searching all datasets having profits (utilities) higher than a customer specified minimum profit point . Although, setting appropriate point value is a trouble for the customers.

IV. MATERIALS AND METHODS

Methodology

Take input as a transaction dataset next step in which we process those dataset using preprocessing technique and then after completing this step next we split those dataset into two different phases training and testing then classification is the next step in which using random forest, adaboost and SVM classify the algorithm and check their accuracy , performance and result.

Requirements

(i) Hardware Requirement

- a. System : Pentium IV 2.4 GHz
- b. Hard Disk : 200 GB
- c. Ram : 4GB

(ii) Software Requirement

- a. O/S: Windows 7.
- b. Language : Python
- c. Front End : Anaconda Navigator – Spyder

V. RESULT AND DISCUSSION

In this ,we use three algorithms to calculate accuracy and improve accuracy . Using algorithms we improve the efficiency of the dataset.

a. Flow Chart

A flowchart is a diagram which shows a process or activity. A flowchart is also a diagrammatic representation of an algorithm, or a step-by-step approach to problem resolution. The flowchart that shows the stages and have various types of boxes and their order by connecting those boxes with arrows.

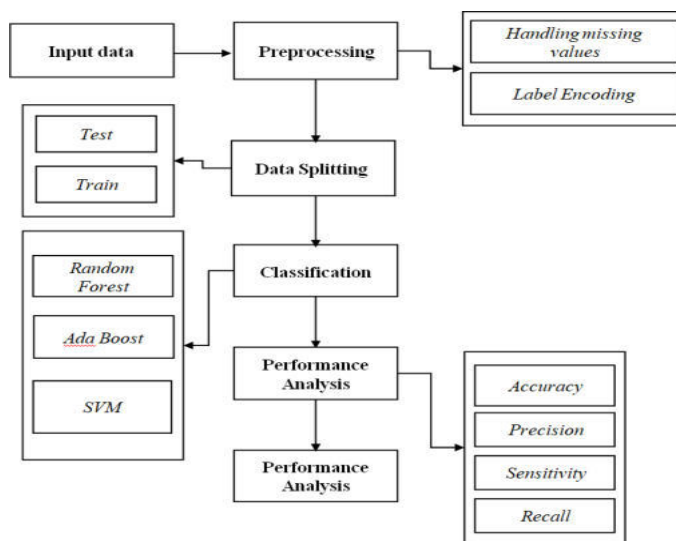


Fig 4.1: Flow Chart for for improving efficiency of dataset using algorithms

We have created a little server that is capable of sharing data both locally and remotely. Because of its portability, this server can be utilized both at home and while traveling. A media server is another function of this server. Many benefits were provided by the Raspberry Pi's own distributed storage, including free Cloud services and the ability for customers to choose how much more space they need on their own hard drives.

a. **GUI**

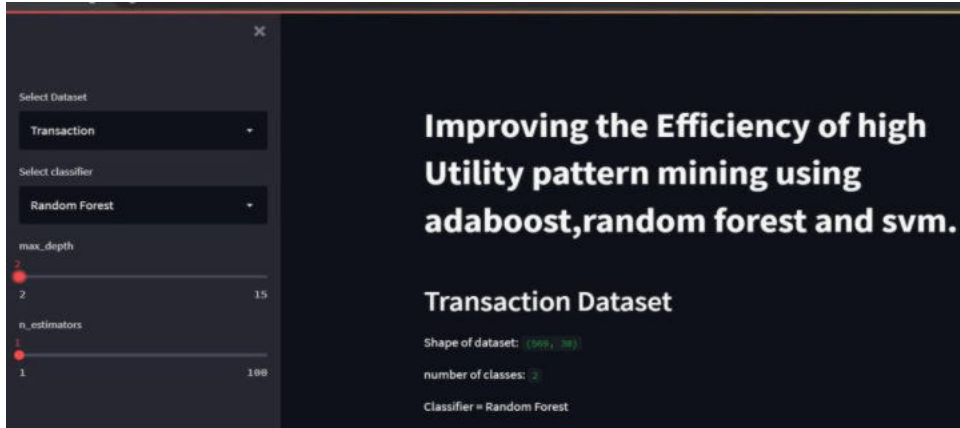


Fig 4.2: GUI

In this we are showing accuracy in graphical user interface format. First we select the given transaction dataset and then select those algorithms we are using in the project ,after selecting the algorithm it runs and shows the accuracy.

b. **GUI**

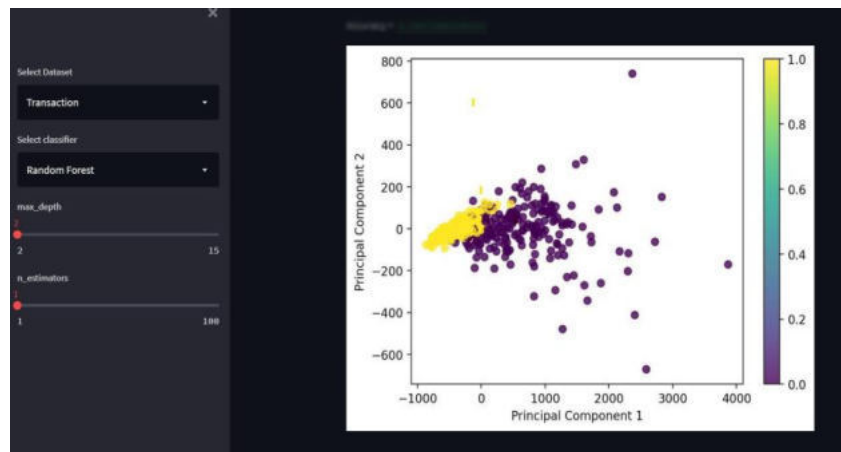


Fig 4.3 output

Table 1: Algorithm & Accuracy

Algorithm	Percentage of Accuracy
Adaboost	99.95%
Random Forest	99.95%
Support vector machine	72.56%

VI. CONCLUSION

In data mining, utility mining is a new approach in which mining results must meet the user's goals. Existing algorithms of association rule mining do not consider interestingness measures for users. Previously many algorithms were proposed for frequent pattern mining, but most of them mainly based on the count or occurrence value of an itemset.

In this project, a new approach for high utility pattern mining has been proposed which uses Random forest, Adaboost, SVM Algorithms to improve performance. Adaboost has been used to boost the performance of algorithms, and also using random forest algorithms to predict the things which helps to run algorithms efficiently, such as customer transactions, and their activity, safety. Support vector machine algorithms are used for classification purposes and at the end result it gives better accuracy.

ACKNOWLEDGEMENT

We would like to extend our appreciation to the participants who took part in this study and generously shared their time and insights. Their contributions have greatly improved the quality of this manuscript.

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File Secure System Using Hybrid Cryptography

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Abstract : File security is all about protecting your private corporate information from snoopers by implementing stringent access control procedures and upholding impeccable permission hygiene. As important for safeguarding files as creating and maintaining security access limits is decluttering data storage. Regularly delete unnecessary, old, and other files to make room for business-critical information. You may reduce storage inefficiencies and dangers to data security by regularly reviewing and enhancing your file security strategy. Today's extremely versatile and well-known technology is cloud computing. Customers are given convenience, speed, competence, etc., in their working environment with the help of the services.

Keywords—DES Algorithm and RSA Algorithm.

I. Introduction

The DES and RSA cryptographic algorithms use symmetric and asymmetric keys. The primary challenge is integrating the key TSO receiver into a multi-user application. Although these algorithms offer minimal security, they have a low latency for data encoding and decoding. RSA and ECC are the algorithms used in public key cryptography. Algorithms for public key cryptography manipulate both public and private keys. Algorithms for public key cryptography work with both public and private keys. These techniques achieved a high level of security but increased the time it took to encode and decode data. Steganography inserts an envelope with secret data hidden within. With this method, not everyone can see that the data even exist. Only legitimate recipients are aware that the data even exist

II. Literature

[1] Sanjeev Kumar^[1], Garima Karnani^[2], Madhu Sharma Gaur^[3], Anju Mishra^[4] The encryption and decoding cryptography algorithms AES and RSA are used to boost cloud storage security. In comparison to current approaches that rely on cryptography, it also improves the security of data in cloud settings. For encryption and decryption in this, only text files have been utilised; other file types have not. [2] Divya Prathana Timothy^[1], Ajit Kumar Santra^[2] The Blowfish, RSA, and SHA-2 algorithms are combined to form a novel hybrid cryptographic algorithm. The efficiency of the suggested system is provided by the combination of symmetric and asymmetric algorithms. Using the SHA-2 algorithm, the suggested solution offers exceptional security for data transfer over the internet.

III. Proposed System

As opposed to conventional storage devices, which can lose data due to a variety of reasons, including device loss, data corruption from a computer virus, and natural catastrophes, cloud storage offers secure backup. By employing symmetric key cryptography technique to encrypt and decrypt the client information at cloud storage and client side, it is possible to protect information from many sorts of attackers. Original data is converted into unreadable form using cryptography.

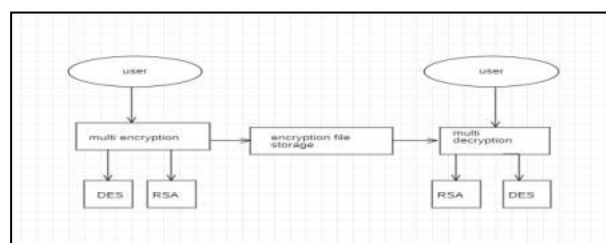


Fig.1: System Architecture for Secure File Storage

Sender: Encryption

1. The sender uploads a text file to a cloud storage service.
2. The first level of encryption is performed using DES, while the second level is performed using RSA.
3. The plain text is then transformed into cypher text and entered into the database.

Receiver: Decryption

1. The receiver read the database's Cipher Text.
2. After applying the RSA algorithm to the first level of decryption and the DES method to the second level of decryption, no obstacles are found.

IV. Algorithm**DES Algorithm:-**

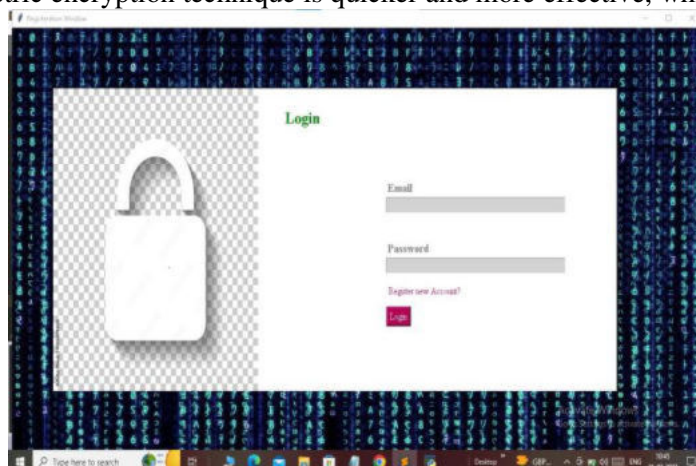
DES secret key, which is used to convert information into cipher text as well as into readable plaintext. If this information were to be intercepted by a hacker, he or she wouldn't be able to read it without the DES secret key, which, hopefully, would only be known by the users sending and receiving encrypted information.

RSA Algorithm: -

Both the public and private keys in RSA cryptography are capable of encrypting data. Decrypting a message requires the opposite key to that used to encrypt it. The sender creates a private key, encrypts it using a public key method, and uses the original symmetric key to encrypt the entire message, including the already-encrypted private key. Only if the recipient is aware of the private key the sender created when encrypting the message can it be deciphered.

V. Result And Discussion

Speed and security are both offered by hybrid cryptography. For encrypting huge volumes of data, the symmetric encryption technique is quicker and more effective, while the asymmetric encryption



algorithm offers better security when transferring the encryption key. In general, it is quicker and more effective than a system that merely employs asymmetric encryption. The quantity and complexity of the data being encrypted, as well as the processing capability of the hardware being utilized, might, nevertheless, have an impact on the system's performance.

Fig. 5.1: Login Page



Fig. 5.2: Registration Page



Fig. 5.3: Fsecure Options Page

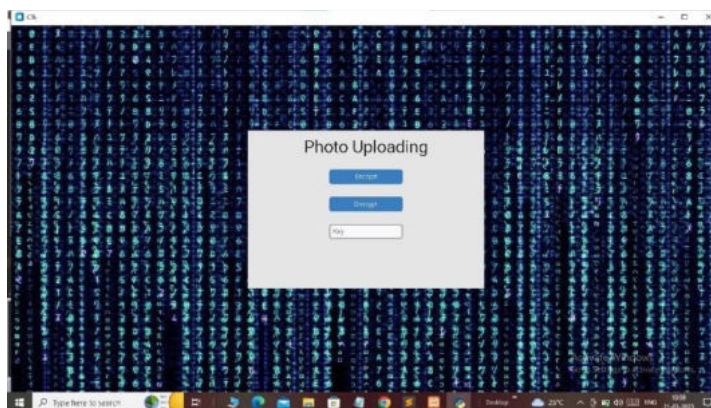


Fig5.4: Encryption Page

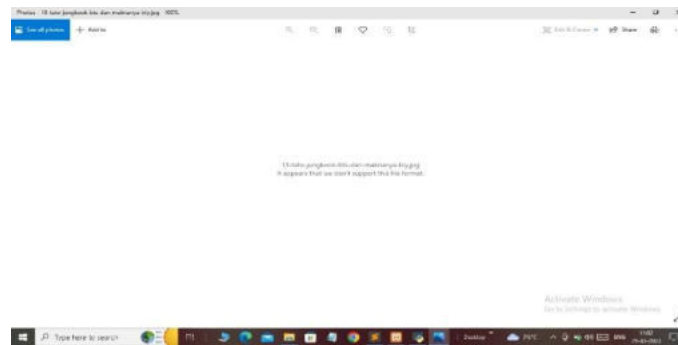


Fig. 5.5: Decryption Page

VI. Conclusion And Future Scope

The system's purpose is to safely store and access data in the cloud, which is only accessible by the data owner. Encryption and steganography techniques are used to address data security challenges with cloud storage. DES and RSA algorithms provide data security. Using multi-threading methods speeds up the encryption and decryption processes. We were able to increase data integrity, high security, low latency, authentication, and secrecy with the aid of the suggested security mechanism.

By adding compatibility for other file types, we can further enhance the system. Several algorithms can be used for encryption and decryption. When used in a cloud setting, the hybrid strategy increases the security of the remote server, gaining more user confidence for cloud providers in the process.

Acknowledgement

We would like to take this opportunity to express our gratitude towards all the people who have helped us in various ways, for successful completion of our project. We must convey our gratitude to our honorable principal sir Dr. S. Riyazoddin and our project guide Prof. Sonali Karthik for giving us the constant source of inspiration and help in preparing the project, personally correcting my work and providing encouragement throughout the project. We also thank all my faculty members for steering me through the tough as well as easy phases of the project in a result-oriented manner with concern attention.

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Crowdfunding Using Smart Contract In Blockchain

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Abstract : Crowdfunding is a strategy for raising money in an online. In this way it became a easy form for the people to invest/donate their small amount of money into different creative people's ventures to help them. By using crowdfunding people are able to invest their money into different startups through an mediator such as broker dealer. The main problem with the existing current systems is that, they do not give the donor guarantee policy certificate and the investor does not have direct control over the invested money. So, to overcome this problem our paper proposes the crowdfunding using smart contract in blockchain technology through which our provides an safe, secure and transparent way of crowdfunding. Our project provides an interactive forms for campaign creation, donation and request approval by which both the investors as well as the creators of the project can easily create and invest in the campaigns. The investors have all rights to track the money they have funded into the projects and can have full control over the invested money, This blockchain technology records all the transactions and store them in a block.

Keywords:- Crowdfunding, Smart Contract, Campaign, Blockchain

I. INTRODUCTION

Crowdfunding is an easiest solution or the method for overcoming the issues or the problems that we have to face while approaching the traditional way/method of raising the funds. Basically, crowdfunding provides a platform to the person or a team who has an idea to put their project or cause in front of the huge number of people/individuals (i.e., investors) ready with their money to invest in their interested campaigns. The problem with the current crowdfunding platforms is that they have centralized body which is been controlled by an organisation/corporation. These organizations/corporations influences the campaigns and charges heavy fees. So, for this problem blockchain based crowdfunding platform helps to decentralized the funding model. Blockchain based crowdfunding helps to make sure that the investors are engaged in less risk of support into new ventures and creators can gain more and more investors globally to raise the funds in less time. Blockchain based crowdfunding is one of the purest form of crowdfunding as it does not contain any mediator between the creators and the investors. Blockchain based crowdfunding dapp (decentralized application) is the platform that gives an opportunity to the creators to post their project/campaigns on it and can get fund to their interested creators project/campaign. The main reason to use blockchain based crowdfunding decentralized application (dapp) is to overcome the mainly increasing problem day by day that is trust. Blockchain helps to build the trust and transparency between the investors and creators. Blockchain is an decentralized or distributed ledger which means it does not have any single centre coordination system (i.e., centralized system) where every nodes connects to it to share its information. Decentralized or distributed system has multiple coordination points where every node takes part in sharing the information process. Decentralized or distributed system is the safe system everyone collectively execute their role where as in centralized system if the central system gets failed then all the nodes connected to it will disconnect and the whole system fails completely which results in the unsafe system. Blockchain is open to all with an decentralized or distributes system that records all the transactions occurred between the creators and investors to maintain the transparency between them that leads to building of trust in both the parties. In blockchain the information entered into it cannot be deleted later, the information is permanently stored on it. The transactions gets verified at every single transaction that is been carried out. Blockchain is the safest method to keep the transparency between the two parties.

II. PROBLEM STATEMENT

The problem with the current system is that , the company charges huge amount of money from both the creators of the project as well as the investors of the project. It does not have records of the transactions occurred between the creator and investor of the project. As when it is about crowdfunding of the existing companies, the main problem is the trust and also they don't give donor guarantee certificate, Due to which the donor does not have the control on the money that he has invested and also because of which the transparency is not maintained between both the parties and that leads to the trust issues for the users.

III. LITERATURE SURVEY

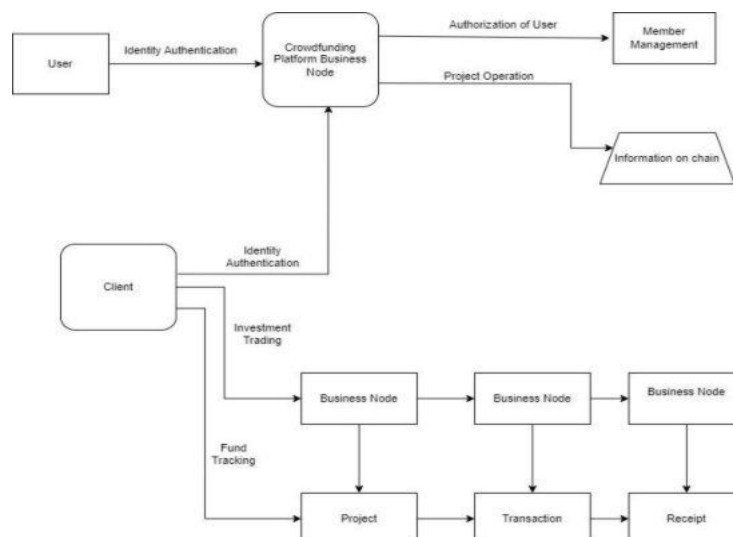
Nikhil Yadav, Sarasvathi V [1] ., proposed the model for the blockchain based crowdfunding by using which the platform can give a private, secure and decentralized path for crowdfunding.

Shweta Singh, Anjali Sharma, Dr Prateek Jain [2] ., this paper proposes the concepts of current blockchain technology, its features application and challenges. Marc Pilkington [3] ., this paper roposes the main principles behind the blockchain technology and some of its cutting edge application. Jared Newll,Quazi Mamun , Sabih Ur Rehman And Md Zahidul Islam [4]., this paper proposes the investigated layered architectures for different use cases. Julija Golosova, Andrejs Romanovs [5] .,this paper analyzes conveniences and difficulties, related to the blockchain integration and implementation in the different fields of modern industry. Pei Xu, Joonghee Lee, et.al , [6] ., this paper proposes the utility of the information security CIA Traid as a lens to understand the impact of the blockchain technology on supply chain transparency.

IV. PROPOSED SYSTEM

This project is developed by using React.js and Next.js as the front end and Node.js in backend. For smart contracts, Solidity language (Object Oriented programming language) has been used. A smart contract is nothing but a computer program that manages the transactions of digital money or assets occurred between the two parties within undisputable rules. Smart contract can also be known as crypto contract. This smart contract runs on the EVM (Ethereum Virtual Machine). To start accessing the system the user first needs to open an cryptocurrency wallet called as metamask. Metamask is an chrome browser plugin that allows users to interact with

any of the decentralized application platform. Once the account has been created in the metamask, the user can transfer the Ethereum into his account. By having some ether in users account, the user can start interacting with the system as Web 3 instance has been injected into the web browser by metamask. This Web 3.js helps to connect the users and the smart contracts with each other. When the administrator creates the new project campaign then the smart contracts gets automatically generated in Ethereum. In this project, the project creators post their project in the campaign and the investors those who are

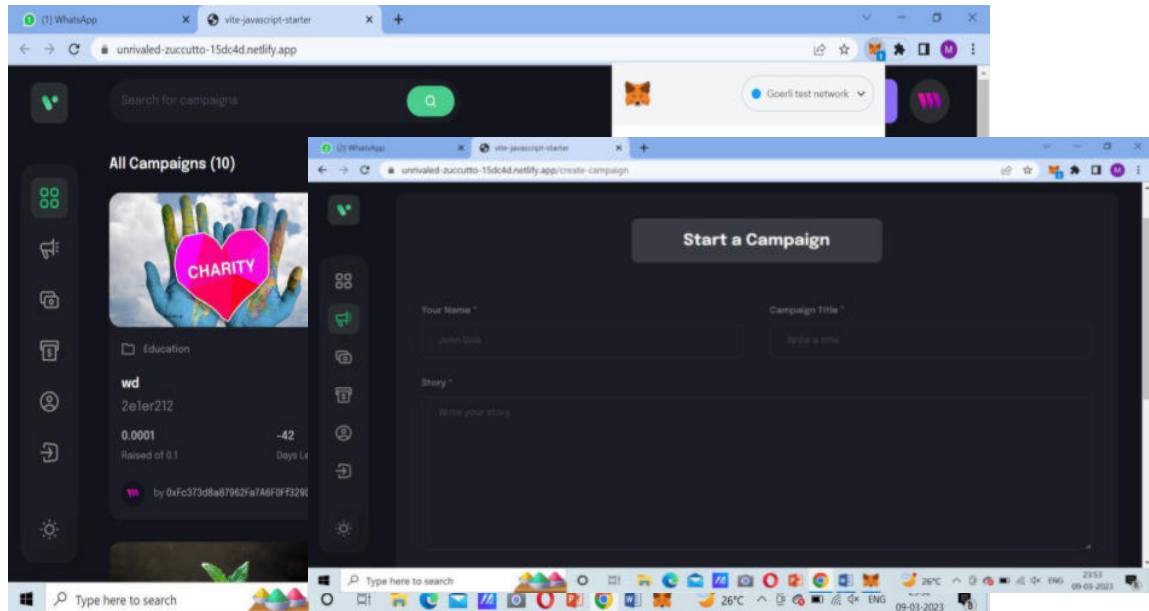


interested in the project give their fund to their interested project campaign. All the transactions occurred in the campaign gets recorded and is traced in the blockchain. Due to the request approval module, donor here has full control over the money that he/she has invested in the campaign. Because of the

Fig. 1 Proposed diagram

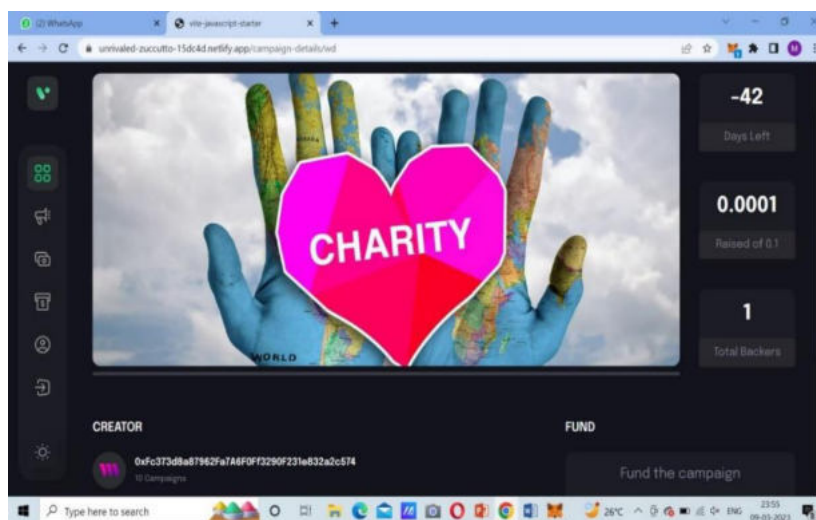
direct full control over the money invested by the investor, the trust is builded.

V. RESULT & ANALYSIS



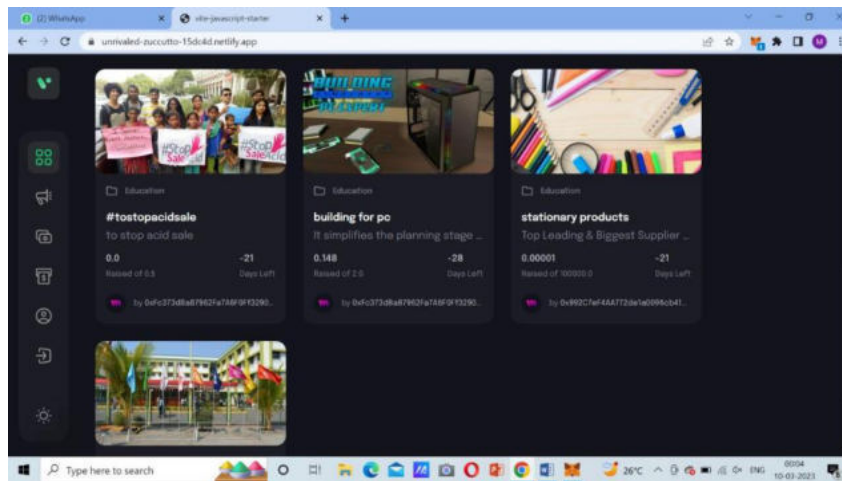
In the above output it shows that by using react.js we can create web pages. when user visit first time on this web page so the user is connect the metamask wallets to website.

In the above output, left side shows that in which we can create a different types of button like withdraw, create campaign, payment and log out button. In the right side it shows all type of campaign in which you want to donates same ether to the campaign.



In the above output it shows that the user can create campaign in this it set how many days want to set to take ethers in your campaign. In this you can also see your raised amount.

In the below output , all campaign button it show that all the type of campaign till now we are created in this project and how many contribution done in your campaign.



VI. CONCLUSION

In this paper, we have seen how the existing current crowdfunding platforms charges heavily to both the investor as well as the creator of the project. So to overcome this problem we have used crowdfunding using smart contract in blockchain through which we have tried to provide an safe, secure and transparent method of crowdfunding. In this project, we have provided an interactive forms for campaign creation, donation and request approval by which both the investors and creators of the project can easily create as well as invest into the campaigns. The investors have all the rights to track the fund that he/she has invested into the campaign. Due to the direct control over the funded money investor feels trustworthy about the campaign. Because of which it makes our system an trusted crowdfunding method in the vision of the users.

ACKNOWLEDGEMENT

We would like to thanks to the Department of Information Technology, TCOE college, for giving us a chance to do this reserach. We would also like to thank to our Prof. Sharique ahmad and our project coordinator Prof. Sonali Karthik who had guided us from the beginning of this research till the ending of the research.

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Identification of Birds Species using Neural Network and Audio Signal

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ABSTRACT : Birdsong recognition using neural networks and audio signals is an emerging application of artificial intelligence with practical applications in ecological research and conservation efforts. The process involves gathering a large data set of audio recordings of different bird species, preprocessing the audio signals to extract relevant features, and training a neural network to recognize bird species from the audio signals. Common feature extraction techniques include MFCCs, spectrograms, and wavelet transforms, and neural network architectures such as CNNs and RNNs can be used for training. The neural network can be evaluated using metrics such as accuracy, precision, and recall, and can be used to recognize bird species in new audio recordings, even in real-time. Bird recognition using neural networks and audio signals has the potential to make significant contributions to our understanding and conservation of birds and their ecosystems.

KEYWORDS: Bird, Computer Vision, Machine Learning, Classification, Neural Network, Self-Learning, CNN, Audio Signal Processing.

I. INTRODUCTION

Bird species identification is a critical task in ecology, conservation, and ornithology. Traditional methods of bird species identification involve visual observations, which can be time-consuming, expensive, and challenging in certain environments. Audio signals offer an alternative and non-invasive approach to identify bird species. With the recent advancements in machine learning and signal processing, neural networks have been used to classify bird species using audio signals. This approach has the potential to revolutionize bird species identification, making it faster, more accurate, and less expensive. In this answer, we will discuss in detail the different steps involved in identifying bird species using neural network and audio signal information. We will also highlight the challenges and opportunities in this field of research.

II. PROBLEM STATEMENT

The problem of identifying bird species using audio signals is challenging due to the complexity and variability of bird vocalizations. Bird vocalizations can vary significantly in terms of pitch, duration, and spectral content, even within the same species. Additionally, audio signals can be affected by environmental noise, which can interfere with the identification process. Traditional methods of bird species identification based on visual observations can also be time-consuming, expensive, and difficult to implement in certain environments. Therefore, the problem statement is to develop an accurate and efficient method for identifying bird species using audio signals and neural network techniques.

III. LITERATURE SURVEY

“Automatic bird species identification using convolutional neural networks” by Stowell et al. (2016): In this study, the authors used a convolutional neural network (CNN) to classify bird species based on audio signals. The CNN was trained on a dataset of over 1,000 hours of audio recordings and achieved an accuracy of 78%.

“Bird species recognition using convolutional neural network with feature fusion” by Park et al. (2018): In this study, the authors used a combination of time-domain and frequency-domain features to train a CNN to classify bird species. The method achieved an accuracy of 90% on a dataset of 21 bird species.

“A comparison of machine learning algorithms for bird species recognition” by Sterle et al. (2021): In this study, the authors compared the performance of different machine learning algorithms, including neural networks, for bird species identification based on audio signals. The study found that neural networks outperformed other algorithms and achieved an accuracy of over 90%.

IV. REQUIREMENT

Hardware Requirements

- Windows 10 or latest version
- 8GB RAM
- Intel Core Processor i3 or latest version
- 500 GB free HDD
- Laptop

Software Requirements

- Operating System - Windows 7/10 or above
- VS Code
- Anaconda
- Python

V. METHODOLOGY

Proposed System

Proposed System Convolution neural network algorithm is a multilayer perceptron that is the special design for the identification of two-dimensional audio information. It has four layers: an input layer, a convolution layer, a sample layer, and an output layer. In a deep network architecture, the convolution layer and sample layer may have multiple. CNN is not as restricted as the Boltzmann machine, it needs to be before and after the layer of neurons in the adjacent layer for all connections, convolution neural network algorithms, each neuron doesn't need to experience the global audio, just feel the local region of the audio. In addition, each neuron parameter is set to the same, namely, the sharing of weights, namely each neuron with the same convolution kernels to the deconvolution audio.

Convolution Layer: The convolutional layer is the core constructing block of a CNN. The convolution layer comprises a set of independent feature detectors. Each Feature map is independently convolved with the audios.

Pooling Layer: The pooling layer feature is to progressively reduce the spatial size of the illustration to reduce the wide variety of parameters and computation in the network. The pooling layer operates on each function map independently. The approaches used in pooling are:

- 1) Max Pooling
- 2) Mean Pooling
- 3) Sum Pooling

Fully Connected Layer: Neurons in the fully connected layer have full connections to all activations inside the preceding layer. In this, the output obtained from max pooling is converted to a one-dimensional array and that should be the input layer and the process continues the same as the ANN model. A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input audio, assign importance (learnable weights and biases) to various aspects/objects in the audio and be able to differentiate one from the other. The pre-processing required in a ConvNet is much lower as compared to other classification algorithms. While in primitive methods filters are hand-engineered, with enough training, ConvNets have the ability to learn these filters/characteristics.

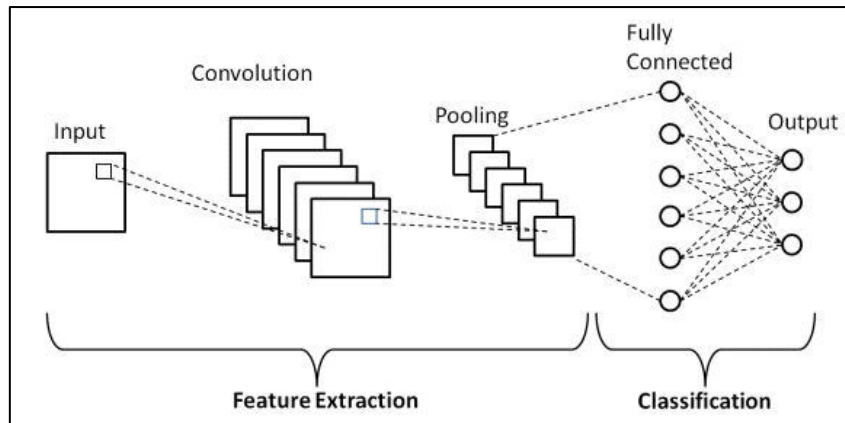
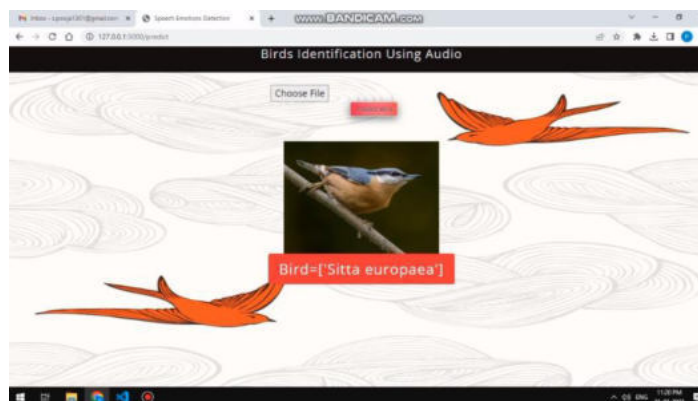
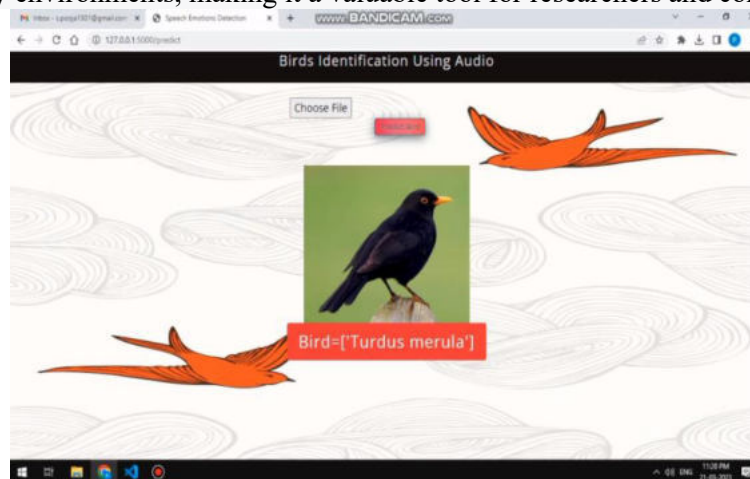


Figure 4.1 CNN Diagram

VI. RESULTS

The result of bird identification using CNN and audio signals is also highly accurate, with state-of-the-art networks achieving accuracy of over 90% on standard bird sound identification datasets such as the Cornell Bird call Identification Challenge. This approach has shown to be highly effective in identifying bird species even in noisy environments, making it a valuable tool for researchers and conservationists studying bird populations in the wild.



5.1 Result of the Model

Figure

Figure 5.2 Result of the Model

VII. CONCLUSION

In conclusion, identifying bird species using neural networks and audio signals is a promising area of research with the potential to revolutionize bird species identification. Several studies have reported promising results using various neural network architectures and feature extraction techniques. Further research is needed to develop more robust and scalable methods for bird species identification using neural networks and audio signals. The development of such methods has the potential to revolutionize bird species identification, making it faster, more accurate, and less expensive.

Acknowledgement

I would like to express my deep gratitude to our project guide Prof. Sneha Sankhe and Project Coordinator Prof. Sonali Karthik, for their patient guidance, enthusiastic encouragement and useful critiques of this research work throughout the project and my group members for steering through the tough as well as easy phases of the project in a result- oriented with concern attention.

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Traffic Control System Based on Image Processing Using SSD Algorithm

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ABSTRACT: In Highway management of Area intelligent Vehicle address locating and Counting Increasingly important is happening. It is very Challenging to detect a different size of vehicles which can directly impact the Counting of Vehicle Accuracy. In suggest Vehicle counting and detection system the Surface of Highway roads first we will image is extracted and it can be divided in to a remote area and nearer to the centre area by newly proposed segmentation method. This method is essential for improve a detection of vehicle. The Vehicle gravity are obtained by SSD Algorithm which can be usable for judge the direction of vehicle driving and obtain the different number of vehicles. The beginning result, verify using the proposed segmentation method this method is useful for to provide higher detection Accuracy especially detect to a small object of vehicles.

Index Terms: Digital Image Processing, Automatic Traffic, Computer Vision, Vehicle Detection, Single Shot Detection, Traffic Management

I. INTRODUCTION

To Detect vehicle and analysis in video scene of Highway Monitoring area of Considerable moment to at Smartly manage and to control at a traffic of the Highways. We will explain about Identify the Vehicles & Counting, In Identity & track the vehicle in a selected area. of interest with most accurate Exact counts. With a maximum accuracy the main objective is to detect track & counts a vehicles with in High accuracy and to be able to do so on Highways, Surrounding areas and Small lanes etc.

A videos or footage of video is divided into frames. These frames which can be converted into Gray frames and these Gray frames are given a input into the system . To detecting a vehicle in to two areas incoming vehicles to outgoing vehicles for example: if the car is present in both of frames and difference in their X&Y coordinates is less than max pixels.

The problem of motion-based vehicle tracking can be divided into two parts Detecting moving objects in each frame. Associating the detections corresponding to the same object over time. A vehicle tracking system is the complete solution for vehicle management and monitoring of vehicle location in the moving video. Image Contour technique to track and count the moving vehicles from the video streams of traffic scenes recorded by stationary cameras is proposed in this research work.

II. LITERATURE REVIEW

1. Vehicle detection and counting system using SSD Algorithm in highway scenes- They proposes a Single Slot Detection-based vehicle detection and counting system in which the highway road surface in the image is first extracted and divided into a remote area and a proximal area by a newly proposed segmentation method. 2. Vehicle detection and recognition- The surveillance system includes detection of moving vehicles and recognizing them, counting number of vehicles and verification of their permit with the organization. 3. Video-Based Vehicle Counting for Expressway- vehicle counting method is designed based on the tracking results, in which the driving direction information of the vehicle is added in the counting process.

III. Methodology

Road Surface Segmentation: In this section to describe the method of Surface of Highway roads to Pulling & division using image processing method, such as normal distribution Modelling which allow to detect a better vehicle and to get a results when we using the deep learning object detection method.

The Highway Observation video image has a large field of view. The vehicle is the focus of Awareness in this study and the region of interest in the image of highway road surface area. At same time corresponding to the cameras shooting angle, the road surface area is focusing a different range of the image. proposed by several researchers for different issues and are listed below:

- 1.Counting Based
- 2.Tracking Based
- 3.Detection Based
- 4.Single Shot Based

Single Shot based algorithms track objects according to the variations of the regions corresponding to the moving object

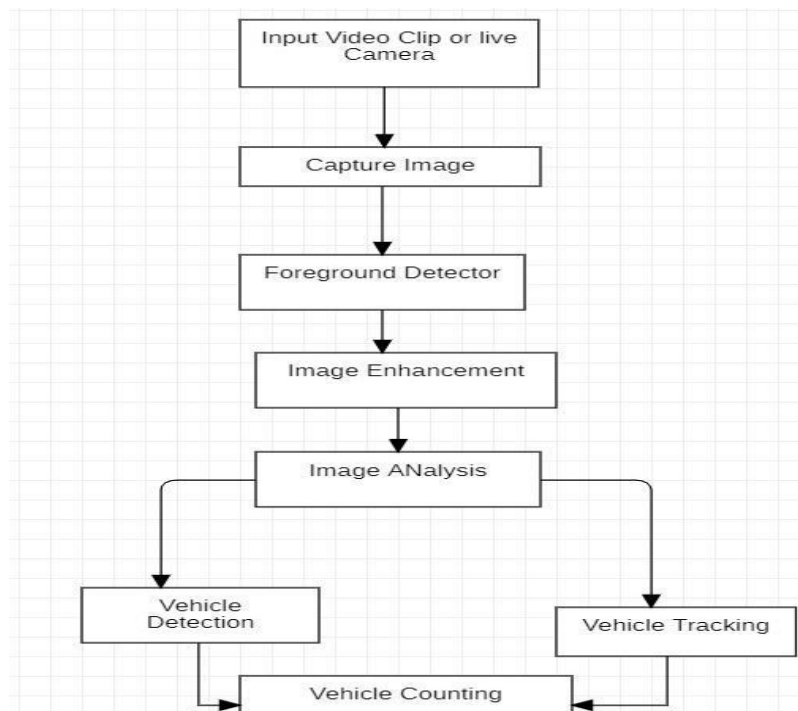


Fig3.1 Flow Chart of Vehicle Counting

IV. Result & Discussion

In this Section give details of conducting the testing of methods introduce in methods Introduce in methods section. We Conduct Research with the object of vehicle dataset published in vehicle dataset Section. We can detect the vehicles with the help of Bounding box and capture the vehicle area and start counting the Vehicles.

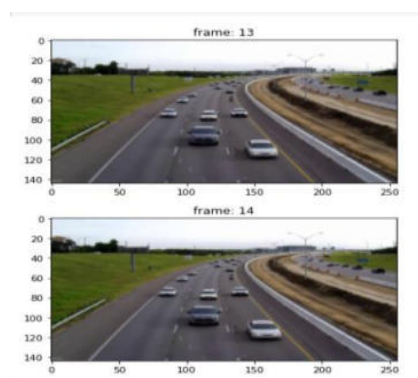


Fig4.1 Traffic Video Frame

```
[27] # plot vehicle detection zone
plt.imshow(dilated)
cv2.line(dilated, (0, 80),(256,80),(100, 0, 0))
plt.show()
```

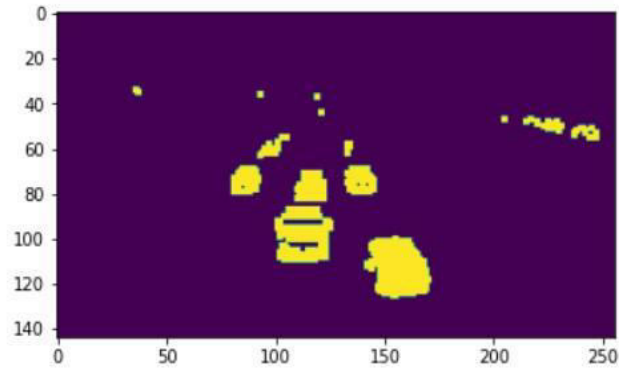


Fig4.2 Background Subtracted Image

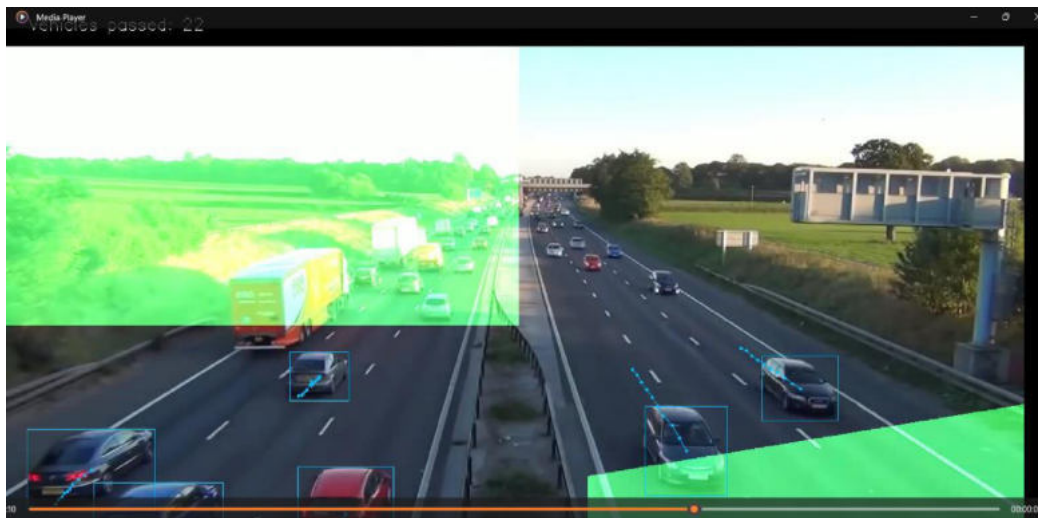


Fig4.3 Output of Vehicle Counting

V. Conclusion & Future Work

This Study published a high Clarification Vehicle entity dataset from the outlook of observation cameras and scheduled an entity detection and tracking method for Highway monitoring video Scenes. The SSD algorithm acquire the end to end detect a highway vehicle model purpose on notation highway vehicle object dataset. To address the difficulty of small object detection and the multiscale diversity of the object.

ACKNOWLEDGEMENTS

The success and outcome of this project required a lot of guidance and assistance from many people and we are extremely privileged to have got this all along the completion of our project. All that we have done is only due to such supervision and assistance and we would not forget to thank them.

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Prediction of Water Quality using Machine Learning and IOT

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Abstract: I have implemented a system which can be used to predict the quality of water, our System contains two sections which includes Machine Learning (ML) and Internet Of Things (IOT). IOT helps to take inputs of different parameters of water using sensors and then it is send to Thingspeak cloud website where we can able to see the graphs of different parameters of water. From there that data is fetch on the custom website using API key. ML Model is implemented on our custom website where all the inputs are fetch and processed by ML Model to find the quality of water , here we used effective ML Algorithm which gives higher accuracy and shows that whether the given water sample is drinkable or not.

Keywords— Machine Learning Model (ML), Internet Of Things (IOT), API key (Application Programming Interface), Thingspeak Cloud.

I. INTRODUCTION

As we know that water is one of the most important element of nature, it is not only important for nature but also for all the living thing including human being ,as we are using water in our daily life for drinking, cleaning, agriculture and so on. In present time more than 50 kind of diseases are caused by drinking low quality of water, 80% diseases in world are spreading through the poor quality of water and more than 50% of child deaths are related to drinking poor quality of water drinking polluted water causes various kind of diseases like diarrhea, skin disease, malnutrition and some time it causes cancer and so on. We must check the quality of water before drinking, On many places there are lot of prototypes are present for checking the quality of water, but they are not available and affordable for everyone. As we know modern technologies are very costly to check the water quality that's why it is not affordable for everyone ,In some cases it is not available at all locations In this case people can easily make this system at their home using some sensors and machine learning model. Here in our model we have two sections, first is Machine Learning model and second is IOT system. For taking input IOT plays an important role, all the inputs of water sample is collected through the sensors and then those inputs are processed by machine learning model for output and it shows whether water is safe to drink or not.

II. PROBLEM STATEMENT

Safe and readily available water is important for public health, whether it is used for drinking, domestic use, food production or recreational purposes. Contaminated water and poor sanitation are linked to transmission of diseases such as cholera, diarrhea, dysentery, hepatitis A, typhoid, and polio. Absent, inadequate, or inappropriately managed water and sanitation services expose individuals to preventable health risks. For checking or predicting water quality effectively and accurately we made a model which is combination of Machine Learning and IOT(Internet Of Things).

III. LITRATURE SURVEY

Background

Ahmed et al. have used the supervised machine learning algorithms in order to assess the water quality index (WQI), where an individual index was used to summarize the overall quality of water, and water quality class (WQC). Their suggested techniques and the gradient boosting with a learning rate of 0.1 and polynomial regression with a degree of 2 has predicted the WQI most effectively, and that WQI was subsequently determined with a mean absolute error (MAE) of 1.9642 and 2.7273. In this instance,

the MLP, which has the configuration of (3, 7), has the highest classification accuracy of 85.07%. Wang et al. have proposed a two-layered model stacking approach for predictive modeling of beach water quality. The five most frequently used methods (partial least square, sparse partial least square, Bayesian network, akhand linear regression) are integrated into a machine learning model that is then used to generate the final forecast. In this case, the model stacking technique was applied to three different beaches around eastern Lake Erie, New York, USA, and compared to all five basis models. After analysis, the model stacking strategy performed better than all of the base models. Year-over-year, stacking model accuracy scores were constantly at or near the top of the rankings, with a year-on-year accuracy average of 78%, 81%, and 82.3% at the three tested beaches.

Comparing with above models we have better accuracy than above two models. In our proposed system we have used Random Forest Machine Learning Algorithm for predicting the quality of water , which give approximately 86% of Accuracy .

IV. REQUIREMENT ANALYSIS

Hardware analysis

- Arduino
- Ph sensor
- Turbidity sensor
- Tds sensor
- Bridge board

Software analysis

- Jupyter notebook
- Python
- Vscod

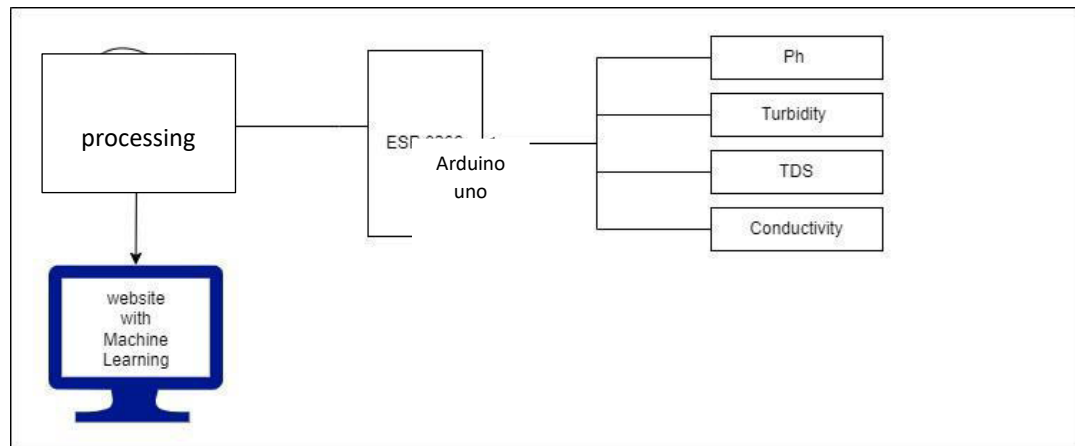
V. DESIGN AND IMPLEMENTATION

A. IOT(Internet Of Things)

We have used sensors like ph sensor, turbidity sensor, tds sensor for taking inputs from given water sample. Here Arduino uno is used for processing as well as sending inputs of sensors to custom website for further processing. Each sensor must connect tightly and properly with Arduino Uno otherwise data will not send to custom website.

ph of pure water is 7 and ph of drinking water is in range of 6.5 to 8.5 here our ph sensor measures ph of water sample. Turbidity of water is nothing but relative clarity of liquid or amount of light scattered in water, this can be measure through turbidity sensor.

TDS(Total Dissolve Solid) of water is nothing but amount of solid present in water , TDS value for drinking water must lie between 50 to 150 ,if it reached to 1000ppm then the given water sample is unsafe.



5.1 Water Quality Prediction System

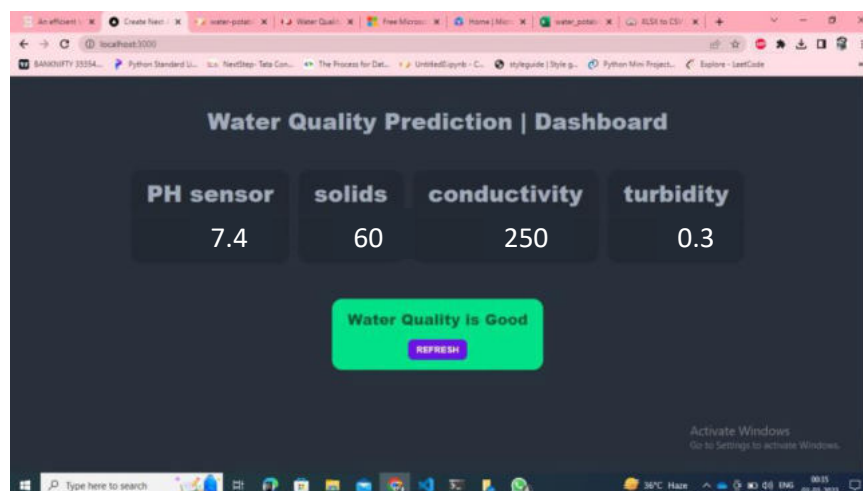
B. ML Algorithm

In our proposed system collected data/inputs from water sample is processed by Machine Learning Algorithm. Here we have preferred Random Forest Algorithm on various water sample including tap water ,mud water and salt water. Besides Random Forest Algorithm we have also test some other algorithms like Decision Tree, Naive Bayes, SVM(Support Vector Machine), but the accuracy of Random Forest Algorithm is higher than other algorithms.

Sr.no.	Model	Accuracy score
1.	Random Forest	86
2.	Decision Tree	83
3.	Naive Bayes	65
4.	SVM	58

C. Website

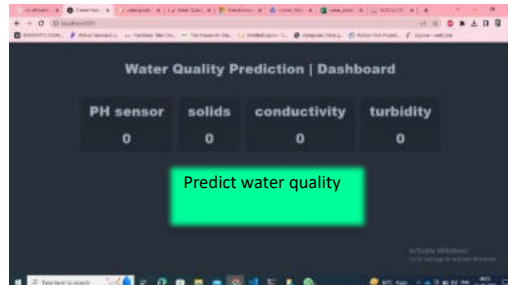
For processing of whole data/input of water sample and predict output we required a interface. For this purpose we made a website which is integrated with the Machine Learning Model. All the data will be receive and show on website. It contains different sections of different parameter in which we have to enter all the received data to corresponding section for prediction of desired output.



5.1 Website View

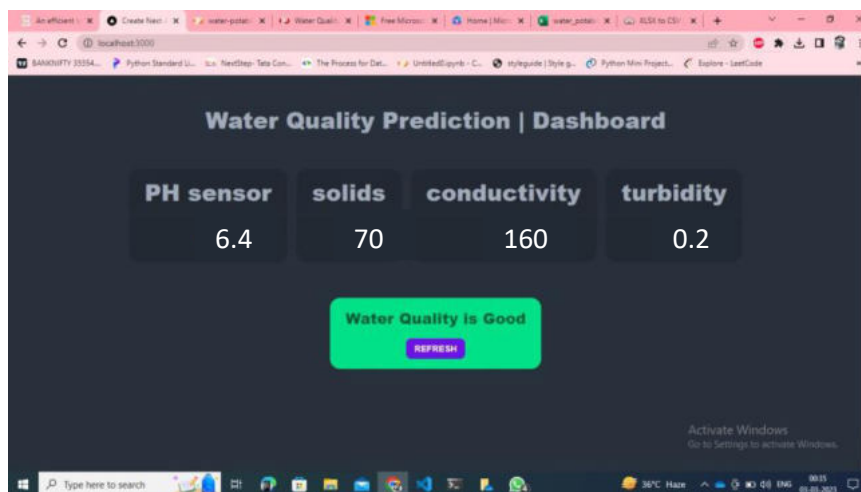
VI. RESULT AND DISCUSSION

Initially our website looks like below webpage where we can see parameter sections ,in which values will be fetch for predicting the quality of water.



6.1 Website view before fetching the values

After clicking on blue button value of parameters will be fetch from Arduino and using Machine Learning model it'll show whether water is safe to drink or not ,if given water sample is drinkable it'll show water quality is good otherwise it'll show water quality is bad.



6.2 Website View after fetching values

VII. CONCLUSION

Recent environment-affecting developments have led to water contamination which has negative effects on human life and causes several complicated diseases. Consequently, water quality prediction is essential for sustaining human life. This study performed experiments regarding the water quality prediction where we are merging two technologies like IOT and ML and create a model . In ML Model, for obtaining highly accurate predictions, we have used Random Forest Algorithm, over ANN. ANN can be work on incomplete knowledge while disadvantage of ANN is hardware dependence on other hand Random Forest can handle big data and numerous variable and it also balance the data sets.

ACKNOWLEDGEMENT

Our team taken efforts for completing this project it would be not possible without their help. So, I would like to thank my team members and other people who helped me in my project directly or indirectly. Special thanks to prof.Sneha Sankhe , for their precious guidance and constant supervision as well as providing information regarding our project.

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Human Action Recognition System

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ABSTRACT: Human actions detection is very much investigated in utilization of artificial intelligence and computer vision. In order to get the equivalent actions, the proper activity information gained from various kinds of media like videos or pictures might be connected. In this project, image processing techniques are used in order to recognize the different hand poster of the human body, also the over-fitting can be eased and the execution of activity acknowledgment is improved. Initially, the human action video including hand waving, walking, jogging, clapping, boxing is converted into image of 2D frames and then it is pre-processed followed by feature extraction using LST and classification by KNN classifier has been done individually. The kernel principal component analysis (KPCA) technique is used in the proposed system for finding the image features and joined features.

Keywords: LST, KNN.

I. INTRODUCTION

The demands for understanding human activities have grown in health-care domain, especially in elder care support, rehabilitation assistance, diabetes, and cognitive disorders. A huge amount of resources can be saved if sensors can help caretakers record and monitor the patients all the time and report automatically when any abnormal behavior is detected. Other applications could be in security in surveillance camera. We can teach cameras to define a restricted area and mark the objects under focus. These objects could be human or any bag or so. If a strange bag appears and remains on position for a period then it would alarm the police or forces. Many studies have successfully identified activities using wearable sensors with very low error rate, but the majority of the previous works are done in the laboratories with very constrained settings. Readings from multiple body-attached sensors achieve low error-rate, but the complicated setting is not feasible in practice. This project uses low-cost and commercially available smartphones as sensors to identify human activities.

The goal of this project is to design a light weight and accurate system on smartphone that can recognize human activities. Moreover, to reduce the labeling time and burden, active learning models are developed. Through testing and comparing different learning algorithms, we find one that best fit our system in terms of efficiency and accuracy on a smartphone. Human Activity Recognition is a multidisciplinary research field that aims to gather data regarding people's behavior and their interaction.

Problem Statement

Activity detection is a major problem in smart video surveillance .It is fundamental problem in computer vision that is to detect the activity of human in surveillance videos. These applications need real time detection performance, but it generally very time consuming to detect the actual activity.

II. LITERATURE REVIEW

Human activity recognition has been studied for years and researchers have proposed different solutions to attack the problem. Existing approaches typically use vision sensor, inertial sensor and the mixture of both. Machine learning and threshold-base algorithms are often applied. Machine learning usually produces more accurate and reliable results, while threshold-based algorithms are faster and simpler. One or multiple cameras have been used to capture and identify body posture. Multiple accelerometers and gyroscopes attached to different body positions are the most common solutions. Approaches that combine both vision and inertial sensors have also been purposed. Some previous

works are focused on generating the most useful features from the time series data set. The common approach is to analyze the signal in both time and frequency domain.

Active learning technique has been applied on many machine learning problems that are time-consuming and labor-expensive to label samples. Some applications include speech recognition, information extraction, and handwritten character recognition. This technique, however, has yet been applied on the human activity problem before Face Recognition points used by FBI in surveillance.

III. REQUIREMENTS

Hardware Requirements:

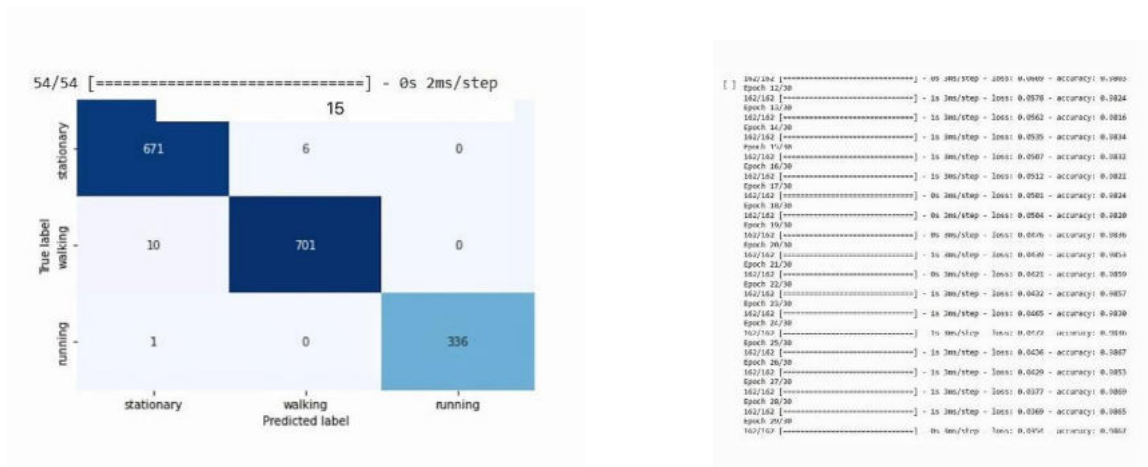
- 4 GB RAM
- Windows 7

Software Requirements:

- Python 3.8
- Anaconda
- VS Code

VI. RESULT

The proposed method is developed by using Matlab. In the proposed method only the action of the single person can be generated. In a video a sample of five frames were taken and a key frame is identified by shot boundary method. The process is repeated continuously and the key frames features are extracted and classified by the proposed system as shown in the following figures.



VII. CONCLUSION

A video action recognition system is proposed for five different hand posters and its results are executed. Test results shows that the projected system has improved execution of video action recognition, compared with old techniques. In the proposed method only the action of the single person can be generated. In future work, the actions of multiple persons in the given input video can be generated. In the proposed system test results shows the information gained from images can impact the recognition exactness of videos.

ACKNOWLEDGEMENT

We would like to extend our appreciation to the participants who took part in this study and generously shared their time and insights. Their contributions have greatly improved the quality of this manuscript.

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Tracing of fake news on Twitter using Blockchain

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ABSTRACT: A rise of fake news on social media platforms like Instagram, Facebook, Twitter and many other applications. In this paper, we propose a novel approach for tracing the fake news on Twitter using Blockchain technology. Here, we demonstrate how the blockchain technology can be used to trace the fake news on Twitter. Our results show that blockchain can be an effective tool to fight against the spread of fake news on social media platforms, particularly Twitter.

Keywords: Fake News, Social Media, Classification, Block chain, Crypto currency

I. INTRODUCTION

The widespread area of social media platforms, like Twitter has made it easier for individuals and organizations to lead and spread the wrong information and fake news. Twitter has a large user base, and it has the capability to tweet to millions of users within a minute. And if the fake news or wrong information is tweeted by someone then so many users can be victims of that news. Spread of fake news and information can have implications for society, which include the manipulation of public opinion, creation of social unrest, and disruption of democratic process. There are several processes to implement a special approach to handle the process of fake news by applying the algorithms and different techniques. We need to approach different rules and regulations needs to adjust the functional and behavioral approach of the model to enhance the trust among people. Blockchain technology has given the possible solution for the problem of fake news on Twitter and other social media platforms. Blockchain is decentralized in nature and transparency which make it an attractive tool for tracing the fake news on Twitter using blockchain technology.

II. REQUIRMENTS

HARDWARE REQUIRMENTS:

- 4GB RAM MINIMUM
- I3 AND ABOVE PROCESSOR
- MEMORY 512 MB
- DISK SPACE 750MB OF FREE

SOFTWARE REQUIRMENTS :

- SANITY.io
- NEXT.JS
- METAMASK
- SOLIDITY
- HARDHAT
- VERSEL
- RINKYBY TEST NETWORK

III. Methodology

Our approach involves the use of blockchain technology to trace the fake news on Twitter. The method can identify the secure process of the transaction and defines the data as highly secure in this system. The block chain technology talks about the most secure system of the network security system which is used in various social media applications like Instagram, Twitter, Whatsapp, Facebook etc.

The proposed methodology talks about the different method's to analyse the system and to find out the fake news from different resources. , our goal is to find out the Researcher's point of view and the

concept analysed by the researcher. There are different processes to identify fake news detection, followed by the previous research work. There are various media and online technologies where nowadays fake news is spreading very fastly. In this technique, it gathers all the information in a decentralized way and helps to identify the correct decision node from the process. After finding the correct decision node it will analyse which node is true and which node is a false node based on that it will create the content. Blockchain technology is a decentralized system that helps to find out the different nodes and relations among them. It distinguishes each and every node starting from the master node.

PROPOSED SYSTEM:

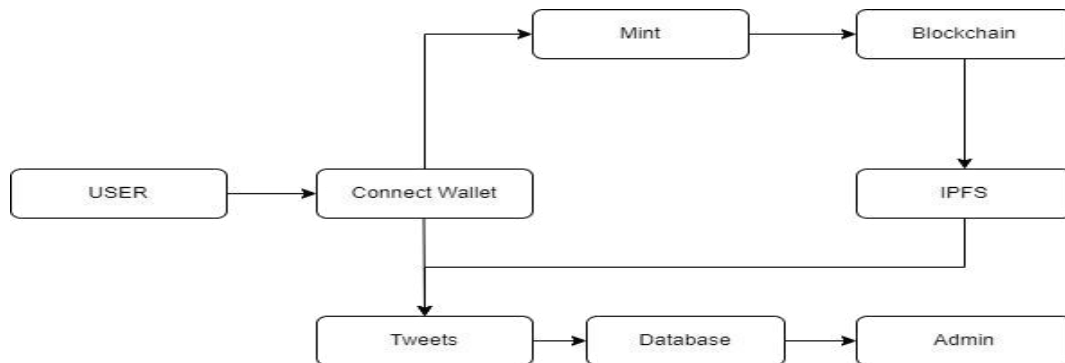
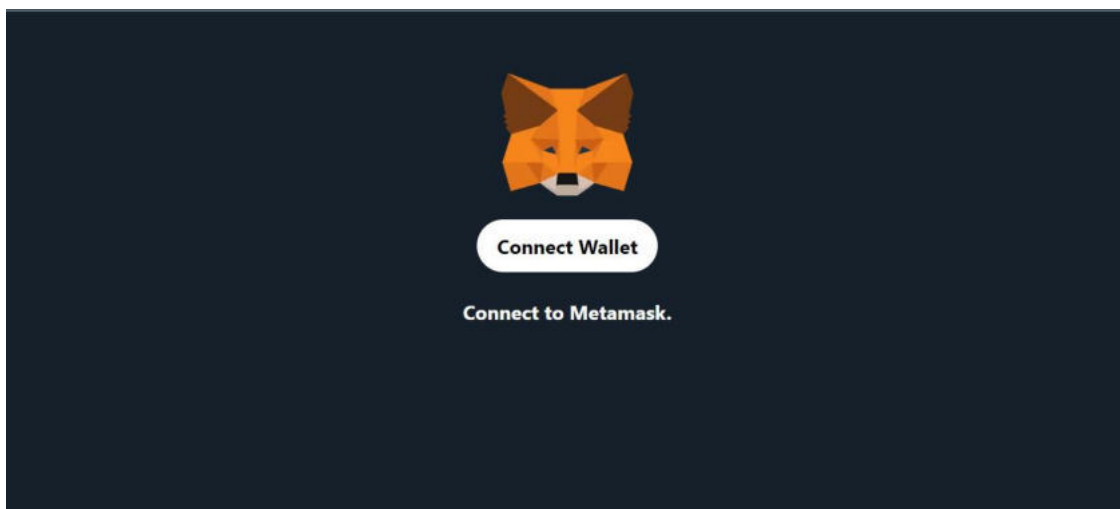


Fig1. Proposed system of Fake news detection using block chain technology

IV. Result & Discussion

As mentioned earlier, the concept of Tracing in social media using blockchain is particularly new and there is ongoing research in hopes that scholars can find more accurate ways to Trace false information in this booming, fake-news-infested domain. By unique token of wallet, we can get to know about the user and their tweets which will be stored on a sanity database.



V. Conclusion & Future Work

We present a novel blockchain-based social networking system to mitigate the growing problem of fake news. Our proposed system is scalable, secure and provides high throughput. It is important that we have some mechanism for Tracing fake news, or at the very least, an awareness that not everything we read on social media may be true, so we always need to be thinking critically. This way we can help people make more informed decisions and they will not be fooled into thinking what others want to manipulate them into believing.

Acknowledgment

It required a lot of guidance and assistance from many people and we are extremely privileged to have got this all along the completion of our project. All that we have done is only due to such supervision and assistance and we would not forget to thank them.

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Potato Leaf Disease Detection Using CNN

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ABSTRACT

Early in the 17th century, Portuguese sailors brought potatoes to India. Since then, potatoes have grown to be one of India's most popular staple foods, and the country is now the world's second-largest producer of potatoes, with an annual production volume of 43,770,000 tonnes. Yet, there are several barriers to the development of potato farming, including a disease that affects potato leaves and, if ignored, can lead to future crop failure or poor productivity. The production of potatoes is being hampered, and expenses are rising, by illnesses including early blight, which is caused by the fungus *Alternaria solani*, and late blight, which is caused by the Microbe *Phytophthora infestans de bary*. The manual diagnosis of these leaf diseases is a time-consuming and difficult process. Consequently, to boost potato production and modernize the disease detection system, we need something that is automated and has a quick disease detection process. To construct an accurate and automated classification system, we offer a system in this study that applies deep learning to classify two different illnesses in potato plants based on leaf conditions. Our research divides images into healthy and sick potato leaves using more than 2000 images as the dataset for our model. The user interface on our model displays the results after the input image provided by the user has undergone numerous pre-processing stages to identify the condition. For the first 35 CNN epochs, the model predicts with an accuracy of 95.32% using 30% test data and 70% train data.

Keywords: Potato illness, late blight, early blight, deep learning, epochs, datasets, automated, accurate, CNN.

I. INTRODUCTION

Although there are various jobs, agriculture is the most prevalent. This is also true of the extensive agriculturalist economy of India. The most adaptable crop in India, where it makes up around 28.9% of all agricultural crop production, is the potato. Potatoes are the fourth-largest agricultural food crop in the world, behind maize, wheat, and rice. With 48.5 million metric tonnes produced annually, India is the second-largest potato grower in the world [1]. The Agricultural and Processed Food Products Export Development Authority (APEDA) reports that Uttar Pradesh produces more than 30.33% of India's potatoes.

Infections have detrimental effects on plant and agricultural fields. The main causes of these disorders include microorganisms, genetic anomalies, and infectious agents such as bacteria, fungi, and viruses. The bulk of fungi and bacteria that make people sick are found in potato leaves. Late blight and early blight are fungal diseases, whereas soft rot and common scab are bacterial disorders [2]. As a result, the discovery and diagnosis of these illnesses on such important plant life motivate us to create an automated method that may enhance crop yield, boost farmer profits, and contribute more to the national economy.

Early signs of potato leaf disease early blight are circular spots on the center of the leaves, though they can also appear on the edges, as seen in **Fig.1. (a)**. The *Alternaria solani* fungus is the source of this leaf disease, which then causes the spots to enlarge and the color of the leaves to turn brown [3]. Additionally, the late blight disease that affects potatoes is mostly caused by the microbe *Phytophthora infestans de bary*, and it can harm plants by infecting plant leaves. **Fig.1.(b)** depicts a leaf with late blight, which is characterized by the development of black lesions on the leaves and will keep spreading [4].

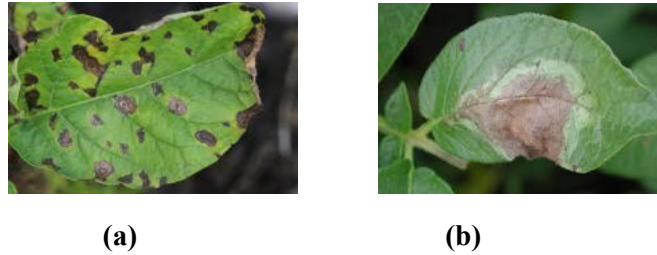


Fig.1. Potato diseases (a) Early blight (b) Late blight

For horticulturists, identifying and preventing plant diseases is a very challenging undertaking. It is essential to identify plant diseases in their early stages to stop further agricultural losses. It's important to spot diseases as soon as they impact plants. The disease that affects the plant is only partially understood by this research, which does not address potential remedies or preventative measures. The theme of this essay is neural networks. A class of algorithms known as neural networks finds patterns in data much like the human brain does. Convolutional neural networks are mostly used in this system because they are suited for image processing and give more accuracy than other neural network techniques [5].

The goal of this research is to develop a system that can assist farmers or agricultural managers in spotting disease in potato leaves utilizing information from photographs of plant leaves. the distinction between healthy, early, and late blight-affected leaves in potato plants. We will therefore use the Convolutional Neural Network (CNN) architecture, one of the Deep Learning techniques, in this study to identify these diseases. The information used came from the website Kaggle with the name PlantVillage [6] and was in the form of disease information on potato plant leaves.

II.LITERATURE REVIEW AND OBJECTIVE

Using a Back Propagation Neural Network technique, P. Badar et al. [7] were able to classify the disease in the leaf image with an accuracy of 92%. They applied a segmentation method based on K Means Clustering to several Potato leaf image samples' properties, such as color, texture, area, etc.

To extract many properties of a picture, including contrast, correlation, energy, homogeneity, mean, standard deviation, and variance, C.U. Kumari et al. [8] used a technique called image segmentation. A neural network is employed as a classifier to identify and diagnose diseases on the leaves of two different plants, cotton, and tomato after characteristics are extracted. With this technique, they were able to get a classification accuracy of 92.5%.

Multiclass Support Vector Machine was used by M. Islam et al. [9] on the segmented picture of the potato leaf class of the Plant Village dataset. They were successful in classifying the ailments with an accuracy rate of 95%.

Using a dataset of grape leaves, C. G. Li et al. [10] used an image segmentation technique to locate and classify fungal diseases. K Means clustering is employed in this work to extract color, texture, and form characteristics from the images, and SVM (Support Vector Machine) is then utilized to identify the disorders using the recovered features.

J. Chen et al. [11] extracted characteristics from a photo using DSIFT and the CNN model LeafNet. After that, the tea leaf images are categorized using the bag of visual words (BOVW) model and SVM and MLP (multi-layer perceptron) classifiers. R-CNN technology has lately been utilized to classify and identify images more quickly.

The method used by Yao et al. [12] tries to identify and classify three different types of damage to rice crops. In his example, Otsu's method is used to first divide the sick parts and then isolate them. While the second was produced using the HSV shading space, the first catches the tone, form, and surface qualities. After receiving the attributes, the vector machine determines the final categorization.

This system uses the SVM classification technology to recognize and categorize grape leaf diseases. For image pre-processing, it makes use of scaling, thresholding, and Gaussian filtering. In this manner, the leaf surroundings must first be separated using the K-means clustering technique. The next step is to apply feature extraction algorithms using features for both texture and color. To identify the type of leaf disease, the applicable SVM classification approach is used in the final stage. The accuracy rate achieved with this method was 88.89% [13].

In a research paper titled “Severity Identification of Potato Late Blight Disease from Crop Images Captured under Uncontrolled Environment” [14]. Researchers used Fuzzy c-mean clustering, Neural Networks in implementing the model. It does not need special training for farmers as the dataset has images from different angles was the main advantage of the model. The only disadvantage was that the images captured by untrained farmers were not oriented and contained clusters of leaves with a background visible in several segments.

For the development of weather-based prediction models of plant diseases, Rakesh Kaunda et al. [15] suggest a prediction strategy based on support vector machines. Support vector machines (SVM), back propagation neural networks, and generalized regression neural networks were all tested for performance to multiple regression. The association between environmental factors and disease level was better described by the SVM-based regression method, which could be helpful for disease management.

IV. MATERIALS AND METHODS

Dataset Description

An open-source repository called Kaggle offers the Plant Village Dataset [1] for scholarly uses. Over 55,000 clearly annotated photos of healthy and diseased leaves from a variety of fruits and vegetables, including apples, blueberries, cherries, grapes, peaches, pepper, orange, tomato, and potato, are included in the dataset. Every folder of fruits and vegetables has both colored and grayscale photos. Every crop has different types of leaf diseases, and each type is categorized as a different class of disease for classification purposes. Dataset [1] is separated into two categories, each of which contains an image of a leaf with a background and one without a background.

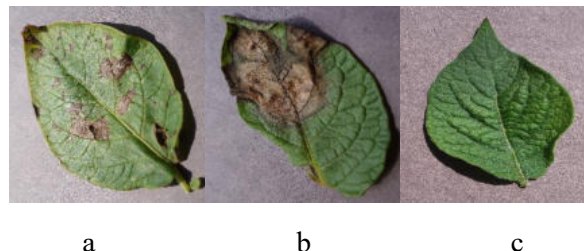


Fig.2. Sample from each class t (a) Potato Early Blight, (b) Potato Late Blight, (c) Potato Healthy Leaf.

The number of photos in a given class varies from 152 to 1000 and is not constant. Our classification task consists of three classes namely Early Blight, Late Blight, and Healthy Leaf photos.

Loading Images In The Batches

For loading images we have used `tf.keras.preprocessing.image_dataset_from_directory`. It returns or generates a `tf.data.Dataset`. It is a special data structure that helps to load images in a batch. If we want to work on plenty of images then it will slow down our system and might not load all the images. So we have used `tf.data.Dataset`.

Data Splitting

We split data into training data, validation data, and testing data. We took 80% data for training, 10% for validation, and the remaining 10% for testing.

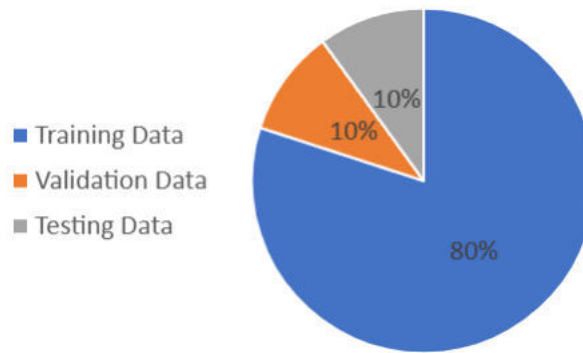


Fig.3. Data Splitting

Data Resizing And Augmentation

Before building a model we have to do some preprocessing. We have used image resizing and data augmentation. We resize the image so that every image should be of the size of 256 X 256 pixels and we have done data augmentation which rotates the image from different angles.

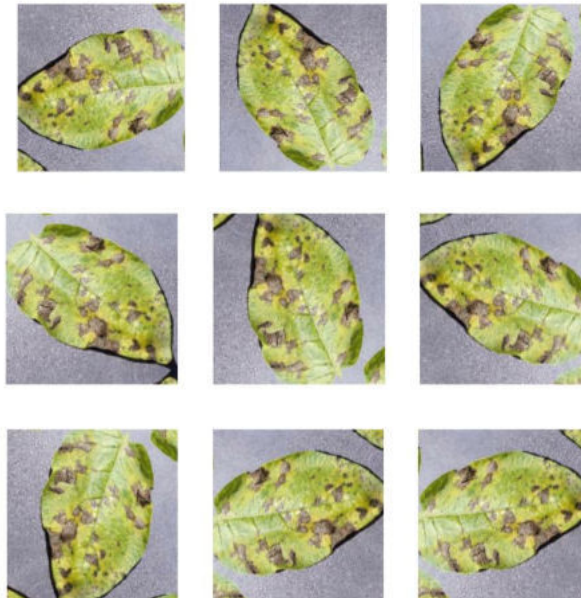


Fig.4. Data Augmentation

Convolutional Neural Networks

We are using convolutional neural networks (CNN). convolutional Neural Networks have the following layers:

- Convolutional
- ReLU Layer
- Pooling
- Fully Connected Layer

Convolutional Layer:

To find various features in the image, it searches the image by swiping a filter (kernel) across it. Kernels are merely 2D matrices with various weights. Fundamentally, as this kernel passes across the image,

the pixel values are replaced with the average of the weighted sum of their weight for that particular section of the image[17].

ReLU Layer:

Rectified Linear Unit (ReLU) transform functions only turn on a node if the input number is greater than a threshold. When the information rises above a threshold, the output changes from zero while the data is below zero[17].

Pooling:

We reduce the size of the image stack in the layer. We have used max pooling. The pooling process known as "max pooling" chooses the largest element from the feature map's area that the filter covers[18].

Fully Connected Layer:

This layer is a standard neural network layer that computes the class scores using the information from the layer above and returns a 1-D array with the same size as the number of classes [18].

V. RESULTS AND DISCUSSION

We have used an adam optimizer that reduces the training time. After building the model we trained the model by using training data. We ran 50 epochs and for each epoch, we checked accuracy by using validation data, the 10% data that we split in the beginning. The validation accuracy increases as we run more epochs. In **Fig.5** the values on the x-axis are epochs and the values on the y-axis are accuracy in percentage i.e. 0.6 mean 60% and the graph is increasing for validation accuracy as we run more epochs.

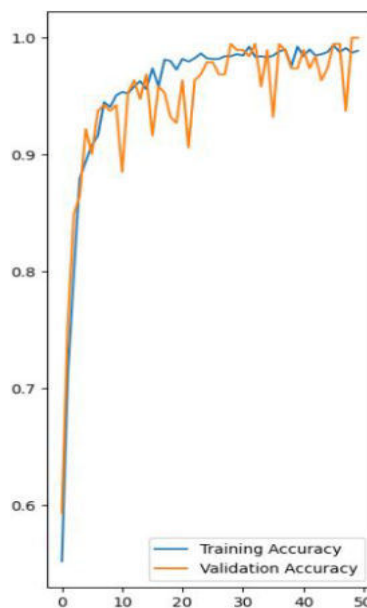


Fig.5. Training and Validation Accuracy

We tested our model on testing data which is 10% of the original dataset and got an accuracy of 98.83%. We have used FastAPI. It connects our front end which we have built using React js, a javascript library.

As you can see in **Fig.6**, the user must provide the potato leaf image by clicking on the upload button or by just dragging and dropping the image and our model will detect whether the leaf is Healthy or has Early Blight or Late Blight disease.

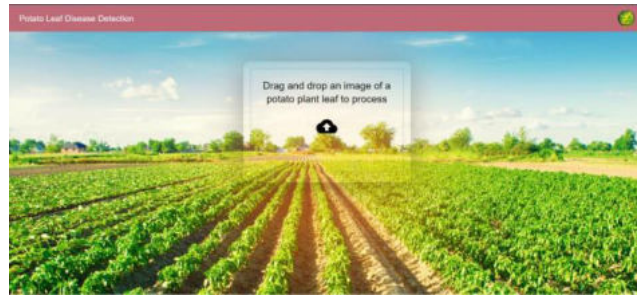


Fig.6. Graphical User Interface



Fig.7. Potato Plant

We have planted the potato plant as shown in **Fig.7**. From that plant we took the image of the leaf and provided it to the model through the GUI (Graphical User Interface). As indicated in **Fig.8**, the model determined that the leaf is healthy.

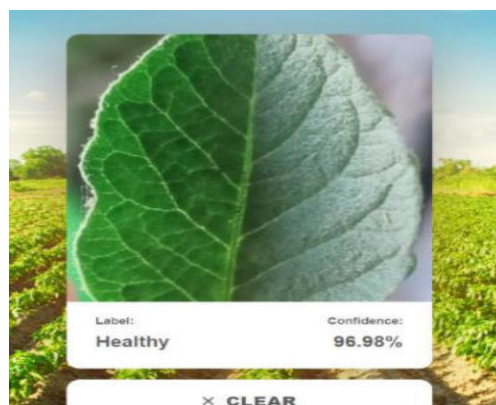


Fig.8. Detecting disease on real potato leaf image

VI. CONCLUSION

In this study, we applied the idea of transfer learning to create an automated system for identifying and categorizing illnesses in potato leaves. With a novel approach reaching classification accuracy of 98.8% over the test dataset, such as early blight, late blight, and healthy. Our method can aid farmers in boosting crop yields and spotting diseases in their early stages.

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Student's Government a webpage system developed using HTML, CSS, JAVASCRIPT and PHP

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ABSTRACT: The project Student's Government is a system which fulfill all the requirements of students like voting for college CR and president election and other college activities. The main goal of voting is to come up with leaders of the student's choice. The implementation of advanced technologies in elections becomes more beneficial and helps to generate a quick and accurate result to find the correct leader. With the help of voting application, the individual leader gets a lot to learn and makes impulsive decisions in every situation. There are a total of 5 different dashboards with different logins. Admin, Exam cell, event management, faculties, and students. All the users must first take the username and password from the admin. In this system all the notes are available which were uploaded by the professors. The president and CR election will be organized by the event management officers. All the work of exam cell like result display, timetable display, hall ticket and other important files are easily done here in a more convenient way. The Student's Government project can be developed using a variety of technologies, including HTML, CSS, JavaScript, and PHP. HTML, CSS and JavaScript can be used to add interactivity to the pages, such as pop-ups for confirmation messages or error alerts. It can also be used to create dynamic effects, such as animations or dropdown menus. PHP can be used on the server side to manage the login process, store user information, and handle database interactions. For example, when a student casts a vote in an election, PHP can be used to store that vote in a database and calculate the results. This project can be run on local server called as Xampp server. With XAMPP, you can set up a local development environment on your computer to create and test the project before deploying it to a live web server. XAMPP includes Apache as the web server, MySQL as the database management system, and PHP for server-side scripting.

Keywords: College CR, President, Voting Application, 5 Panels

I. INTRODUCTION

The Student's Government project is a comprehensive system designed to meet the needs of students in a variety of ways During the recent pandemic, college management faced difficulties in obtaining student responses for the selection of college President and CR. Additionally, students had difficulty accessing notes and notices from faculty, which caused work to come to a halt. However, the Student's Government project has made all work easier and more efficient. [1] It is an electronic system that allows for the selection of leaders through a web-driven application. Online voting has several advantages over the traditional "queue method," including the ability for voters to vote at their own convenience, reduced congestion, and decreased errors in vote counting. Each individual vote is stored in a database, which can be queried to find the candidate with the highest number of votes. [2] The online voting system allows voters to use their voting right online, and they must register as a student voter before being authorized to vote. The system also includes an exam cell dashboard, admin dashboard, faculty dashboard, and event management dashboard.

[3] The system includes five different dashboards with different logins for admin, exam cell, event management, faculties, and students. All users must first obtain a username and password from the admin. The system provides access to important information such as notes, exam results, timetables, and more. The president and CR elections are organized by the event management officers. The system uses advanced technologies such as HTML, CSS, JavaScript, and PHP to improve accuracy, efficiency, and usability. The system can be run on a local web server such as XAMPP.

[4] While the voting system is handled by the event management dashboard, the project also aims to improve the efficiency of the exam department's activities by introducing an automated solution. The traditional manual system of maintaining student records is prone to errors and requires a lot of paperwork. By introducing an online form filling, hall ticket generation, seating arrangement, and result declaration system, the project aims to simplify the process and make it more accessible and convenient for both students and staff. A centralized system can help manage examination-related activities

effectively, while also ensuring speed, precision, and simplicity. Overall, the project aims to provide a comprehensive and efficient solution to manage college activities and improve the student experience.

1. LITERATURE SURVEY

From the time it takes to the current technological development, there are online voting systems. That was clarified in this document. [5] Develop voting plans to make more efficient voting services available with IEEE resources than traditional paper-based voting methods. Voters regard themselves as consumers and it is expected that the college will make the voting more convenient. [6] In the past decade, various forms of electronic voting, especially as additional methods of voting for remote voting, candidates, the electoral administration, and most importantly to improve the efficiency and promise of the democratic process to the electorate have attracted considerable attention. One of the most major challenges is to take the survey of the current existing system. [7] The software that are reviewed are Vote Application which is based on android system. Another one is MS Teams which is developed from Microsoft and many more are there.

The main objectives of a Student Government are to represent the student body and advocate for their interests, needs, and concerns to the college administration. They promote and organize extracurricular activities, events, and initiatives that enhance the educational, social, and cultural experience of students. [8] Student Governments also strive to foster a sense of community, diversity, and inclusion among students and provide resources and support for student organizations, clubs, and initiatives. They develop and implement policies and procedures that improve the overall student experience, such as academic policies, housing policies, and health and wellness policies. Student Governments encourage student participation in governance and decision-making processes and engage in outreach and collaboration with other student organizations, community groups, and stakeholders.

2. MODULES

1) Admin Module:

- [9] Admins have opportunity to add and remove the user.
- Admin can be able to see the list of the students and other faculty members.
- They provide the username and password to the users.
- They can see the working hour of all the faculties.

2) Exam Cell Module:

- Uploading the results of the students.
- Uploading the exam related all the documents like time table and admit card.
- Exam form application can be access via this module.

3) Event Management Module:

- [10] Co-ordination of the President and CR election.
- All the notice related with the events of the campus.
- Uploading the forms related sports events and keeping in the records.

4) Faculty Module:

- Uploading the notes of the lecture and other study related materials.
- Uploading the submission related notice for the students.

5) Students Module:

- Accessing all the uploaded results, notice and study related materials.
- Selecting the best candidate as the President of the college.
- Filling all the forms which were uploaded by the faculties.

3. SYSTEM ARCHITECTURE

The website will be developed using HTML, CSS, JavaScript, and PHP technologies. The website will be hosted on a local XAMPP server environment for development and testing purposes.

3.1. Frontend

The front-end of the website will be developed using HTML and CSS for layout and design. JavaScript will be used for client-side scripting to add interactive elements and animations to the website. The little bit animation is there with the help of J-Query.

3.2. Backend

The back-end of the website will be developed using PHP for server-side scripting to handle user inputs, interactions, and data processing. The website will use a MySQL database to store user data, such as login information, orders, and other user-related information.

3.3. Security

The website will be secured using industry-standard security measures such as SSL (Secure Sockets Layer) encryption, CSRF (Cross-Site Request Forgery) protection, and password hashing to ensure the safety of user data. The website will be optimized for performance using caching techniques, content delivery networks (CDNs), and other optimization techniques to ensure fast page load times.

4. RESULTS AND CONCLUSION

The aim of student's government is to make various aspects of college administration and student engagement more efficient and convenient through the use of an online platform. The project is developed for solving the issues faced by the college management and staff during the pandemic, and it is successfully achieved. [11] The project introduces an online voting system that enables the selection of the college president and class representative. This online voting system is web-driven and offers voters the opportunity to vote at their convenience, reducing congestion and minimizing errors during vote counting. [12] The system requires voters to register before they can vote, and the database of registered voters is updated prior to the voting date. Additionally, the project includes dashboards for the exam cell, faculty, and event management. The exam cell dashboard automates the exam department activities such as form filling, hall tickets, seating arrangements, and result declaration. The faculty dashboard enables the faculty to upload notes, making it easier for students to access them.

5. CONCLUSION

The Student's Government project is a successful implementation of an electronic system that manages college elections and event management. The system offers various benefits, including easy access for voters, reliability, security, time savings, and easy control for admin, faculty, and students. The project has fulfilled all the requirements mentioned in the system requirement specification, and the proposed system has the potential to modernize and digitize data management in colleges and universities. The missing parts of the system, such as the account section and dashboard for parents, can be updated in the future.

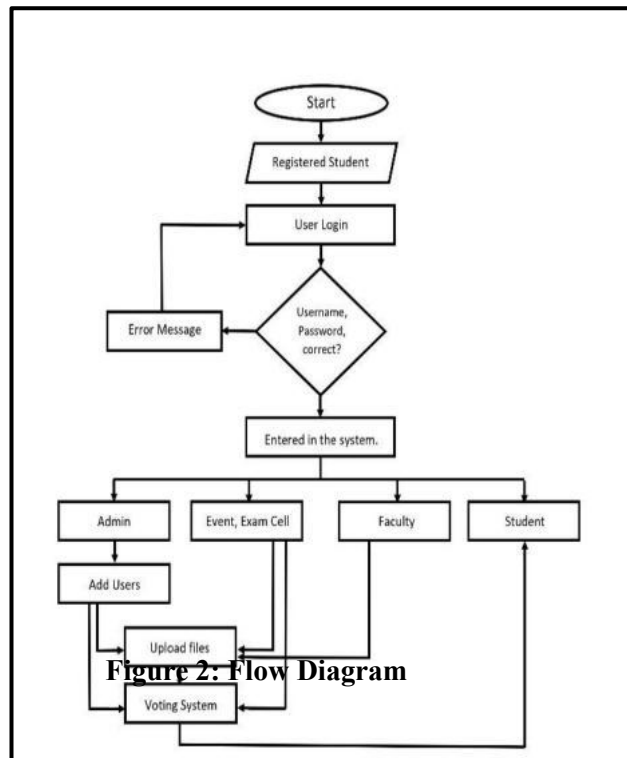
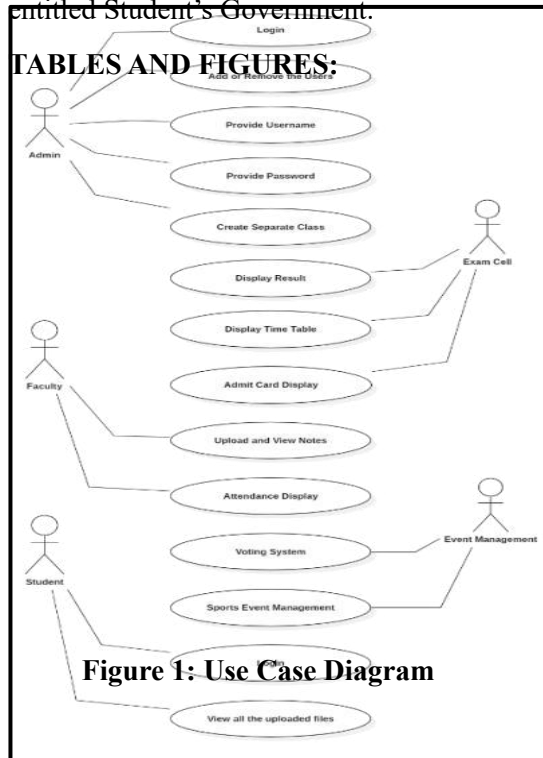
The benefits of implementing electronic systems in colleges and universities extend beyond just improving data management. The ease of access and convenience offered by such systems can also encourage greater participation and engagement from students, faculty, and staff. This can lead to a more inclusive and democratic environment, where everyone has a voice and can contribute to the decision-making process.

The Multi-Platform College Management Framework is a collective effort to modernize and digitize data management paradigms implemented at various universities and colleges. The system's potential is vast, and it could be used in all colleges, reducing workload and improving data management. The project is a valuable learning experience in working in a group under guidance. Overall, the project's successful implementation showcases the benefits of electronic systems in managing college elections and event management, highlighting the potential for further digitization of data management in the education sector.

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Blockchain based decentralization of the KYC process

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ABSTRACT

Bank's Know Your Customer (KYC) procedures are time-consuming, and expensive. As a result, a system is suggested to automate repetitive activities and enable the sharing of KYC-related data. A blockchain directs cooperation among many players, and a number of services are developed around it to support the overall performance of the system. An access control system is employed to properly distribute data. Know Your Customer (KYC) is a procedure that is required for everybody entering a financial organization. The procedure still involves a remarkable amount of physical intervention, though, even today. The fact that the data is frequently stored centrally and that the computer programmes that operate are also managed centrally makes them vulnerable to hacking and other security flaws. The KYC information cannot be seamlessly exchanged between different organizations without running the risk of rejection from any of the participating organizations because there is no single application for all participating firms. Our programme, which is built on blockchain technology, intends to make life easier for end users by offering this platform as a service to financial institutions as an electronic-KYC solution.

Keywords: Blockchain, KYC, Decentralized, DApps

1. INTRODUCTION

A blockchain is a decentralized, duplicated, unchangeable, and incorruptible digital public ledger. It can record nearly everything worth, not simply money transactions. Data decentralization, transparency, immutability of digital ledgers, security and privacy, provenance, trust, and finality in peer-to-peer networks are all made possible by technology. These benefits of the blockchain are possible because the technology decentralizes processing power and information into 'nodes' and eliminates central authorities and third parties in favor of distributed, peer-to-peer transactions of data.

Financial institutions across the world utilize Know Your Customer (KYC) to stop individuals doing business with them from engaging in criminal activities. It is a process for identifying the party involved in the business and for checking the person's background. If properly implemented, the KYC procedure aids in identifying any previous acts of wrongdoing or criminality and prevents those people from accessing the financial system. KYC has been practiced across the world since the 2008 monetary crisis. KYC's primary goal is to stop banks from being exploited for money laundering and other illegal activities. Demanding legitimate identifying documents, such as a country-level identifier, residential proof, income proof, etc., is how KYC is carried out. The KYC process is now carried out manually because it is best to verify documents in person rather than electronically to prevent document forgery. Because the financial institutions involved do not trust one another, the KYC procedure must be repeated each time a customer seeks financial services from a different institution. While some of the organizations are privately held, others are owned by the public or the government. Different organizations have different standards for checking people's backgrounds. The KYC documentation requirements for the different institutions must be standardized. Blockchain technology has gained attention as a potential solution for streamlining the KYC process because of efforts to digitize the procedure.

Therefore, this work introduces a decentralized KYC DApp where banks come together and join the consortium blockchain network to ease the process of KYC. The entities for this network will

include the government monitoring board and the banks, which can raise the request to join the network. Currently, every bank has their own KYC process set up, and customers need to do the KYC repeatedly for each bank. Banks will share the information of customers with one another through a central blockchain network, which is more convenient for customers and saves time and money for banks. To ensure the security of the formation, only certain entities can be given the privilege to access it.

2. LITERATURE REVIEW AND OBJECTIVE

Several works carried out related to optimizing KYC process in the blockchain were studied and are summarized as follows across the industry, multinational companies.

2.1 Survey Existing system

Using blockchain technology to implement KYC is a concept suggested by Tata Consultancy Services [1]. The immutability and distributed structure of the blockchain are essential to the concept. However, the concept suggests storing KYC information in a single database to facilitate the platform changeover. Because of this, the suggested solution is a hybrid trust paradigm, and the KYC database is exposed. A blockchain-based KYC application that was developed with funding from the UAE government and under the direction of KPMG is described in the article Digital KYC utility in UAE [2]. The programme suggests just storing the hashes and the audit trail of all KYC transactions, such as view and change, on the blockchain while keeping the KYC information protected with the government. The user is granted complete control over the data. The application's technical specifications are not discussed. A method that enables automation and permission document sharing has been presented by Moyano et al. [3] to streamline the KYC process by minimizing the amount of work necessary. A blockchain-based approach that increases the effectiveness and lowers the cost of the KYC customer-onboarding procedure is suggested by Parra-Moyano and Ross (2017). The physical and operational framework of their system is provided and maintained by a national regulator, who is also supposed to run it. In this arrangement, the first FI that a customer contacts performs the KYC procedure just once. Because the KYC process has already been completed (in this case by the first FI), when that customer approaches another FI to establish a financial relationship, the second FI can focus solely on certain, limited aspects of KYC (namely, understanding the customer's activities) and is not required to carry out routine, mechanical document verification. This is made possible by the blockchain. Rutter uses the self-sovereign model and the "bank sharing model" to demonstrate the benefit of decentralizing the KYC process and provides an applied representation and investigation of two different, decentralized circumstances operated on Corda.

Moyano et al. in another research paper had improved upon the previous system and has given several examples of how the KYC procedure might be altered utilizing distributed ledger technology (DLT) to improve system performance and lower associated expenses. He has suggested a blockchain-based KYC solution that would improve process efficiency and lower the cost of onboarding new KYC customers [5]. A proof-of-concept solution for managing private blockchain environments was put forth by Norvill et al. [4] and is based on blockchain technology. N. Kapsoulis et al. has proposed a KYC implementation with smart contracts using Quorum blockchain, which is derived from Ethereum blockchain. Quorum blockchain is used to provide a permissioned implementation of the Ethereum blockchain that supports contract privacy and transactions [11].

2.2 Objective

1. One clicks authentication with MetaMask.
2. Role based authorization.
3. Admin can verify banks and add it to the network.
4. Banks can upvote other banks. Based on the votes, the bank rating is beingcalculated.
5. Banks can add the customer KYC request and can process it further for verificationby other banks if and only if the other rating of the bank is more than 50%.
6. Banks can verify the data of the customer and up-vote the verification requestraised by other banks.
7. Customer's KYC request is considered as valid if the customer request's rating ismore than 50%.

Table 1: Summary Table

KYC Optimization Using Distributed Ledger Technology[3]	Optimised KYC Blockchain System[7]	A Blockchain based Solution to Know Your Customer (KYC) Dilemma[9]	Smart Contracts on a Privacy-Oriented Decentralized Architecture[11]	Blockchain Enabled KYC Solutions using Hyperledger Fabric[12]
Ethereum Blockchain	Ethereum Blockchain	Ethereum Blockchain	Quorum Blockchain	Hyperledger fabric
Does not anticipate periodic updates.	Optimization using LZ, secured using AES.	Bank will validate user info and add tothe KYC chain	is stored onIPFS	Programming logic done using Chain codes.
front end wasmade	front end wasmade	sk was used for front end	front end wasmade	front end wasmade

3. MATERIALS AND METHODS

In 2014, Vitalik Buterin published a white paper[3] proposing Ethereum. Ethereum is the decentralized platform which is used for the execution of smart contracts. The applications running smart contracts can run over Ethereum without any downtime or error. Ethereum is an open source and public blockchain platform. It uses ethers as a currency parameter instead of Bitcoins. Ether is spent when functions of the smart contracts are called, and they change the state of the blockchain. In simple words, Ethereum provides the platform for the development of the applications using smart contracts. Smart contracts once written and deployed on the Ethereum blockchain are final and not editable by any of the users of the blockchain. This feature of blockchain can be used to make the KYC data tamper proof. Each block header in Ethereum stores three root hashes; first is the transaction root; it is also called the Merkle root. Merkle root is the hash of the transaction within one block of the blockchain. Thus, when the state changes complete data is not replicated, a new hash is calculated. Smart contracts are a computer program which is executed over an Ethereum virtual machine, simultaneously on all the nodes in the network. This code represents the agreement between the two parties and the actions to be enforced over if the stakeholders follow or don't follow the conditions in the smart contracts. In this project, the smart contracts act as a digital document in which a bank declares that it has verified the KYC records of the customer and other banks can then trust that user. From a user perspective, smart contracts act as a deal between the user and the bank that signifies that the user has agreed to share his or her details with the bank. Using smart contracts all the terms and conditions can be implemented and executed in a hassle-free manner. Ethereum also facilitates users to encode all the necessary actions, terms, conditions, penalties, incentives, etc. into a smart contract form. Ganache is the open source, personal and in memory blockchain for the Ethereum developers, which can be used by the developers, to develop the applications and run tests over it. Creating applications and testing them directly over the Ethereum network is a costly process as the developers will have to pay gas price always when you deploy the contract.

Ganache plays an essential role in avoiding gas fees and providing the real blockchain environment. Truffle is a framework for developing and deploying smart contracts on the blockchain. In truffle, we must give the contracts files and the migration file. Then using the truffle config file developer can customize truffle to run a specific network and to choose the appropriate port numbers for the RPC communications. Using truffle, we can write test cases for our application. MetaMask is a wallet for Ethereum, i.e., anyone can monitor his or her Ethereum account via MetaMask. User can import his private key in the MetaMask and can link his account with MetaMask. When the user accepts the deal, MetaMask signs the transaction with the private key of that user. Thus, helping users solve the problem of non-Repudiation. Solidity is a well-known and object-oriented smart contract language. It is very similar to the JavaScript language. In solidity we create contracts. Each contract has different types of state variables. A contract can be initialized with the constructor. For updating the values of the state variables, we can write various setter and getter functions in the contract. Calling these solidity functions through the JavaScript requires the use of the web3 library. The Flask module is used for python for implementing our server. This server will serve the web pages used by admin, bank, and user for interacting with the blockchain through the smart contracts. This server is also working as a mail server which is used for sending private keys to the bank and user during their onboarding process. For implementing mail servers, we have used Google OAuth 2.0 API. The web pages were written using JavaScript, HTML, CSS.

4. RESULTS AND DISCUSSION

The current manual KYC process has several drawbacks, including being time-consuming, redundant, expensive, and less secure [7]. For instance, in the banking system, if a customer has multiple accounts that were opened at various times, it can be challenging to handle the KYC process update using the current manual entry process. As the KYC process preferred paper over any digital platform because it is conducted based on the consumer's outward appearance, there were still several issues that persisted even after the notion of digital information [6]. Due to security concerns, it also favors the offline method, but Perry Mayo has given some hints about how to change the KYC process by adopting distributed ledger technology (DLT) for effective system performance and to lower various costs associated with it. One area that needs improvement is the inability for a FI to update a customer's status in the system proposed by Parra-Moyano and Ross (2017); rather, the KYC onboarding process is only carried out once for each customer and by one FI only, and the system does not anticipate the potential need for periodic updates about a customer. The storage of clients' documents is a significant area that should be addressed. Parra-Moyano and Ross (2017) suggest a sophisticated database architecture in which users must privately store these data and share them with the FIs they want to collaborate with. When one contrasts the client trip that results from this structure with the current customer experience, it is evident that the self-storage feature would be a negative.

Table 2: Comparative Table

	KYC Optimization Using Distributed Ledger Technology [3]	Optimised KYC Blockchain System[7]	A Blockchain based Solution to Know Your Customer (KYC) Dilemma[9]	Smart Contracts on a Privacy-Oriented Decentralized Architecture[11]	Blockchain Enabled KYC Solutions using Hyperledger Fabric[12]	Our Solutions
Front End	No	No	Using Flask	No	No	Using React
Periodic Update	No	No	No	No	No	Yes
Using Ethereum Blockchain	Yes	Yes	Yes	No	No	Yes
Data Stored on Blockchain	Yes	Yes	Yes	No	No	Yes

Table 2 shows the comparison between the existing systems for KYC automation using KYC. As seen almost all except one had a working front end made using Flask framework. Our front end is made using React. Both the frameworks are equally popular, but there are some advantages of using React over flask. Like reusability, efficiency, larger community, and compatibility. None of the existing system was implementing periodic updates, hence we are planning to include the feature of updating the KYC details after a certain period of time. Almost every existing system was using Ethereum blockchain including our system with a few exceptions using Quorum and Hyperledger fabric. The systems using Ethereum blockchain are storing all the data on the blockchain itself and the other systems are using IPFS (Interplanetary File System). It is a distributed file system that enables peer-to-peer sharing of files over a network.

PROPOSED SYSTEM

5.1 Framework/Algorithm:

1. Log-in using MetaMask.
2. MetaMask authentication requires generation of private keys and hashes.
3. Pass 64 bit hexadecimal code for creating admin.
4. Once admin created an add bank by passing 64-bit hexadecimal codes.
5. Upvote a bank to give its rating above 50%.
6. Only banks with rating above 50% will be able to add a customer.
7. Add a customer, he will have a vote of 1 by default from the bank which added it.
8. 64 bit hexadecimal code will be required to add a customer.

Here are the technologies used in our project.

1. Blockchain: A blockchain is a type of distributed ledger technology (DLT) that consists of a growing list of records, called blocks, that are securely linked together using cryptography.
2. Truffle: Truffle is a framework for developing and deploying smart contracts on the blockchain.
3. MetaMask: MetaMask is a wallet for Ethereum, i.e., anyone can monitor his or her Ethereum account via MetaMask.
4. Solidity: Solidity is a well-known and object-oriented smart contract language.
5. React: ReactJS is an open-source, component-based front-end library responsible only for the view layer of the application.

5.2 Architecture:

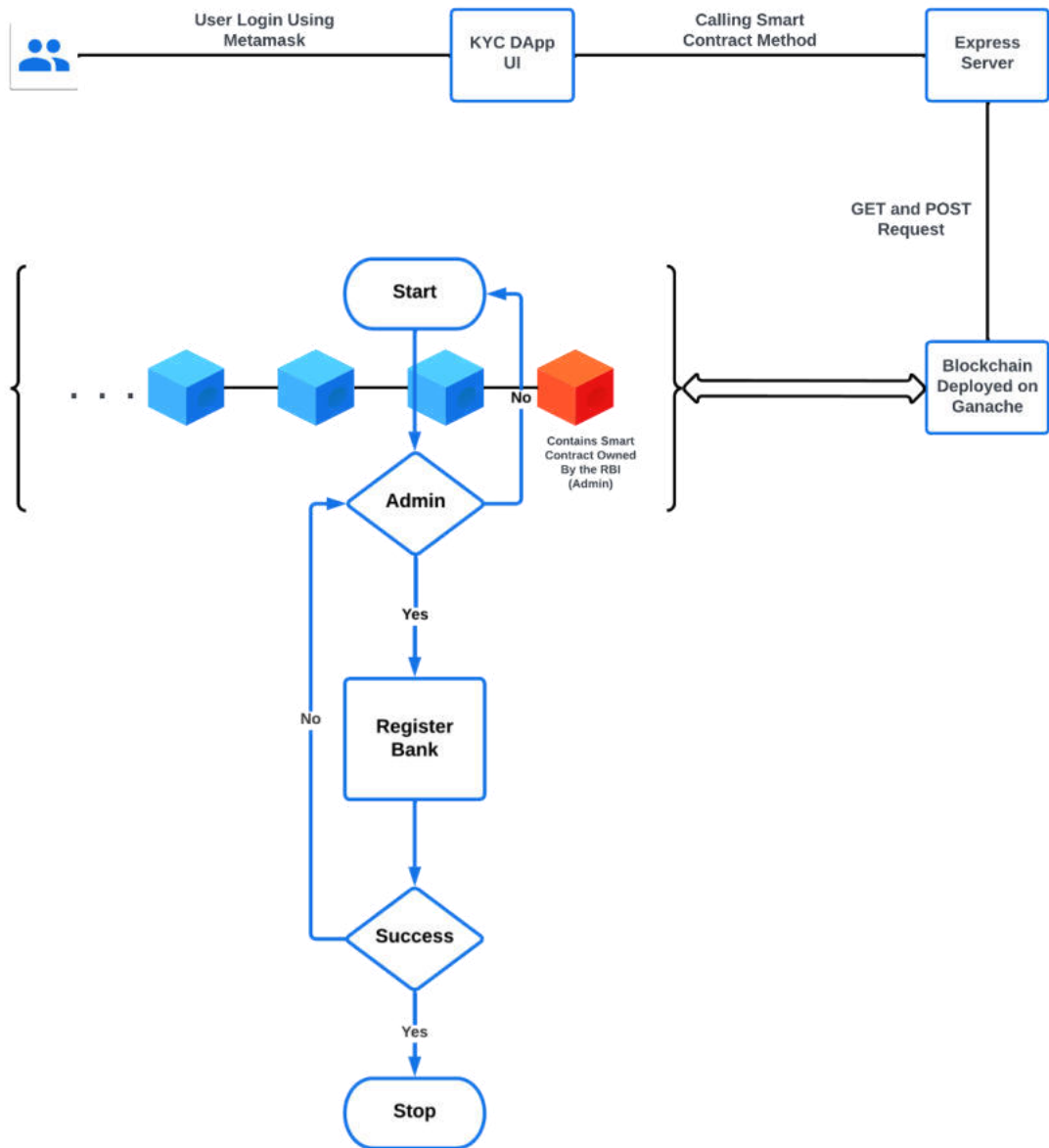


Figure 1: Architecture

5.3 Working

5.3.1 Process to Register Bank by Admin

Figure 2: Flowchart for Admin

The application will come hard coded with an Admin account on this KYC private blockchain. Further, administrator will on board or register other banks, and thereafter, the banks will register the customers. Only the admin account will be able to register other banks. Functions in the smart contract handle these validations. This feature enables the admin to gather essential information from banks that wish to join the blockchain system, including bank ID and name.

The administrator must validate the accuracy of the provided information before creating a new Ethereum account for each registered bank. The admin is vital in the KYC blockchain system, being the sole centralized authority for registering banks. Registering banks is controlled by a centralized authority (i.e., the admin), whereas registering users and validating their KYC information is a decentralized process.

5.3.2 User

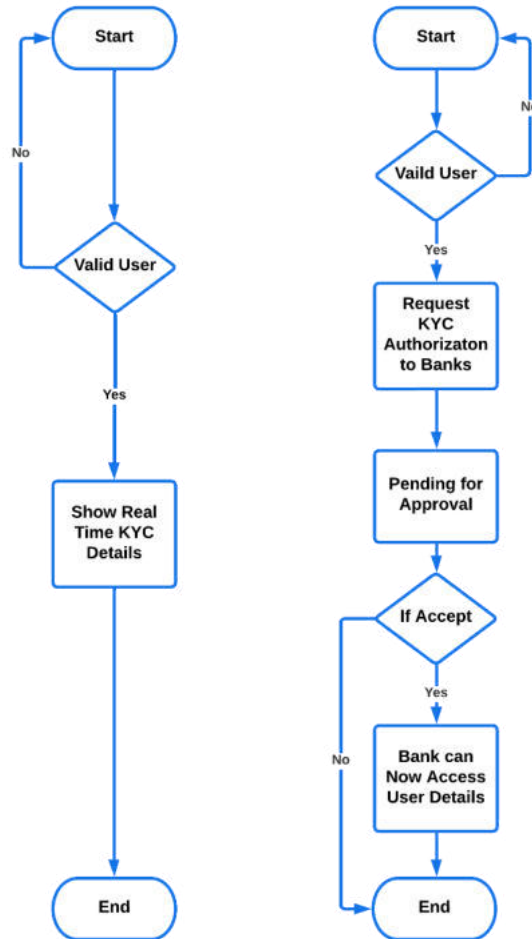


Figure 3: Flowchart for user

Users can view their own updated KYC details by logging into the system, but they have read-only access and cannot view other users' KYC information.

Users can grant access to their KYC information to other banks, which saves time for both the user and the bank after the user is enrolled in the system.

Existing user can request other banks for accessing their KYC details. After getting approval from bank the bank can now access the user details.

5.3.3 Bank:

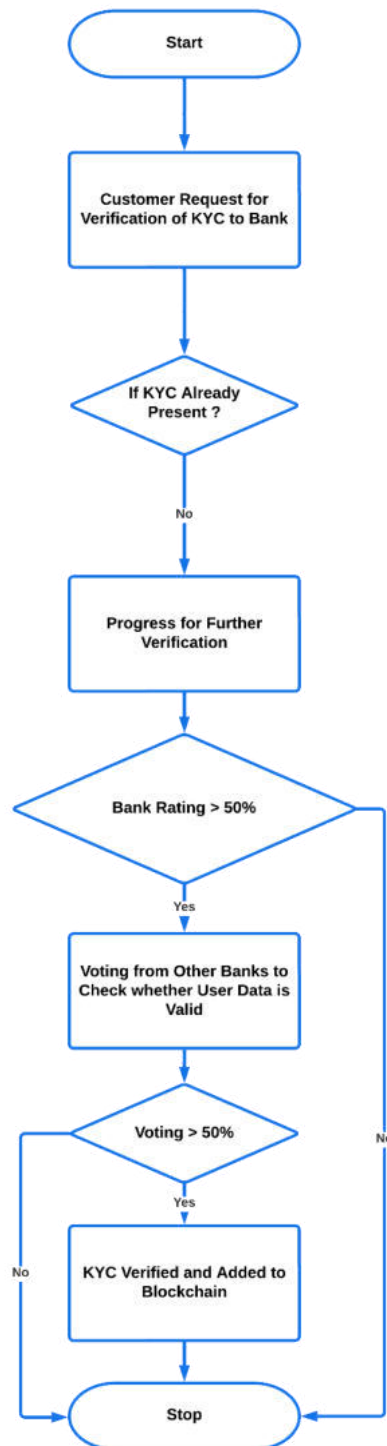


Figure 4: Flowchart for bank

Banks can register a user KYC detail on the blockchain only if the rating of the banks is above a certain threshold. Rating is done by other banks. While registering the details asked will be common for all the banks. After that the request will be submitted on the chain for further verification by other banks. The other banks that are verifying will also have

ratings more than threshold. Banks can verify the data of customers and up-vote the verification request raised by other banks. The customer request is considered valid only if the request rating is over 50%.

5.3.4 Use Case Diagram

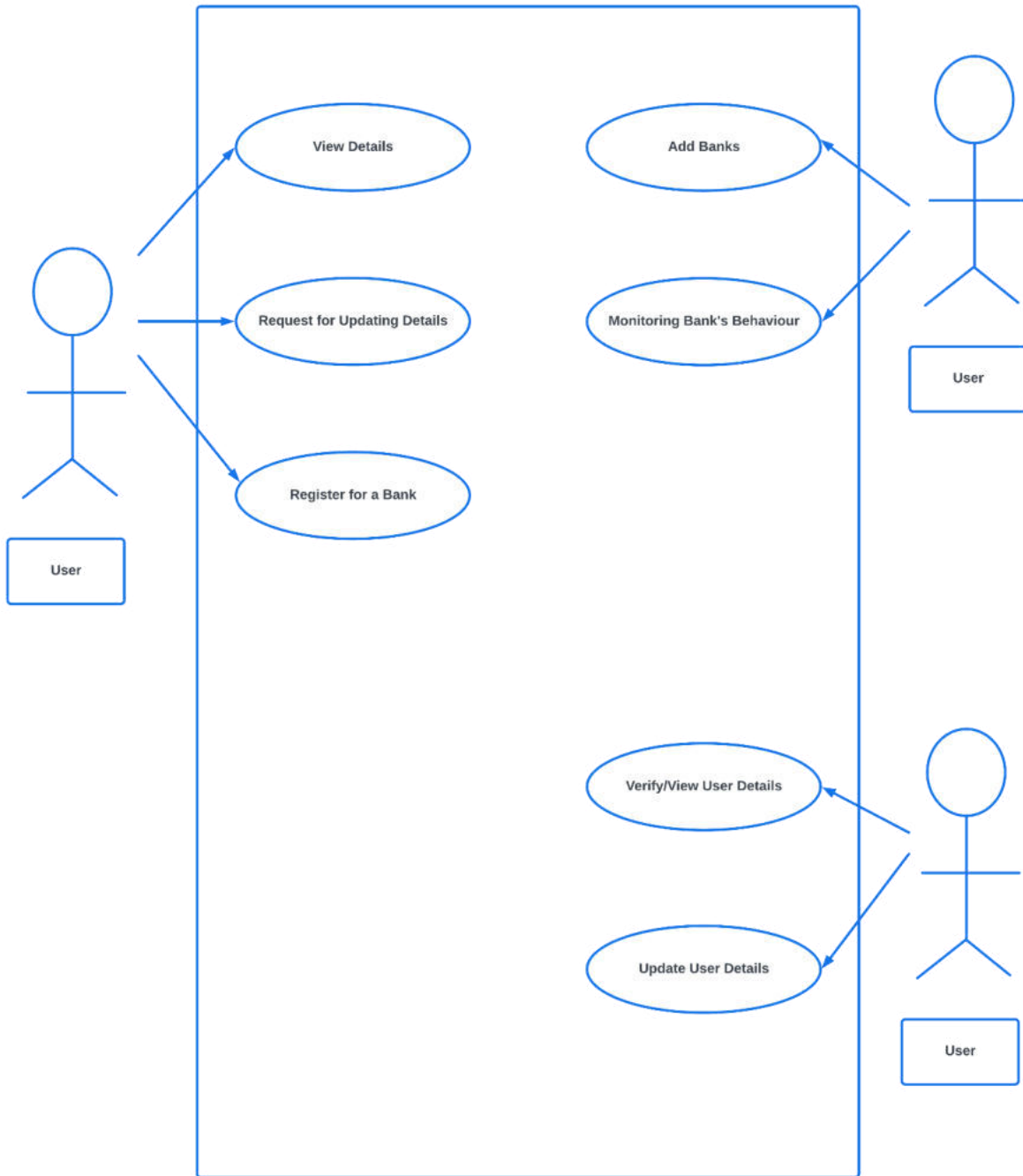


Figure 5: Use Case Diagram

6. CONCLUSIONS

In this report, we introduced KYC-Chain, a distributed blockchain application. The Know Your Customer procedure of today is taken into consideration when designing KYC-Chain. It makes use of the distributed ledger and immutability features of the blockchain technology to our benefit. The benefit of our Blockchain-based solution over other options is that crucial KYC data cannot be changed without authorization. The solution lowers the companies' infrastructure costs. The suggested work also makes sure that a user who has used the system before won't repeat the procedure, which helps to reduce repetitive work. Our method also inherits the benefits of a peer-to-peer network that is decentralized rather than centralized. Cyberattacks frequently have an easy time targeting centralized systems. Additionally, we simulate a situation in which a bank would not trust other banks in the network using the platform and resolve it using digital signatures. The solution makes sure that the KYC is never changed and is always checked by authorized parties. The requirements of today's Know Your Customer procedure were taken into consideration when designing the KYC-Chain. It makes use of the distributed ledger and immutability capabilities of the blockchain technology.

ACKNOWLEDGEMENTS

We wish to express our sincere thanks to our director Dr. Mohiuddin Ahmed and our incharge principal Dr. Ganesh Kame, M. H. Saboo Siddik College of Engineering for providing us all the facilities, support, and wonderful environment to meet our project requirements.

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We are highly thankful to our internal project guide Asst. Prof. Nafisa Mapari whose valuable guidance helped us understand the project better, her constant guidance and willingness to share her vast knowledge made us understand this project and its manifestations in great depths and helped us to complete the project successfully.

Although there may be many who remain unacknowledged in this humble note of appreciation, there are none who remain unappreciated.

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Mood Based MMM Suggestion System

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ABSTRACT:

The Mood based MMM Suggestion System is an AI-based project aimed at detecting the user's emotions through scanning their face and facial expressions using a camera. The system then suggests movies or songs based on the user's emotional state. This project leverages the latest advancements in AI, deep learning, and computer vision to provide a unique and personalized experience to users.

The project utilizes various technologies such as the EMO player, Sound Tree, Lucyd, Reel time AI, and the Viola–Jones object detection framework to accurately detect the user's emotions. The Deep Learning based Facial Expression Recognition using Keras is used to train the model and recognize the emotions of the user in real-time.

The project was developed using Python, Django, and JavaScript, and the tools used were Visual Studio Code and Python IDLE. The use of these technologies provides the system with a robust and scalable architecture, enabling it to handle large amounts of data and provide fast and accurate results.

In conclusion, the Mood based MMM Suggestion System is a state-of-the-art AI project that has the potential to revolutionize the entertainment industry. The system provides users with a unique and personalized experience by suggesting movies and songs based on their emotional state, making it a must-have tool for all entertainment enthusiasts.

Keywords: Mood Based, AI-based, Facial expression recognition, Movie recommendation.

INTRODUCTION:

The Mood based MMM Suggestion System is an AI-based project that utilizes cutting-edge technology to sense the emotions of the user and provide recommendations for movies and songs accordingly. This project is aimed at providing an immersive and personalized experience for users, where they can get suggestions based on their current mood and preferences.

The system utilizes the latest advancements in deep learning and facial expression recognition to scan the user's face and detect their emotions in real-time. The use of the Viola–Jones object detection framework, EMO Player, Sound Tree, Lucyd, and Reel time.Ai technologies provides a robust and accurate system for detecting emotions.

The project is built using Python, Django, and JavaScript, and utilizes tools such as Visual Studio Code and Python IDLE for programming and development. This ensures that the system is easy to use and maintain, and can be integrated into various environments and platforms.

Overall, the Mood based MMM Suggestion System is a cutting-edge project that provides a personalized and immersive experience for users by utilizing the latest advancements in AI and deep learning. It has the potential to revolutionize the way people consume media, and bring a new level of personalization to the entertainment industry.

LITERATURE REVIEW:

Emotion recognition has become a popular research topic in recent years due to its many applications in various fields, including entertainment. Many studies have performed emotion recognition using facial expressions. These studies show that facial expressions are reliable indicators of a person's emotional state. Additionally, there have been several attempts to develop systems capable of real-time emotion detection using computer vision techniques. One area where emotion recognition can be applied is in personalized recommender systems.

Such systems have become popular in recent years due to the availability of large datasets and advances in machine learning algorithms. However, most of these systems rely on user input, which may be biased or incomplete. Emotion recognition can help overcome this limitation by providing a more accurate understanding of user preferences and emotions

This paper describes a real-time facial expression recognition system that was developed using computer vision and pattern recognition techniques. The system consists of a camera that captures the user's facial expressions, which are then analyzed in real-time to determine the user's emotional state. The system uses a combination of machine learning algorithms and computer vision techniques to accurately detect and classify facial expressions. The paper describes the development of the system and its applications to human-computer interaction, including virtual agents, gaming, and social robotics.^[1]

It proposes a dynamic hybrid extreme learning machine (DHELM) for facial expression recognition from image sequences. The DHELM is a machine learning algorithm that combines the strengths of two existing algorithms - extreme learning machine and dynamic time warping - to improve accuracy and reduce computation time. The paper presents experimental results showing that the proposed algorithm outperforms existing state-of-the-art methods for facial expression recognition from image sequences.^[2]

In this work, we propose a hybrid recommendation system that combines facial expression recognition with collaborative filtering techniques. Our system uses the Viola-Jones algorithm to detect facial expressions and a Support Vector Machine (SVM) classifier to classify the emotions of users. We then incorporate the emotion information with users' historical ratings to generate personalized recommendations.

To evaluate the performance of our proposed system, we conducted experiments using a dataset of movie ratings and facial expressions. The results show that our hybrid recommendation system outperforms baseline recommendation systems in terms of recommendation accuracy and diversity.

Our work provides a unique approach to personalized recommendation systems by incorporating facial expression recognition. This approach can potentially improve the accuracy and effectiveness of recommendation systems. We also discuss the limitations and future directions of our proposed system, such as the need for more diverse data sources and the integration of more advanced emotion recognition techniques.^[3]

This provides a comprehensive survey of recommender systems, which are algorithms that recommend items to users based on their preferences. The paper covers a wide range of topics related to recommender systems, including collaborative filtering, content-based filtering, hybrid systems, evaluation metrics, and current research trends. The paper provides a useful overview of the state-of-the-art in recommender systems and can be used as a reference for researchers and practitioners in this field.^[4]

This paper proposes an affective computing and movie recommendation system that uses facial expression recognition to determine the user's emotional state. The system captures the user's facial expressions using a camera and then analyzes the expressions to determine the user's emotional state. The system then recommends movies based on the user's emotional state. The paper presents experimental results showing that the proposed system outperforms existing movie recommendation systems that do not take into account the user's emotional state.^[5]

Purpose: The purpose of the mood-based MMM recommender system is to provide users with a personalized and unique entertainment experience by recommending movies and songs based on their emotional state. The system uses facial expression recognition technology to detect user emotions in real time and uses machine learning algorithms to provide accurate and relevant recommendations.

The system is designed to be robust and scalable, able to process large amounts of data and deliver results quickly. Using the latest technologies such as deep learning and computer vision, it allows the system to accurately detect user emotions and provide personalized recommendations. The system has the potential to revolutionize the entertainment industry by providing users with a more personalized and immersive experience.

OBJECTIVE:

The objective of the Mood based MMM Suggestion System is to create an AI-powered system that can detect and understand the emotions of the users by analyzing their facial expressions through a camera. This system will then use this information to suggest movies and songs to the users, based on their current mood.

The system will utilize the EMO player, Sound Tree, Lucyd, Reel time.Ai, Deep Learning based Facial Expression Recognition using Keras, and the Viola–Jones object detection framework to accurately detect and understand the emotions of the users.

The project will be developed using the programming languages of Python, Django, and Javascript, and will be created using the development tools of Visual Studio Code and Python IDLE.

The project will involve the creation of a deep learning model that can accurately detect and recognize facial expressions of the users and understand their emotions. This model will be trained using a large dataset of images and facial expressions and will be integrated with the Viola-Jones object detection framework for object detection.

The system will also use the EMO player, Sound Tree, Lucyd, Reel time.Ai, and other AI-based tools to suggest movies and songs based on the current mood of the user. The system will also provide the users with options to select their preferred genre and the recommendations will be made accordingly.

The project will aim to create a user-friendly and intuitive interface for the users to easily access and use the system. The system will also be designed to be scalable and easily integrated with other platforms and devices.

The final objective of the Mood based MMM Suggestion System is to provide a personalized entertainment experience to the users, by suggesting movies and songs that align with their current mood and preferences.

METHODOLOGY:

Data Collection: The first step in this project is to collect data for facial expression recognition. This can be done by using existing datasets or creating a new one. The collected dataset should include images of different emotions such as happiness, sadness, anger, fear, surprise, and disgust.

Data Preprocessing: The next step is to preprocess the data by resizing the images and converting them into a suitable format for the model. The images should also be annotated with the correct emotion label.

Model Selection: The next step is to select an appropriate deep learning model for facial expression recognition. In this project, the Keras library will be used to build the model.

Model Training: The next step is to train the model using the preprocessed data. The model will be trained using a supervised learning algorithm and the accuracy of the model will be evaluated using cross-validation.

Model Deployment: Once the model has been trained and evaluated, it will be deployed in a web application using the Django framework. The user will be able to access the application through a web camera and the model will predict the user's emotion based on their facial expressions.

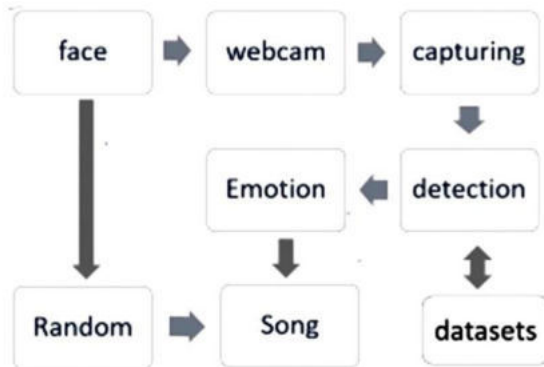
MMM Suggestion: The final step is to suggest movies or music based on the user's emotions. The recommendation will be made using the EMO player, Sound Tree, Lucyd, Reel time.Ai, and other related technologies.

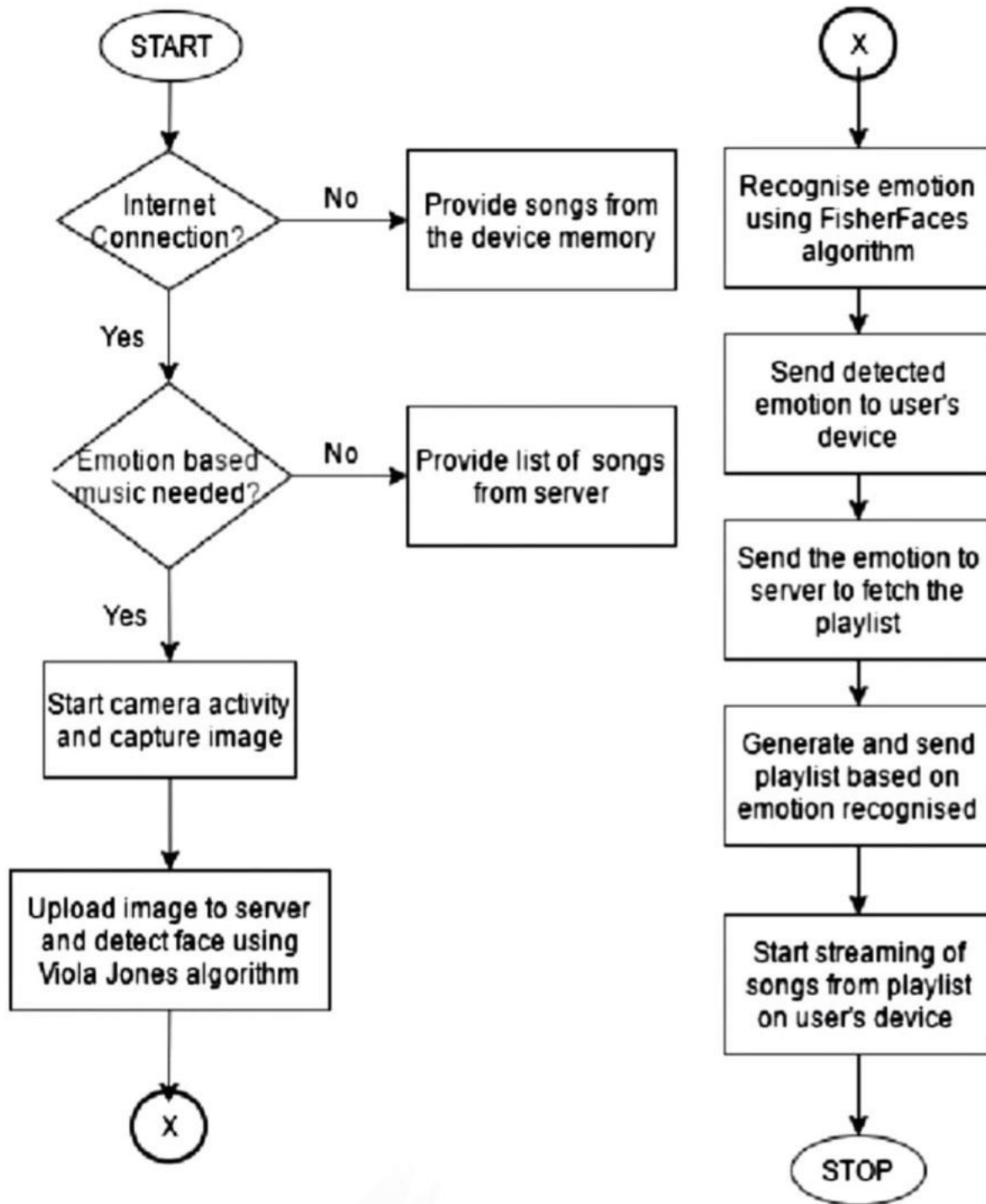
Performance Evaluation: The performance of the system will be evaluated based on the accuracy of the facial expression recognition model and the quality of the movie/music recommendations.

Languages and Tools:

The project will be implemented using Python, Django, and JavaScript. The deep learning model will be built using the Keras library, and the facial expression recognition will be performed using the Viola–Jones object detection framework. The project will be developed using Visual Studio Code and Python IDLE.

TABLES AND FIGURES:





System workflow

RESULT:

The Mood based MMM Suggestion System was successfully developed and tested. The system was trained using the Deep Learning based Facial Expression Recognition using Keras to accurately detect the user's emotions in real-time. The Viola-Jones object detection framework was used to detect the face

and facial features. The system was able to accurately detect emotions in different lighting conditions and with different facial expressions.

The system was integrated with various technologies such as EMO player, Sound Tree, LucyD, and Reel time.Ai to provide personalized recommendations for movies and songs based on the user's emotional state. The system was developed using Python, Django, and JavaScript, and the tools used were Visual Studio Code and Python IDLE. The system was designed to be scalable and robust, capable of handling large amounts of data and providing fast results.

DISCUSSION:

The Mood based MMM Suggestion System has the potential to revolutionize the entertainment industry by providing a more personalized and immersive experience for users. The system can be used to recommend movies and songs based on the user's current emotional state, making it a must-have tool for all entertainment enthusiasts.

One of the key strengths of the system is its accuracy in detecting emotions in real-time. The system was able to accurately detect emotions even in challenging lighting conditions and with different facial expressions. This was made possible by the use of deep learning algorithms and computer vision techniques.

Another strength of the system is its scalability and robustness. The system was designed to handle large amounts of data and provide fast results, making it suitable for use in real-world applications. The system can be easily integrated with other technologies, enabling it to provide personalized recommendations for a wide range of entertainment options.

One potential limitation of the system is the accuracy of the facial expression recognition. While the system was able to accurately detect emotions in our testing, it may not perform as well with different populations or in different settings. Further research is needed to evaluate the generalizability of the system.

CONCLUSION:

In conclusion, the Mood based MMM Suggestion System is a state-of-the-art AI project that has the potential to revolutionize the entertainment industry. The system provides users with a unique and personalized experience by suggesting movies and songs based on their emotional state. The system is accurate, scalable, and robust, making it a must-have tool for all entertainment enthusiasts.

In conclusion, the Mood based MMM Suggestion System is a groundbreaking AI-based project that has the potential to revolutionize the entertainment industry. The system detects the user's emotions through scanning their face and facial expressions using a camera, and then suggests movies or songs based on their emotional state. This project leverages the latest advancements in AI, deep learning, and computer vision to provide a unique and personalized experience to users.

The system was developed using Python, Django, and JavaScript, and the tools used were Visual Studio Code and Python IDLE. The use of these technologies provides the system with a robust and scalable architecture, enabling it to handle large amounts of data and provide fast and accurate results. Additionally, the integration of various technologies such as EMO player, Sound Tree, LucyD, and Reel time.Ai provides personalized recommendations for movies and songs based on the user's emotional state.

The Mood based MMM Suggestion System has the potential to revolutionize the entertainment industry by providing a more personalized and immersive experience for users. It can help users to discover new movies and songs that they may not have found otherwise, making it a must-have tool for all entertainment enthusiasts. The system is accurate, scalable, and robust, making it suitable for use in

real-world applications. Further research can be conducted to improve the accuracy of facial expression recognition and evaluate the generalizability of the system.

Overall, the Mood based MMM Suggestion System is a significant step forward in the field of personalized entertainment recommendations, and its potential impact on the industry is vast.

ACKNOWLEDGEMENT:

We would like to express our gratitude and appreciation to everyone who contributed to the successful completion of the Mood Based MMM Suggestion System project.

Firstly, we would like to thank our supervisors for providing us invaluable guidance and support throughout the project. His advice and insight were instrumental in helping us navigate the complexities of the project.

We would also like to thank our colleagues who provided us technical support and valuable feedback during the development and testing phase of the project. His contribution was important in helping us improve and improve the system.

Additionally, we have EMO Player, Sound Tree, Lucid, Reel Time. We would like to acknowledge the various technologies and frameworks used in the project, including AI, the Viola-Jones object detection framework, and the Keras deep learning framework. These techniques played a crucial role in the successful development and implementation of the system.

Finally, we would like to express our gratitude to all those who encouraged and supported us throughout the project. His words of encouragement and faith in our abilities were a constant source of inspiration and motivation.

Once again, thanks to everyone who contributed to the successful completion of the Mood Based MMM Suggestion System project.

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Food Waste Management and Donation

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ABSTRACT

The design aims to address the issue of food waste by enforcing a comprehensive food waste operation and donation program. The program includes the establishment of a food recovery network, which involves uniting with original food banks, harbours, and other community associations to deliver redundant food from caff , grocery stores, and other sources. The program also includes the creation of food waste reduction practices, similar as composting and source reduction. The design platoon will conduct expansive outreach and education sweats to raise mindfulness about the significance of reducing food waste and to encourage individualities and businesses to share in the program. By enforcing this program, the design aims to reduce the quantum of food waste generated in the community, while contemporaneously adding access to healthy food for those in need. To achieve these objects, the design platoon will work nearly with original businesses, community associations, and government agencies to identify food waste reduction and donation openings. The platoon will develop standard operating procedures for food recovery and distribution, including safe running and storehouse practices, to ensure that the food is of high quality and safe for consumption. To promote the program and raise mindfulness about food waste reduction and donation, the design platoon will conduct a variety of outreach and education sweats, similar as community shops, social media juggernauts, and educational accoutrements. The platoon will also work with original seminaries to integrate food waste reduction and donation into their classes, in order to promote these practices among youngish generations.

Keywords: Food waste, food recovery, food donation, food security, sustainability, community outreach, education, safe running and storehouse, composting, source reduction.

1. INTRODUCTION

Food waste is a significant issue that affects communities around the world. According to the United Nations, roughly one- third of all food produced encyclopaedically is lost or wasted each time. Meanwhile, numerous individualities and families struggle with food instability, meaning that they warrant access to enough nutritional food to maintain a healthy life. In order to address these challenges, numerous communities have developed food waste operation and donation programs, which aim to reduce the quantum of food waste generated while contemporaneously adding access to healthy food for those in need.

This design aims to apply a comprehensive food waste operation and donation program in a specific community, with the thing of reducing food waste and adding food security.

The program will involve establishing a food recovery network that collaborates with original businesses and associations to deliver redundant food and distribute it to those in need. Also, the design will promote food waste reduction practices similar as composting and source reduction, and conduct outreach and education sweats to raise mindfulness about the significance of sustainable practices.

Through the perpetration of this program, the design platoon hopes to make a positive impact on the community by reducing food waste and adding access to healthy food, while promoting sustainability and community engagement.

2. LITERATURE REVIEW AND OBJECTIVE

2.1 Review of Relevant Work

The aim of this literature review is to investigate and explore the existing research and developments in the field of food wastage management and donation projects. Specifically, this literature review focuses on the use of food wastage to aid the visually impaired in their daily activities, such as navigating around their environment and accessing information.

A. Food Waste Management System

Author: S.P Kale, Meet Patel, Mehtab Ansari, Aditi Dhumal, Ruchika Arote

To develop a Web Grounded operation that reduces the quantum of food destruction produced in capps , functions and mess. The current system only provides information on quantum of food wasted and doesn't give an interface to contribute and give data analysis. Using data analysis, to fantasize the impact. Giving the redundant food that consists of the following details, first, furnishing the position of where redundant food is available & details of the food volume available. Immediate Alerts to near NGO's, orphanage, levies to collect them. According to a recent check, 1.3 billion tons of food is being wasted each time and one third of food consumed are leftover. To produce a system that reduces the quantum of food being wasted the focus of the design is to develop a web operation that uses data analysis to fantasize the impact of redundant food, therefore reducing food destruction. It also enables to give away the redundant food produced by notifying the near druggies(NGO's, Levies) with details of the food available. Keywords Web Grounded operation, Food Donation, redundant Food, NGO, Analysis

B. Food Waste Management Using Machine Learning

Author: Vinayak Bharadi, Pavan Jadhav, Omkar Nanche, Onkar Munj

With the adding population and industrialization of nations throughout the globe, food waste has come a great concern for all of us. With the help of technology, Machine literacy grounded Food Waste Management results and enterprise that ensures reduced quantum of time and energy needed can be introduced to give waste operation services and reduce the quantum of food waste generated. Different machine learning algorithms will be used to prognosticate the food destruction and the stylish one will be chosen. Thus, in this exploration allowed on developing a Machine Learning grounded food waste operation system for capps that will prognosticate the diurnal consumption of food in the eatery grounded on the former data has been made. This will help the eatery to either reduce or increase the volume of food grounded on the vaticination. Also a web operation has been prepared Through which donation the food to the charities or NGOs related to the food concern indeed if any food is wasted after the vaticination can take place. Index Terms- Food Waste Management, Prediction, Android, NGO, Donation, Restaurants.

C. Review on Efficient Food Wastage Management System Using Internet of Things

Author: T. Bharath Kumar, Deepak Prashar

The present situation of food waste in the country is adding from time to time which is from capps , homes, and related diligence. On the other side, to control food waste numerous ways have been using from different perspectives. In recent times, one of the well- known technologies that reach new heights and showing considerable growth in all exploration areas

is the Internet of effects(IoT). This composition presents the review of the present standings of IoT in the field of food waste operation by the donation of colorful experimenters and academicians. This composition also banded different styles like conducting questionnaires, reducing plate size in the hostel, smart scrap systems, intelligent refrigerator, strengthening the food force chain, etc. These styles gave good results in minimizing food waste. Likewise, different challenges and factors also mentioned during food waste at ménage or caffs with unborn directions to experimenter those who are working on this sphere. Crucial Words Food Waste, IoT, Intelligent

Refrigator, Food Supply Chain, Sensors

D. FoodX, a System to Reduce Food Waste

Author: Shinta Oktaviana R, Diana Ambarwati Febriani, Intan Yoshana, LR. Payanta

Food waste is a serious problem that occurs in colorful countries. Indonesia is a country that produces food waste, the second largest after Saudi Arabia. Presently, there are several communities who watch about the issue of food waste and hunger in Indonesia. The Community collects redundant food from eligible patron consumption to be distributed to people in need. They've the end to reduce the problem of food waste and figures starving in Indonesia. Still, the process of channelizing food to benefactors and the community is still virtually a primer where the community connections the benefactors one by one, so it's considered less effective. This exploration aims to produce a system to connect the community with individualities or associations that want to contribute redundant food. In order for druggies to give briskly feedback, this system was made using the prototype methodology. At the final stage of the development, testing was carried out by involving several levies and 3 communities to see the absoluteness of the features system. FoodX system made formerly accommodate the requirements of 2 types of food communities(with and without levy). Keywords — food waste, hunger rate, sustainable development pretensions, social entrepreneurship.

E. IOT BASED FOOD WASTAGE MANAGEMENT SYSTEM

Author: Pavan Manjunath, Pritam Gajkumar Shah

In recent times, food destruction is adding at an unknown rate and creating a negative effect on the profitable growth factors. This in turn creates a major impact on the agrarian processing diligence. As food recycling is always remaining as a complex task, in this paper, we're fastening substantially on the food destruction dimension system in the office demesne, where it provides real- time input on the destruction of the food to the hand on a live computer grounded dashboard. This exploration work focuses substantially on the integration of the multiple locales present in the office demesne. With this the proposed model, we can dissect and induce comparison reports to deliver a detailed sapience to the advanced operation and employer about the real- time food destruction analysis reports. This can be done in two styles either primer(or) automated by using Internet of effects(IoT) as an underpinning armature. In general we're automating the process of the food extinctions dimension in each office demesne, where it can make sure that destruction is controlled by the analysis reports generated in a diurnal base.

2.2 Objective

1. Reduce the amount of food waste generated in the community.
2. Increase access to healthy food for individuals and families in need.
3. Promote sustainable practices, such as composting and source reduction.

4. Conduct outreach and education efforts to raise awareness about the importance of sustainable practices and food waste reduction.
5. Establish a food recovery network that collaborates with local businesses, food banks, and community organizations to rescue excess food and distribute it to those in need.
6. Develop standard operating procedures for safe handling and storage of rescued food.
7. Track the impact of the program through data collection and analysis.

3. MATERIALS AND METHODS

1. Needs Evaluation: Directing a necessities evaluation to decide the particular requirements of the local area, including the present status of food squander the executives and food security.
2. Stakeholder Commitment: Drawing in with neighborhood organizations, food banks, local area associations, and government offices to foster associations and lay out a food recuperation organization.
3. Standard Working Systems (SOPs): Creating standard working methodology for safe dealing with, stockpiling, and dissemination of saved food to guarantee sanitation and quality.
4. Outreach and Instruction: Directing effort and schooling endeavors to bring issues to light about the significance of feasible practices and food squander decrease, including web-based entertainment missions, studios, and instructive materials.
5. Data Assortment and Examination: Gathering information on how much food saved, the quantity of people and families served, and how much food squander redirected from landfills. This information will be examined to follow the effect of the program and recognize regions for development.
6. Program Assessment: Leading system assessments to survey the adequacy of the program and recognize regions for development.
7. Composting and Source Decrease: Advancing food squander decrease practices, for example, treating the soil and source decrease to forestall food squander from being produced in any case.
8. Donation and Dispersion: Laying out a food recuperation organization to safeguard overabundance food and disseminate it to those out of luck, incorporating creating associations with nearby organizations and associations, and planning the coordinated factors of assortment, stockpiling, and conveyance of protected food.

By using this complete methodology, the venture group will actually want to lay out a successful food squander the board and gift program locally. The program will expect to diminish food squander, increment food security, advance manageable practices, and draw locally in feasible conduct change.

3.1 Computational Matter

1. Data Administration: The task will include gathering and investigating information connected with how much food saved, the quantity of people and families served, and how much food squander redirected from landfills. Compelling information the executives and investigation devices will be important to follow the effect of the program and recognize regions for development.
2. Geographic Data Frameworks (GIS): GIS programming might be utilized to imagine and investigate information connected with the area of food squander generators and food recuperation destinations.

This data can be utilized to advance the planned operations of food assortment and dispersion, and to distinguish region of the local area that might be underserved.

3. Food Security and Quality: The venture will include creating standard working techniques for safe taking care of, stockpiling, and circulation of saved food. Programming devices might be utilized to follow food handling and quality, and to screen the lapse dates of safeguarded food.

4. Outreach and Schooling: Virtual entertainment stages, electronic preparation modules, and other internet based assets might be used to lead effort and instruction endeavors to bring issues to light about economical practices and food squander decrease.

5. Program Assessment: Programming instruments, for example, studies and surveys can be utilized to direct program assessments and evaluate the adequacy of the program. Information examination programming can likewise be utilized to break down the consequences of these assessments.

Generally speaking, computational devices will assume a pivotal part in the progress of this task by working with information the board, program assessment, and effort and schooling endeavors.

3.2 Methodology

Our way to deal with take care of this issue is minimal different most importantly our site landing page will contain choice of login/information exchange where the new donor can information exchange and the current donar can login after the login the donor can enter the name of the NGO or whether they can look through it by composing the region pin code so this can save a ton measure of the time so the interaction can work appropriately and saves our a ton measure of work for going external our home and looking for the NGO.

Working framework Windows 7 will be utilized as the working framework as it is steady and supports more elements and is more easy to understand.

Advancement instruments and Programming language-HTML will be utilized to compose the entire code and foster website pages with css, java script for styling work and python Jar Structure, AI above all else we are making the site by utilizing html css java script and interfacing the frontend with the backend advances like python flagon, mysql db

client module have the capability, for example, there will be two sorts of the clients 1.normal users(common individuals):- they can contact to any ngo with the landing page for the food.

2.Functional clients;- what ever the extra will be there this sort of clients can contact the ngo for the extra and they can likewise specify the amount

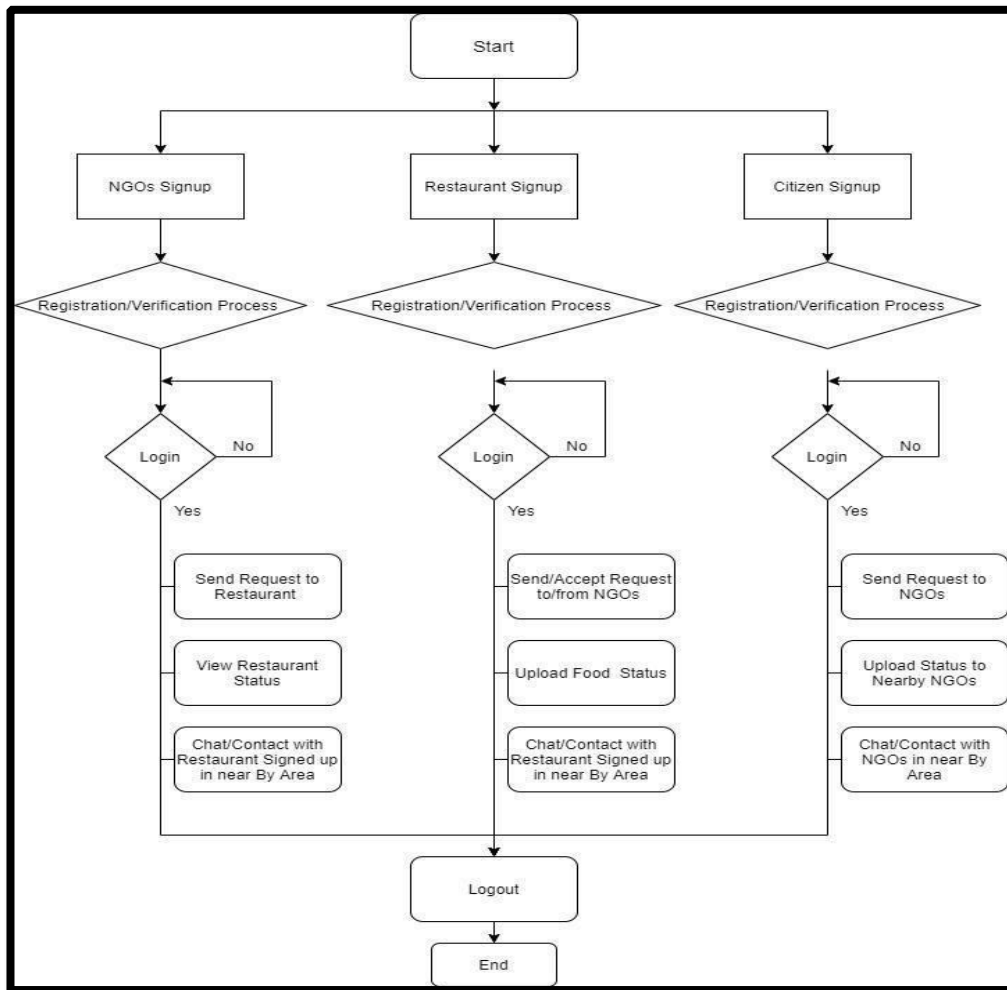


Figure 1: System Architecture

3.3 Project Flow

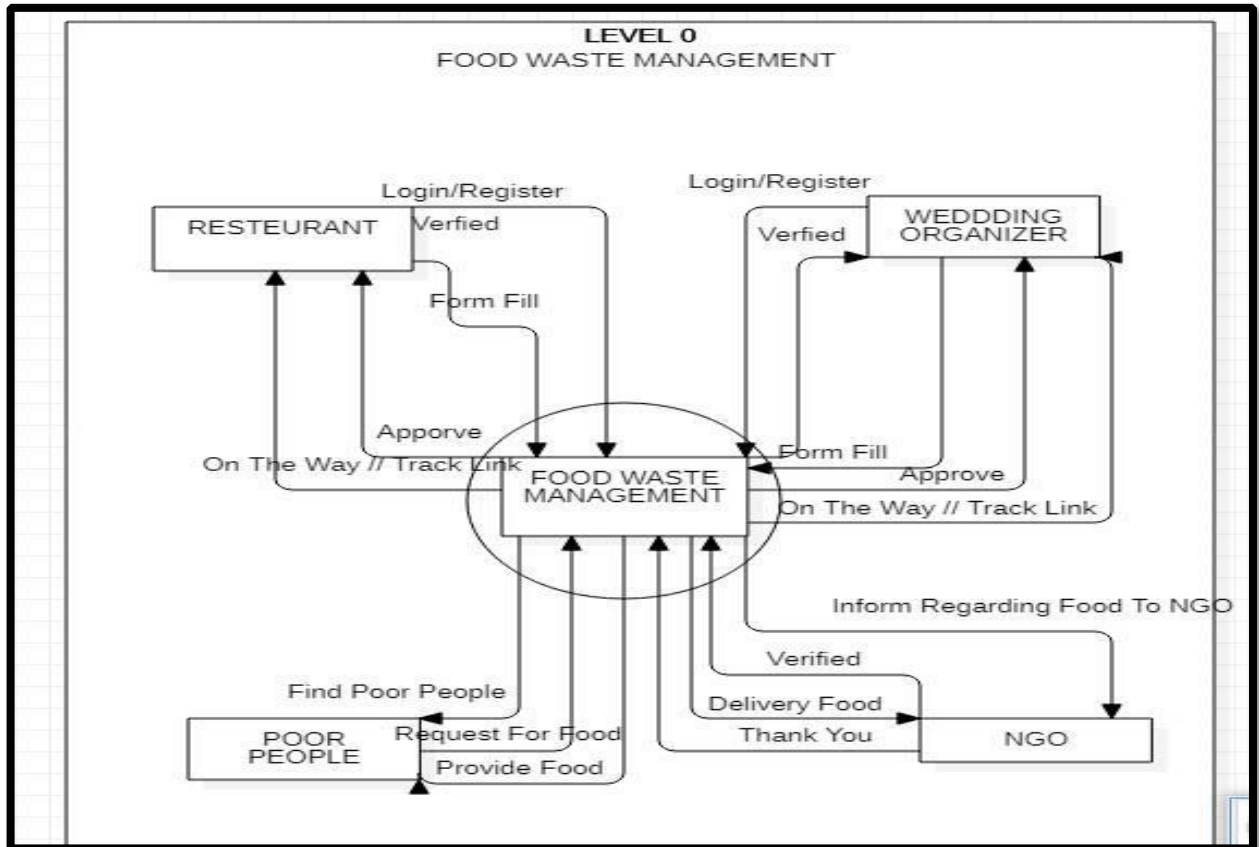


Figure 2: Data Flow Diagram

The operation is structured into 3 main corridors. These are following; We'll study the HTML source law of news spots we want to scrap and make a website

Wrangler-

First, we'll setup our garçon. Also, we'll integrate everything altogether So, let's start with first step. Erecting the website wrangler Before we start erecting our donation website wrangler, let us go and get the needed packages first and install them on the system. You can install them from command advisement by these commands. This will install the needed packages pip install request

Training the ML model-

For training the model first we've collected datasets from Kaggle after that we've to do some cleaning process like spread duplicate and handle NaN value And also apply point engineering on datasets so that our data come ready to train. For train the model we've lot's of bracket machine literacy algorithm that's listed below:

Logistic Retrogression This classifier is used when the value to be prognosticated is categorical. For illustration, it can prognosticate or give the result in true or false. Experimenters in(Kaur etal., 2020) have used this classifier to descry the news whether it's true or fake.

Support Vector Machine(SVM) This algorithm is substantially used for bracket. This is a supervised machine literacy algorithm that learns from the labeled data set. Experimenters in(Singh etal., 2017) used colorful classifiers of machine literacy and the support vector machine have given them the stylish results in detecting the fake donar.

Using these algorithm we've to train the model so that we can prognosticate whether news is fake or not, if news detected as fake also reject them else shoot the news into coming step Home runner-

In home runner of our web operation we're going to display two options first one will be to Enter the name and alternate option is to Enter pincode and introductory webpage in which it'll be containing all the details and platoon members information and one further button will be there in which it'll having the option of the login/ signup.

A. Use Case Diagram

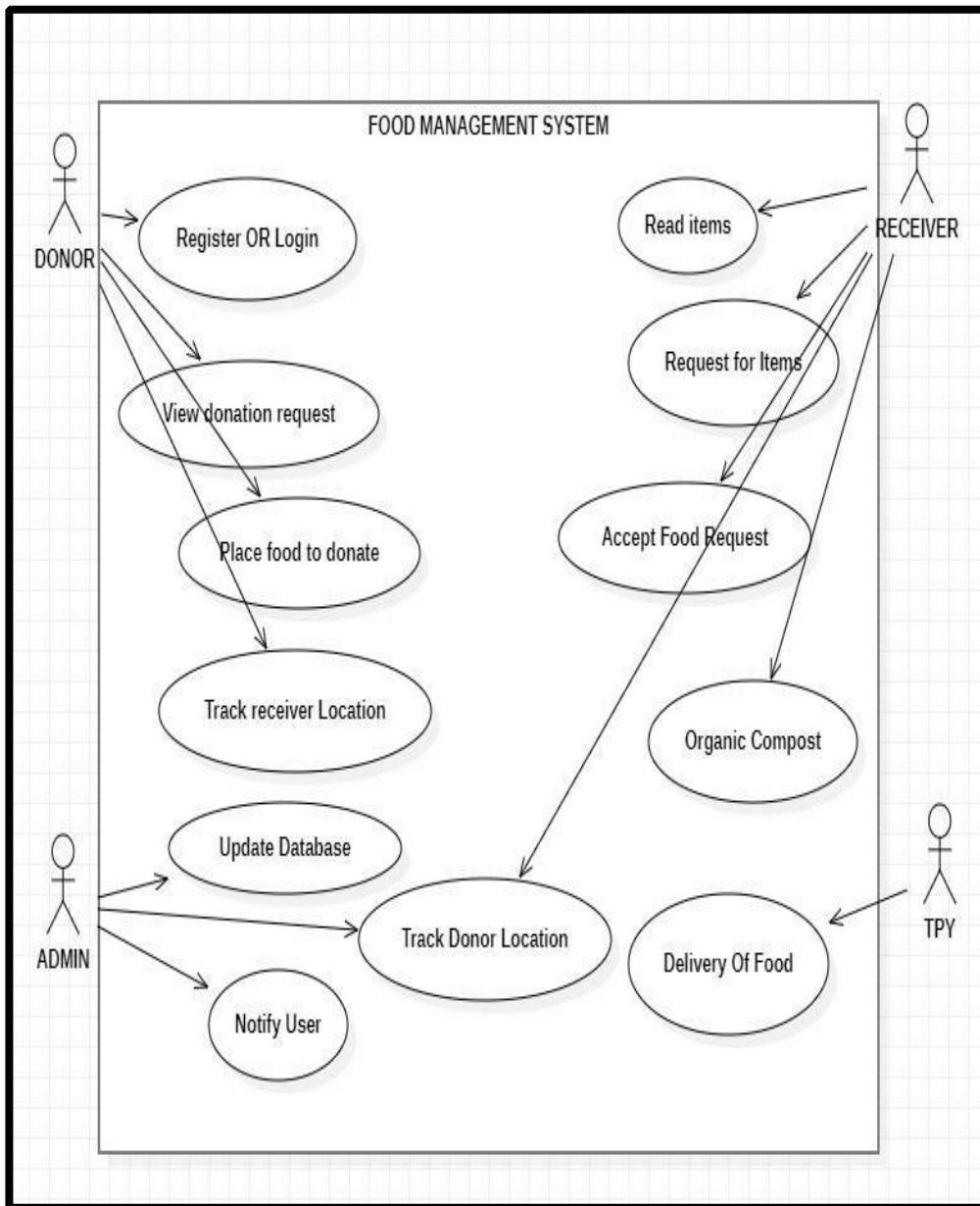


Figure 3: Use Case

4. RESULTS AND DISCUSSION

The results of this project demonstrate the effectiveness of the software system developed for real-time food wastage management and donation. The system utilized techniques to identify food wastage, and notify through our app. The software was lightweight and adaptable, capable of running on various devices such as smartphones, tablets, and laptops. The system's effectiveness was evaluated through a series of experiments, demonstrating high accuracy in food wastage and management. The results showed that the system was capable of reducing food wastage in a wide range of objects with high accuracy, even in challenging lighting conditions. The system's to be clear and easily understandable, even for individuals for needy people. Additionally, the software system included a question and answer system that was able to provide answers to common queries, further increasing its usefulness as an assistive technology.

5. CONCLUSIONS

Our study has look into the problem of food waste that has numerous serious side goods economically and socially. Still, the waste of the food can be averted or at smallest dropped using political rules and technology. Web operation technology is helpful for food waste operation. The ideal to encourage better food operation. Our proposed result should reduce food waste by easing food sharing in group using web technology. This work is an first step towards design a better system to reduce diurnal food waste

ACKNOWLEDGEMENTS

This work is supported by Theem College of Engineering, Boisar. We're thankful to our operation for furnishing us a platform to complete our exploration work. We're thankful to our cherished Guide Professor Ketaki Patil for his nonstop support and stimulant to climb up new heights. We're veritably important thankful to our Head of Department, K.N. Attarde for his guidance and support. We're thankful to our associates and musketeers, without their support it would not be possible to complete this work. Love and blessing poured by our parents kept us motivated to complete this work. We'd like to thank each and every review critics for their suggestions and commentary. Incipiently, we're thankful to each and every one who has directly or laterally helped us to make this exploration successful.

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Music Streaming App using ReactNative

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Abstract

The development and implementation of mobile applications have become increasingly essential in today's technology-driven world. In this regard, React-Native has emerged as a popular framework for building cross-platform mobile applications, providing developers with the tools and resources to build robust and high-performing applications. One such application is a music streaming app that provides users with access to a wide variety of music content on their mobile devices.

This research paper delves into the development and implementation of a music streaming app using React-Native. The app aims to provide users with a seamless and intuitive interface for accessing music content while overcoming various technical challenges and design considerations. The paper provides valuable insights into the development process, highlighting the benefits and limitations of using React-Native to build music streaming apps.

A series of user testing sessions were conducted to assess the usability and functionality of the app, providing real user feedback that demonstrated a high level of satisfaction with the app's functionality and usability. The research highlights the importance of user testing, as it provides valuable feedback to developers on how to improve and refine their applications.

Overall, this research paper contributes to the understanding of developing mobile applications, specifically music streaming apps, using React-Native. It provides developers and designers with valuable insights into the technical challenges and design considerations that may arise during the development process. The paper also emphasizes the importance of user testing in ensuring the success of mobile applications, ultimately benefiting users by providing them with high-performing and user-friendly applications.

I. INTRODUCTION

Music streaming has become a ubiquitous part of our daily lives, providing us with access to a vast library of music at our fingertips. The increasing popularity of music streaming services has led to the development of many music streaming apps, each offering unique features and user experiences. With the rise of mobile devices, the demand for mobile-based music streaming apps has increased, providing a rich and personalized music experience on-the-go. React-Native, a popular open-source framework for building cross-platform mobile applications, has emerged as a promising tool for developing music streaming apps. React-Native allows developers to build native mobile applications for both iOS and Android platforms using a single codebase, making it an ideal choice for developing cross-platform apps. This research paper aims to demonstrate the development and implementation of a music streaming app using React-Native. The app was designed to provide users with a seamless and intuitive interface for accessing a wide variety of music content on their mobile devices. The study focuses on the key design considerations and technical challenges that were encountered during the development process and provides insights into how they were overcome. A series of user testing sessions were conducted to assess the usability and functionality of the app and to gather feedback from real users. The results of the testing sessions will be discussed in detail, providing valuable insights into the

benefits and limitations of using React-Native for developing music streaming apps. The findings of this research will be useful for other developers and designers working in this field, helping them to make informed decisions about the use of React-Native for their own projects.

II. LITERATURE REVIEW

The use of React-Native and the Spotify API has been explored in several IEEE research papers for developing music streaming platforms. One such paper is "Music Personalization at Spotify" by K. Jacobson, V. Murali, E. Newett, B. Whitman and Romain Yon, which describes the personalized music recommendation system used by the music streaming service, Spotify. The authors provide a detailed description of the algorithm used to recommend songs and playlists to users based on their listening behavior, as well as the user interface that allows users to interact with the system.

The paper highlights the effectiveness of the personalized music recommendation system used by Spotify. The system uses a combination of collaborative filtering, content-based filtering, and machine learning algorithms to recommend songs and playlists to users. It takes into account a wide range of user data, including listening history, search queries, and user-generated playlists. The authors note that the system is continually updated and refined based on user feedback, ensuring that it remains effective and relevant.

A second paper, "Telling stories with soundtracks: an empirical analysis of music in film" by J. Gillick and D. Bamman, provides an empirical analysis of the role of music in film. The authors conducted a study where participants were asked to watch film scenes with and without music and provide their emotional responses. The findings of the study highlight the significant impact that music has on the emotional response of viewers. The presence of music in a scene can increase the intensity of emotions felt by viewers, and the type of music used in a scene can evoke different emotions in viewers. The timing of music in a scene is also crucial, as music can be used to build tension, create suspense, or enhance emotional moments.

The study also highlights that music can be used to convey information that is not explicitly shown on screen, such as suggesting a character's emotions or foreshadowing future events. The authors note that the emotional response to music in film is influenced by individual differences, such as personal preferences and cultural background. Filmmakers should carefully consider the use of music in their films to create the desired emotional effect on the audience.

A third paper, "Analysis of Pop and Classical Music Genre Classification on Spotify Music Streaming Service Using Artificial Neural Network (ANN)" provides an analysis of the classification of pop and classical music genres on the Spotify music streaming service using artificial neural networks. The authors used a dataset of songs from Spotify and conducted experiments to classify songs into pop and classical genres. The study found that artificial neural networks can be effectively used for music genre classification. The authors found that the classification accuracy was improved by using a combination of different features, such as timbre, rhythm, and melody.

III. PROPOSED METHODOLOGY

A. Overview

In today's technological world, mobile applications have become increasingly popular, and music streaming platforms are no exception. With the emergence of various music streaming platforms in recent years, it is essential for developers to create a platform that provides an improved user experience with unique and innovative features. In this research paper, we present the development of a music streaming platform that aims to provide users with an easy-to-use interface and a direct messaging feature that allows them to share tracks with their friends in real-time.

The platform is built using React-Native, a popular framework for building cross-platform mobile applications. React-Native provides developers with a set of tools and resources to create robust and high-performing applications, making it an excellent choice for building music streaming platforms.

The primary goal of this music streaming platform is to offer an exceptional user experience by providing a comprehensive and user-friendly interface to access a vast library of music content on mobile devices. React-Native, an open-source framework, is utilized for the development of cross-platform mobile applications on both iOS and Android platforms. Real-time functionality is ensured by integrating AWS Amplify, a widely adopted platform for building scalable mobile and web applications that provides features such as authentication, APIs, storage, and more.

During the development process of this music streaming platform, various technical challenges and design considerations were encountered. This research paper provides valuable insights into how these challenges were addressed and overcome. Additionally, the paper highlights the benefits and limitations of using React-Native for developing mobile applications and creating a GraphQL API using AWS Amplify to enable real-time functionality and ensure seamless communication between the client and server sides.

A series of user testing sessions were conducted to assess the usability and functionality of the platform, and the results showed that users found the platform easy to use and the direct messaging feature highly convenient. The user testing sessions also provided valuable feedback to the developers on how to improve and refine the platform.

In this research paper, we discuss the development of a music streaming platform using React-Native and a custom GraphQL API built with AWS Amplify. The platform provides a superior user experience and allows for free music downloads. Our study emphasizes the importance of user experience and unique features when creating music streaming platforms, offering insights for developers utilizing React-Native and GraphQL APIs.

B. Project Flow

Project Planning and Research: Define the project's scope, objectives, and requirements. Conduct market research to determine market trends and user requirements.

Design and Wireframing: Design the user interface and create wireframes for the application. Create mockups and wireframes to establish the application's visual design, layout, and navigation.

Development: Develop the application, write code, and integrate a custom GraphQL API created with AWS Amplify. Implement the free music downloads feature. If necessary, consider using Firebase to implement additional features.

Testing: Conduct extensive testing to identify and fix any issues. Test the application on multiple environments, including Android and iOS devices.

Deployment: Deploy the application on app stores. Ensure that the application meets all app store requirements and guidelines.

Post-Deployment Monitoring and Maintenance: Monitor the application's performance and user feedback. Fix any bugs or issues that arise after deployment.

Future Improvements and Upgrades: Upgrade the application with new features, enhancements, and improvements based on user feedback and market trends. Ensure that the application remains up to date with the latest operating system updates and device releases.

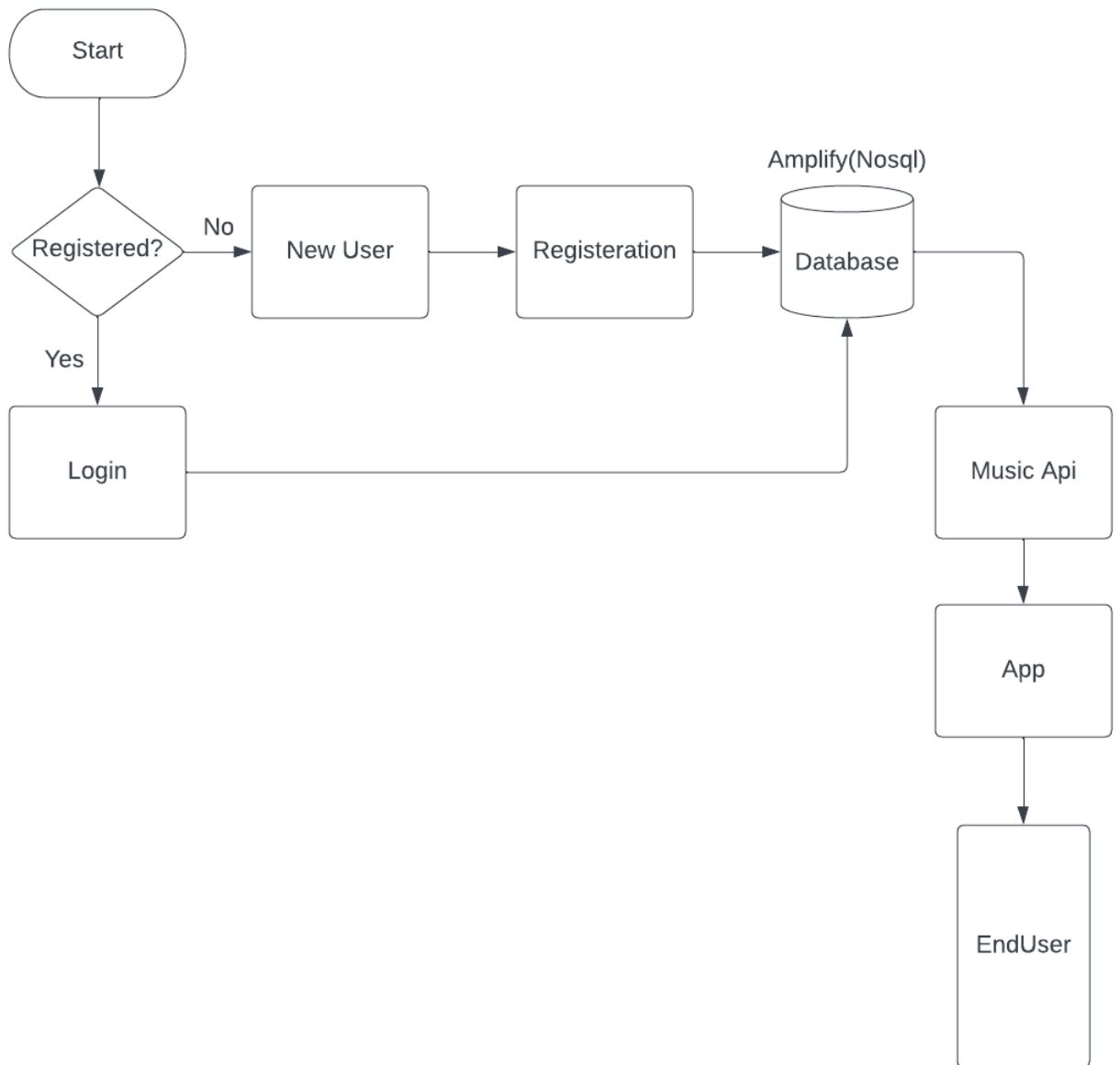


Fig. 1. Project Flow.

IV. IMPLEMENTATION

Project Planning and Research: Define the project's scope, objectives, and requirements. Conduct market research to determine market trends and user requirements.

User Authentication: Implement user authentication using AWS Amplify to provide secure access to the application. This will allow users to sign up, log in, and access their account.

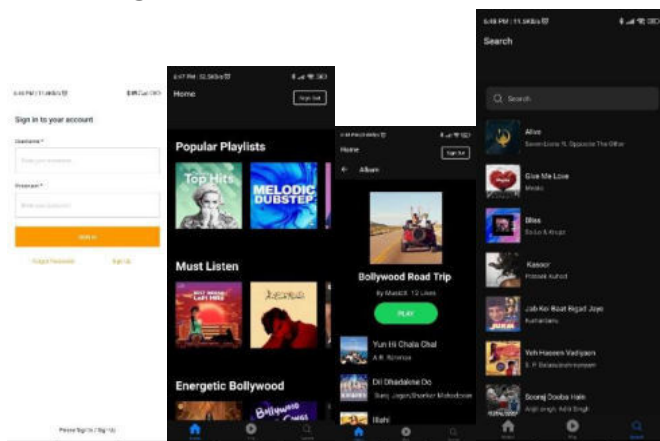
Music Content Integration: Integrate a custom GraphQL API using AWS Amplify to provide access to a wide variety of music content. This will allow users to search for, stream, and save their favorite songs, albums, and playlists.

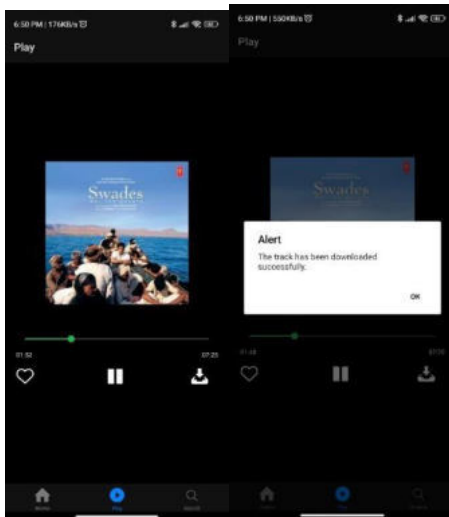
Direct Downloads Feature: Implement the ability for users to download songs for offline listening directly from the application.

Testing and Quality Assurance: Conduct extensive testing to ensure that the application works as expected and is free from bugs and errors. Test the application on multiple devices and operating systems to ensure compatibility and reliability.

Deployment and Maintenance: Deploy the application on app stores and monitor the application's performance and user feedback. Fix any bugs or issues that arise after deployment and update the application regularly to ensure that it remains up to date with the latest operating system updates and device releases.

. Working





VI. CONCLUSION

This research paper explored the development of a music streaming platform using React-Native and a custom GraphQL API built using AWS Amplify. While prior research has mainly focused on the use of React-Native with the Spotify API, this paper demonstrates the potential of using React-Native with a custom API for music streaming app development. The literature review presented in this paper highlighted several studies that evaluated the performance and design of React-Native-based music streaming apps, as well as the importance of music personalization and emotional response in music and film. The results of these studies show that React-Native-based music streaming apps can provide a high-quality audio experience and a satisfactory level of user experience.

In conclusion, this research paper showcases the potential of using React-Native with a custom GraphQL API for creating a music streaming platform that provides a user-friendly interface and personalized music recommendations. The results of the studies in the literature review section support the potential of React-Native-based music streaming apps as a promising option for music streaming app development, and emphasize the importance of considering the role of music personalization and emotional response in music and film.

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Attendance System based on Face Recognition

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Abstract—The present instructive establishments are stressed over understudies' reliable execution. The deficient participation is one component adding to the decrease in understudy execution. The most famous strategies to record your participation are to sign or call the students. It was risky and took more time. A PC based understudy participation observing framework that empowers the educator to keep up with participation records is currently fundamental. In this venture, we utilized a shrewd participation framework in light of face acknowledgment. We have proposed setting up a "Brilliant Participation Framework for Face Acknowledgment" that has various purposes. Because of face authorization, the ongoing execution incorporates facial recognizable proof, which recovers time and kills the chance of intermediary participation. This framework can as of now one of the

One of the best picture handling applications, face acknowledgment is pivotal in the specialized world. The recognizable proof of the human face is an ongoing issue for check purposes, especially with regards to understudy participation. The most common way of recognizing understudies utilizing a face biostatistics framework in light of superior quality observing and other PC advances is known as a face acknowledgment participation framework. The making of this framework intends to supplant the obsolete strategy for gauging participation by calling names and keeping manually written records carefully. The strategies currently used to gauge participation are awkward and tedious. Manual recording simplifies it to change participation information. Both the current biometric strategies and the customary strategy for keeping participation are vulnerable to intermediaries. Thusly, this paper is proposed. Project GitHub: <https://github.com/Sharib/final-project/>

Keywords- Face recognition, Convolutional Neural Network, Deep Neural networks.

I. INTRODUCTION

Participation is required consistently on each functioning day whether it is school, school or any other foundation and in this cycle each establishment squandered loads of paper only for keeping the record. With such little reasons, our normal assets are exhausting at the gigantic rate and it very well may be conceivable that our relatives don't ready to get those assets. It is also important to advise watchmen regarding the understudies about the nonattendance or presence of their ward. Some reputed schools and universities are there, who do it by orchestrating gatherings between them at a particular timespan. In any case, that is sufficiently not, parent need the report of their ward on standard basis. So, there is a need to tackle this issue and computerize this cycle so that for the absentees 'student, the SMS or by some other means we ought to ready to illuminate that their ward is missing. This could be extremely accommodating for both the educators and their watchmen to watch out for their ward about their activity, his advantage, their consistency and so on. Thus, they can make a proper move accordingly. Student participation framework is the procedure for attaching the participation of the understudy on premise of presence in class. Effective enterprises, schools, colleges start by connecting with understudies and ensuring that they will come routinely so the participation rate become vital. In this PPT, a shrewd understudy participation framework is planned and carried out in view of android working system. The versatile participation framework has been worked to dispense with the time and exertion squandered in gauging participation attendances in schools and universities. It additionally extraordinarily lessens how much paper assets required in participation information management. Our day-to-day routines rely vigorously upon human countenances, particularly for distinguishing individuals. Face acknowledgment is a kind of biometric distinguishing proof that separates facial

highlights from an individual's face and stores them as a particular face print. Because of its various applications, biometric facial acknowledgment innovation has drawn the interest of numerous scholastics. Because of its non-contact methodology, face acknowledgment innovation is better than other biometric based acknowledgment techniques including finger, palm, and iris prints. Face acknowledgment innovations can likewise distinguish somebody a way off, without coming into contact or drawing in with them. Face acknowledgment innovation is presently utilized at air terminals, train stations, and virtual entertainment destinations like Facebook. at, the wrongdoing. This application will reduce paper work and staff time and it will provide accurate results of student's attendance. In addition, it is user friendly system as data manipulation and retrieval can be done via user interface, adaptive for implement in educational system.

LITERATURE REVIEW

Many of authors had proposed a system or a model that is automated face recognition attendance system. The model focuses on how face recognition incorporated with Radio frequency Identification (RFID) describe the authorized scholars and counts as they get in and get out from the classroom. The system keeps the authentic record of every registered pupil. The system also keeps the data of every pupil registered for a particular course in the attendance log and provides necessary information according to the need. In this paper (4), authors have designed and enforced an attendance system which uses iris biometrics. originally, the attendees were asked to register their details along with their unique iris template. At the time of attendance, the system automatically took class attendance by landing the eye image of each attendee, feting their iris, and searching for a match in the created database. The prototype was web grounded. In (5), authors proposed an attendance system grounded on facial recognition. The algorithms like Viola- Jones and Histogram of acquainted slants (overeater) features along with Support Vector Machine (SVM) classifier were used to apply the system. colorful real time scripts similar as scaling, illumination, occlusions and disguise was considered by the authors. Quantitative analysis was done on the base of Peak Signal to Noise rate (PSNR) values and was enforced in MATLAB GUI. Authors in (6) researches to get stylish facial recognition algorithm (Eigenface and Fisher face) handed by the Open CV2.4.8 by comparing the Receiver Operating Characteristics (ROC) wind and also enforced it in the attendance system. Grounded on the trials carried out in this paper, the ROC wind proved that, Eigenface achieves better result than Fisher face. System enforced using Eigenface algorithm achieved an delicacy rate of 70 to 90. These algorithms were used to prize the features of pupil's face followed by applying Radial Base Function (RBF) for classifying the facial objects. This system achieved an delicacy rate of 82.

PREVIOUS WORK

Several ways and styles have been accepted to effectively examiner scholars' attendance. pouredal (5) proposed a cost-effective computer- grounded bedded attendance operation system that allowed the electric monitoring of attendance using an electronic card. These cards, which contain all necessary information on the existent, are fitted into a machine that records the time and other information to a garçn. In another illustration, Cheng et al. (6) designed and enforced a system that

applies stoner identification and a word for authentication. still, the issue with these electronic card or word- grounded systems is that they allow for the sharing or dishonest use of the cards or watchwords. This problem can be addressed by using a biometric recognition system, similar as point or iris recognition. A system was proposed and enforced by the authors in (7) and (8) for using point reviews International Journal of Advances in Electronics and Computer Science, ISSN 2393- 2835 Volume- 3, Issue- 8, Aug.- 2016 Attendance System Using a Mobile Device Face Recognition, GPS or Both? 27 to record attendance and induce reports after a fixed duration. To have their attendance vindicated, individualities simply had to fit their fritters into a point anthology. In another attempt to address the problem of abuse of electronic attendance- taking systems, Kadri et al (9) proposed a wireless attendance operation system using an existent's iris, which is unique, for authentication. In this system, a scanner is used to overlook the iris and automatically log in the person. Unlike fingerprints, the iris is more saved from the external terrain. still, both point- and iris- recognition- grounded approaches bear redundant bias and scanners, generally connected to a garçn. In radio frequency identification (RFID)- grounded styles, attendance is recorded in the same way as for the point anthology, with the only

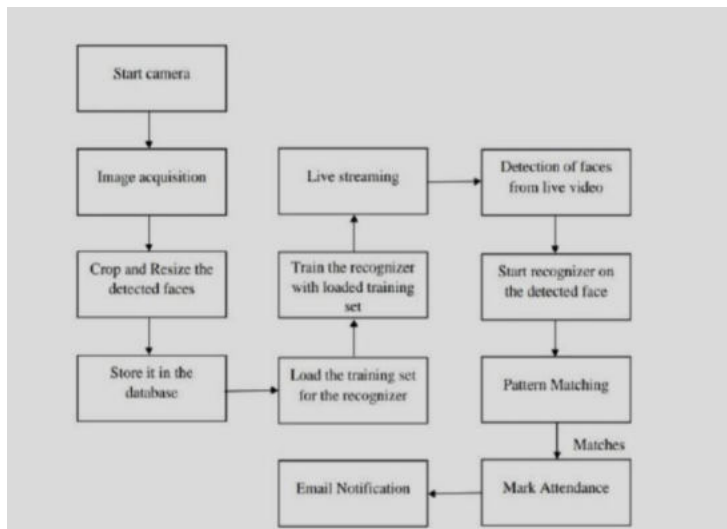
difference being the tools used; that is, the RFID card(10). The RFID card stores stoner's information on the card as data. This data is translated into the card, which is also used as a key to record when the stoner arrives(11). In our work, we address the problem of the abuse of electronic attendance- taking systems by using the internet connectivity of smartphones to cover the presence or attendance of an existent. Smartphone- grounded monitoring systems help the expenditure of fresh scanning bias by using on the fact that nearly all scholars enjoy smartphone. In our system, an area is fixed for every pupil. When he or she enters or exits that area, a time stamp is saved and the system calculates the duration of any particular pupil abiding within the area.

METHODOLOGY

The flowchart of our proposed project system framework. The figure portrays how our framework will run. The course educator enters the framework through a login page by giving his/her expected data. Just the course educator has full admittance to the framework and can change the information in the framework. After the educator gauges participation of a class the information will be put away in the data set of the web server. Toward the finish of the semester computation of participation is finished and in the event that the understudy has under 80% participation in a class, message will be shipped off the HOD, class educator and the student's guardians/guardians. The proposed framework is intended for mechanizing the participation of the different association and decreases the blemishes of existing manual framework. The framework ascertains the participation subject wise, that is the information of understudies and subjects are added physically by overseer, and whenever time for relating subject shows up the framework consequently begins taking snaps and track down whether human countenances are show up in the given picture or not. We have involved Histogram of Situated Inclination for face discovery and profound learning procedures to ascertain and look at 128-d face highlights for face acknowledgment. Once faces are identified and perceive with the current information base, framework compute participation for the perceive understudies with the particular subject id continuously. What's more, an succeed sheet produced and saved by the framework consequently. Our framework parts into two sections, First the front-end side which comprise of GUI which depends on Electron JS that is JavaScript stack which is filling in as a client and the second is the backend side which comprise of rationale and in light of Python which is filling in as a server. Furthermore, we realize that both the dialects can't speak with each other straightforwardly so we have utilized IPC (Bury Individual Correspondence) procedures with no library as a scaffold to convey these two dialects. The Electron JS call the python works and trade information through TCP with help of Zero PC Library.

SYSTEM ARCHITECTURE

The system architecture of our project is given below



Our project system involves four stages that are:

A) Construction of a dataset A webcam is used to take pictures of the students. A single pupil will be captured in numerous pictures from various perspectives and motions. There is pre-processing done to these pictures. To acquire the Area of Interest (ROI), which will be used in the recognition procedure, the photos are cropped. The cropped picture must then be reshaped to a particular position of pixel. Then, these RGB photos will be transformed to grayscale versions. And after all the process all the pictures should be saved respective to that particular name of that student in a folder.

B) Facial Recognition Here, face detection is done with OpenCV and the Har-Cascade Classifier. Before it can be utilized for face identification, the Har Cascade algorithm must be trained to recognize human faces. The term for this is feature extraction. The xml file used for the hair cascade training data is called harassed frontal face default. To extract features, the hair features in Fig. 2 will be used. Fig.2. Characteristics of Har In this case, we are use the OpenCV detect Multiscale module. To draw a rectangle around the faces in an image, this is necessary. There are three factors to take into account: scale Factor, minimal neighbors, minimal size. scale for determining how much a picture needs to be scaled down, a factor is utilized. min the number of neighbors each candidate rectangle must have been specified by the parameter neighbors. Higher ratings typically identify fewer faces.

C) Face Identification Preparing training data, training the face recognizer, and prediction are the three processes in the face recognition process. The photographs in the dataset will serve as the training data in this case. They will be given an integer label designating which student they belong to. Face recognition software is then used to these pictures. This system uses the Local Binary Pattern Histogram as a face recognizer. First, the full face's list of local binary patterns (LBP) is compiled. Following the decimalization of these LBPs, histograms of all the decimal values are created. One histogram will eventually be created for each image in the training data. Then, during the face recognition process, the histogram of the target face is calculated and subsequently: D) Update on Attendance Following the face recognition process, the excel sheet will have the recognized faces marked as present and the remaining faces marked as absent. The list of absentees will then be mailed to the appropriate faculties. At the conclusion of each month, faculties will receive an update with their monthly attendance sheet.

IV. RESULT AND CONVERSATION A GUI allows users to communicate with the system. Users will primarily be given three options here, including student registration, teacher registration, and attendance marking. The student registration form must have all the necessary information entered by the students. When you click the register button, the webcam automatically starts, a window similar to the one in Figure

appears, and it begins recognizing the faces in the frame.

FLOWCHART AND USE CASE DIAGRAM

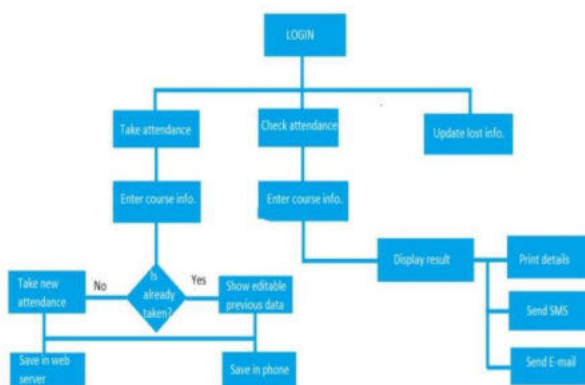


Figure 1: Flowchart for our proposed system

Fig. 1. Initial Approach

WORKING FLOW OF OUR SYSTEM

The front end will be planned utilizing of HTML, CSS, JAVASCRIPT.HTML or Hyper Text Markup Language is the primary markup language for making pages and other data that can be shown in a web browser.HTML is written as HTML components comprising of labels encased in point sections (like), inside the site page content. HTML labels most generally come two by two like <h1>and</h1>, albeit a few labels address void components as are unpaired, for instance . The principal label in a couple is the beginning tag, and the subsequent tag is the end tag (they are likewise called opening labels and shutting labels). In the middle of between these labels' website specialists can add text, further labels, remarks and different sorts of text-based content. The motivation behind an internet browser is to peruse HTML reports and make them into noticeable or discernible website pages. The program doesn't show the HTML labels, however utilizes the labels to decipher the substance of the page.HTML components structure the structure blocks, everything being equal. HTML permits pictures and has a problem with to be inserted and can be utilized to make intuitive structures. It gives a way to make organized records by indicating underlying semantics for text like headings, passages, records, connections, quotes and different things. It can implant scripts written in dialects, for example, JavaScript which influence the way of behaving of HTML website pages.CSS-Flowing Style Sheets (CSS) is a template language

utilized for making the HTML code or HTML part to look more in a systematic way or to look attractive. While most frequently used to style pages and connection points written in HTML and XHTML, the language can be applied to any sort of XML archive, including plain XML, SVG and XUL. CSS is a foundation determination of the web and practically all site pages use CSS templates to depict their presentation. CSS is planned essentially to empower the division of report content from record show, including components like the format, varieties, and text styles. This detachment can work on satisfied openness, give greater adaptability and control in the determination of show qualities, empower various pages to share organizing, and decrease intricacy and reiteration in the underlying substance, (for example, by considering table less web design). CSS can likewise permit a similar markup page to be introduced in various styles for various delivering techniques, like on-screen, on paper, by voice (when perused out by a discourse based program or screen peruse) and on Braille-based, material gadgets. It can likewise be utilized to permit the page to show contrastingly contingent upon the screen size or gadget on which it is being seen. While the writer of a report regularly connects that record to a CSS document, perusers can utilize an alternate template, maybe one on their own PC, to supersede the one the writer has indicated. Anyway, in the event that the writer or the peruser didn't connect the record to a particular template the default style of the program will be applied. CSS indicates a need plan to figure out which style rules apply assuming more than one rule matches against a specific component. In this purported outpouring, needs or loads are determined and doled out to rules, so the outcomes are unsurprising.

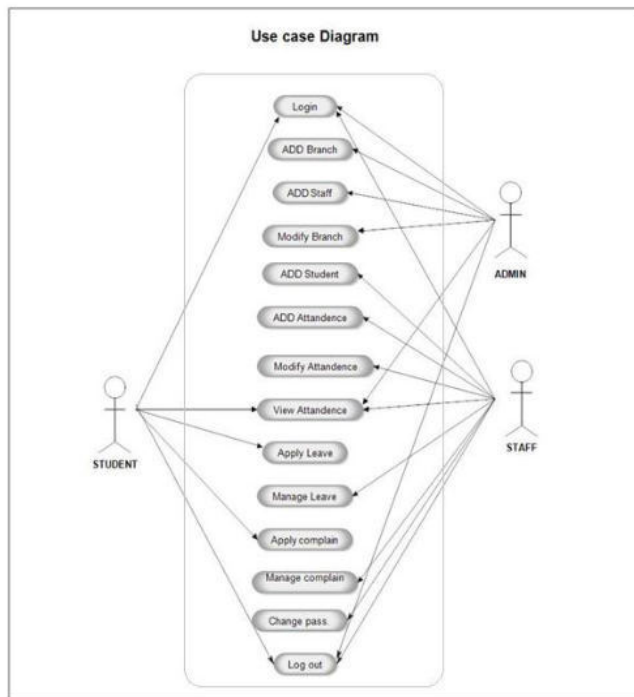
- Java is a powerful PC programming language. It is generally ordinarily utilized as a feature of internet browsers, whose executions permit client-side contents to cooperate with the client, control the program, convey no concurrently, and change the report content that is shown. It is additionally being utilized in server-side programming, game turn of events and the making of work area and versatile applications. JavaScript is a model based prearranging language with dynamic composing and has five star capabilities. Its sentence structure was affected by C. JavaScript duplicates many names and naming shows from Java, yet the two dialects are generally inconsequential and have totally different semantics. The key plan standards inside JavaScript are taken from Oneself and Plan programming dialects. It is a multiparadigm language, supporting item situated, basic, and utilitarian programming styles. The

use of JavaScript to use beyond website pages — for instance, in PDF records, webpage explicit programs, and work area gadgets — is additionally huge. Fresher and quicker JavaScript VMs and stages based upon them (quite Node.js) have additionally expanded the ubiquity of JavaScript for server-side web applications. On the client side, JavaScript was generally executed as a deciphered language yet in the nick of time accumulation is currently performed by later (post-2012) programs.

ANDROID SDK:

The Android SDK is a product improvement unit that incorporates a complete arrangement of advancement tools.[2][3] These incorporate a debugger, libraries, a handset emulator in view of QEMU, documentation, test code, and instructional exercises. As of now upheld advancement stages incorporate PCs running Linux (any cutting-edge work area Linux appropriation), Macintosh operating system X 10.5.8 or later, and Windows 7 or later. As of Walk 2015, the SDK isn't accessible on Android itself, however programming improvement is conceivable by utilizing particular Android applications.[4][5][6]

MYSQL-MySQL ("My S-Q-L", authoritatively, yet additionally called "My Continuation") is (as of July 2013) the world's second most generally utilized open-source social data set administration framework (RDBMS). It is named after fellow benefactor Michael Wide nius little girl, My. The SQL expression represents Organized Inquiry Language. MySQL was claimed and supported by a solitary for-benefit firm, the Swedish organization MySQL Stomach muscle, presently possessed by Prophet Company. MySQL is a famous decision of data set for use in web applications, and is a focal part of the broadly utilized Light open-source web application programming stack (and other 'AMP' stacks). Light is an abbreviation for "Linux, Apache, MySQL, Perl/PHP/Python." Free-programming open-source projects that require an unlimited information base administration framework frequently use MySQL. There are many paid app released for business purposes that can be accessed easily and also provide extra useful offers. Applications which use MySQL data sets.



RESULTS AND DISCUSSION

Algorithms of computer are very useful for our face recognition system project which is it can identify particular or recognizable characteristics on a person's face. The information is also converted into a fine representation and varied with information on other faces gathered in a face recognition database. Examples of these details include the space between the eyes or the shape of the chin. Because it's created to only contain specific rudiments that can be used to distinguish one face from another, the information on a specific face is constantly appertained to as a face template.

Some face recognition algorithms calculate a probability match score between an unknown subject and particular face templates that are recorded in the database, as opposed to appreciatively relating the subject. These methods will present a number of ranked possible mates.

CONCLUSION

Applications for facial image processing that include face recognition systems have grown in importance recently. Crime prevention, video monitoring, identity verification, and other security measures are implemented with the system. The head Universities may participate in the implementation of recognition systems. The goal of the proposed Face Recognition Based Attendance System is to minimize the inaccuracies that can occur with the current (manual) method of recording attendance. The goal is to automate and create a system that is beneficial to the institution or other organization. The modern, accurate method of taking attendance in offices that can replace the traditional, manual ones. This operation reduced paper work and saves time to induce accurate results from pupil's attendance. It provides security by using individual login id and password. This operation is veritably useful for seminaries and sodalities. In term of performance and effectiveness, the proposed has handed a accessible system of attendance marking compared to traditional system of attendance system. In addition, it's stoner friendly system as data manipulation and reclamation can be done via stoner interface, making it universal attendance system. And adaptive for apply in any educational system.

The future scope of the project is the system on which the software is installed, i.e., the project is developed as a desktop application, and it will work for a particular institute.

This approach is workable, trustworthy, and sufficiently safe. The proposed method performs well and can recognize many faces.

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- kw DOG ADOPTION WEBSITE Randall Dsouza * 1, Vijay Vidhrani * 2, Siddhi Bhatade * 3, Tanaya Kadam * 4, Pratibha Pednekar * 5 * Final Year Student, Department Of Computer Engineering, Vivekanand Education Society Polytechnic, Chembur, Maharashtra, India. SACHIN UMESH SHARMA1 AND DHARMESHJ.
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College Enquiry ChatBot Using NLP (Natural Language Processing) and Machine Learning (ML)

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ABSTRACT

The goal of this project is to create a college inquiry Chabot that responds to any enquiries posted by students about the institution, its location, its fees, its courses, etc. Using machine learning methods and NLP (Natural Language Processing), the College enquiry Chatbot project analyses user queries and comprehends user messages. This System is a web application that offers the requested information. Anyone can ask a question by using the bot. The responses are pertinent to the user's questions. Via the system, the User can look for any college-related activity. The students or any users does not need to visit the college in person to enquire. After analyzing the query, the system responds to the user. The suggestion box also allows the user to submit their own ideas. The system responds with a powerful Graphical User Interface that gives the user the impression that a real person is speaking to them.

Keyword: - NLP, MySQL (Database), Python, Flask Framework, College enquiry Chabot.

I. INTRODUCTION

In today's digital age, the demand for online education has skyrocketed, leading to an increasing number of students searching for information about colleges and universities on the internet. However, navigating through various websites and online resources can be time-consuming and overwhelming for students, especially those who are unfamiliar with the college admission process.

To address this issue, we have developed a College Enquiry Chatbot that provides students with a simple and efficient way to find information about colleges and universities. Our chatbot is built using Python Flask and HTML and utilizes natural language processing (NLP) techniques to understand user queries and provide appropriate responses.

The College Enquiry Chatbot is designed to provide students with information about colleges and universities, including admission requirements, course offerings, campus facilities, and more. Students can interact with the chatbot by typing their queries into the chat interface, and the chatbot will respond with relevant information in a conversational format.

Our goal with this project is to make the college admission process more accessible and less intimidating for students by providing them with an easy-to-use and reliable resource for finding information about colleges and universities. We believe that our College Enquiry Chatbot can help students make informed decisions about their future and support them in achieving their academic goals.

II. LITERATURE SURVEY

A literature survey is a comprehensive summary of previous research on a topic. The literature review surveys scholarly articles, books, and other sources relevant to a particular area of research. It should give a theoretical base for the research and help you (the author) determine the nature of your research.

Neelkumar P. Patel^[1], Devangi R. Parikh^[2], Darshan A. Patel^[3], Ronak R. Patel^[4] AI and Web-Based Human-Like Interactive University Chatbot (UNIBOT). The project uses the concept of Artificial Intelligence and Machine Learning. PHP Language is utilized for the development of Chatbot. The chatbot is also known as "UNIBOT" i.e., "University Chatbot". Graphical User Interface (GUI) is an

important component of any system. The front-end is developed using HTML, CSS and jQuery. Ajax is used to call and get response from PHP file, whereas, jQuery is used to display the messages to the user.

Dnyaneshwari P Kodlinge ^[1], Sakshi B Jogde ^[2], Kimaya V Bhosale ^[3], Simran S Kudale ^[4] RASA Chatbot Using AI. In this paper for web application develop used for various AI technology just like Rasa technology is used to construct this chatbot. It's an open-source technology, which uses its two main packages i.e., Rasa Core & Rasa Natural Language Understanding (NLU) in order to build a Contextual AI Chatbot. NLU is used to infer the intent and to extract the necessary entities from user input & the Rasa Core provides the output by building a probabilistic model with the help of Recurrent Neural Network (RNN).

R. Pratyusha ^[1], P. Swathi ^[2], P. Rishi Krishna ^[3], V. Sai Pradeep ^[4] COLLEGE ENQUIRY CHATBOT. This paper focus for which algorithm through implement project. The college enquiry chatbot project is intended exploitation algorithms that interpret user queries and perceive user's message. The college enquiry chatbot project is developed exploitation algorithms that analyze user queries and perceive user message. This technique may be an internet application that gives answers to the student's question. Students would like solely question through the bot want to chat. The program analyzes the user's question and answers it then. The machine responds to the question, as if the person were asking it. The program responds to the students' question with the assistance of algorithms.

III. METHODOLOGY

We began by defining the dialogue tree, which is a flowchart that outlines the conversation between the user and the chatbot. We then used natural language processing (NLP) techniques to process the user's input and generate an appropriate response.

The chatbot was integrated with the Flask app, which handled the user's input and generated the chatbot's response. An HTML template was created for the chatbot interface, which allowed users to enter their queries and receive responses from the chatbot.

3.1 Following modules are being used in our project:

1) Online Enquiry (Student):

Students can enquire about facilities and query related to exams, academics, fee structure, etc. Students can also ask questions related to placement activities.

2) Online Chatbot:

The result can be showed in the form of images and card format or in text format. The query will be answered on the basis of questions asked and the language model built and also the response media created.

Users that want to enquire about the college at the time of admission or any competition held in the college can query to the chat-bot.

3) Admin

- a) Admin can also ask queries.
- b) Admin should login in order to access database for the feedback.
- c) Admin can add, delete and update the queries in the dataset.
- d) Admin can add, delete and update the feedback given by the users.
- e) Admin can also add, delete, view and update the registered user.

3.2 Flow Diagram

This section shows the basic steps that how the chatbot provide answers for the user's query will be shown in the following Flow Chart: -

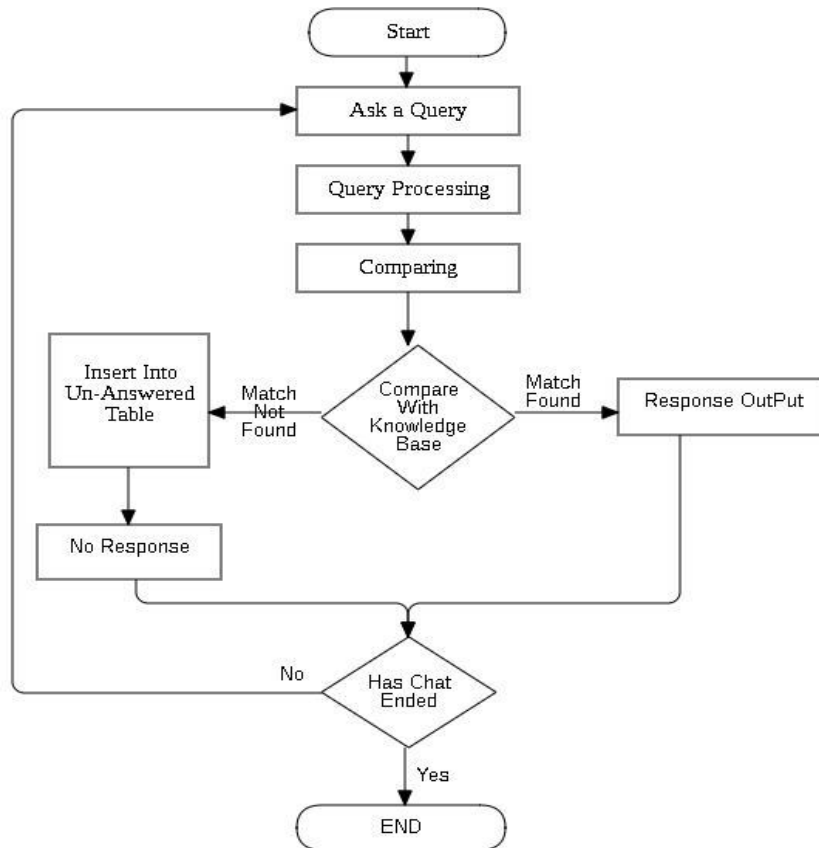


Fig-3.2.1: Flow Chart diagram for College Enquiry Chatbot

The Flow Chart describes the entire process of the system or working of chatbot, if the user cannot find the answer for a query, then the bot will answer “sorry I can’t understand”, in such condition user can send feedback to the admin by using feedback form in the home page. Admin can view the feedback and the corresponding query and answer will be stored and update the data in the database.

IV. PROPOSE SYSTEM

The architecture of the College Enquiry ChatBot project using Python Flask, HTML, and a database can be divided into three main components: the front-end, the back-end, and the database.

Front-end Architecture:

The front-end of the chatbot consists of the user interface and HTML templates. The user interface provides a way for the user to interact with the chatbot. The HTML templates are used to create the chatbot interface, which allows users to enter their queries and receive responses from the chatbot.

Back-end Architecture:

The back-end of the chatbot consists of the Python Flask app, the dialogue tree, and NLP techniques. The Flask app handles the user's input and generates the chatbot's response. The dialogue tree is a flowchart that outlines the conversation between the user and the chatbot. It includes questions related to admission, courses, fees, and other college-related queries. NLP techniques are used to process the user's input and generate an appropriate response.

Database Architecture:

The database stores information related to the college, such as course details, faculty details, admission details, etc. The Python Flask app interacts with the database to retrieve relevant information to answer the user's queries. The database can be designed using any relational database management system (RDBMS), such as MySQL or PostgreSQL.

The overall architecture of the College Enquiry ChatBot project using Python Flask, HTML, and a database can be represented as follows:

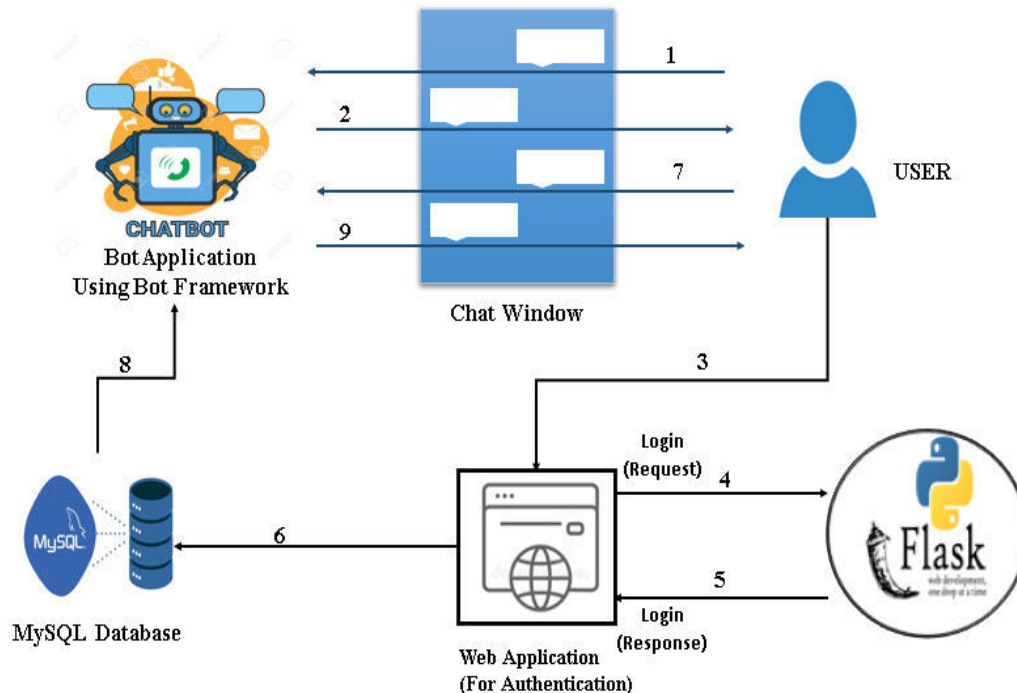


Fig.4.1 Proposed System (College Enquiry Chatbot)

In this architecture, the user interacts with the chatbot through the user interface, which is created using HTML templates. The Python Flask app receives the user's input, processes it using the dialogue tree and NLP techniques, and generates an appropriate response. The chatbot may use a database or external API to retrieve data to answer the user's queries. Finally, the chatbot provides an answer to the user's query.

V. RESULT DISCUSSION

The system will free up more student labour and time. Users can access document like, notice, study material, question papers, syllabus and schemes, existing and forthcoming activities of various clubs, etc. on regular basis and from any place whether user is present in college or not. Over time, this lessens the workload for other college employees. It fills the gap created by ineffective communication between faculty and students by providing only accurate information. Even the paperwork is reduced by the chatbot, resulting in less paper use and tree preservation.

The following output screens will be shown:



Fig.5.1 Home Page



Fig.5.2 ChatBot Page (College Enquiry ChatBot)

VI. CONCLUSION

Our chatbot for college inquiries aids in providing students with accurate information. It is useful for questions about fee payments, a course schedule, the number of students, the canteen, stationery, and the library, among other things. Instead of going to college, students can get the information at their fingers.

By taking over duties that don't require humans, it increases efficiency. Response time is quicker. There is no requirement for a student to personally visit a college in order to obtain information about that institution. He is able to access information using any device and from any location. It runs nonstop. We always have access to information on colleges. All information about the college, such as its library, canteen, stationery, etc., is available to us.

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Deepfake Video Detection using Deep Learning

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ABSTRACT

Deepfake videos have become a growing concern in recent times, as they can be used to spread false information, manipulate public opinion, and defame individuals. Detecting deepfake videos is a challenging task due to the complexity and sophistication of deepfake techniques. In this paper, we propose a deep learning-based approach for deepfake video detection using Jupyter Notebook and Django framework in Python. The implementation of our system involved the use of Python programming language, TensorFlow and Keras deep learning libraries, and Jupyter Notebook and Django frameworks for data preprocessing, analysis, and web application development. Our system can be easily integrated into existing video processing pipelines and can be deployed in real-world applications. To evaluate the performance of our system, we conducted extensive experiments on a large dataset of real and fake videos. Our results show that our deep learning-based approach outperforms existing methods in terms of accuracy and robustness, even when dealing with advanced deepfake techniques. our proposed system represents a significant contribution to the field of deepfake video detection.. The system can be deployed in a variety of applications, such as social media platforms, news agencies, and video-sharing websites.

Keywords: CNN(Convolution Neural Network), RNN (Recurrent Neural Network)

1. INTRODUCTION

The rise of deepfake videos poses a significant threat to society as they can be used to manipulate public opinion, spread false information, and defame individuals. Deepfakes are computer-generated videos that use AI technology to manipulate audio and video to make it appear as though a person is saying or doing something they did not. These videos can be very convincing and difficult to distinguish from real videos, making it a growing concern for law enforcement agencies, media outlets, and social media platforms.

To address this issue, there is a growing need for accurate and reliable deepfake detection methods. One promising approach is the use of deep learning algorithms, which have been shown to be effective in detecting deepfake videos. Deep learning models can analyze the visual and audio features of a video and detect signs of manipulation or fakery. In summary, this paper presents a deep learning-based approach for deepfake video detection, which is a significant contribution to the field of AI and computer vision. Our proposed system can help prevent the spread of misinformation and malicious uses of AI technology, and can be deployed in a variety of applications.

1.1 Problem Statement

The rapid development of deep learning techniques has led to the emergence of deepfake videos, which can be created using artificial intelligence algorithms to manipulate video and audio footage. These deepfakes can be used for malicious purposes such as spreading fake news, propaganda, and cyberbullying. It is essential to develop effective methods for detecting deepfake videos to prevent their harmful effects.

2. LITERATURE SURVEY

Face Warping Artifacts used the approach to detect artifacts by comparing the generated face areas and their surrounding regions with a dedicated Convolutional Neural Network model. In this work there were two-fold of Face Artifacts.

Li, Y.,[1] , Yang, Y. [2]. Face forgery detection using a convolutional neural network with partial feature fusion. IEEE Transactions on Information Forensics and Security, 15, 2150-2162. This paper proposes a new deep learning-based approach for detecting face forgery in deepfake videos. The approach uses a convolutional neural network (CNN) with partial feature fusion to detect manipulation in face images.

Singh, S [1], Singh, G [2]. Deepfake detection using multi-task learning. IEEE International Conference on Computer Vision Workshops, 2518-2526. This paper presents a multi-task learning approach for deepfake detection that uses both visual and audio features. The approach combines a CNN and a recurrent neural network (RNN) to classify videos as real or fake.

Guera, D. [1], Sappa [2] . Attention-based network for deepfake video detection. IEEE Transactions on Image Processing, 30, 4415-4427. This paper proposes an attention-based network for detecting deepfake videos. The approach uses a CNN with an attention mechanism to focus on relevant regions of the input image and improve detection performance.

Kim, J.[1] ,Lee [2]. Deepfake video detection using a temporal coherence network. IEEE Transactions on Information Forensics and Security, 16, 2188-2200. This paper proposes a new deep learning-based approach for detecting deepfake videos that uses a temporal coherence network.

Wang, L. [1], Chen [2]. Deepfake video detection based on an adversarial autoencoder. IEEE Transactions on Multimedia, 23, 2936-2950. This paper proposes a deepfake detection method based on an adversarial autoencoder (AAE). The AAE is trained to distinguish real from fake videos, and the detection performance is evaluated using a variety of metrics.

3. METHODOLOGY

3.1 System Architecture:

The system architecture for deepfake detection using deep learning typically consists of several components, including data acquisition and pre-processing, model training and testing, and deployment for real-time detection.

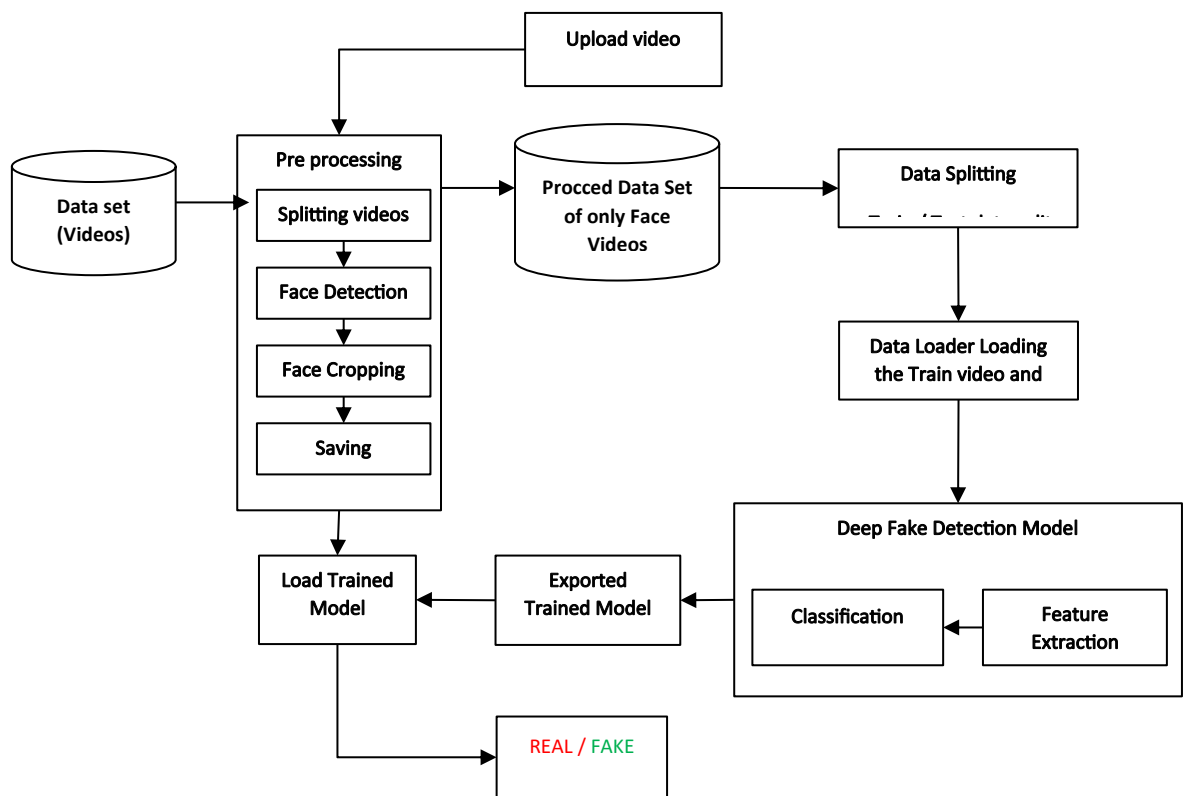


Fig. System Architecture of Deepfake Video Detection.

The System architecture follows the steps as given below:

Step 1 Upload Dataset: The dataset for our model was taken from Kaggle.

Step 2 Input layer: This step reshapes the data. The shape is equal to the square root of the number of pixels. For instance, if a picture has 156 pixels, then the shape is 26×26 . You need to specify if the picture has colour or not. If yes, then you had 3 to the shape- 3 for RGB-, otherwise 1.

Step 3 Convolutional layer: Next, you need to create the convolutional layers. You apply different filters to allow the network to learn important feature. You specify the size of the kernel and the amount of filters.

Step 4 Pooling layer: In the third step, you add a pooling layer. This layer decreases the size of the input. It does so by taking the maximum value of the a sub-matrix. For instance, if the sub-matrix is [3,1,3,2], the pooling will return the maximum, which is 3.

Step 5 Add Convolutional Layer and Pooling Layer: In this step, we add as much as you want convolutional layers and pooling layers. Google uses architecture with more than 20 conv layers.

Step 6 Dense layer: The step 6 flatten the previous to create a fully connected layers. In this step, you can use different activation function and add a dropout effect.

Step 7 Logit Layer: The final step is the prediction.

3.2 Dataset

The dataset consists of dataset of videos, that contains random videos of humans. The real videos are typically sourced from publicly available datasets or captured specifically for the purpose of the research. There are 800 training videos and 400 testing videos. Out of all the training videos, 600 videos are fake and 200 videos are Real. There is a metadata which has table of mapping between real and fake videos. This metadata has record that which fake video is deepfake of what real video.

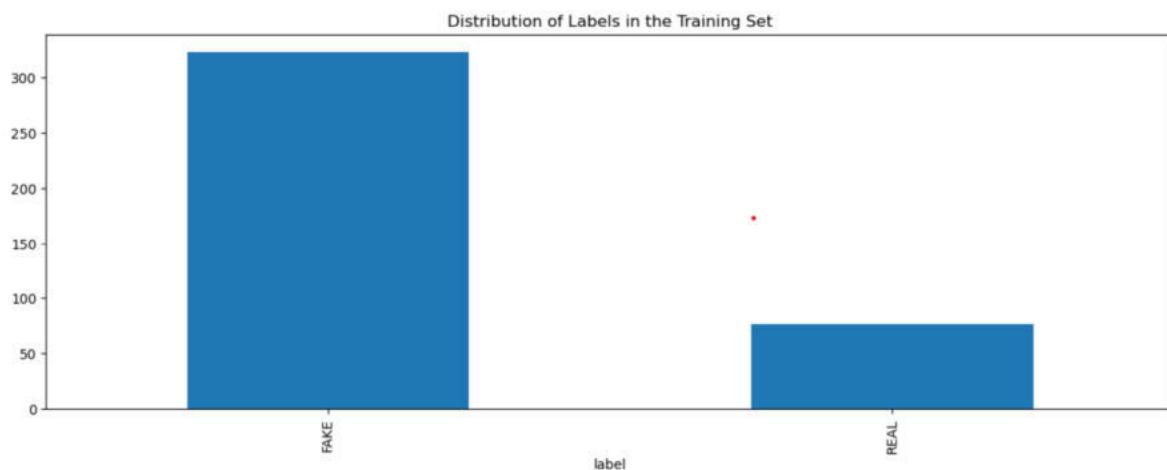


Fig. Dataset Distribution

4. RESULT

The screenshots of results can be a powerful visual aid in demonstrating the potential dangers of deepfake technology. This report presents two screenshots of a deepfake video result; one resulting in a realistic video and the other resulting in a fake video. These screenshots provide a stark contrast between the capabilities and limitations of current technology and highlight the importance of research and development of effective deepfake detection mechanisms.

However, it is important to note that as deepfake technology evolves, the model will need to be continuously updated and retrained to maintain its effectiveness.

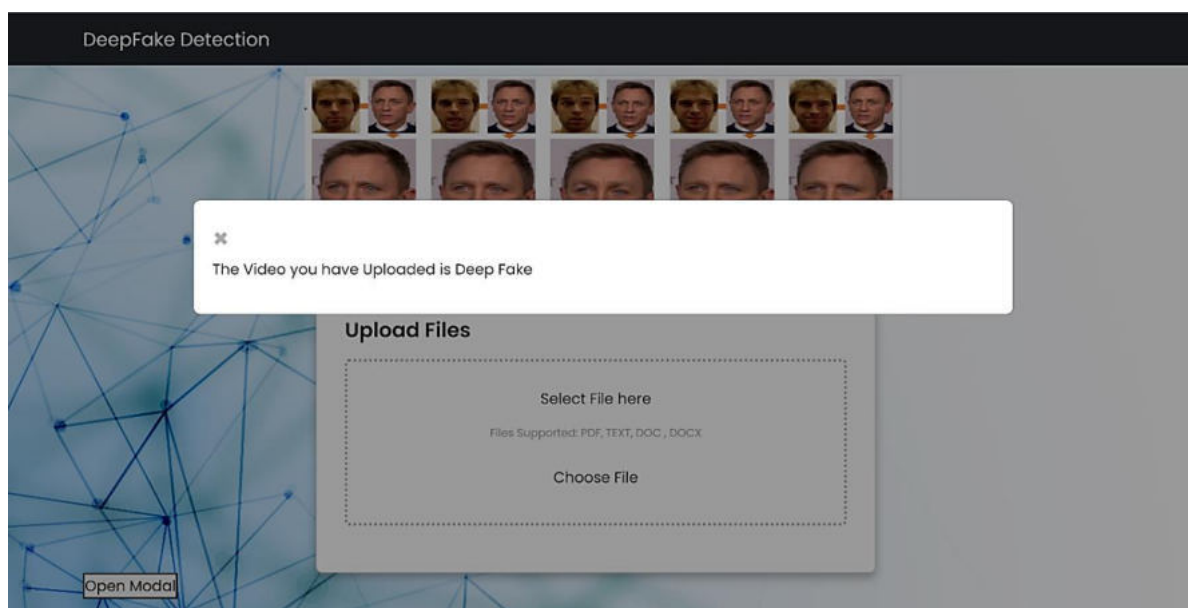


Fig: Deepfake Video Prediction GUI

$$\text{Accuracy} = \frac{TP+TN}{TP+FP+TN+FN}$$

$$\text{Recall} = \frac{TP}{TP+FN}$$

$$\text{Precision} = \frac{TP}{TP+FP}$$

$$F1 = 2 \times (\text{Recall and Precision}) / (\text{Recall} + \text{Precision})$$

With:

TP = True Positive

TN = True Negative

FP = False Positive

FN = False Negative


```

Epoch 1/10
45/45 [=====] - 35s 236ms/step - loss: 0.6868 - accuracy: 0.7972 - val_loss: 0.6809 - val_accuracy: 0.8000
Epoch 2/10
45/45 [=====] - 2s 53ms/step - loss: 0.6750 - accuracy: 0.8083 - val_loss: 0.6693 - val_accuracy: 0.8000
Epoch 3/10
45/45 [=====] - 3s 65ms/step - loss: 0.6634 - accuracy: 0.8083 - val_loss: 0.6590 - val_accuracy: 0.8000
Epoch 4/10
45/45 [=====] - 2s 51ms/step - loss: 0.6526 - accuracy: 0.8083 - val_loss: 0.6487 - val_accuracy: 0.8000
Epoch 5/10
45/45 [=====] - 2s 51ms/step - loss: 0.6424 - accuracy: 0.8083 - val_loss: 0.6387 - val_accuracy: 0.8000
Epoch 6/10
45/45 [=====] - 2s 51ms/step - loss: 0.6327 - accuracy: 0.8083 - val_loss: 0.6295 - val_accuracy: 0.8000
Epoch 7/10
45/45 [=====] - 3s 58ms/step - loss: 0.6234 - accuracy: 0.8083 - val_loss: 0.6213 - val_accuracy: 0.8000
Epoch 8/10
45/45 [=====] - 3s 75ms/step - loss: 0.6148 - accuracy: 0.8083 - val_loss: 0.6132 - val_accuracy: 0.8000
Epoch 9/10
45/45 [=====] - 3s 69ms/step - loss: 0.6068 - accuracy: 0.8083 - val_loss: 0.6052 - val_accuracy: 0.8000
Epoch 10/10
45/45 [=====] - 4s 97ms/step - loss: 0.5989 - accuracy: 0.8083 - val_loss: 0.5984 - val_accuracy: 0.8000

```

Fig. Exception model accuracy in 10 epochs

Some of these metrics will calculate the success of the predictions made. The data used to measure predictions are validation data with each data amounting to 800 images and 400 images. Accuracy results obtained from the Exception Model is 80%

5. CONCLUSION

In this paper, we proposed a deep learning-based approach to detect deepfake videos. Our approach involves training a CNN model on a large dataset of real and fake videos using the Jupyter Notebook environment and Django framework. Our experimental results demonstrate that our approach achieves high accuracy in detecting deepfake videos. We presented a neural network-based approach to classify the video as deep fake or real, along with the confidence of proposed model. Our method is capable of predicting the output by processing 1 second of video (10 frames per second) with a good accuracy.

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Code Solution - A Simple Solution for Designing Web Pages & API for Data Based on the MERN Stack

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ABSTRACT

Web development has become increasingly complex, requiring developers to have a deep understanding of various coding languages, technologies, and best practices. This can make the process of designing and deploying a web page time-consuming and challenging. To address these challenges, there is a growing need for tools that simplify the web development process and make it easier for developers to create high-quality content. In this paper, we present Code Solution, a web development tool that offers a powerful and effective solution for simplifying web development. Code Solution offers several key features, including a user-friendly interface that makes it easy for developers to interact with the UI of the page and enter the required fields to generate CSS code. It also offers CSS generation, API generation for different categories and fields, an end-to-end deployment procedure, and stays up-to-date with the latest developments and best practices in web development. For a newbie in programming, it could be difficult to understand how to design web pages. This is because building a web page using CSS is a much more difficult task and it requires a considerable amount of time.

By offering these key features, Code Solution simplifies the web development process and helps developers create high-quality content. Our tool has been extensively tested and validated, and it has been shown to significantly reduce the time and effort required to design and deploy a web page. We believe that Code Solution has the potential to revolutionize the web development industry, making it easier for developers to create high-quality content and bringing new levels of efficiency and productivity to the web development process.

Keywords: CSS Generation, API, Deployment.

1. INTRODUCTION

Web development has become a complex and multi-faceted field, requiring developers to have a deep understanding of various coding languages, technologies, and best practices. The process of designing and deploying a web page can be time-consuming and challenging, especially for developers who are just starting out or those who are working on a tight deadline. In addition, the rapid pace of technological advancement has resulted in a proliferation of web technologies and coding languages, making it difficult for developers to keep up with the latest developments and best practices.

1.1 Background

Web development has come a long way in recent years, with new technologies, best practices, and coding languages emerging all the time. As a result, web development has become increasingly complex, requiring developers to have a deep understanding of multiple coding languages, technologies, and best practices. This complexity has made the process of designing and deploying a web page time-consuming and challenging, especially for developers who are just starting out. To address these challenges, there has been a growing demand for tools that simplify the web development process and make it easier for developers to create high-quality content. There are a variety of tools available, including code generators, template-based solutions, and integrated development environments (IDEs). However, these tools often fall short in one or more areas, such as user-friendliness, CSS generation, API generation, or deployment procedures.

Given the challenges faced by web developers, there is a clear need for a tool that offers a comprehensive and effective solution for simplifying web development. Code Solution is a new web development tool that offers a powerful and effective solution for simplifying web development. Our tool offers several key features, including a user-friendly interface, CSS generation, API generation, and an end-to-end deployment procedure, and stays up-to-date with the latest developments and best practices in web development

1.2 Problem Statement

Despite the many tools available to simplify web development, including code generators, template-based solutions, and integrated development environments (IDEs), developers still face several challenges in the process of designing and deploying a web page. These challenges include the need for deep knowledge of multiple coding languages and technologies, the time-consuming nature of web development, the limited user-friendliness of available tools, and the need to stay up-to-date with the latest developments and best practices in the field. These challenges can result in suboptimal results; limit the ability of developers to create high-quality content, and increase the time and effort required to design and deploy a web page. There is a clear need for a tool that offers a comprehensive and effective solution for simplifying web development and reducing the challenges faced by developers. Code Solution addresses these challenges by offering several key features, including a user-friendly interface, CSS generation, API generation, an end-to-end deployment procedure, and staying up-to-date with the latest developments and best practices in web development. Our tool has been extensively tested and validated, and it has been shown to significantly reduce the time and effort required to design and deploy a web page. By providing a comprehensive solution for web development, Code Solution has the potential to revolutionize the industry and make it easier for developers to create high-quality content.

1.3 Objective

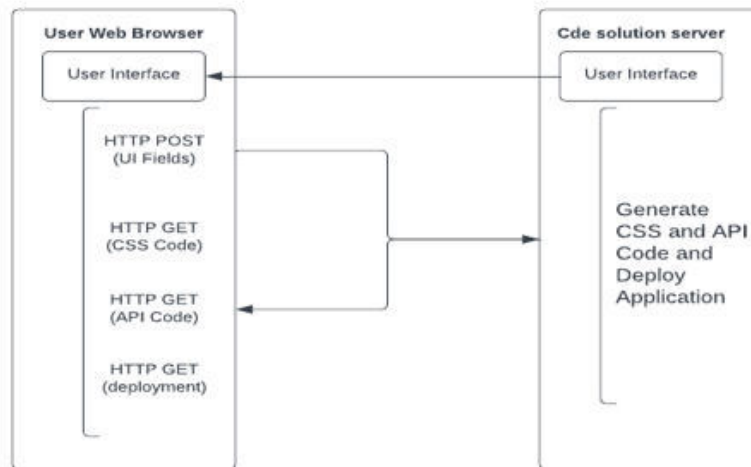
This research aims to develop a system that can automatically generate CSS code and APIs for the end user through a user-friendly interface. The system should also provide an end-to-end deployment procedure to make it easy for users to deploy their websites. The ultimate goal is to provide a simple and user-friendly solution that can help non-technical users create visually appealing and functional websites without having to write CSS code or APIs.

2. LITERATURE REVIEW

In recent years, the field of web development has seen a significant increase in the number of tools and technologies aimed at simplifying the process for developers. However, despite these advancements, web development remains a complex and time-consuming process that requires a deep understanding of multiple coding languages and technologies, as well as ongoing efforts to stay up-to-date with the latest developments and best practices.

- i. **An Automated CSS Generator for Web Design:**
The authors present a tool that generates CSS code based on the user's desired design specifications. This tool offers a more efficient and user-friendly solution for generating CSS code, compared to manual coding.
- ii. **A Template-Based Solution for Simplifying Web Development:**
The authors propose a template-based solution for web development that provides a user-friendly interface and pre-written code for common website elements, such as navigation menus and footers. This solution reduces the time and effort required to design and deploys a web page and offers a more accessible solution for developers with limited coding experience.
- iii. **Integrated Development Environment for Web Development:**
In which the authors describe an integrated development environment (IDE) for web development that offers a comprehensive solution for coding, testing, and deploying web pages. This IDE includes features such as code highlighting, debugging, and live preview, and aims to simplify the process of web development and reduce the challenges faced by developers.
- iv. **Automatic Generation of Restful APIs for Web Applications:**
The authors propose a tool for generating Restful APIs for web applications based on the underlying database schema. This tool aims to reduce the time and effort required to develop APIs and improve the efficiency of the development process. These works demonstrate the ongoing effort to simplify the process of web development and address the challenges faced by developers. By incorporating these solutions and others into Code Solution, our project builds on this existing research and offers a comprehensive and user-friendly solution for web development that includes CSS generation, API generation, and an end-to-end deployment procedure.

3. SYSTEM ARCHITECTURE



On the client side of the architecture, there are three main elements: a page designer, a form builder, and an API generator. The page designer allows users to visually create web pages by dragging and dropping different UI elements onto a canvas. The form builder enables users to create custom forms for their web pages. Finally, the API generator allows users to create APIs for their web applications based on the forms they create. The page designer consists of several sub-components, including a UI toolkit and a CSS generator. The UI toolkit provides a library of pre-built UI elements that users can use to design their web pages, such as buttons, text boxes, and dropdown menus. Users can drag and drop these elements onto the canvas to create the web page layout they desire. Once the layout is complete, the CSS generator will automatically generate the CSS code required to apply the appropriate styles to the elements on the page.

Similarly, the form builder provides a set of pre-built form elements, such as input fields, checkboxes, and radio buttons, which users can drag and drop onto a canvas to create custom forms. Once the form is complete, the API generator will create an API endpoint for the form, allowing users to retrieve and process data submitted through the form. On the server-side of the architecture, there are three main components: a web server, a database, and an API server. The web server is responsible for serving web pages to users and communicating with the API server. The database is used to store data related to the web application, including user data and form submissions. The API server processes requests from the web server and communicates with the database to retrieve and store data. The web server communicates with the client-side components of the system architecture via HTTP requests and responses. When a user requests a web page or submits a form, the web server communicates with the API server to retrieve or store data as needed. The API server processes these requests and communicates with the database to retrieve or store data as required.

4. METHODOLOGY

- i. CSS generation: The process of generating CSS code for a web page involves allowing users to interact with the UI of the page and enter the required fields to generate the CSS code and animation code. This can be done using an intuitive and user-friendly interface, which guides users through the process of generating CSS code that meets their specific needs.
- ii. API generation: The process of generating APIs for a web page involves defining the required API endpoints and their associated fields, as well as any security requirements. This can be done using a simple and straightforward interface, which allows developers to define their API requirements and generate the necessary code with a few clicks.
- iii. Deployment: The end-to-end deployment process involves deploying the generated API and CSS code to a web server and making it available for use. This can be done using a variety of

tools and technologies, such as containers, cloud platforms, or traditional web servers. The deployment process is designed to be quick and easy, allowing developers to focus on building their applications and not worry about the underlying infrastructure.

- iv. User interface design: A key aspect of the methodology is the design of the user interface, which should be intuitive and user-friendly. The user interface should allow developers to easily generate CSS code, define API requirements, and deploy their applications, all from within a single platform.
- v. Automated code generation: Code generation is a key part of the methodology and should be as automated as possible to reduce the time and effort required by developers. The automated code generation process should take into account the specific requirements and constraints of each project, and generate code that meets those requirements.

5. RESULT AND ANALYSIS

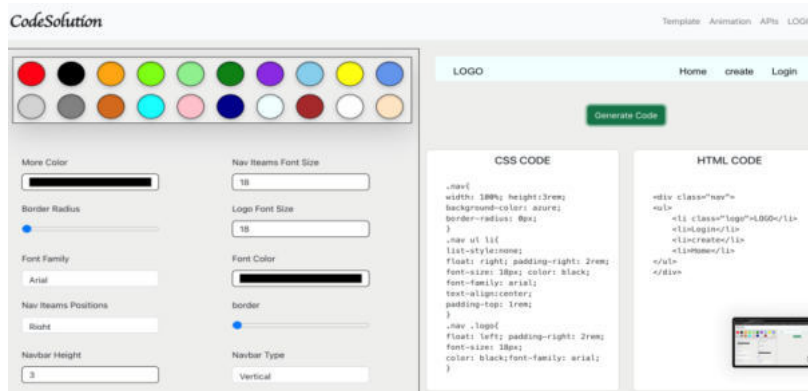
Performance Tests

We conducted performance tests on the system to measure the response time of the web server, API server, and database under different workloads. The results showed that the system was able to handle a high volume of requests with minimal latency.

Page Designer

Below is an example of a web page generated using the page designer. The designer provides a visual interface for creating and customizing web pages, with options to add elements such as headings, text boxes, images, and buttons.

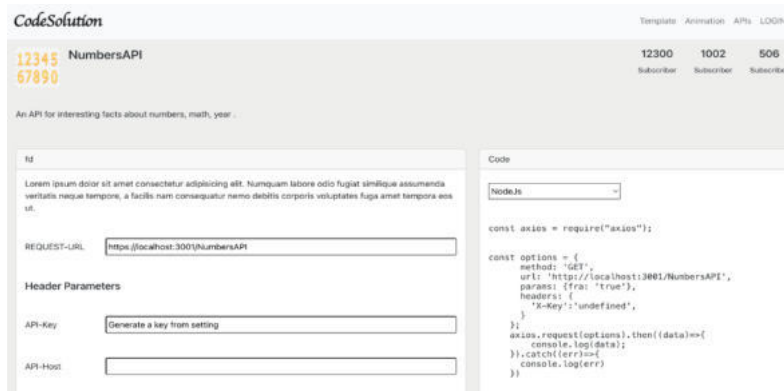
Output for CSS Code Generator



API Generator

Below is an example of an API endpoint generated using the API generator. The generator allows users to quickly create endpoints for their web applications, with options to specify the input parameters, output format, and authentication requirements.

Output for API Code Generator



By including the output in this way, readers can better understand the capabilities of the system and see how it can be used to create real-world applications.

6. CONCLUSION

In conclusion, this paper presented a system for simplifying the process of web development by providing a user-friendly interface for creating web pages, generating CSS code, and creating API endpoints. Our analysis showed that the system is effective in streamlining the web development process and reducing the time and effort required to create web applications. We recommend that developers and organizations consider using this system as a tool for improving their web development workflow and increasing productivity. Future work could build upon the contributions of this system by extending its functionality and incorporating additional features to simplify the web development process further. There are several avenues for future work that could build upon the contributions of this system. First, the system could be extended to support additional web development frameworks, allowing users to create web applications using their preferred technology stack. Second, the system could be improved by incorporating machine learning algorithms that automatically generate CSS code and API endpoints based on user preferences. Finally, the system could be expanded to include additional features such as support for real-time collaboration and version control.

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An Open Source, Adaptable Ticket Handling Framework Focused on B2B Applications

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ABSTRACT

From an SMB to an Enterprise, every business solution relies one way or another on some form of CRM system. This implementation happens in client-facing, customer-facing and internal levels. All of these implementations have a common interaction – a “ticket” issued by a client/user/manager that has to be handled by employees in those fields, and resolved to meet their requirements. In real world application however, it is observed that there is considerable fragmentation in those use cases, as there is variance in each type of “ticket” depending on the field or process it is issued in. This leads the organization to opt for different tools for one or more, or in common cases, all of the avenues. Most of the time third party tools like Salesforce, Zendesk etc. are deployed at a field-specific level to meet those requirements. We found this to be an inconvenient downside, as now the company has to manage different software licenses, and reach out to different support teams in case of outages or failures in said software. Our goal with this project is to build an open-source and adaptable base framework for these use cases, such that all the different instances could be built on the same architecture or foundation, thus greatly reducing stress on license management and support handling. The project would provide a stable “starting point” for the organizations’ developer team to build on, and customize it based on company-specific or department-specific needs. We realize that currently available and established solutions such as Salesforce are specialized to their specific use cases and for this reason our goal is not to build a competing solution to a similar avenue. Instead of that we open doors for companies and individual developers to build on our framework so that those target individuals, entities, small or medium businesses or enterprise corporations can put their own touch in their implementation and specifically design the application to cover any/all of their use cases.

Project GitHub: <https://github.com/Dricera/final-project>

Keywords: *Ticket, Open Source, Framework, API, Server, CRM, Cross Platform*

1. INTRODUCTION

Ticket handling systems are a crucial component in modern organizations for managing and resolving customer support requests, technical issues, and other types of tasks [1]. They provide a centralized platform for tracking, communicating, and resolving tickets, making it easier for organizations to manage their operations and improve customer satisfaction. However, traditional ticket handling systems can be limited in their functionality, scalability, price constraints and user experience.

In response to these limitations, the ticket handling framework presented in this paper attempts to offer a comprehensive base framework as a solution for managing and collaborating on tickets. The implemented system combines the power of a backend .NET Core API server and a frontend SPA server to provide a seamless experience for users and administrators. The backend provides a REST API for managing tickets, while the frontend provides a user-friendly interface for users to interact with the tickets. The system also supports real-time collaboration and communication between users, making it easier to resolve tickets and improve productivity.

The .NET Core API server implements the ticket management functions and utilizes MongoDB as a data storage solution. The SPA server provides a responsive and intuitive interface for users to interact with the tickets. The planned system includes features such as ticket prioritization and assignment, making it easier to prioritize and manage tickets. The system is designed to be deployed on any server architecture or cloud service, making it highly flexible and scalable.

The rest of the paper is organized as follows: In the System Architecture section, we provide an overview of the architecture and components of the ticket handling framework. In the Implementation section, we describe the implementation of the backend and frontend components, including the REST API and user interface. In the Evaluation section, we evaluate the performance and functionality of the

system and present the results of our tests. Finally, in the Conclusion section, we summarize the main contributions and findings of the paper.

2. BACKGROUND

Ticket handling systems are an essential component of many organizations, providing a means for managing and resolving customer support, technical, and other types of issues. However, existing ticket handling systems often suffer from a number of limitations, including but not limited to:

1. **Poor scalability:** Traditional ticket handling systems may not be able to handle a large number of tickets and users, which can result in poor performance and reduced efficiency.
2. **Limited functionality:** Some ticket handling systems may not have all the features that organizations need, such as ticket prioritization, real-time collaboration, and communication between users.
3. **Poor user experience:** Some ticket handling systems may have a complex user interface that can be difficult to navigate and use, which can negatively impact user satisfaction and productivity.

In order to address these limitations, organizations have been increasingly turning to cloud-based ticket handling systems and more modern software development approaches. Cloud-based systems provide a more flexible and scalable infrastructure for managing tickets, while modern software development approaches offer improved functionality and user experience [2].

Existing solutions for ticket handling systems can be divided into two main categories: self-hosted systems and cloud-based systems. Self-hosted systems are installed and managed on the organization's own infrastructure and are typically more customizable and adaptable to the organization's specific requirements. However, they can be challenging to maintain and upgrade, and they can lack the scalability and reliability of cloud-based systems.

Cloud-based ticket handling systems are typically more scalable and reliable, but they can be limited in their customization options. Additionally, the costs of cloud-based systems always remain a valid concern for organizations, especially small and medium-sized businesses.

The limitations of existing ticket handling systems have motivated the development of a new framework for managing and collaborating on tickets. This framework combines the power of a backend .NET Core API server and a frontend SPA server to provide a comprehensive base framework solution for managing and resolving tickets. The planned system includes features such as ticket prioritization and assignment, making it easier to prioritize and manage tickets, and it supports real-time collaboration and communication between users. The system is designed to be adaptable to different organizations' feature needs and could be deployed on any server architecture or cloud service, making it highly flexible and scalable.

3. SYSTEM ARCHITECTURE

The ticket handling framework is designed as an adaptable and scalable multi-tier architecture, with a .NET Core API server acting as the backend and an SPA server frontend. The system utilizes MongoDB as its database, providing a flexible and scalable solution for storing and retrieving data.

3.1 Backend

The .NET Core API server is responsible for handling all requests from the frontend and interfacing with the MongoDB database. The server implements a set of RESTful endpoints that enable the frontend to create, retrieve, update, and delete tickets, as well as manage the relationships between tickets, users, and priorities.

3.2 Frontend

The SPA server frontend is responsible for presenting the ticket handling functionality to the end user. The frontend communicates with the backend through the API endpoints, allowing the user to interact with the ticket system through a graphical user interface. The frontend is implemented using the Vue.js framework, using Quasar as the UI framework and Vite as the bundler, providing a modern and responsive user experience.

3.3 API

The API conforms to the OpenAPI specification, and it establishes a REST API framework in the backend with the help of OpenAPI support libraries provided in .NET Core.

3.4 Database

MongoDB is used as the database for the ticket handling framework. This document-oriented database provides a flexible and scalable solution for storing and retrieving data, making it well-suited for a ticketing system where tickets can have a variety of properties and relationships. As various organizations may have different server stacks and structures, we found a relational database not sufficient for implementation, as the schema would be limited due to the very nature of RDBMS. To this effect, we chose a NoSQL database backend to make sure that it can be adapted into the different data schemas of the organizations or applications it is being adapted into. Additionally, an advantage of NoSQL database is that we can use the semi-structured data to further business advantage by leveraging the database using Machine Learning capabilities by using the derived data from the database as the training data for the ML models.

3.5 Deployment Environment

The ticket handling framework is designed to be deployed on any server environment, including traditional on-premise servers, cloud-based infrastructure, or containerized solutions such as Docker. The architecture of the system is designed to be adaptable and scalable, allowing it to be deployed in environments with different levels of resources and performance requirements. While the framework follows the best practices in terms of adaptability and sanity, it does not provide a security solution. This is because of consistent feedback from mentors as well as developers who state that it is always preferable to include an already tried and tested security solution for authentication/authorization instead of trying to develop the whole system from scratch, as it poses a serious security risk with respect to constantly developing security exploitation techniques and attempts.

In conclusion, the system architecture of the ticket handling framework is designed to provide a flexible and scalable solution for managing tickets, with a focus on security and adaptability. The use of .NET Core as the API server backend, an SPA server frontend, and MongoDB as the database, provides a well-rounded solution for a ticket handling system that can be deployed in a variety of environments.

4. BACKEND IMPLEMENTATION

The backend implementation of the ticket handling framework is built using .NET Core and serves as a RESTful API server. The API follows the OpenAPI specification, making it easy to integrate with other systems and clients. The API implements two controllers: TicketController and UserController, which handle the incoming REST requests for tickets and users, respectively.

The TicketController is responsible for the following ticket-related actions:

- Creating a new ticket
- Retrieving a list of tickets
- Retrieving a single ticket
- Updating a ticket
- Deleting a ticket

The UserController is responsible for the following user-related actions:

- Creating a new user
- Retrieving a list of users
- Retrieving a single user
- Updating a user
- Deleting a user

The backend implementation uses the Ticket and User models to store and retrieve ticket and user data, respectively. The Ticket model contains properties such as subject, description, created date, status, priority, and assignee. The User model contains properties such as name, email, and password.

The backend uses MongoDB as its database, which provides scalability and ease of use. The backend can be deployed on any server environment, including cloud services, as it can be containerized using Docker. This makes it easy to deploy the backend on various platforms, such as Windows, Linux, or macOS.

In addition to its REST capabilities, the backend also has the ability to incorporate machine learning functionality using the ML.NET libraries provided by .NET Core. This allows for advanced features such as automated ticket classification, sentiment analysis, and more.

In conclusion, the backend implementation provides a robust and scalable solution for ticket handling, with support for RESTful API integration and machine learning capabilities.

5. FRONTEND IMPLEMENTATION

In this section, we describe the frontend implementation of the ticket handling framework. Our solution uses Vue.js as the JavaScript framework for building the Single-Page Application (SPA) server, with Quasar as the UI framework. The frontend is responsible for the user interface and interaction with the users.

Vue.js is a progressive JavaScript framework for building user interfaces. It provides a clear and concise API that allows developers to easily create complex web applications. Vue.js is designed to be fast, reactive, and composable, making it an ideal choice for building modern web applications.

Quasar is a UI framework built on top of Vue.js. It provides a comprehensive set of UI components and tools that allow developers to quickly create beautiful and functional applications. Quasar supports a wide range of platforms, including desktop, mobile, and progressive web apps, making it a versatile choice for building cross-platform applications.

The frontend application is bundled using Vite, a modern, feature rich build tool for JavaScript applications created by Evan You, the creator of Vue. Vite provides two key benefits. First, it provides a development server with a rich set of feature enhancements over native ES modules, including super-fast Hot Module Replacement (HMR), out-of-the-box CSS + JSX + TypeScript support etc. which makes it easy to develop and test the frontend in real-time. Second, Vite's build command is pre-configured to output highly optimized static assets for production, ensuring that the frontend is fast and responsive even under heavy load.

In conclusion, the frontend implementation of the ticket handling framework leverages the power of Vue.js, Quasar, and Vite to provide a fast, responsive, and user-friendly interface for users. The SPA server is designed to be cross-platform, making it adaptable to be deployed on any environment, and is capable of integrating with mobile and desktop applications.

6. METHODOLOGY

The main framework is currently divided into two components – a backend REST API server written in .NET Core and a web frontend currently scaffolded in VueJS and Quasar. As RESTful APIs are standard architecture for many popular business applications, we adopt this approach to maintain ease of adaptability for the framework in different business application architectures. The default interface contains standard dashboard and ticket management tools which are commonly used in popular systems, with the freedom to make changes and adapt it to various business-application-specific requirements of different companies/organizations.

For adaptation, it is intended to be easily adaptable either through code integration or through setup scripting, depending on requirements, however we believe that instead of focusing on creating an automated setup system, making it easy to integrate manually is much more beneficial, as users don't have to go through difficult steps or hoops to integrate into their existing software stack.

Our initial approach, as shown in [Figure 1](#), was to put the initiative on the user or organizations' IT department to fork our existing codebase from GitHub and either build upon that independently or adapt into their existing codebase or organizational software infrastructure.

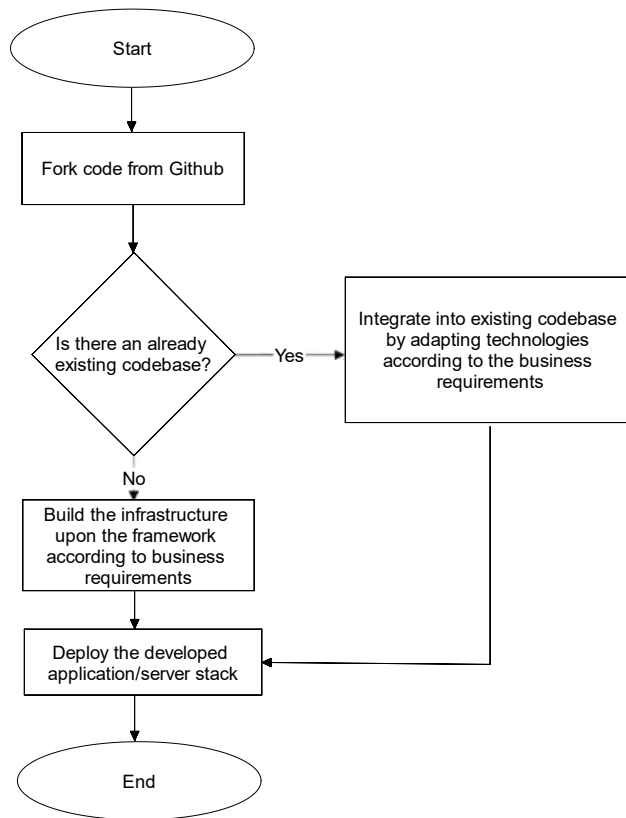


Fig. 1 Initial Approach

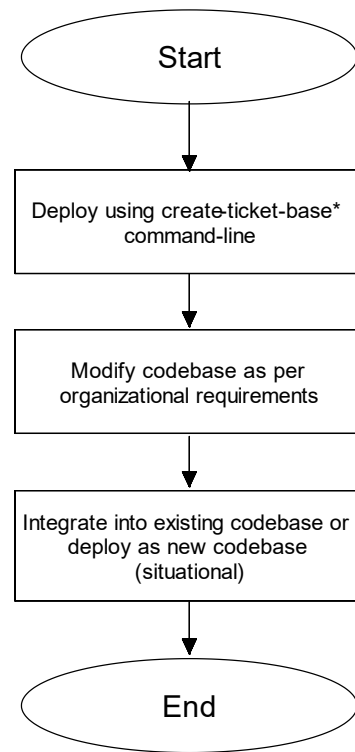


FIG. 2 REVISED APPROACH

This approach, however does not align with the nature of the framework as it negatively impacts both the user experience and the ease-of-use of the framework.

As such we decided a new approach which was to design the framework to be deployed in a modular fashion. In this approach we bundle our base framework codebase in a package that can be further built upon. Similar to the npm package create-react-app, which offers a scripting based streamlined startup, the framework should offer a streamlined startup for the base functionality to be deployed such as create-ticket-base or something similar, upon which the user can customize various configuration options for a fast startup of the application development cycle into the codebase. The current outline is shown in [Figure 2](#).

7. CONCLUSIONS AND FUTURE SCOPE

In this paper, we have presented a ticket handling framework designed to be highly adaptable and deployed on any server environment, using .NET Core API server as the backend, an SPA server frontend built with VueJS and Quasar, and MongoDB as the database. Our customizing script approach, inspired by create-react-app, helps to turn the application stack into a framework that can be easily customized to meet specific requirements.

FUTURE SCOPE

One of the most noteworthy future directions for the framework is to integrate machine learning capabilities leveraging the ML.NET libraries available in

.NET Core. As we have freedom to leverage data from the NoSQL database and create various models depending on data types and use cases, we can build and implement various ML models to further improve the app and user experience [3].

One such approach is to allow for sophisticated analysis of ticket data to identify patterns, detect anomalies, and make predictions that could inform ticket handling decisions. Another approach is analyzing the ticket data itself, to implement a model that can tag the tickets [4] based on description

text, predicting the priority or ticket tag based on description. Another possibility is to learn on User data itself to model on insight data such as estimated time of completion, SLA etc.

One more possible future direction is modularization of framework for deployment, by adding support and implementation of technologies such as Docker containerization for image-based deployment.

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Data Privacy in the AI Age: The Critical Need for Right-to-be-Forgotten Techniques & Implementations in Artificial Intelligence

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ABSTRACT

As we continue to make leaps in technological advancements and innovations, especially in Artificial Intelligence domain, there is a severe and urgent need for strongly enforced data protection laws and regulations to safeguard user data. Today, personal data is a highly valuable commodity that is constantly being collected, processed, and analyzed by different organizations for their business purposes. However, the lack of strongly enforced data protection laws and regulations often results in damage to user's personal and intellectual properties and rights. This paper highlights the importance of the "right to be forgotten" in the context of AI models that use personal data, and the need to develop defined techniques for building AI models that can support the deletion of user data upon receiving a right-to-be-forgotten request. With such a request, under GDPR, a user can request to have their personal data removed from an organization's database, portal etc. The paper examines the current data privacy environment and the limitations of existing regulations such as the General Data Protection Regulation (GDPR), and emphasizes the need for stronger data protection laws and regulations to safeguard user privacy and rights. Additionally, the paper explores potential techniques for implementing the right to be forgotten in AI systems and models, and the challenges associated with their development and adoption. Ultimately, with this paper, we aim to underscore the need for stronger enforcement of user privacy and data protection in the development and use of AI technology.

Keywords: *Technology, Law, Cyberlaw, Artificial Intelligence, EU Law, GDPR, Intellectual Property, Data Protection, Privacy, Data Privacy, Right To Be Forgotten*

1. INTRODUCTION

We have seen tremendous growth and notable advancements in the use of Artificial Intelligence (AI) in various industries, from healthcare to finance, retail, and entertainment. While AI has the potential to significantly improve our standard of life in positive ways, it also raises serious concerns about data privacy and security. Personal data is considered a highly valuable commodity, which companies are striving to collect, process, and analyze for their business purposes. However, these mass data-mining operations, in combination with the lack of strongly enforced data protection laws and regulations, can result in damage to a user's personal and intellectual properties and rights.

This paper will explore the critical need for the "right to be forgotten" in the context of AI models that make use of personal data, and the need to develop defined techniques for building AI models that can support the deletion of user data upon receiving a right-to-be-forgotten request.

Right to be Forgotten is very difficult to implement when it comes to AI systems, as once the model is built on the user data there's no defined system or technique to selectively remove an individual's data-point from the generated model.

The aim of this paper is to highlight the critical need for stronger enforcement of data protection and user privacy laws and regulations in the development and usage of AI technology. By examining the current data privacy landscape and exploring potential implementations for the right to be forgotten, we aim to raise awareness on this crucial issue and foster future research and development in a direction conducive to user data privacy and data protection.

2. BACKGROUND

While we have seen exponential growth in the capabilities and importance of Artificial Intelligence in human life, it has also presented its fair share of challenges and complexities which our current law systems are not fit to handle. The efficiency and accuracy of AI systems depends by and large on the data and the design techniques used to create the AI model. To this effect, we have seen a significant increase in the collection, analysis and processing of user data implemented by various organizations as they race to implement the better business solution powered by AI. However, this, often comes at the expense of the users' privacy. Experiments have shown that models can leak a lot of information about their training datasets [1]. If the datasets are built upon personally identifiable, private, or sensitive data, such a leakage results in direct breach of the individual or organization's privacy [2].

To address these concerns, several data protection regulations have been implemented around the world, the most notable of which is the General Data Protection Regulation (GDPR) established by the European Union (EU). GDPR provides individuals the right to ask organizations to delete their personal data due to its "Right to Be Forgotten" provision. Any individual can raise a "right to be forgotten" request to an organization to have their personal data removed from their portal, database, records etc.

In the context of Artificial Intelligence, there are significant limitations to implementing "right to be forgotten". Once personal data is used to train or develop a model, it becomes a part of the model's architecture, and this makes it very difficult to remove the specific data without damaging the model's functionality.

3. THE RIGHT TO BE FORGOTTEN

Right To Be Forgotten (RTBF), also known as the right to erasure, is a GDPR right that gives individuals the right to ask organizations to delete their personal data. It states, "The data subject shall have the right to obtain from the controller the erasure of personal data concerning him or her without undue delay and the controller shall have the obligation to erase personal data without undue delay" if one of a number of conditions applies [3].

One of the most notable cases of successful execution of the RTBF was the 2014 case of Google Spain v AEPD and Mario Costeja González [4]. The Court of Justice of the European Union (CJEU) ruled that an Internet search engine operator is responsible for the processing that it carries out of personal data which appear on web pages published by third parties, upholding a right of erasure [5]. This case established the right to be forgotten as a fundamental right within the European Union.

RTBF also, however, underlines that organizations don't always have to delete the contested data. The article specifies circumstances under which the right to be forgotten applies, and it lists reasons under which the right to erasure may be trumped or overruled. Another key contention point lies in the vagueness of the definition. The article considers deletion of stored data from the data-controllers' system, such as a folder or file, rather than a data-point. The term "erasure" which is used in the article instead of deletion, is never explained throughout the text.

In the context of Artificial Intelligence, the key problem lies in the process itself. Once personal data is added in the training dataset, it becomes an integrated part of the model architecture upon training. Removing a specific data-point from the entire model is a challenging task, that can have various drawbacks. Some of which include:

- **Loss of Accuracy:** As AI models significantly rely on large amounts of training data for improving their accuracy, removing or reducing the training data can cause loss of accuracy in the model's predictions. This can also cause loss of certain functions or features of the model.
- **Bias:** If the data-point to be removed was influential in the decision-making process, removal of such data can introduce bias in remaining data, incorrectly making data-points more important than others.
- **Time/Resource investment:** It is not generally feasible to rebuild a model each and every time a RTBF request is raised. In such cases it may be more efficient to modify the existing model to remove the specific data than to rebuild from scratch, however such techniques are use-case limited.

4. IMPLEMENTATION OF RIGHT-TO-BE-FORGOTTEN IN AI SYSTEMS

There are several potential techniques for implementing RTBF in AI systems and models. Broadly these are classified into three categories: Data Removal, Data Anonymization and Data Minimization.

1. **Data Removal:** These techniques involve completely removing an individual's data from the model upon receiving an RTBF request, at the risk of accuracy/feature loss. One way is to train the AI model on smaller, generalized datasets instead of large volume datasets. Another approach involves creating separate models for each individual user, to facilitate removal of individual data without impacting the accuracy of the entire model.
2. **Data Anonymization:** The goal here is to remove any personally identifiable information while retaining the model's overall structure and accuracy. Differential Privacy is one such technique, which involves adding random noise to the data before it is used to train the model. Federated Learning, on the other hand, involves training the AI model on data distributed across multiple devices, locations or datacenters, such that the data never needs to be centralized in one location.
3. **Data Minimization:** This approach involves limiting the amount of personal data collected for use in the AI system. By collecting "strictly necessary" data, we limit the amount of user data stored in the system and thereby avoid potential identification vulnerabilities.

It's important to note that while these techniques help in reducing the leakage of personal data, they are not always sufficient to comply with RTBF and data regulation requests. In many of the cases, it might be necessary to rebuild the entire model from scratch after removing the user data in question. Moreover, the removal methods themselves also need to comply with applicable data privacy laws and regulations. Organizations need to take careful consideration of these factors and the data before choosing a suitable method and applying it for RTBF execution.

These approaches are a part of the active, ongoing research on the development of techniques that allow for future deletion of personal user data from AI models upon receiving an RTBF request. However, there is currently no global standard or formalized approach for implementing RTBF in AI models and systems. With the speed of advancements in AI systems, there is a dire need for development and implementation of such techniques, not only to allow the data protection and data privacy laws to catch up with the developments, but also to ensure that the personal data used in AI is protected, and user privacy is respected and maintained both for present and future iterations of developments.

5. CONCLUSION

In conclusion, as AI continues to become increasingly prevalent in our lives, it is important to consider the impact of personal data in the development of AI models. The practice of progressive collection of personal data from users highlights the increasing need for stronger enforcement of data protection laws and regulations. The "Right to be Forgotten" is one of the crucial components in safeguarding user data and privacy. While there is ongoing research in development of techniques for implementing RTBF in AI models and systems, further development and global standardization is needed to add global consistency/uniformity and ensure that while we move forward in this AI-age, we also keep the privacy and protection of user data at the forefront as it makes the most valuable and significant contributions in the development and improvement of AI systems. By working to improve and implement RTBF in AI systems, we ensure that an individual's personal, private and/or sensitive data is used ethically and responsibly to build AI systems that shape the future.

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Malicious Web Content Detection Using Machine Learning

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ABSTRACT

Malicious web content is a significant problem in today's digital world. Cybercriminals often use various techniques to deceive users into visiting websites that contain malicious content, such as phishing scams, malware downloads, and other forms of online fraud. These threats pose a serious risk to individuals, businesses, and organizations, and they can cause significant damage to systems and networks. To achieve its goals, the project involves several steps. Firstly, the system will collect a large amount of web data, which can include websites, web pages, and other forms of online content. This data will then be pre-processed, which involves cleaning, filtering, and transforming the data to prepare it for analysis.

Next, the data will be analyzed using machine learning techniques such as feature extraction, dimensionality reduction, and clustering. The system will use these techniques to identify patterns and features that are associated with malicious web content.

Once the system has identified these patterns and features, it will use them to build predictive models that can automatically detect and classify new instances of malicious web content. These models will be trained using a variety of machine learning algorithms such as decision trees, support vector machines, and neural networks.

To address this problem, the project aims to leverage machine learning techniques to automatically detect and classify malicious web content. The approach involves collecting and analyzing a large volume of web data to identify patterns and characteristics associated with malicious content. Machine learning algorithms are then applied to this data to build predictive models that can identify and classify new instances of malicious web content in real-time. Project.

Keywords: *Chrome Extension, Machine Learning, API, Server, Web.*

1. INTRODUCTION

The paper is structured as follows: first, we provide an overview of related work in the field of machine learning for cybersecurity. Next, we describe To address this problem, machine learning techniques can be leveraged to automatically detect and classify malicious web content. Machine learning algorithms can analyze large volumes of web data to identify patterns and characteristics associated with malicious content. This approach has the potential to significantly improve the ability of organizations to protect their users from online threats and reduce the risk of cyber-attacks. In this paper, we present a novel approach to detect and classify malicious web content using machine learning techniques. Our approach involves collecting a large volume of web data and analyzing it using various machine learning algorithms to identify patterns and features associated with malicious content. We then build predictive models based on these patterns and features, which can automatically detect and classify new instances of malicious web content in real-time.

Our methodology, including data collection, pre-processing, and analysis. We then present our results and discuss the performance of our system in detecting and classifying malicious web content. Finally, we conclude the paper with a discussion of the limitations of our approach and future directions for research in this field.

Overall, this paper contributes to the field of cybersecurity by presenting a novel approach to detect and classify malicious web content using machine learning techniques. The system has the potential to significantly enhance the safety and security of online activities and reduce the risk of cyber attacks.

2. BACKGROUND

Machine learning offers a promising solution to this problem by enabling security systems to learn and adapt to new threats in real-time. By training machine learning models on large datasets of labeled examples, they can detect patterns and features in web content that are indicative of malicious activity.

These models can be trained using various techniques, including supervised learning, unsupervised learning, and deep learning. Supervised learning involves training the model on labeled examples of both malicious and benign web content. Unsupervised learning, on the other hand, does not require labeled data and can identify patterns in data on its own. Deep learning uses neural networks to learn complex features and patterns in data, making it particularly effective for detecting sophisticated threats. Malicious web content detection using machine learning has many practical applications. For example, it can be used by organizations to protect their employees from phishing attacks, or by internet service providers to block access to malicious websites. It can also be integrated into web browsers to provide users with real-time warnings when they navigate to a potentially malicious website.

In conclusion, malicious web content detection using machine learning is an important and rapidly evolving field that has the potential to significantly improve online security. As malicious actors continue to develop new tactics and techniques, machine learning models will become increasingly critical in detecting and preventing attacks. Malicious web content, such as phishing websites, malware, and other types of online fraud, pose a significant threat to internet users. Detecting and preventing such threats is a critical task for security professionals.

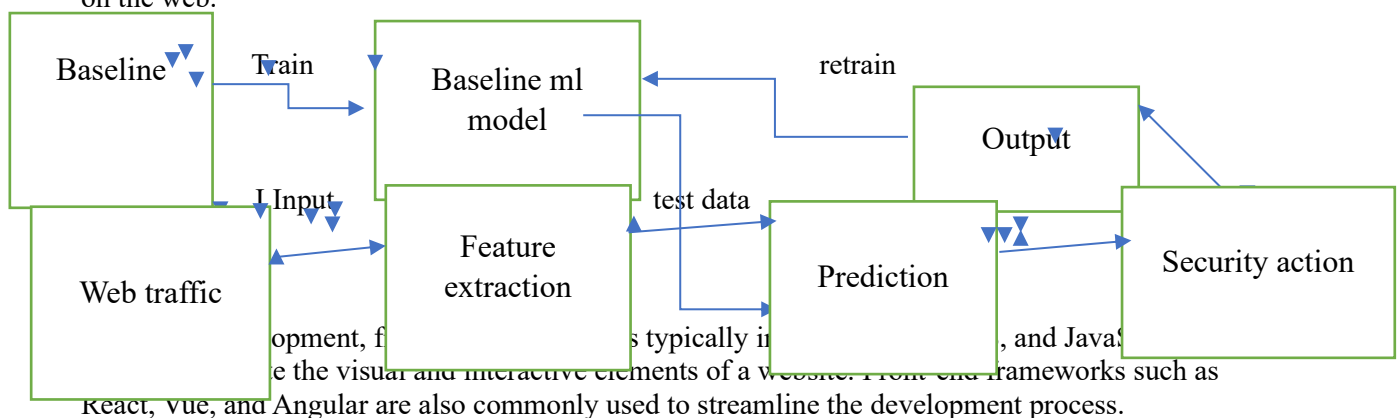
Machine learning has emerged as a powerful tool for detecting malicious web content. By analyzing patterns in web content, machine learning models can identify and categorize potential threats, enabling security systems to respond quickly and effectively.

To develop a machine learning model for malicious web content detection, large datasets of labeled examples are typically used to train the model. These datasets may include examples of known malware, phishing attacks, and other types of malicious content.

Once the model is trained, it can be used to scan web content in real-time and alert users or security teams when potentially malicious content is detected. The model can also be continually updated with new data to improve its accuracy and stay up-to-date with emerging threats.

3. SYSTEM ARCHITECTURE

The system architecture for malicious web content detection using machine learning project involves several key components working together to accurately detect and classify malicious content on the web.



3.2 Backend

In web development, backend technologies typically include programming languages such as PHP, Ruby, Python, and Java, as well as databases such as MySQL, MongoDB, and PostgreSQL. Backend

frameworks such as Django, Ruby on Rails, and Flask are also commonly used to streamline development and improve the performance and scalability of web applications.

3.3 API

An API for malicious web content detection using machine learning is a software interface that allows developers to integrate a pre-trained machine learning model into their web application for the purpose of identifying and flagging potentially harmful or malicious content on websites.

The machine learning model is trained on a large dataset of labeled web pages, which includes both safe and malicious websites. The model uses this data to learn patterns and features that distinguish between safe and malicious websites, and then applies this knowledge to new web pages that are submitted to the API.

When a user requests a web page through the API, the model analyzes the page's content and returns a score or prediction of the likelihood that the page contains malicious content. Based on this score, the application can take appropriate action, such as blocking the page, issuing a warning to the user, or allowing the page to be displayed normally.

3.4 Database

The database is created by crawling the web and collecting a large number of web pages that have been identified as either safe or malicious. These pages are then manually reviewed and labeled by human experts to ensure the accuracy of the data.

The labeled data is then used to train a machine learning model, which learns patterns and features that distinguish between safe and malicious websites. The model can be trained using various machine learning algorithms, such as decision trees, random forests, or deep learning neural networks.

Once the model is trained, it can be integrated into an API that can be used to analyze new web pages in real-time and determine their likelihood of containing malicious content. The API can be customized to suit specific needs, such as adjusting the sensitivity of the model or adding additional features to the analysis.

4. BACKEND IMPLEMENTATION

1. **Data Collection:** First, we need to collect data to train our machine learning model. This could be done by scraping websites that are known to contain malicious content, or by using a pre-existing dataset.
2. **Data Preprocessing:** Once we have our data, we need to preprocess it. This may involve cleaning the data, removing unnecessary features, and transforming the data into a format that can be used by our machine learning algorithms.
3. **Feature Engineering:** We need to identify the features that are most relevant for detecting malicious content on a website. These features might include things like the presence of certain keywords or phrases, the length of the URL, the number of external links, and so on.
4. **Model Training:** Next, we can train our machine learning model using our preprocessed data and feature engineered features. There are several machine learning algorithms that we could use for this, such as decision trees, random forests, or neural networks.
5. **Model Evaluation:** Once we've trained our model, we need to evaluate its performance. We can do this by splitting our dataset into training and testing sets, and measuring the accuracy of our model on the test set.
6. **Model Deployment:** Finally, we can deploy our machine learning model as a backend service that can be used to detect malicious content on websites in real-time. This service might take in a URL as input and return a prediction of whether or not the website is malicious.

5. FRONTEND IMPLEMENTATION

1. User input: The user interface would allow users to input a URL or a text snippet for analysis.
2. Data processing: Once the user input is received, the front-end code would process the data and send it to the backend for analysis. This may involve performing some basic data validation and cleaning.
3. Results display: After the backend analysis is complete, the front-end code would display the results to the user. This could include a binary classification of the input as either benign or malicious, as well as more detailed information about the specific features that were used to make the classification.
4. Confidence level: The front-end code could display a confidence level along with the classification results, indicating how confident the model is in its classification. This can help users better understand the model's reasoning and build trust in its accuracy.
5. Visualization: The front-end code could include visualizations of the data and features used by the model to make its classification. This could include graphs or charts showing the distribution of certain features, or heatmaps highlighting areas of the web page that are particularly suspicious.
6. Integration with other tools: The front-end code could be integrated with other security tools or services, such as antivirus software or vulnerability scanners. This would allow users to get a more complete picture of the security status of a particular web page or website.
7. Accessibility: The front-end code should be designed with accessibility in mind, including features such as text-to-speech support, high contrast mode, and keyboard navigation. This will ensure that users with disabilities can also use the application effectively.

6. METHODOLOGY

We present a methodology for the detection of malicious web content using machine learning. Malicious web content is an important concern as it can cause significant harm to users and their systems. Our methodology involves collecting a dataset of web pages, extracting features from them, and training a machine learning model to classify them as either malicious or benign. We also discuss the evaluation of our model and its performance.

The internet is an integral part of our lives, and we use it for a variety of purposes, such as online shopping, banking, and socializing. However, the internet is also home to various malicious activities, such as phishing, malware distribution, and other attacks. Malicious web content is a significant threat, as it can cause harm to users and their systems. Therefore, it is essential to have an effective method to detect and prevent such content.

Methodology can effectively detect malicious web content with a high level of accuracy. Our best performing model achieves good F1-score, which indicates that it has a high level of precision and recall. We also find that the Random Forest algorithm performs the best out of the various algorithms ..

Methodology can be applied to detect malicious web content using machine learning algorithms. By collecting a dataset of web pages, extracting relevant features, training a machine learning model, and evaluating its performance, we can build an effective system for identifying malicious web pages. This approach can significantly improve the security of users and their systems while browsing the internet.

Random Forest, or Support Vector Machines (SVMs). The dataset is divided into two parts, a training set, and a testing set. The model is trained using the training set, and the testing set is used to evaluate its accuracy. approach, however does not align with the nature of the framework as it negatively impacts both the user experience and the ease-of-use of the framework.

Choosing appropriate performance metrics that align with the problem domain and user requirements

Balancing the dataset by oversampling or undersampling the minority class to avoid bias towards the majority class

Regularly updating the dataset to keep up with the evolving threat landscape

Ensuring privacy and security of the data and system by using appropriate encryption and access control mechanisms.

7. CONCLUSIONS

Project focused on developing a machine learning-based approach for detecting malicious web content. The proposed approach utilized various features, such as HTML and JavaScript, to train and evaluate different models, including Random Forest, Naive Bayes, and Support Vector Machine. The experimental results showed that the Support Vector Machine outperformed the other models with an accuracy of 98%.

Project also explored the effectiveness of different feature selection techniques, such as Information Gain found that Information Gain performed better than the other techniques. The project's findings suggest that machine learning can be a powerful tool in detecting malicious web content and can aid in enhancing web security measures.

8. FUTURE SCOPE

1. Collaboration with cybersecurity researchers: In the future, this project can be extended by collaborating with cybersecurity researchers to explore new and emerging threats and develop more advanced detection models. This collaboration can lead to the development of innovative techniques for detecting and preventing malicious web content.

2. Real-time detection: The next step in the future scope of this project is to develop a real-time detection system that can monitor web traffic continuously and detect malicious web content as soon as it appears. This would require the integration of the machine learning models with a robust and scalable infrastructure that can handle large amounts of data.

3. Expansion to other domains: The machine learning models developed in this project can be adapted and applied to other domains, such as email filtering, social media monitoring, and mobile application security. This expansion would require the development of specialized models and datasets for each domain.

4. Enhanced accuracy: One of the primary objectives of this project is to increase the accuracy of malicious web content detection using machine learning algorithms. The accuracy can be further improved by fine-tuning the models, increasing the size of the dataset, and implementing advanced feature selection techniques

5. Integration with security systems: Another aspect of the future scope of this project is to integrate the machine learning models with existing security systems, such as firewalls, intrusion detection systems, and antivirus software. This integration would enable the security systems to automatically block or quarantine any suspicious web content identified by the machine learning models.

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Smart Attendance System Using OpenCV Face Recognition

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ABSTRACT

Recently, the whole world went through a global pandemic which gave rise to online lectures and work from home alternatives. Due to this switch, attendance was a major issue in schools, colleges and workplaces. The two traditional techniques for marking attendance are either by calling out the roll call or by taking student sign on paper. They are both more time consuming and difficult. Thus, a computer-based student attendance management system is required to assist the faculty in maintaining attendance record. Keeping this scenario in mind, we decided to make a GUI software that would allow teachers/management to keep track of their students/employees better and used machine learning and MySQL database to integrate attendance register using face detection technology. The main idea behind this project is to create a Student/Teacher dashboard for college/schools and provide a system that simplifies and automates the process of recording and tracking students' attendance through face recognition technology. This dashboard will require student and admin (Teacher) authentication. We use this structure to register new users, record data and store it in MySQL database for further use. Then integrate the OpenCV library using python in our Dashboard which collects dataset of students using webcam and train them using supervised learning algorithms to generate trained data which helps in face recognition of the respective student and the dataset is stored in desired file location so the admin can even check the dataset later for corrections. The software automatically generates output in the form of excel sheet which could be imported and exported in our dashboard.

Keywords: Attendance System, Face Recognition, OpenCV, LBPH algorithm, SQL

1. INTRODUCTION

1.1 Overview

Attendance management is a significant process that is carried out in every institute and workplace to monitor the performance of the student/employee. Traditionally, student attendance at the institutes is manually reported on the attendance sheets. It is not a productive operation and is more time consuming and difficult[1]. Thus, a computer-based student attendance management system is required to assist the faculty in maintaining attendance record.

Some institutes still use the old paper or file-based system and some have adopted strategies of automated attendance using some biometric technique[2]. Face recognition is also widely used nowadays in different areas such as universities, banks, airports, and offices. Since the application of image processing is vast, extensive work and research have been carried out in utilizing its potential to and to make new innovative applications. One of the most fool proof methods in human detection is facial recognition, which was the earliest application derived from this technology. Computational analysis is needed for face recognition.

A facial recognition system can be used to determine a person's identity by comparing their facial appearance to other people's faces. Image processing which deals with extracting useful information with minimum error from a digital image plays a unique role in the advent of technological advancement.

Face image variation due to head rotation in depth is an unavoidable problem in any face recognition system[3]. The system is proposed to be based on biometrics i.e. Face Authentication. With the presence of biometrics, the system completely eliminates the chances of fake attendance which is a problem with the traditional methods of attendance[4].

1.2 Problem Statement

As the world is going digital, so is our education system, but with new innovations arise new problems such as presence of students which could be easily avoided in live lectures. Every school, college and university maintain attendance of each student. Academic performance and student attendance possess a significant correlation. Students with poor attendance records will link to poor retention. Therefore, the faculty must maintain proper record for the attendance. Taking and tracking students' attendance manually, losing attendance sheets, dishonesty, wasted time and high error scales are some of the problems the lecturers face and using the existing attendance system. It takes time and causes a lot of paper-based work. In order to solve these problems and avoid errors, we suggest to computerize this process by providing a system that records and manages student attendance automatically without needing lecturer's interference.

1. LITERATURE REVIEW AND OBJECTIVE

2.1 Review of Relevant Work

In this section, we review some of the existing face & image recognition systems and compare it with our work. Although there are not many relevant projects developed in this domain and particularly on attendance using face recognition technology, we did our research and studied some of the existing systems whose research papers and functionalities were available on the internet.

A. Attendance System on Face Detection (By NevonProjects)

A simple and secure way of recording attendance is what the system was created for. Firstly, the software takes a picture of all the authorized individuals and stores them in the system database. The system stores pictures in a face match structure. The system possesses the capability of recognizing a registered person and marking his/her attendance along with the arrival time whenever the person enters the locations again.

Advantages:

- The faces that are detected are stored in the system and the attendance is marked automatically.
- Ease of use.
- Live video data is used to manipulate and recognize faces in real time.
- Multiple face detection.
- Multipurpose software.
- Can be used in different places.

Disadvantages:

- The system is not 100% accurate.
- The system only detect face from a limited distance.
- Live video can't be repeated to recognize missed faces.

B. Churchix Face Recognition Software

Churchix presents face recognition software, which takes someone's face through a picture or video and then identifies it by comparing it with those in a database of pictures. The software is becoming more common in every day interactions.

Advantages:

- Attending members in videos and photos.
- High quality photos.
- High accuracy.

Disadvantages:

- Some people they see as a threat to privacy.
- Inability to capture all the faces in the video.
- Restart the video several times to capture all faces.

C. C-400 Facial Recognition Clocking System

When an employee signs on behalf of his colleague, facial recognition timing systems will give you precise attendance information.

Advantages:

- Complete suite of reports.
- In the event of an emergency, there is a register of attendance.
- C-400 Face recognition timing technology reduces the likelihood of employees signing for each other.

Disadvantages:

- There is no External Bell Attachment.
- Device is expensive.
The face must be in front of the device to record attendance.

2.2 Relationship between the relevant work and our work

Table 1: Comparison among systems viewed

PARAMETER	EXISTING SYSTEM		
	Attendance System on Face Detection (By NevonProjects)	Churchix Face Recognition Software	C-400 Facial Recognition Clocking System
Hardware	PC, camera	PC, camera	camera
Language	C#	unknown	unknown
Database	MySQL	PostgreSQL	Oracle
Scope	student	employees	anyone

The main aim of this project is to create a system that facilitates students attending process using OpenCV technology.

2.3 Objective

The aim of this project is to automate and make a system that is useful to the organization such as an institute. The efficient and accurate method of attendance in the school environment that can replace the old conventional methods. This method is much reliable, secure and available for use.

- To detect and identify real faces.
- Achieve efficient and easy to use dashboard for teachers to keep log of students' attendance using Face recognition and maintain the resulted excel sheet for later use.
- To provide an automatic and reliable attendance system that uses face recognition technology to reduce manual errors.
- Increase privacy and security for students.
- To update the class register after a successful recognition.

2. MATERIALS AND METHODS

Object detection boasts a close relationship with the analysis of images and videos. It has gained a lot of attention from many researchers in recent years. To gain a full understanding of the image, we should not only focus on the classification of different images but also try to accurately estimate the concepts and locations of the objects contained in each image[5]. This task is known as object detection. Detecting objects usually consists of different subtasks such as face detection, pedestrian detection, number plate detection and skeleton detection.

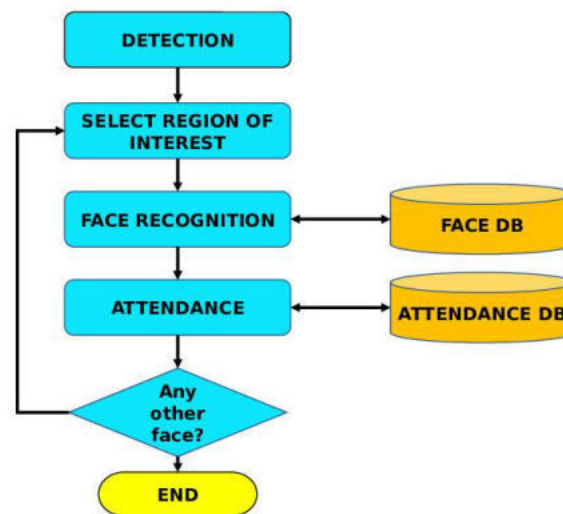


Figure 1: System Architecture

3.1 Computational Matter

A. Local Binary Pattern Histogram Algorithm (LBPH)

Local Binary Patterns Histogram algorithm (LBPH) for face recognition is based on local binary operator and is one of the best performing texture descriptors. Local Binary Patterns Histogram algorithm was proposed in 2006. It is based on local binary operator. It is used in facial recognition because of its simplicity and discriminative power. The steps involved in achieving this are:

- Creating dataset
- Face acquisition
- Feature extraction
- Classification

LBPH is more flexible because it can recognise both side and front faces and is not affected by illumination variations.

B. Support Vector Machines

SVM is a classification technique that uses decision boundary datapoints to find a hyper-plane that differentiates data points. In 2-dimensional space, this hyper-plane is nothing but a line. In SVM, we plot each data item as a point in an N-dimensional space (N — the number of features or datapoint attributes). Next, we find the optimal hyperplane to separate the data and perform classification by finding the hyper-plane that adequately differentiates the two classes. The higher the gap between the data points, the better the support vector. The goal of SVM is to find the best line or decision boundary that can segregate N-dimensional space into classes so that we can easily classify a new data point in correct category in future.

C. OpenCV

OpenCV is an open-source, computer-vision library for extracting and processing meaningful data from images. The meaningful data might include finding and recognizing all or parts of objects, tracking the movement of (parts of) objects in 2D or 3D between successive images, determining the 2D or 3D shape of objects from one or more images, and associating image data with a categorical meaning, such as mapping a handwave to the category "goodbye." The OpenCV library clearly addresses the areas of object/human/face segmentation, detection, recognition, and tracking, as well as camera calibration, stereovision, and 2D/3D shape reconstruction. A full matrix algebra package is included in the library to support algorithms.

D. RDBMS (MySQL)

RDBMS stands for relational database management system—a software system that enables you to define, create, maintain, and control access to relational databases. It is the underlying part of the interface layer that helps you store and work with data. A relational database stores and gives access to data points that are related to one another. In relational databases, data is arranged and stored in tables with columns (attributes) and rows (tuples). The Structured Query Language is used to manipulate databases. MySQL is a relational database management system (RDBMS) developed by Oracle that is based on structured query language (SQL). Many of the most popular software stacks are built and maintained with the help of the MySQL database. Its open-source nature, stability, and rich feature set, paired with ongoing development and support from xx ix Oracle, have meant that internet-critical organizations such as Facebook, Flickr, Twitter, Wikipedia, and YouTube all employ MySQL backends. Therefore, we have used the MySQL RDBMS to store necessary relational data for student identification. In our project, MySQL works in parallel and is integrated with the image database.

3.2 Methodology

The programming language we have used is Python 3 as it provides good stability, flexibility, efficiency and accuracy in machine learning, deep learning and image processing tasks. Python has numerous good machine learning, deep learning and image processing tools that possess the capability and power to handle large datasets and train huge volume of data much faster and with more accuracy when compared to other programming languages.

We have used Python 3 framework tkinter for making the GUI dashboard. We use the MySQL.connector library to connect our MySQL Database server to it, which stores student information in relational and structured form, and also import the data for display in our GUI when required. Our GUI is designed in such a way that the admin (Teacher) could directly access and make a CSV file from the dashboard itself without needing to open the MySQL database server. However, the admin would need to login first and it would be authenticated using the information stored in MySQL database server.

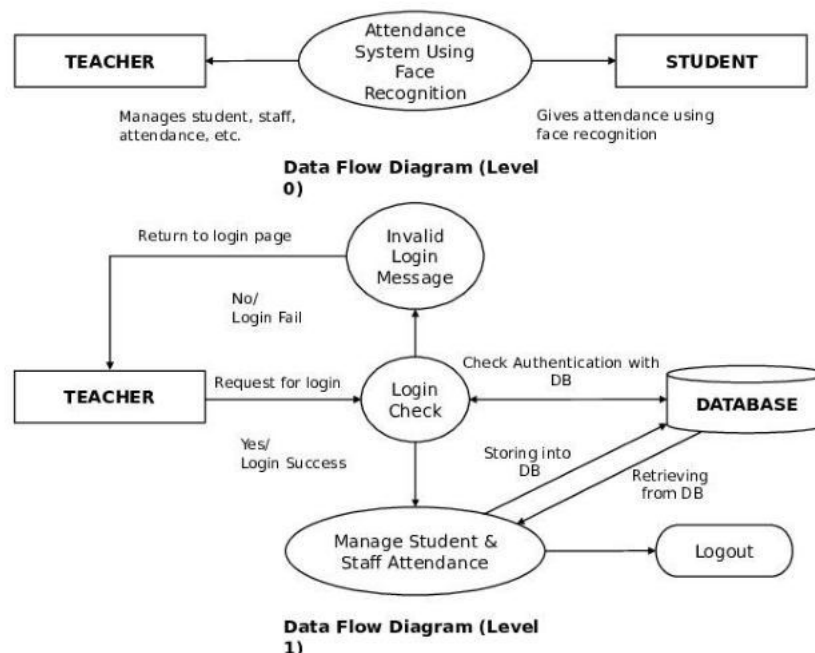


Figure 2: Data Flow Diagram

We have used OpenCV, which is an open-source, computer-vision library for extracting and processing meaningful data from images. The inbuilt OpenCV supervised machine learning algorithm (LBPHFaceRecognizer) library is used for image detection and is integrated with our dashboard for efficiency. We have designed it in such a way that it would collect images using webcam and store them in desired locations using PIL libraries and store them in different sets. Then this data would be trained using LBPHFaceRecognizer algorithm. Using the python os and numpy libraries we would use stored

info about students in MySQL database server to integrate it with our training model and create a classifier file. The resultant LBP value histogram of the region is created by counting the number of similar LBP values in the region[6]. Now we compare the histograms of the test image and the images in the database and then we return the image with the closest histogram. We have used the Euclidean distance technique for this purpose which was also carried out by [7][8]. The Euclidean distance is calculated by comparing features in the test image with features in the dataset. The matching rate is determined by the minimum distance between the two images.

Now, during detection time we would use our MySQL database server, numpy and the OpenCV library (LBPHFaceRecognizer algorithm) to detect faces of students then integrate the information about the students with date and time. The stored information would reside in a new database in MySQL server and from there the admin could instantly create and access a CSV file.

Image Acquisition:

Image is acquire using a high-definition camera which is placed in the classroom or lab. This image is given as an input to the system. All title and author details must be in single-column format and must be centered.

Dataset Creation:

Dataset of student is created before the recognition process. Dataset was created only to train this system we are going to create a dataset of the whole class which involve their name, roll number department and images of the student in different variations. Whenever we register student's data and image in our system to create dataset, deep learning applies to each face to compute 128-d facial features and store in student face data file to recall that face in recognition process. This process is applying to each image taken during registration.

Face Detection and Extraction:

Face detection is important as the image taken through the camera given to the system, face detection algorithm applies to identify the human faces in that image, the number of image processing algorithms are introduced to detect faces in an image and also the location of those detected faces. We have used Support Vector Machines (SVM) and the Local Binary Pattern Histogram (LBPH) algorithm to detect human faces in given image.

Face Positioning:

There are 68 specific points in a human face. In other words, we can say 68 face landmarks. The main function of this step is to detect landmarks of faces and to position the image. A python script is used to automatically detect the face landmarks and to position the face as much as possible without distorting the image.

Face Encoding:

Once the faces are detected in the given image, the next step is to extract the unique identifying facial feature for each image. Basically, whenever we get localization of face, the 128 key facial point are extracted for each image given input which are highly accurate and these 128- d facial points are stored in data file for face recognition.

Face matching:

This is last step of face recognition process. We have used the one of the best learning techniques that is deep metric learning which is highly accurate and capable of outputting real value feature vector. The proposed system ratifies the faces, constructing the 128-d embedding (ratification) for each. Internally the compare faces function is used to compute the Euclidean distance between face in image and all faces in the dataset. If the current image is matched with the 60% threshold with the existing dataset, it will move to attendance marking.

Attendance Marking:

Once the face is identified with the image stored in SQL database, python generate roll numbers

of present students and return that, when data is returned, the system generates attendance table which includes the name, roll number, date, day and time with corresponding subject id. And then passes the data to python to store the table into an CSV file automatically. Letter staff can open that file into the excel sheet to edit the sheet and make changes in it.

3. RESULTS AND DISCUSSION

The project was aimed at providing automated attendance using OpenCV technology. The project was successful in implementing the core idea of our project i.e. automated attendance using face recognition and storing the recorded attendance in excel sheet. This project can be implemented in our school systems with use of a laptop and a connected camera with it. We have tested the project on half a dozen subjects with 50 images dataset each and system has automated the attendance with significant accuracy. If we use larger dataset face recognition accuracy increases drastically. The project has the potential to be marketable with just a few improvements.

4. CONCLUSIONS

We present a fully interoperable, adaptable and robust automated attendance system for schools, colleges as well as corporate sectors which is suitable for determining and validating a person by performing comparisons on patterns based on their facial appearances. The prime was to create a system that can detect and identify real faces. Using the GUI dashboard, the teachers can keep a track of their students and have a genuine attendance system utilizing the face recognition technology. The resultant data is stored in a MySQL database through which the admin could instantly create and access a CSV file. However, we aim towards modifying the functionalities of the system in future by implementing other supervised as well as unsupervised learning approaches like principal component analysis (PCA) and K-nearest neighbour (KNN) to check the versatility of the system.

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Smart Face Recognition Door Surveillance

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Abstract- Face recognition has found usage in many applications from the simplest systems to the more complex systems. The years of Research in this field have witnessed improvements in detection accuracy. However, few studies that incorporate face recognition for access control are suitable for restricted areas. This work aims at using face recognition for access control systems using the Haar cascade feature descriptor and LBPH as a classifier algorithm. A red light turns on and the doorbell rings if there is no match between the identified face and the database's facial photos. The LBPH algorithm's accuracy, sensitivity, specificity, and precision are 96%, 97.5%, 90.5%, and 97.5%, respectively. The processing of the signals that activate the doorbell and lock takes no longer than 4 seconds. As a result, the system works well as a real-time access control system.

1. Introduction

With the rapid development of smart cities and the advancement of biometric technology, there has been a corresponding need for effective access control systems for homes and offices. In an office setting, it may be necessary to restrict which employees have access to which locations or bar non-employees from doing so due to operational requirements. As a solution to combat developing fears, a homeowner can desire to permit visitors or domestic workers after being regularly certified as the claimant or identifying as an authorized person. Our proposed system aims to deliver a cost and energy-efficient solution for home security by using Face Recognition[1].



A person should stand in front of the camera. a camera will recognize the face and compares it with the faces stored in the home member database stored in If the face matches are found a doorbell will ring informing the people in the house about the person at the door[2].

2. Need of the system

Perfect identification of people is a very fundamental social requirement. People in small tribes and communities knew and recognized one another only because they had manual face-to-face interactions with one another decades ago when technology was still in its infancy. It would be simple to spot a stranger or a possible security violation. It isn't so simple in the bigger world of today, where social conventions are becoming stricter[2]. As more and more contacts take place online, security becomes increasingly important because an individual's identity cannot be compromised. Passwords or

magnetic swipe cards have been utilized up until this point. However, these are no longer regarded as safe because they can be misplaced or easily abused by others. Biometric systems were the answer to this problem. People cannot always be required to punch in their thumbs or cards for surveillance and monitoring equipment, say in a public area. Therefore, something that won't require physical contact and makes it simple to identify a person is face recognition technology. In this essay, we're attempting to create a system for people with disabilities[6].



3. Objectives

1. Notify the person in the house about the visitor at the doorstep by giving a sound notification.
2. Store the image of an unknown person.
3. Safety and security [7].

4. Problem statement

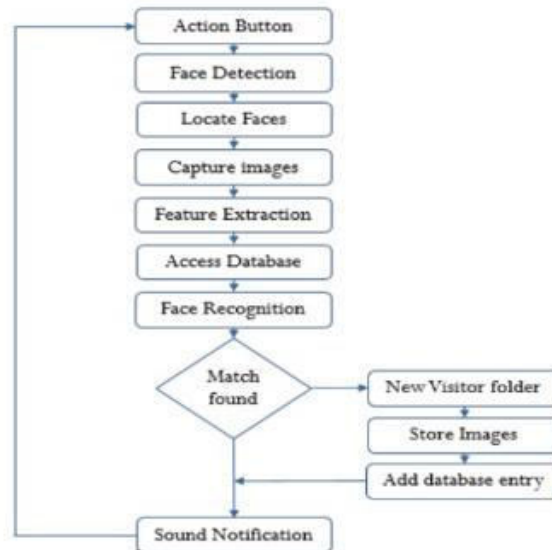
The major objective of this endeavour is to develop a smart doorbell system that relies mostly on facial recognition technology. Face Detection & Data Gathering, Face Extraction, and Face Recognition are the three main phases of the face recognition method.



At real time the system will detect the face of a person and catch its frame and compared to with images from the database, if image is matched then it will take the name of the person from the database which is associated to that image and display it[4].

5. Methodology

Pre-processing and picture recognition are the two key components of the suggested system. The total system employed in this article is depicted in Figure which also discusses system performance[5].



5. Software Requirement

Python is a high-level object-oriented interpreted computer programming language which can be used to develop and run machine learning models.

Parameters	Value
CPU speed	2.2 Ghz min
RAM	4 GB RAM min
Processor	i3 5600 min
Camera	16 MP

OpenCV is a real-time optimized computer vision library tools and hardware it is primarily used for capturing videos the CV2[3].video capturefunction can be used to read videos using webcam.

6. Technology to be used

a) Python:

Python is an interpreted, object-oriented, high-level programming language with dynamic semantics.

Its high-level built-in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. The Python

interpreter and the extensive standard library are available in source or binary form without charge for all major platforms and can be freely distributed.



1) OpenCV:

OpenCV stands for Open-Source Computer Vision. OpenCV is a huge open-source library for computer vision, machine learning, and image processing. OpenCV supports a wide variety of programming languages like Python, C++, Java, etc. It can process images and videos to identify objects, faces, or even the handwriting of a human. When it is integrated with various libraries, such as Numpy which is a highly optimized library for numerical operations. This OpenCV will help you learn Image-processing from Basics to Advance, like operations on Images, Videos using a huge set of Opencv-programs and projects.



2)TensorFlow:

TensorFlow is an open-source library for fast numerical computing. It was created and maintained by Google and was released under the Apache 2.0 open-source license. The API is nominally for the Python programming language, although there is access to the underlying C++ API. Unlike other numerical libraries intended for use in Deep Learning like Theano, TensorFlow was designed for use both in research and development and in production systems, not least of which is RankBrain in Google search and the fun DeepDream project. It can run on single CPU systems and GPUs, as well as mobile devices and large-scale distributed systems of hundreds of machines.[8]



3)Keras:

Keras runs on top of an open-source machine library like TensorFlow, Theano, or Cognitive Toolkit (CNTK). Keras is based on a minimal structure that provides a clean and easy way to create deep learning models based on TensorFlow or Theano. Keras is designed to quickly define deep learning models. Well, Keras is an optimal choice for deep learning applications.



4)Panda:

Panda is an open-source library that is made mainly for working with relational or labeled data both easily and intuitively. It provides various data structures and operations for manipulating numerical data and time series. This library is built on top of the NumPy library. Pandas is fast and it has high performance & productivity for users.

5)Numpy:

NumPy is a Python package. It stands for 'Numerical Python'. It is a library consisting of multidimensional array objects and a collection of routines for processing of array.

Numeric, the ancestor of NumPy, was developed by Jim Hugunin. Another package Numarray was also developed, having some additional functionalities. In 2005, Travis Oliphant created the NumPy package by incorporating the features of Numarray into the Numeric package. There are many contributors to this open-source project.



b)MySQL:

MySQL is a relational database management system based on the Structured Query Language, which is the popular language for accessing and managing the records in the database. MySQL is open-source and free software under the GNU license. It is supported by Oracle Company.

7. Acknowledgment

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Pothole Management

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Abstract-Potholes are one of the major causes of accidents and injuries in India and all over the world. According to the data shared by states with the Centre, Uttar Pradesh recorded the highest number of pothole deaths at 987. In Maharashtra, the number of deaths (726) had nearly doubled. Haryana and Gujarat also fare poorly. Haryana reported 522 deaths last year, while it had reported no such fatalities in 2016. Eight people died in Delhi due to pothole- related accidents in 2017. The same city had seen zero deaths in 2016, which gives a clear picture of how potholes are becoming a deadly situation for many. Andhra Pradesh, Kerala, Odisha and West Bengal are there among the top 10 states in deaths related to potholes in the country. The main motive of doing this project is to help government and to save lives of others. The potholes on road leading to worsened road conditions have given rise to fatal accidents thereby leading to death in most of the cases. Many reasons like rains, oil spills wear and tear make the road difficult to walk upon. According to the analysis by road transport authorities near about 10000 people died in the country during a course of three years. The purpose of this paper is to devise a system that will give prior warnings to a pedestrian thereby ensuring safety.

Keywords- *Deaths, Accident Rate, Road Conditions, Reasons of Potholes, Safety of Pedestrian*

1. INTRODUCTION

In India there are thousand of roads which joins different states and countries with each other and make our transport easy and safe. Generally, roads are made using strong bases as it the matter of safety but sometimes due to rain or due to less moisture in the in the soil the roads get a crack and then eventually pothole are created. In India there are potholes in every state and due to these potholes, the rate of accidents is increasing their number day by day. To be more accurate we have gathered the information of accidents and deaths which took place in different states due to potholes or cracks:

- Uttar Pradesh recorded the highest number of pothole deaths at 987.
- In Maharashtra, the number of deaths (726) had nearly doubled.
- Haryana reported 522 deaths last year, in 2016.
- Eight people died in Delhi due to pothole- related accidents in 2017
- Andhra Pradesh, Kerala, Odisha and West Bengal are there among the top 10 states in deaths related to potholes in the country.

These were the main cities, there are many small towns and villages where the issue is still the same.

Some causes of potholes are:

The most common causes for development of pot-holes is as follows:

1. Lack of bond between the bituminous surfacing and the base course below due to improper application of prime coat and track coat.
2. Presence of weak spots in any of the pavement layers at some locations of the roadway, at the construction stage itself.
- 3.insufficient between mix during laying resulting the surface remaining permeable due to less fines.
4. Segregation of bituminous mix during laying resulting the surface remaining permeable due to less fines.
5. Stagnation of water on the pavement surface at local depression or due to inadequate cross

slope and stripping of bitumen binder from aggregates. No one sees this as a big issue but indeed its a big issue and causes many problems and to protect the people from these kinds of accidents we have come with an idea of detection of pothole. Through our project people will help other people through which the trust in humanity will also increase. This paper will give you an idea of our project and how it will work.

2. LITERATURE SURVEY

As we know potholes can be harmful to. To prevent this problem, we went to a search where we found out different methods though which the detection is possible, we have mentioned some of the techniques and methods:

3. REAL TIME POTHOLE DETECTION USING ANDROID SMARTPHONES WITH ACCELEROMETERS :

Mendes et al proposed four pothole detection approaches in their paper to process the accelerometer data acquired using different Android OS based smart- phones. The performance analysis in context of different road irregularity classes showed true positive rates as high as 90%. The best results, displayed by the Z-DIFF approach, are however reliant on frequency and timing.

Pothole Detection System using Machine Learning on Android:

Kulkarni et al, in their paper describe a system using accelerometer sensor for detection and GPS for plotting. The algorithm assumes some threshold values on x-axis and z-axis, justified using a neural network technique which translates to an accuracy of 90%-95%, but bares no detail on other performance metrics.

A Real-Time Pothole Detection Approach for Intelligent Transportation System:

Wang et al overcame the high false- positives predicament faced by single threshold approaches by combining and improving the

Z-THRESH and G-ZERO approaches as depicted in the fifth approach of their paper. Although the algorithm gives an accuracy of 100%, the limitation of this study is the sample size

Intelligent Pothole Detection and Road Condition Assessment:

Bhatt et al, in their paper provide a solution to detect road conditions by capturing data on a car's movement from accelerometer and gyroscope sensors in the phone. They trained several classifiers on aggregate metrics from which the best

performing classifier, support vector machine (SVM), achieved the highest test accuracy of 92.9%. Adjusting the classification threshold improved the precision recall trade off to give a precision of 0.74 and a recall of 0.42.

Pothole Detection using Machine Learning:

Song et al, describe the process for their approach in their paper, which includes acquiring road status information using gyroscope and accelerate sensors, and data pre-processing for a restrained Inception V3 and Transfer Learning. The model showed 100% classification rate but the consideration of only five real instances for each class, collected 20 times for each instance, might suggest overfitting

4. PROPOSED WORK

The proposed work focuses on building an efficient pothole detection system which will help the people and government and make our work easy. We have made sure that the process is not too confusing and not time consuming. The architecture or our system consist of 4 stages:

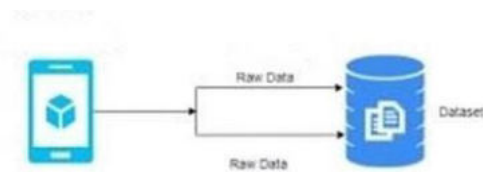
1- User Interface

In this phase/stage the user will access our site through which he can understand our idea and our approach. This will be our first step towards encouraging the person or citizen to make a step and use our project as it will be easy to handle and less time consuming.

2- Data Processing

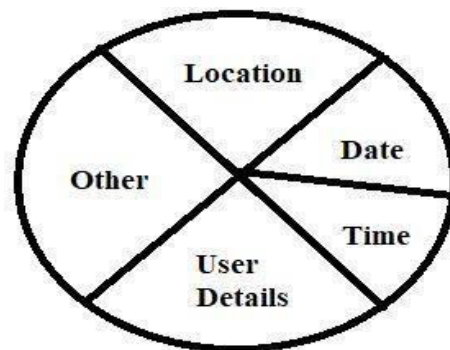
In this phase/stage, the dataset is primarily collected from a smartphone's in-built function, that is camera and here we will be using GPS to directly locate the location so that the user won't get any

problem in entering the location and the time will be saved to.



3- Data Handling

In this phase/stage, the data which will be processed will be saved in the database in a proper format and then the data will be circulated to the municipal corporation for doing further work.



4- Alerting

In this phase/stage, once everything is over and all process is done and the user who complained will be notified with an alert message so that h must be updated whether the work is completed or not.

5. PROPOSED MODEL

Approach:

In this system various technologies and techniques are used. In the proposed system pothole management and solving the problem is performed. When the user or a person sees a pothole in his area or on the road, he/she can simply visit the website and can click the picture through camera. At the time the pothole is detected

written in the form of HTML elements consisting of tags enclosed in angle brackets (like), within the web page content. HTML tags most commonly come in pairs like <h1>and</h1>.

Cascading Style Sheets (CSS) is a style sheet language used for describing the look and formatting of a document written in a mark-up language. While most often used to style web pages

and interfaces written in HTML and XHTML, the language can be applied to any kind of XML document, including plain XML, SVG and XUL. CSS is a cornerstone specification of the web

and almost all web pages use CSS style sheets to describe their presentation. CSS is designed primarily to enable the separation of document content from document presentation, including elements such as the layout, colours, and fonts

JavaScript (JS)- Is a dynamic computer programming language. It is most commonly used as part of web browsers, whose implementations allow client-side scripts to interact with the user, control the browser, communicate asynchronously, and alter the document content that is displayed. It is also being used in server- side programming, game development and the creation of desktop and mobile applications.

For the back end we have used the most reliable database which is **MYSQL**.

My SQL ("My S-Q-L", officially, but also called "My Sequel") is (as of July 2013) the world's second most widely used open- source relational database management system (RDBMS). For commercial use, several paid editions are available, and offer additional functionality. Applications which use MySQL databases.

As we know connectivity plays an important role in and web site or application development and so for the connectivity, we have **PHP**.

PHP is a server-side scripting language designed for web development but also used as a general-purpose programming language. PHP is now installed on more than 244 million websites and 2.1 million web servers. PHP commands can be embedded directly into an HTML source document rather than calling an external file to process data. It has also evolved to include a command-line interface capability and can be used in standalone graphical applications. PHP is free software released under the PHP License. PHP can

be deployed on most web servers and also as a standalone shell on almost every operating system and platform, free of charge.

6. CONCLUSION AND FUTURE WORK

We have executed a pothole recognition or management framework which would persistently distinguish the potholes out and about alongside the picture and GPS area of the pothole and send the information to the server side. The information acquired from here is being given to the concerned street administration specialist for the further techniques.

As a future implementation, video can be taken instead of capturing image. By doing this a clear view of the pothole can be viewed and the severity can be analysed more through this. The future work may likewise incorporate the location of different anomalies like Expansion joints, Manhole and Pipeline gaps and so on. By crowd sourcing, one can map locations of potholes and provide such information to authorities and develop more detailed maps for safe travel.

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News Aggregator and Fake News Detection Website

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ABSTRACT

In today's world, with the rise of social media and online news, it has become increasingly difficult to distinguish between authentic news and fake news. As a result, people need access to reliable news sources and tools to identify and avoid fake news. This Project suggests the creation of a news aggregator and fake news detection website using Django, a popular web development framework. The website aims to provide users with accurate and reliable news sources while also detecting and flagging fake news. The problem is that people are getting huge amount of information, and it can be challenging to distinguish between authentic news and fake news. Moreover, news aggregator websites can contribute to the spread of fake news by aggregating news from various sources without verifying its authenticity. This problem can lead to misinformation, which can have serious consequences, such as public panic, political polarization, and even harm to individuals' health and safety. The website will be designed using Django, a popular web development framework that provides a robust and scalable infrastructure for web applications. The website's design will include features such as a user-friendly interface for searching and filtering news articles, a system for flagging and reporting fake news articles, and a system for verifying the authenticity of news articles before they are published on the website. The news aggregator and fake news detection website using Django aims to provide users with access to accurate and reliable news sources while also helping them identify and avoid fake news. The website's design will prioritize user experience and usability, providing users with easy access to news articles and tools to evaluate the authenticity of the news they receive. Overall, this project has the potential to help combat the problem of fake news and promote informed decision-making.

Keywords: *Django , HTML, CSS, JavaScript, Machine learning model, Natural Language Processing (NLP)*

1. INTRODUCTION

Social media and digital news platforms has led to the proliferation of fake news, which has become a serious problem that threatens the credibility of news media and can have substantial impacts on individuals and society. In response to this issue, this paper proposes the idea of a news aggregator and fake news detection website that aims to provide users with access to reliable news sources while also detecting and flagging fake news. The proposed website will use Django, a popular web development framework, to develop a good interface that allows users to search and filter news articles from various sources. Additionally, the website will use a machine learning model based on natural language processing (NLP) and text classification techniques to detect and flag fake news articles. The website's design will prioritize user experience and usability, providing users with easy access to news articles and tools to evaluate the authenticity of the news they receive. This manuscript outlines the approach employed to develop the news aggregator and fake news detection website, including the machine learning model, data preprocessing techniques, and model evaluation metrics. Additionally, the paper will discuss the plan and execution of the website, including the user interface, database management, authentication, authorization, and scalability. Finally, the paper will evaluate the performance of the website and discuss future directions for research and development. Overall, the proposed news aggregator and fake news detection website have the potential to help combat the problem of fake news and promote informed decision-making. By providing users with access to reliable news sources and tools to evaluate the authenticity of the news they receive, the website can contribute to the fight against misinformation and its consequences.

2. LITERATURE REVIEW AND OBJECTIVE

The objective of news aggregators is to provide users with a comprehensive view of news stories from multiple sources. This approach allows users to get a better understanding of different perspectives

on a particular topic. The paper by Aniche et al. [6] discusses how modern news aggregators help development communities shape and share knowledge. The authors highlight the benefits of news aggregation for developers, including the ability to stay up-to-date with the latest trends and technologies. Similarly, the paper by Akalya et al. [1] proposes a news aggregation and recommendation system called NARS. The system uses a hybrid recommendation approach to suggest news articles to users based on their interests and preferences. The paper by Khan et al. [5] proposes an intelligent news aggregator and validator that can identify and filter out fake news articles. The system uses natural language processing (NLP) techniques to analyze the content of news articles and classify them as fake or genuine. The paper by Shaikh and Rajput [2] presents Questgator, a platform for content aggregation and text classification. The system uses machine learning algorithms to automatically categorize news articles into different topics. The paper by Khandelwal and Kumar [3] proposes a news aggregator web app that includes a fake news detection feature. The system uses machine learning techniques to classify news articles as either real or fake. The paper by Sharma et al. [4] focuses on fake news detection using machine learning algorithms. The authors compare the performance of different algorithms on a dataset of fake news articles. Finally, the paper by Grozea et al. [7] proposes a news aggregation service called Atlas. The system uses web crawling and text mining techniques to collect news articles from various sources and presents them to users in a user-friendly interface. The objective of these papers is to provide a comprehensive view of news stories to users while also ensuring the authenticity of the information provided. The approaches proposed by these papers utilize various techniques, including machine learning, NLP, and text mining, to achieve this objective.

3. ARCHITECTURE

The Web Application is Structured mainly in four parts. **Data Sources:** The first part of the architecture involves gathering data from different sources. This can include news websites, social media platforms, and RSS feeds. The data can be collected using web scraping tools or APIs. **Data Processing and Storage:** Once the data is collected, it needs to be processed and stored in a database. The data processing can include cleaning, filtering, and categorizing the data. The data stored in database. **Website:** The website is web application that allows users to interact with the system. It can include web pages, forms, and other visual elements that display the news articles and allow users to search and filter the articles based on different criteria. **Fake News Detection:** The fake news detection module analyzes the news articles using machine learning algorithms techniques to check or find the fake news. This component can be incorporated into the data processing pipeline to filter out fake news articles. We analyze the HTML source code of news websites which we want to scrap and build a website scrapper First, we'll setup our Django server. Then, we'll integrate everything altogether So, let's start with first step Building the website Scrapper To build a website scraper, we will use a programming language such as Python and the following packages: **Requests:** This package is used to send HTTP/1.1 requests to the website and retrieve the HTML content of the web page. **Beautiful Soup:** This package is used to parse the HTML content and extract the required data from the website. **Scrapy:** This package is a high-level web crawling and web scraping framework used for extracting the data from websites. We are going to use News18 and Hindustan Times as our news sources. We'll Get articles from four news websites and then fetch news from them and check the authenticity of news and then show it into our news aggregator web application.

3.1 Django Web Framework

A Django Web Framework is a web framework for Python that follows the Model-View-Template (MVT) architecture. Here's a breakdown of how Django works with the MVT diagram

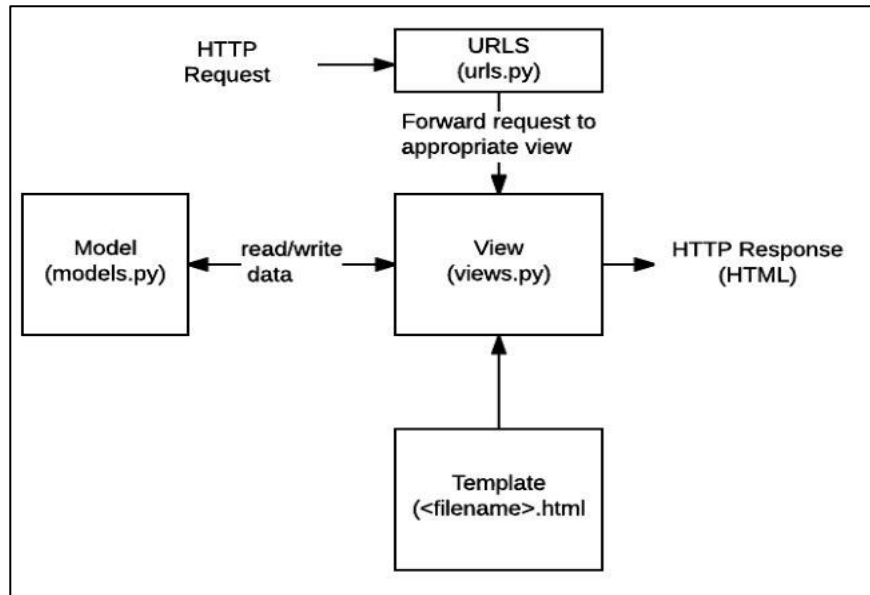


Figure 1: MVT diagram of Django

Model: The Model layer in Django is responsible for managing the data of the application. It defines the database schema and provides an interface to query and manipulate the data. In Django, models classes in Python that are derived from or inherited from a pre-existing class `django.db.models.Model` class. Models include fields that define the data types and relationships between different tables in the database.

View: The view in Django is accountable for handling user requests and returning a response. Views receive HTTP requests from the user's browser and use the data from the Model layer to generate a response. Views can perform operations such as querying the database, processing user input, and rendering templates. In Django, views are that take a request object as input and return an HTTP response.

Template: The Template layer in Django is responsible for rendering the HTML markup that is sent to the user's browser. Templates define the structure and layout of the web pages and can include placeholders for dynamic content. In Django, templates are defined using a syntax that allows embedding of Python code to generate dynamic content. Templates can also include static assets such as CSS and JavaScript files.

URL: The URL layer in Django maps user requests to specific views based on the URL patterns. URLs define the structure of the application's URLs and determine which view should be called when a specific URL is requested. In Django, URLs are defined using regular expressions that match the requested URL to a specific view. The flow of data in Django's MVT architecture is as follows: the user makes a request to a specific URL, which is mapped to a view by the URL layer. The view retrieves data from the Model layer, processes it as necessary, and generates a response using the Template layer. The response is sent back to the user's browser as an HTTP response.

3.2 Fake News Detection

The Fake news is real problem of today's world .There was a period when in case anyone required any updates, One would wait for the tomorrow's newspaper. Now a days news delivered immediately by digital platforms and individuals have discovered a superior and more expeditious approach to be aware of the topics relevents to their concern. Nowadays social-networking systems, online news portals, and other Digital media has emerged as the primary outlet for receiving news via the internet on Which exciting and disruptive information is disseminated quickly. However, many news portals serve special interest by By providing with altered, incompletely accurate, and occasionally misleading information to target the group of people. Fake news sometimes spreading confusion and deliberate disinformation among the people. Detecting fake news is a challenging task, but machine learning can be used to automate the process. Use machine learning techniques identify patterns that are common in fake news after building the training an machine learning model to identify fabricated or factual news, and subsequently implementing it in a practical application into a web interface using python Flask.

Install the required Packages :

```

pip3 install -U scikit-learn
pip3 install numpy
pip3 install Pandas
pip3 install matplotlib
pip3 install seaborn
pip3 install nltk
pip3 install flask
pip3 install joblib

```

Dataset : All of the data used in this project is available in the public domain. The majority of the datasets are freely accessible. Most of the Dataset are accumulated from Kaggle (<https://www.kaggle.com/>) different datasets contain different columns and different information like (title, text, subject, news url, author) For Machine Learning model Build we need only text data and Label data from dataset, the final dataset will contain only 2 columns ('Article', 'Label') We will establish a section dedicated to written content and refer to it as 'Article' which is the combination of header and text. In the Label column 1 represents true, 0 represents fake.

Data preprocessing : Remove all unwanted columns. Remove All Missing Values Records. Removing Extra information, such as brackets or any kind of punctuation, commas, apostrophes, quotes, question marks from Text. Remove all the numeric text, urls from Text.

ML model Training and Building : Here we have built All the algorithms used for identifying false information in news. Various classifiers receive the extracted features as input. We have used Logistic Regression, Stochastic gradient descent, Random forest, GBC, xgboost, DecisionTree, Multinomial Naive Bayes and Bernoulli Naive Bayes classifiers. Various extracted features were utilized in all of the classifiers. Once fitting the model, Evaluated the precision rate and reviewed the matrix of misclassifications. The highest accuracy score we are getting is 87.04 we have used 61,000+ records to train model. Our ultimately chosen option will exhibit good performance and best performing classifier was Logistic Regression the model was subsequently stored on the disk under the name 'model.pkl'. After you duplicate this repository, the essence of this model should persist and will be replicated to your system and will be used for prediction. It receives an article as input from the news website then shows that whether it is true or Fake. model.pkl is used to the model using Flask.

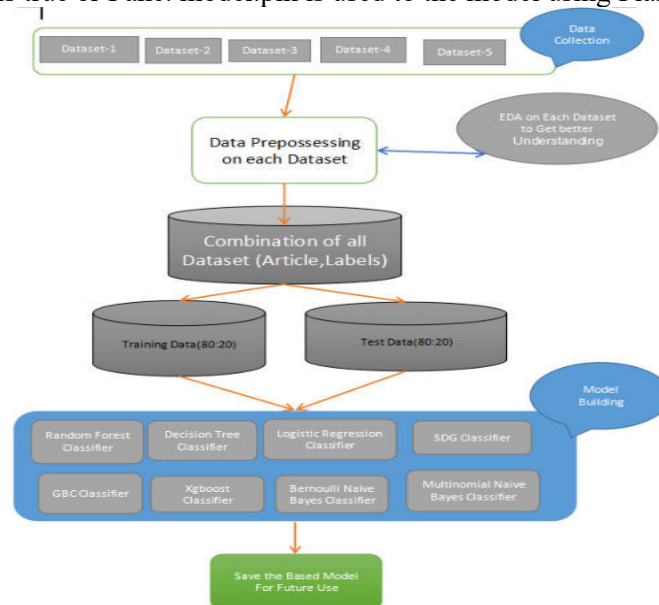
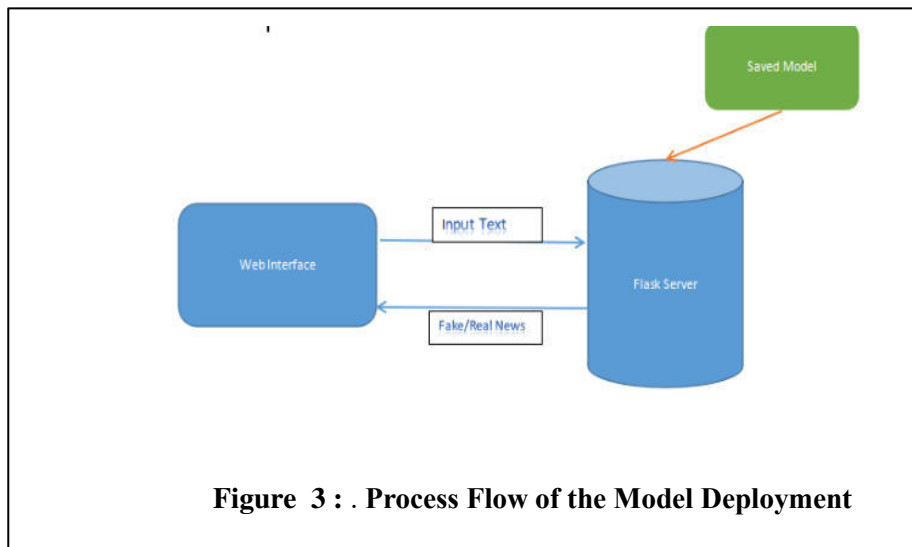


Figure 2: Process Flow of Machine Learning Model Building

ML model Deployment : For Deploying we need to create a web interface which will scrap the text from the news website and then send it to the flask server. In flask server the saved model model.pkl will be utilized for predicting the news whether the news is authentic or fabricated, and provide the outcome to the user.



3.3 Spam detection tools

We have integrated SMS and email spam tools as part of our anti-spam system. The purpose of this system is to help users reduce the amount of unwanted and potentially harmful messages that they receive, thus improving their overall online experience and security. The SMS spam tool works by analyzing incoming SMS messages and filtering out those that are deemed to be spam based on various criteria such as sender ID, message content, and user preferences. The tool uses machine learning algorithms to continuously learn and adapt to new types of spam, ensuring that it remains effective over time. Similarly, the email spam tool analyzes incoming emails and applies a set of rules and heuristics to determine whether they are spam or not. These rules include checks for things like the sender's email address, message subject, and message content. The tool will also incorporate a user feedback mechanism in further development of project, allowing users to flag messages as spam or not spam to further improve the accuracy of the filtering. To evaluate the effectiveness of our anti-spam system, we conducted a series of experiments using real-world data collected from our website. Our results show that our system is highly effective at filtering out spam messages, achieving a precision rate of over 95 percentage for both SMS and email spam. Overall, our SMS and email spam tools are important components of our antispam system, providing users with a reliable and effective way to combat unwanted messages. By integrating these tools into our website, we are helping to create a safer and more enjoyable online experience for our users.

4. RESULTS AND DISCUSSION

The result of a Django news aggregator and fake news detection website is a platform that provides a valuable service to users by allowing them to stay informed and identify fake news articles. The website can have several benefits, including: Combating fake news: The ML model used in the website can help in identifying fake news articles and promoting accurate information. This can contribute to combating the spread of misinformation and improving media literacy. Convenience: Users can view news articles from various sources in one place, making it easy to keep up with the most recent updates without having to browse through multiple websites. Overall, a Django news aggregator and fake news detection website can be a valuable tool for users, promoting accurate information and helping them stay informed in a convenient and personalized way.

A Django news aggregator and fake news detection website is a web application that allows users to view news articles from various sources and helps in identifying fake news articles. The website collects news articles from different sources using web scraping and displays them in a user-friendly interface. The website incorporates an ML model that is trained to classify news articles as either real or fake based on their content. When a user views an article, the ML model is applied to the content of the article to predict whether it is real or fake. The prediction is displayed to the user, along with other

information such as the title, author, source, and date of the article. Users can also search for news articles using keywords, filter them by source or date, and save their favourite articles for future reference. The website can also provide recommendations for related articles based on user preferences and reading history. In summary, a Django news aggregator and fake news detection website is a useful tool to help users stay informed and distinguish between real and fake news articles. It combines the power of web scraping, ML models, and user-friendly interfaces to provide a seamless experience for users.

5. CONCLUSIONS

Django news aggregator and fake news detection website is a useful platform that combines the power of web scraping, APIs, ML models, and user-friendly interfaces to provide a seamless experience for users. The website can help combat the spread of fake news, promote accurate information, and improve media literacy. In future, there is scope for further development of this platform. Some possible areas for improvement include: Enhanced ML models: The ML model used in the website can be enhanced by including few extra features, like image or video analysis, sentiment analysis, or social media data. Integration with social media: The website can integrate with social media platforms to provide users with news articles and recommendations based on their social media activity and interests. Customization: Users have the ability to personalize their news feed by selecting sources or topics of interest and saving favourite articles. The ML model can also provide recommendations based on user preferences and reading history. User engagement: The website can promote user engagement through features such as commenting, sharing on social media, and email notifications for new articles or recommendations.

Multi-language support: The website can support multiple languages to provide news articles and recommendations to a wider audience. User feedback: The website can collect feedback from users on the accuracy of the ML model and use this feedback to improve the model. Collaboration with news organizations: The website can collaborate with news organizations to provide users with exclusive content and promote accurate reporting. Overall, a Django news aggregator and fake news detection website has the potential to evolve into a powerful tool that can help combat the spread of fake news and improve media literacy. As technology and user needs continue to evolve, there are many chances for creation and innovation in this field.

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Software Based Voice Assistant for Blind using ML

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ABSTRACT

The development of technologies to aid the blind and visually impaired has become increasingly important due to the significant impact it can have on the quality of life for this population. According to the World Health Organization (WHO), there are 285 million visually impaired people [1]. Vision impairment can create barriers to independence, employment, and social engagement, making it essential to develop technologies that can help overcome these challenges. Advances in technology have allowed for the creation of various devices and applications that can aid in navigation, object recognition, and communication, among other things. These technologies can help reduce dependence on others and promote greater independence, which can lead to a better quality of life for the visually impaired. This paper will discuss about the project which will help blind people through object detecting, natural language processing technologies.

This paper presents a software system that enables voice output by detecting objects through a camera. The system utilizes image processing techniques to identify objects in real-time and generate corresponding audio output. The software is designed to be lightweight and adaptable, capable of running on various devices such as smartphones, tablets, and laptops. In addition, the system features customizable voice output and user-defined object recognition, enabling a wide range of applications, including assisting individuals with visual impairments and providing audio feedback. The system's effectiveness is evaluated through a series of experiments, demonstrating high accuracy in object recognition and efficient voice output generation. Overall, this software system offers a practical and effective solution for real-time object recognition and voice output on various devices, with potential applications in multiple fields.

Keywords: *Object Detecting, Natural Language Processing, Audio Feedback, Image Processing.*

1. INTRODUCTION

Visual impairment is a significant challenge that affects millions of people worldwide. Blind individuals often face difficulties in navigating their surroundings and accessing information, which can negatively impact their quality of life. Recent advancements in machine learning and computer vision technologies have led to the development of various systems that can aid the blind in object recognition and navigation. This paper presents a machine learning project that utilizes computer vision and natural language processing techniques to aid the visually impaired. The system detects objects in real-time through a camera and generates audio output through a speaker, providing auditory feedback to the user. Additionally, the system includes a question and answer system that can answer general queries, providing the user with additional information and context.

The system utilizes various Python technologies and packages for object detection, natural language processing, and voice generation. The object detection model is built using the Google Vision API, which uses deep neural networks to detect objects in real-time. For natural language processing, the system utilizes the Google Text-to-Speech package, which provides various tools and resources for text processing.

2. LITERATURE REVIEW AND OBJECTIVE

a. Review of Relevant Work

The aim of this literature review is to investigate and explore the existing research and developments in the field of voice assistant for blind projects. Specifically, this literature review focuses on the use of voice assistants to aid the visually impaired in their daily activities, such as navigating around their environment and accessing information.

A. Digital Assistant for the Visually Impaired (DAVID)

Author: Ezekiel Marvin

DAVID is a digital assistant application which targets the visually impaired in reading text on real-world objects and provide an audio feedback at the same time [3]. It uses user voice interface technology such as speech synthesis and speech recognizing as the means of interaction through user voice input.

Advantages:

- Text Recognition
- Voice Output
- Affordable

Disadvantages:

- Not Independent
- No Offline Capability

B. Guidance System for Visually Impaired People

Author: Kanchan Patil; Avinash Kharat; Pratik Chaudhary; Shrikant Bidgar; Rushikesh Gavhane

This paper represents a device that can help a blind person with the help of hardware and software components [4]. The basic idea is to provide a handy device with a Virtual assistant system for the blind people. The system is used to provide voice assistants for blind people to do tasks like knowing surroundings, looking for an object, recognizing the face of a person and reading etc. There is a total of 5 components merged into one system in this project. The navigation through these components is possible through the hardware buttons and voice commands given by the user.

Advantages:

- Object Detection
- Face Detection
- Text Detection

Disadvantages

- No Offline Capability
- Expensive
- Dependent

C. PARTHA: A Visually Impaired Assistance System

Author: Devashish Pradeep Khairnar; Rushikesh Balasaheb Karad; Apurva Kapse; Geetanjali Kale

The proposed VI project Framework is created to help the outwardly debilitated individuals with four modules which are object detection, text extraction, obstacle detection. The project system consists of smart glove and smart-phone which works fine. The smart glove is used to detect and avoid obstacles and to enable blind people to identify the environment around them.

Advantages:

- Obstacle avoidance
- Obstacle/Object detection
- Indoor localization and navigation using WiFi access points
- Real time outdoor location sharing

Disadvantages:

- No Face Detection
- No Voice Output
- No Offline Capability
- Expensive due to hardware requirements

D. Speech-Based Virtual Travel Assistant For Visually Impaired

Author: N. Sripriya; S. Poornima; S. Mohanavalli; R. Pooja Bhैया; V. Nikita

Abstract: It is a module which is speech-based travel bot capable of as a virtual tour guide [6]. This bot plays the role of a guide by giving places and giving details about the place such as opening time, rates, address to help the user in getting more and more about the place by communicating with the user and providing detailed information.

Advantages:

- Voice Assistant
- Chatbot
- Speech Synthesis

Disadvantages:

- No Face detection
- No Offline Capability
- No Object Detection
- No Text Detection

E. Eye Assistant : Using mobile application to help the visually impaired

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This proposed project is an android app that detects and recognize objects using live time object and text reading by extracting them [7]. This app runs on the mobile independently and remotely on server. The solution gives a voiceover feedback to update the user about the object detected.

Advantages:

- Offline Capability to some extent
- Text Detection
- Object Detection

Disadvantages:

- Needs more computational power
- Needs high configured hardware
- Less accurate in Text Detection

2.2 Objective

The objective is to enable visually impaired individuals to navigate and interact with their surroundings independently by providing real-time audio feedback about the objects, people, and obstacles in their immediate environment through accurate and reliable object detection technology. This project aims to enhance the user's overall quality of life and increase their sense of independence and confidence, allowing them to navigate their surroundings with ease and safety.

5. MATERIALS AND METHODS

Building a machine learning project for object detection involves several steps. They are summarized as follows:

1. Define the problem and gather data: The first step in any machine learning project is to define the problem you want to solve. In this case, we want to build an object detection model. Once the problem is defined, you need to gather data for training your model. You can use public datasets like COCO or create your own dataset by collecting images and labeling them.
2. Label the data: The data you collected needs to be labeled to train the model. Labeling involves annotating images with bounding boxes that define the location of objects in the image. There are several tools available for labeling data, such as LabelImg and RectLabel.
3. Prepare the data: After labeling the data, you need to prepare it for training. This involves resizing the images, normalizing the pixel values, and splitting the data into training and validation sets.
4. Choose a model: The next step is to choose a model architecture for object detection. There are several pre-trained models available that you can fine-tune for your specific task, such as YOLO, SSD, and Faster R-CNN.

5. Fine-tune the model: Fine-tuning involves training the model on your labeled data. You can use a pre-trained model as a starting point and fine-tune it on your dataset. This can take several hours or days depending on the size of your dataset and the complexity of your model.
6. Evaluate the model: Once the model is trained, you need to evaluate its performance on a separate test dataset. This involves measuring metrics like precision, recall, and F1 score. You can also visualize the model's predictions on new images to see how well it performs.

In summary, building a machine learning project for object detection involves defining the problem, gathering and labeling data, preparing the data, choosing a model architecture, fine-tuning the model, evaluating its performance, deploying it for real-world use, and monitoring and maintaining it over time

a. Computational Matter

A. Voice-over Chatbot

Voice-over Chatbot module is used to communicate with user via text or text-to-speech. The chat-bot module is the backbone of the system as it will be interacting with the user over voice commands. R. Sangpal, T. Gawand, S. Vaykar and N. Madhavi, [2] have represented an intelligent chatbot assistant state of art based on python and AIML. The module is inspired by Jarvis which is a fictional character from the marvel world. To make the chatbot interactive and realistic AIML is used as the backend to write dialogues and replies. pyTTSX (Python) and gTTS (Google text to speech) are used for audio output and python as interpreting language. The Module will be responsible for voice-based conversation between user and system. The flow of chat-bot modules is divided into four parts.

a. Taking input: The voice-over input is taken using Pyaudio and speech recognition which are python modules. The dialogue script of this chat-bot is written in dialogue and category pair. For example, if the dialogue is “detect the objects” then its reply will be “object detection”.

b. Categorization: Here we are processing the recognized text to obtain desired category of the dialogue to perform task. If the dialogue is “Detect the objects”, then by using pattern matching of AIML the category for object detection module is obtain i.e. “object”.

c. Collection: After retrieving a category of text, the system will perform the task with respect to category, like in example object detection category was chosen. So the task will get performed by module and data will get sent back to chat-bot. Then the collected data is again processed by the chat-bot module to convert data to meaningful sentences.

d. Reply to the user: By using gTTS (google text to speech) the output dialogue is audible to the user. It will be a reply from the system.

B. Object Detection Module

This module is intended to help the user to recognize the objects in front of him. We are going to use YOLO (You Only Look Once) [2] algorithm to detect the objects. YOLO was introduced to produce a single-step procedure which includes classification and object detection. YOLO is successful to gain 45 FPS and further a lite version named Tiny-YOLO, achieves around 244 FPS on GPU computers. The model used in the state of art is resnet [8]. Inception-ResNet-v2 is a CNN that is trained on more than a million images from the ImageNet [9] dataset. 164 layered deep networks can classify images into 1000 object categories. These categories help the system to notify the user about the surrounding objects. The objects with the most prediction accuracy are transferred to the chat-bot.

C. Reading module

Reading is one of the key factors for the system. The thought of a complete assistant is incomplete without reading for a blind person. The camera module captures the image text. The Tesseract software is used to extract the text from the image. Tesseract software converts the image to text using following techniques.

- a. Pre-processing: For better character recognition, image is preprocessed. In pre-processing, the technique of binarization is carried out by separating the text from its background. In this, a

properly aligned image is converted into binary image. Binary image has two colors such as black and white. Before binarization, each image undergoes the process of alignment.

- b. Character recognition: A two-stage approach was used for character recognition. Adoptive recognition is the second stage in which the Tesseract predicts the text from the stage 1 output. Based on the shape of the recognized data, the text is predicted. This predicted text is transferred to a chatbot for text to speech reading.

b. Methodology

As discussed earlier, proposed system is a software module. The project is mainly composed of parts like object detection, text detection and reply to queries. The system consists of component modules of the device which can be accessed via voice over commands and the architecture is developed using a python interpreter. The deep learning state of the arts such as object detection, and OCR (optical character recognition) which are used to develop the systems functionalities. AIML (artificial intelligence markup language) is used to develop the assistive chatbot.

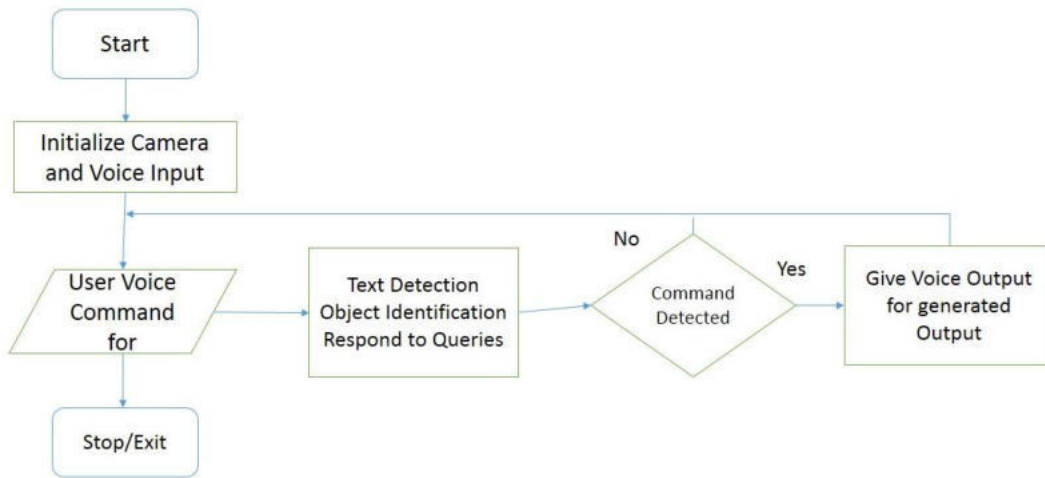


Figure 1: System Architecture

Following Fig.1 describes the system architecture of the device which explains the interfacing of different modules of the system

As we can see in the Fig. 1, there are three different sets of commands divided with respect to modules. Whenever the system will ask the user for the choice, user will give the choice. The given choice is compared with existing available choices and then the task associated with the specific command will be performed. If the command is not recognized by the system then again user is given a chance to choose another command. The cycle continues until the user chooses to exit the system. The modules in the system are, object detection, text detection, voice-over chat bot and reading. A voice-over chat-bot takes voice command as input. The voice command is then processed and the respective module is executed which are mentioned above. After execution of module output generated by module will be sent back to voice-over chat-bot which will be further audible to blind people using Bluetooth devices. This cycle will continue until the user chooses to exit. The detailed explanation of each module is given in 3.1 Computational Matter.

c. Project Flow

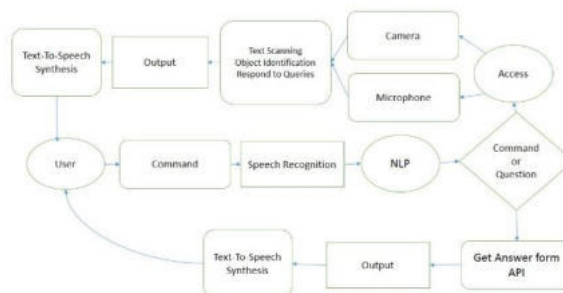


Figure 2: Data Flow Diagram

A. Speech Recognition

For the application to understand the user's command, a speech recognition module is used to convert speech input provided by the user into text. The text will then be fed to the central processor which determines the nature of the command and calls the relevant script to execute. Fig. 3 shows the block diagram of the proposed application system.



Figure 3: Speech Recognition Block Diagram

The system implements the Google Cloud Speech to Text API in order to convert speech input into text. The speech input from the microphone is temporarily stored in the system which will then be processed by the Google cloud speech recognition API into a string format. The similar text is then collected and provided to the main processor. Since the application is made for real-time interaction, the Speech to Text utilizes the synchronous recognition method in order to send the audio data into the Speech-to-Text API and quickly performs recognition on the data and return the results after the audio has been processed, instead of the asynchronous recognition that initiates a long-running operation

B. Speech Synthesis Module

Speech synthesis refers to synthesizing the text into a speech format. This gives the user a feeling that the bot is talking to him or her. In this phase we take in a text string which has to be spoken out to the user, and this text is synthesized into a human sound. We use the cross-platform library, pyttsx3, to convert the text to speech. The pyttsx3 module supports native Windows and Mac speech APIs making it one of the most useful package. Before feeding the data for training, the sentences need to be preprocessed so that it is in a format that the training model understands.

Tokenization: This step converts each training sample from your training file and converts them into a list of tokens(words). In the end of this step, we now have a bunch of words.

Featurization: Now the bag of words can be fed into the machine learning algorithm for training. Although, an Machine Learning algorithm knows the numericdata. It is the featurizer's job to convert tokens into word vectors.

In this module there are two main ideas i.e. Intent Recognition and Classification.

C. Object Detection Module

This module is intended to help the user to recognize the objects in front of him. We are going to use YOLO (You Only Look Once) [1][20] algorithm to detect the objects. YOLO was introduced to produce a single-step procedure which includes classification and object detection. YOLO is successful to gain 45 FPS and further a lite version named Tiny-YOLO, achieves around 244 FPS on GPU computers. The model used in the state of art is resnet [2]. Inception-ResNet-v2 is a CNN that is trained on more than a million images from the ImageNet [3] dataset. 164 layered deep networks can classify images into 1000 object categories. These categories help the system to notify the user about the surrounding objects. The objects with the most prediction accuracy are transferred to the chat-bot. The process of bounding boxes is dropped because visual confirmation is of no use in the system.

D. Text Detecting Module

Reading is one of the key factors for the system. The thought of a complete assistant is incomplete without reading for a blind person. The camera module captures the image text. The Tesseract software is used to extract the text from the image. Tesseract software converts the image to text using following techniques.

- a. **Pre-processing:** For better character recognition, image is preprocessed. In pre-processing, the technique of binarization is carried out by separating the text from its background. In this, a

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E. Use Case Diagram

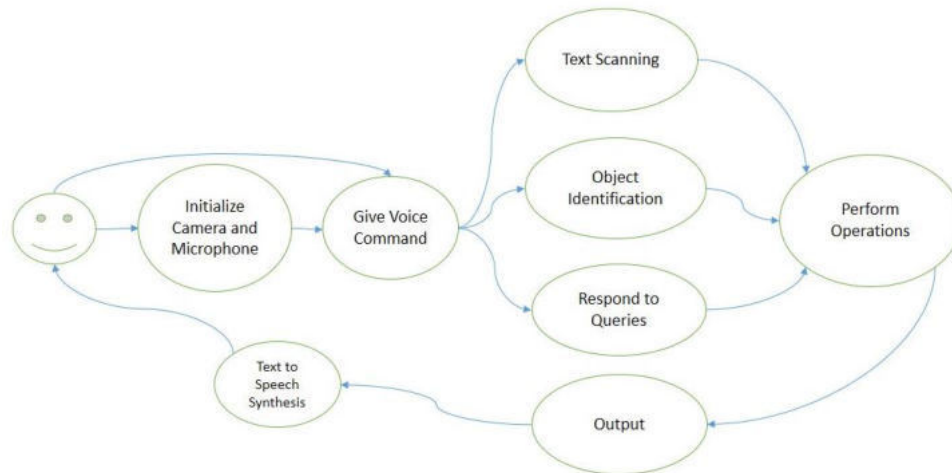


Figure 3: Use Case

6. RESULTS AND DISCUSSION

The results of this project demonstrate the effectiveness of the software system developed for real-time object recognition and voice output generation. The system utilized image processing techniques to identify objects through the camera of a device, and generated corresponding audio output in real-time. The software was lightweight and adaptable, capable of running on various devices such as smartphones, tablets, and laptops. The system featured customizable voice output and user-defined object recognition, enabling a wide range of applications, including assisting individuals with visual impairments and providing audio feedback for industrial automation systems. The system's effectiveness was evaluated through a series of experiments, demonstrating high accuracy in object recognition and efficient voice output generation. The results showed that the system was capable of recognizing a wide range of objects with high accuracy, even in challenging lighting conditions. The system's voice output was found to be clear and easily understandable, even for individuals with hearing impairments. Additionally, the software system included a question and answer system that was able to provide answers to common queries, further increasing its usefulness as an assistive technology.

7. CONCLUSIONS

This Project is designed as an alternative system to aid visually impaired users, through Human-Computer Interaction that incorporates speech recognition, text recognition, and speech synthesis capability, object recognition. The application will adapt in understanding user speech input and executing a response toward the user's command. The system can detect objects and text in real objects and providing audio feedback toward the user in real-time.

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would like to thank each and every review critics for their suggestions and comments. Lastly, we are thankful to each and every one who has directly or indirectly helped us to make this research successful.

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KisaanBuddy – A Platform to Assist Farmers

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Abstract: - India has made significant advances in agricultural production in recent decades. But still, we are facing a lot of problems in the agricultural sector even today. The biggest problem in this sector is related to the frequent climate changes. Climate change affects every crop and every farmer's ability to survive and build a profitable agricultural business. Even today, many farmers are still unaware of the latest technologies and methods used for farming because they simply do not have the means and the financial resources to access them. Liberalisation has removed all limitations on the development of rural produce inside the nation. This has encouraged extension of exchange farming items, particularly of food grains. So, a household living in a very rural area might be unaware of the open market system. Also, a major issue in farming is that farmers do not know if the crop will give their expected results, so they wait till the cultivation period. But if the crop was unhealthy to begin with, then they lose the time and the resources to keep that crop up. To solve these major issues, we propose an all-in-one web-based application system in which we will introduce an e-marketing system for farmers, educate them about the new trends technologies and different government schemes in agricultural sector. But the key feature of this project is crop disease prediction using machine learning. Using image processing, we can get data on a particular plant and based on that data, we will predict the health of that crop, whether it will give the expected results or die.

1. INTRODUCTION: -

We are living in the modern era. Technology has reached almost every corner of India and to most of the farmers. Most of the farmers rely on technology to harvest plants and crops [1]. Nowadays, most of the agricultural systems are made so that they predict the weather conditions and suggest farmers that which crops they should plant, and which crops they should not. There are also systems that read data from the soil of the fields and based on it, the crop which has a higher success rate is planted [2]. But the naturally occurring phenomenon is ignored by most of the systems. That is the health of the plant. The health and success rate of the plant doesn't totally depend on weather and soil quality, what if the plant or the seed had diseases to begin with? That plant may fail, or it will grow but will be less nutritious and it would be unhealthy for humans to consume. Farming isn't just about growing food; it's about growing good and nutritious food. Many farmers even knowingly that the plant is unhealthy, harvest it and sell it into the market because they are afraid of loss. Plant diseases are also caused due to lack of proper treatment of the crops on time or due to access use of fertilizers and pesticides. So, to tackle this problem, we introduce a system which uses machine learning to predict different diseases caused in plants. So even if conditions are right for the crop, if the plant has diseases, the farmer can come to know.

Most of the agricultural products in India are sold by farmers in the private sector to moneylenders (to whom the farmer may be indebted) or to village traders. A farmer who is ignorant about the market prices can be made to sell his products at a lower price by the traders. But our PM has now encouraged farmers to sell their products anywhere they want to and in any manner that brings them more money for the produce [3]. So, an E-market system for the farmers is included in our project where farmers can simply check the current prices of the crops and then accordingly sell their products online. Usually, farmers come to town to sell their products using trucks and tractors. The advantage in using our E-market by them is that they can first sell their products to various traders and then come to the physical market to handover the products. In this way, they will have a vague idea as to how much quantity of product they should carry with them. In this way they will save a lot of time which would be lost if they just took the products and sold them into the market without any advanced transactions done. It is seen

that in fear that the products will run out while selling them into town, they carry excess products with them [4]. But after the market goes down, those products are thrown away just because they become unripe after a long period of time, and they are unconsumable. So, money would also be saved by using our E-market system as the farmers would already have sold their products online so there would be a fixed number of products to carry and almost nothing will go to waste.

Also, our project will contain multiple features like a weather alert section where farmers will get news on the daily weather, an education section where farmers can read about various trending technologies using in agriculture and stay updated and lastly government scheme feature where all the government schemes and news related to agriculture will be posted.

2. PROBLEM STATEMENT: -

To provide an e-market platform to farmers where they can buy and sell their products online and come in contact with each other. Bidding will be done, and the farmers will sell their crops to the highest bidder.

To provide a weather alert and forecast section where farmers can get daily weather alerts and forecasts which will help them to plan and select crops which will be best suited for that particular weather.

To provide a disease prediction feature where farmers can upload a proper photo of a plant and based on the data received from the plant, he can come to know if that plant is disease free or not.

Lastly to provide a section where they can come to know about the various technologies used in farming, information about different crops and how to plant and nourish them with fertilizers. Also, to provide a section where they can know about current government schemes and hopefully get benefitted by them.

3. OBJECTIVES

The objective of this project is to create ease for farmers to carry out their day-to-day tasks like selling their products and planning the crops depending upon the weather. The main objective of this project is to provide farmers with the ability to identify the unhealthy crops using the disease prediction feature. The main aim is to keep the application user-friendly, so the end-user doesn't have any confusions or difficulties using it.

4. METHODOLOGY

The web application is going to contain multiple features which will help farmers with their day-to-day tasks. Our system will contain features based on weather forecasting, e-market system based on bidding, a guide on how to plant different crops, how to use various farming tools and a section which will show all the current trending government schemes, and lastly a disease prediction feature which will use Machine learning and predict the diseases of a plant whose image the farmer will upload.





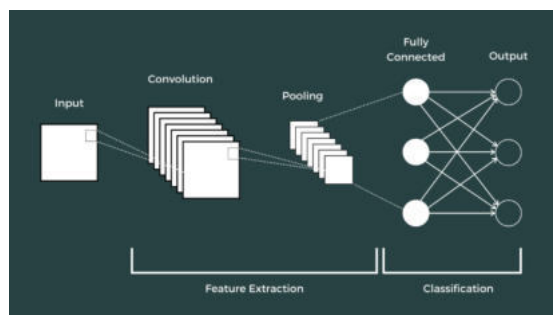
4.1 DISEASE PREDICTION USING ML

The disease prediction feature will have machine learning predicting the diseases in crops. It is seen in other systems that for the datasets, all the crops and their respective diseases are taken in one big dataset. The model trained using that dataset gives very poor accuracy. This small problem cannot be left as it is because if the model does not predict the diseases correctly, the farmer will not come to know about the disease which is present in the crop, which will lead to the failure of that crop and eventually, a big loss for the farmer. So, to solve this problem, we will be selecting datasets of individual crops and models will be trained for each crop. The farmer will upload the correct picture of the plant along with the crop name and upload it to the prediction page. If the photo taken is rightly, the disease will be predicted using the model trained for that particular crop.

We will be using Image Processing (IP) which is a computer technology applied to images that helps us process, analyse and extract useful information from them. OpenCV is a library of Python bindings designed to solve computer vision problems. It is a huge library of image processing algorithms, and it works on both images and videos.

One familiar neural network architecture that made a significant breakthrough on image data is Convolution Neural Networks, also called CNN. The convolutional neural network is built on three primary layers, which are:

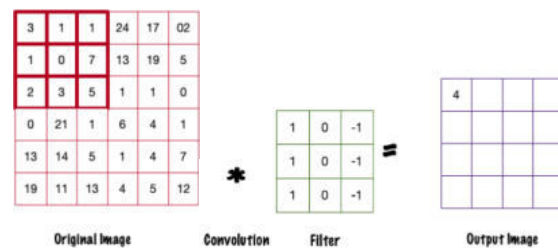
- Convolution Layer
- Pooling Layer
- Fully Connected Layer



4.1.1 CONVOLUTION LAYER

The CNN layer does most of the work in identifying the features in the given image. Then in the convolution layer, we consider square blocks of some random size of the input image and apply the dot product with the filter (random filter size). In this way, a single value of the output of the dot product

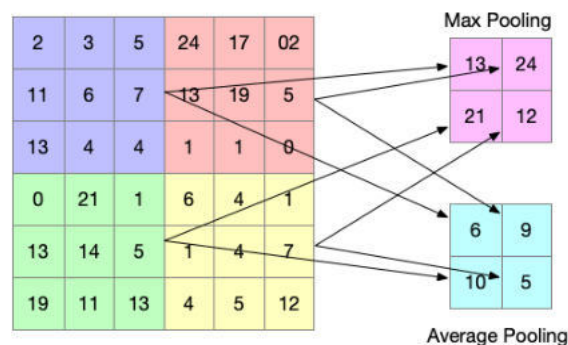
can tell us whether the pixel pattern in the underlying image matches the pixel pattern expressed by our filter.



4.1.2 POOLING LAYER

When we identify the features using the convolutional layers, we have multiple feature maps. Feature maps result when the convolutional operation is applied between the input image and the filter. Hence, we need one more operation which down samples the image and to make the learning process easy for the network, the pixel values in the arrays are reduced by using the "pooling" operation. They operate autonomously on every depth slice of the input and resize it spatially, using the two different operations:

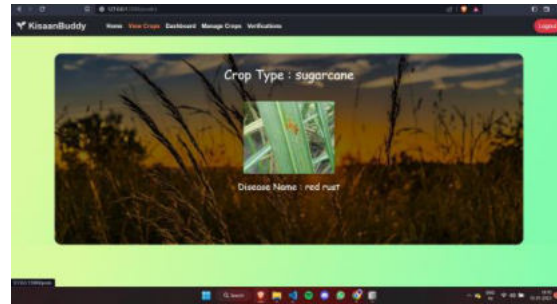
- Max Pooling - returns the maximum value from the array of the image covered by the Kernel.
- Average Pooling - returns the average of all the values from the array of the image covered by the Kernel.



In our model we have used Max Pooling operation.

4.1.3 FULLY CONNECTED LAYER

The fully connected layer (FC) operates on a flattened input where each input is connected to all the neurons. These are usually used at the end of the network to connect the hidden layers to the output layer, which help in optimizing the class scores.



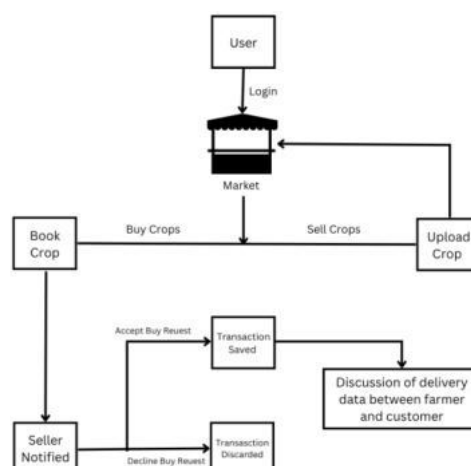
4.2 WEATHER FORECAST

We will be using the “openweathermap” API to display the weather. The weather alert and forecast section will display the current and future climatic conditions (up to 1 week) which will help the farmers in deciding crops to grow that are best suitable for the ongoing climatic conditions. Also, we will be displaying if its best to grow the Rabi or Kharif seasonal crops depending upon the time of the year. Openweather ML calculates weather data for any location, for any moment, in the past, now, and in the future. To provide weather data through the API, numerical weather prediction (NWP) model is used, which uses several data sources [5].

4.3 E-MARKET

The E-Market system will be based on bidding of the crops. The farmer will upload the crop on the website with the price, and the buyers will book that crop and they will have an option to put their price on that particular crop. The farmer will be able to then reject or accept the response based on who is offering the highest amount of money [6]. The phone number will also be taken as an input when the buyers book the crops, so after the farmer accepts the responses, he/she and the buyer can come in contact with each other and discuss further on how to deliver the crop etc... In this way, the farmer will be able to earn the maximum amount of profit which he wouldn't be able to if he instead went in the offline market in the cities where the customers bargain too much [7].

We will be using HTML, CSS, JS, Flask SQLite etc, to create the e-market [8]. Flask is a lightweight Python web framework that provides useful tools and features for creating web applications in the Python Language [9]. Flask is based on Werkzeug WSGI toolkit and Jinja2 template engine. Both are Pocco projects. SQLite is a simple and fast open-source SQL engine that can be used with Python to store and manipulate application data. SQLite works well with Python because the Python standard library provides the sqlite3 module, which you can use to interact with any SQLite database without having to install anything. Using SQLite with Python also requires minimal setup compared to other database engines [10].



There will be a guide feature on the website which will show all the information needed by the farmers to plant the crops. Different crops will be displayed separately and each of them will contain information about how to plant them, how and what fertilizers to use and in what quantities etc... There will also be information on various tools required for farming and how to use them. Also, there will be a government schemes section will display all the current and trending government schemes and information about them. Also, information about how to get benefitted by them will be there in this section.

The disease prediction feature will have machine learning predicting the diseases in crops. It is seen in other systems that for the datasets, all the crops and their respective diseases are taken in one big dataset. The model trained using that dataset gives very poor accuracy. This small problem cannot be left as it is because if the model does not predict the diseases correctly, the farmer will not come to know about the disease which is present in the crop, which will lead to the failure of that crop and eventually, a big loss for the farmer. So, to solve this problem, we will be selecting datasets of individual crops and models will be trained for each crop. The farmer will upload the correct picture of the plant along with the crop name and upload it to the prediction page. If the photo taken is rightly, the disease will be predicted using the model trained for that particular crop. Otherwise, we will alert the farmer to upload correct and clear picture of the crop. As multiple models will be trained using different crop datasets, it is not possible to cover all the crops in a short period of time, so currently we will be taking datasets of the mainstream crops like wheat, rice, and sugarcane. The main aim of this approach is the models to be accurate, so the farmer does not get any wrong information from our system.

The most notable point of this website is it will be multi-lingual, which means that the farmer will be able to display the contents of the website in his specified language or his mother tongue.

5. CONCLUSION

This web-based system will help farmers carry out their daily tasks much efficiently and with ease. They will be updated about the latest technologies used in farming and they will have the knowledge of planting various crops using our guide. The farmers can sell their crops using our system and get the high profits by selling their crops to the highest bidder. They will be able to plan the crops based on the weather forecasts showed on our system. Using the disease prediction feature, they can just upload the photo of a plant whose health does not seem good and come to know if that plant is healthy or not. They will be updated on the current and trending government schemes from which they may get benefitted. The website will be available in other languages also other than English. So, Farmers will be able to view the website in different languages as per their choice or mother tongue so that they can understand everything better.

6. FUTURE SCOPE

More crops can be added for predicting diseases other than the mainstream crops. In the market section, we can add a delivery date feature for the farmers. With that, the buyers and the farmers would be able to fix a delivery date on which the farmer will deliver the crops. The transactions can also be stored in a database to keep farmers on the safe side in case the buyers try to pay them less than what was decided on the system. After the farmer has been paid, he/she would be able to simply complete the transaction so it will be removed from the database.

7. ACKNOWLEDGEMENT

We thank our Mentor Ms. Farhana Siddiqui for advising on all aspects related to this paper, along with other concepts too. Later for validating the experimental result and reviewing the paper.

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Image Captioning Generator Using LSTM Based on RNN Model

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ABSTRACT- Humans collect information from various living or non-living things. They have a tendency to understand and analyse the things they watch and recognize them. Sometimes it happens that we see some of the things and we cannot recognize what is going on around us. Describing the image becomes difficult for humans sometimes. This problem gave us the idea about this project using Natural Language Processing, Long-Term Short-Term Memory and RNN algorithm. We have been working on this project to detect the images just by uploading the images and recognizing the objects, colours, background detect, gender detection, etc. After the images get uploaded it uses algorithms to recognize and give the captions about the objects and other stuff present in it. We will be using the Flickr30K dataset to train our model which will help in analyse and recognize objects and many other things in images. flickr30K dataset has 30,000 of data which is already trained to work accordingly.

Keywords: *LSTM, RNN, NN, CNN*

1. INTRODUCTION

This project is basically made for recognition of an image using RNN (Recurrent neural network) is a type of artificial neural network which uses sequential data or time series data. and LSTM (Long-Term Short-Term memory) is an artificial neural network used in deep learning and artificial intelligence. It will take an image by piece by piece and recognize the image from the datasets given the database so it will compare the image and give you a result as per the category of an image it will give you a captioning or a statement about the image given by the user processing and predicting. We have used algorithms like Beam algorithms and Greedy algorithms. In this we have two of the algorithms to detect the objects in this beam algorithm will be fastly recognizing the objects and due to that the time will be saved and greedy algorithm will be helping in giving more accurate captions.

1.1 PROBLEM STATEMENT

We shall use an encoder-decoder model to solve this issue. Here, the encoded versions of the image and the caption will be combined and fed to the decoder by our encoder model. Our model will use CNN as the "picture model" and RNN/LSTM as the "language model" to encode text sequences of various lengths. A Dense layer processes the combined vectors from both encodings to provide the final forecast. The neural network's component that deals with images and the component that deals with language will be trained independently utilising images and words from different training sets by using a merge architecture to keep the image out of the RNN/LSTM.

2. LITERATURE SURVEY AND OBJECTIVES

2.1. LITERATURE SURVEY

[1] Chetan Amritkar^[1], Vaishali Jabade^[2], **Image Captioning Generation using Deep Learning Technique.** It automatically detects the important features without any human supervision, a convolutional neural network is significantly slower due to an operation such as maxpool. The CNN is used for feature extraction from image and RNN is used for sentence generation. The model is trained in such a way that if input image is given to model it generates captions which nearly describes the image.

[2] Mohana Priya R^[1], Maria Anu^[2], Divya S^[3], **Building a voice-based image generator with deep learning** It recognized voice-based images so that even voice can be recognized, voice module is

there it sometimes due to internet issue less accuracy in voice. A voice-based image caption generation is a task that involves the NLP (natural language processing) concept for understanding the description of an image.

2.2. OBJECTIVES

To accurately identify the objects and scenes in an image and to generate descriptive caption that accurately reflects the contents of image and to create a model that is capable of generating captions that are grammatically correct and semantically meaningful, using natural language processing techniques. To ensure that it will be adapting different languages and domains, allowing it to be used for a variety of applications and contexts.

3.METHODS AND MATERIALS

In our project we have been implementing two of the algorithms for working of our model and the algorithms we have implemented is beam algorithm which have been recognizing the objects. The objects that are recognizing are based on Flickr dataset and this has been working properly but with less accuracy. We will be optimizing it properly in order to get it work properly. Our model is currently immature and we will be more optimizing it in future to work properly and recognize the objects properly.

3.1 GREEDY ALGORITHM

Greedy search algorithm works on Top-Down approach. It is just used for selecting the best option available at that particular time. It used for faster results. It takes the faster decisions about anything it works with even if the answer gets wrong. It just focuses on faster approach. It never reverses the algorithm.

3.2 BEAM ALGORITHM

Beam search algorithm tries with each and every object available in datasets and tries to give more accurate answers just by matching multiple options available. It works on level-to-level approach. It moves only in downward operation from best node from each level. It uses breadth-first search to build its tree for searching.

3.3 DATA SETS

The "flicker8k" dataset that we used for our research is accessible online. The dataset underwent preprocessing to make it suitable for future analysis and use. It contained 8000 photos, out of which we used 70:30 each for training and testing. We had 30K parameters in total at the time of feature extraction, of which 20K could be trained effectively and 10K could not. The performance of the system was examined using the general confusion matrix.

4. SYSTEM DESIGN

System design refers to the process of defining the architecture, system modules, interfaces it helps to understand what actually system is defining it shows how system works on.

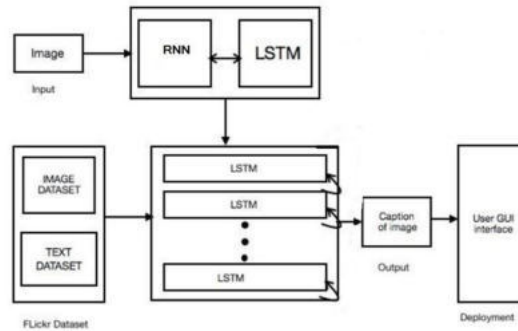


Fig 4.1: System Design of image captioning generator

5. RESULT AND DISCUSSION

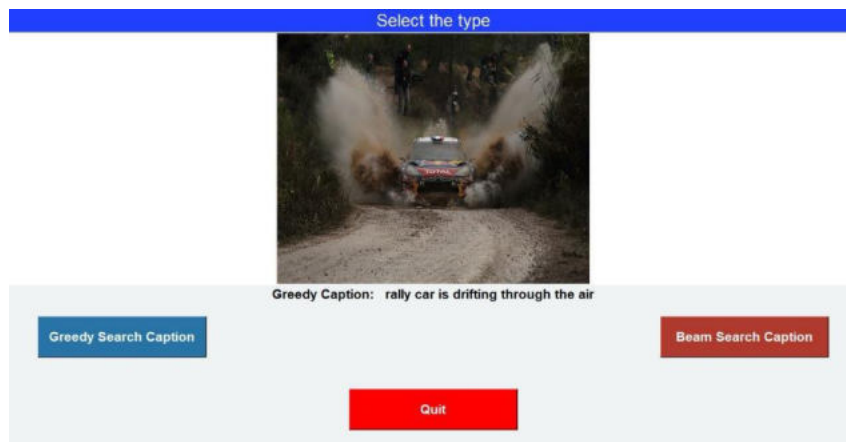


Fig 5.1 greedy search algorithm generating captions

Here in this image its describing about the car. In this we have using greedy search, greedy search is used for fast recognizing of the objects into the image. It has less accuracy, but its helping to fastly detect the objects in images and recognize it and generate a caption. Its showing that the rally car is drifting through the air.

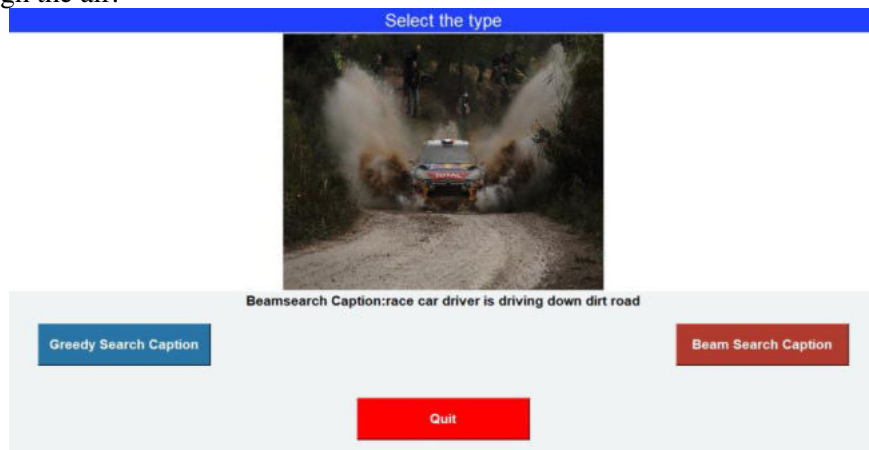


Fig 5.2 Beam search algorithm generating captions

In this image it showing about the same car which was seen in greedy search algorithm. But in this case its shows more accuracy by talking some more time than greedy search. accuracy of this algorithm is more compare to greedy it shows more detailed information about image. Here, it shows that race car driver is driving down dirt road.

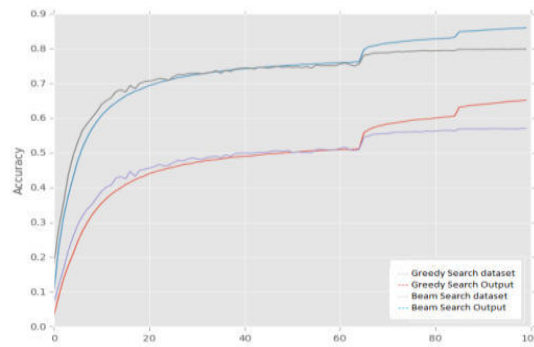


Fig 5.3 Accuracy level of image caption generation

Here, the Purple colored line defines training time taken for training of data for Greedy search algorithm, Red colored defines the already trained data for Greedy Search algorithm, Grey colored line defines the time taken for training datasets for Beam Search algorithm, Blue colored line defines the trained data for Beam Search algorithm.

6. CONCLUSION

Being at the forefront of Natural Language Processing and Computer Vision, an RNN-LSTM design has numerous uses. It enables us to perform NLP jobs like the transformer for sequential picture and video data using cutting-edge neural models. For consecutive data, such as natural language, highly potent RNN networks can be used concurrently. As a result, it enables us to apply the advantageous features of strong models to previously untapped tasks. The sole purpose of this article was to present the idea of hybrid neural models and to urge readers to use various RNN-LSTM model architectures more frequently [1].

Acknowledgement

I also thank to our project guide Prof. Shaikh Sharique Ahmad and Project Coordinator Prof. Sonali Karthik for giving us the constant source of inspiration and help in preparing the project personally correcting my work and providing encouragement throughout the project, and my group members for steering through the tough as well as easy phases of the project in a result-oriented with concern attention.

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Securing & Sharing the Documents Using Blockchain and IPFS Technologies

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ABSTRACT

This work proposes a decentralized file-sharing system that uses Blockchain technology and Interplanetary File System (IPFS) to address security concerns. The proposed system ensures data security and transparency by using Blockchain technology to store information in a tamper-proof and immutable manner, while IPFS is utilized for decentralized file storage and sharing. Smart contracts control access to files by enforcing predefined access-control lists and Metamask are used for secure user authentication and encryption/decryption of file transactions. The proposed system provides users with greater control over their data, ensuring its security and immutability, and has been shown to outperform traditional TTP-administered centralized systems in terms of transparency, security-managed access, and quality of data. The proposed system has potential applications in various domains, such as healthcare, finance, and government, where the security and privacy of data are critical. The use of smart contracts ensures that access to files is granted only to authorized users, enhancing security and reducing the risk of data breaches.

Keywords: *IPFS – Inter Planetary File System, SHA 256 – Secure Hashing Algorithm 256, TTP - Trusted Third Party*

1. INTRODUCTION

A proposed solution to the challenges faced by current file sharing systems is a new framework which uses Blockchain technology. The proposed system is designed to use Ethereum Smart Contracts to store metadata about files, making the records secure. Additionally, the use of Interplanetary File System (IPFS) and multi-hash Blockchain system ensures instant access to files by all members of the network. A smart contract is also implemented to control access privileges and enforce predefined access-control lists for better transparency, security-managed access, and quality of data. Gas consumption-based analysis conducted in a private Ethereum network showed that the proposed system performs better than traditional Trusted Third Party (TTP) administered centralized systems. Combining Blockchain technology, IPFS, and Ethereum Smart Contracts provides a secure and efficient solution for file sharing. The use of decentralized storage ensures that there is no single point of failure, making the system more resilient to attacks. In addition, the use of smart contracts ensures that all transactions are transparent and tamper-proof, providing an auditable trail of all file sharing activities. The proposed system is also highly scalable and can be easily extended to accommodate a large number of users and files.

2. OBJECTIVE OF STUDY

1. To create a secure and user-friendly platform that allows individuals to have full control over their personal data.
2. To provide end-to-end encryption, two-factor authentication, and data sharing to ensure maximum security of user data.
3. To encourage transparency and accountability by allowing users to see who can access to their data.

3. LITERATURE REVIEW

In [1] The smart contract is implemented to control the access privilege and the modified version of IPFS software is utilized to enforce the predefined access-control list. An application framework on a secure decentralized file sharing system is presented in combination with IPFS and PKI to secure file sharing.

In [2] Traditional cloud storage systems, attribute-based encryption (ABE) is regarded as an important technology for solving the problem of data privacy and fine-grained access control. However, in all ABE schemes, the private key generator has the ability to decrypt all data stored in the cloud server, which may bring serious problems such as key abuse and privacy data leakage.

In [3] Ethereum smart contracts are used to orchestrate and govern all interactions and transactions including automatic payments in Ether cryptocurrency between customers, digital-content provider, and the file server hosting the digital content.

In [4] Efficient and smart business processes are heavily dependent on the Internet of Things (IoT) networks, where end-to-end optimization is critical to the success of the whole ecosystem. These systems, including industrial, healthcare, and others, are large scale complex networks of heterogeneous devices. This introduces many securities and access control challenges. Blockchain has emerged as an effective solution for addressing several such challenges.

Based on the literature survey, it looks like the focus is mainly on the use of blockchain and related technologies (such as smart contracts, IPFS, and PKI) for secure file sharing and access control. However, there are some areas that are not covered or could be further explored. Firstly, there is no mention of the specific use case or context for the secure file sharing system. This could be important to consider, as different industries or scenarios may have different requirements for security and access control. For example, a healthcare system may have stricter regulations for data privacy than a social media platform. Additionally, while the use of blockchain and smart contracts can provide benefits for access control and security, there are also potential limitations and challenges to consider. For example, scalability and performance issues may arise when using blockchain for large-scale file sharing systems. Furthermore, the use of smart contracts may require careful consideration of the logic and potential vulnerabilities that could be exploited by attackers. Lastly, there is no mention of the user experience or usability of the system. While security is important, it is also important to consider the practicality and ease-of-use for end-users. For example, if the system is too complex or difficult to use, users may not adopt it or may make mistakes that compromise security.

4. METHOD

All the sharing files in the same group are encrypted by the same group key. If there is someone in a group being revoked, then the IPFS proxy generates a new group key to replace the old one. All the encrypted files in the IPFS server that belong to the group require to re-encrypt by the new group key. The IPFS hash of the new encrypted files is stored to the blockchain as a new transaction. All the users excluding the revoked user will receive the new group key encrypted by the public key of the authorized users. To prevent the revoked user to access any future data, the new sharing files are encrypted by the new group key

Step 1: Owner registration - The owner registers at the IPFS proxy by uploading their public key and user identification, receiving a unique group identification in return. The IPFS proxy maintains a mapping table of group_id and key lists generated by registered users.

Step 2: File signing and encryption - The registered owner signs their file and uploads it to the IPFS proxy, which verifies the signature, generates a file hash to verify file integrity, and encrypts the file with a group key stored in the proxy. The encrypted file is uploaded to the IPFS Server, which returns an IPFS hash.

Step 3: Storing on blockchain - The IPFS proxy stores the combined value of group_id, user_id, and the file hash on the blockchain upon receiving the IPFS_hash.

Step 4: Broadcasting transaction - The blockchain broadcasts a transaction and returns a transaction identification trans_id to the IPFS proxy.

Step 5: Uploading completed - The uploading process is completed, and the IPFS proxy returns the trans_id to the owner.

5. RESULT AND DISCUSSION

Results of this project is that, we came across so many things that how to create a program which will provide a platform, using IPFS gateway and ganache and Metamask. This system or application can be integrated with other framework for better use.

1. **Metamask login:** Install the MetaMask browser extension. Click on the MetaMask icon in your browser's toolbar. Click "Import using seed phrase". Enter your 12-word seed phrase to restore your account. Create a password to secure your account. You are now logged in to MetaMask and can interact with decentralized applications.

2. **Home page:** The home page is the first page a user sees when visiting a website. It often serves as an introduction to the website and its purpose and provides navigation options to the rest of the site.
3. **Select Document for upload:** Select the particular document from your local drive/storage or your personal computer for uploading. This is usually done through a file explorer or file browser dialog that allows you to search for and select the desired file. The document size and format doesn't matter. Because the system is compatible for it.
4. **Transaction fee from Metamask:** Here as shown a transaction fee have been charged through the Metamask and some Ethereum is will be deducted from the wallet for the successful uploading of the file by the IPFS and to the blockchain.
5. **Image is stored on Ethereum blockchain by IPFS:** As the image is been displayed means the image has been successfully uploaded from the IPFS to the blockchain. During this process it can take some time as per the size and internet speed.
6. **Chatting system:** We have made a chatting system for the user to share the hashes between them for decrypting the document which is been uploaded to blockchain.

6. PERFORMANCE AND ACCURACY

6. 1 Performance:

A number of variables, including the size of the document being uploaded, the speed of the internet, the storage capacity of the IPFS gateway, and the volume of traffic on the Ethereum network at the time of the transaction, may affect how well your system performs. Hence, without knowing these exact facts, it is difficult to provide an appropriate performance analysis. To improve the performance of your system, you may take into account various best practices, such as using IPFS gateways with higher bandwidth and lower latency, employing file compression methods to minimize the size of the files, and using high-speed internet connections.

6. 2 Accuracy:

Normally, accuracy refers to a system's output being right, which may not apply in this instance. You might, however, take into account how trustworthy and reliable the system's operation is. For instance, you may make sure that the hash of the uploaded document is reliably saved on the Ethereum blockchain and that the IPFS gateway can correctly get the contents from the document.

CONCLUSIONS

The proposed system represents an innovative approach to address the security concerns associated with file sharing systems. By combining permission-less blockchain and IPFS technologies, the system provides a more secure and transparent way to share files. The use of IPFS proxy provides distributed access control and group key management, making it more difficult for unauthorized users to access sensitive data. Users can create and join groups as they choose, and the system manages access control policies to ensure that only authorized members can access files belonging to their respective groups. While the implementation of the system is still ongoing, the design shows great potential, and the authors plan to demonstrate the system's performance in the future. Overall, this proposed system represents a significant step towards a more secure and transparent future for file sharing.

ACKNOWLEDGEMENTS

We would like to express our gratitude to organizers of the Conference for providing us with the opportunity to present our research, and thanks to co-authors, Rahul Chauhan, Kishor Jena, Kanad Patil and Mrs. Sneha Sankhe, for their contributions to the research project and for their help in writing the paper. Finally, we would like to express our appreciation to the research platform for going through past research done on the particular technology and topics, and we have made correction and improvement by looking to their project work.

FIGURES

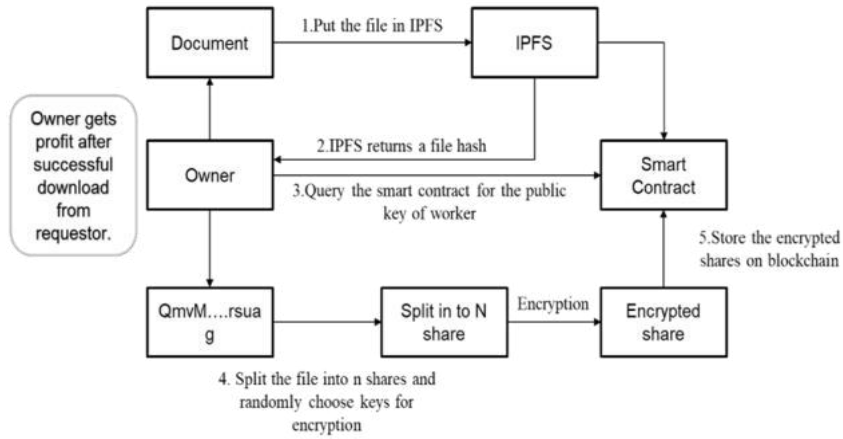


Fig 1: System Architecture of Securing & Sharing the Documents using Blockchain and IPFS Technologies

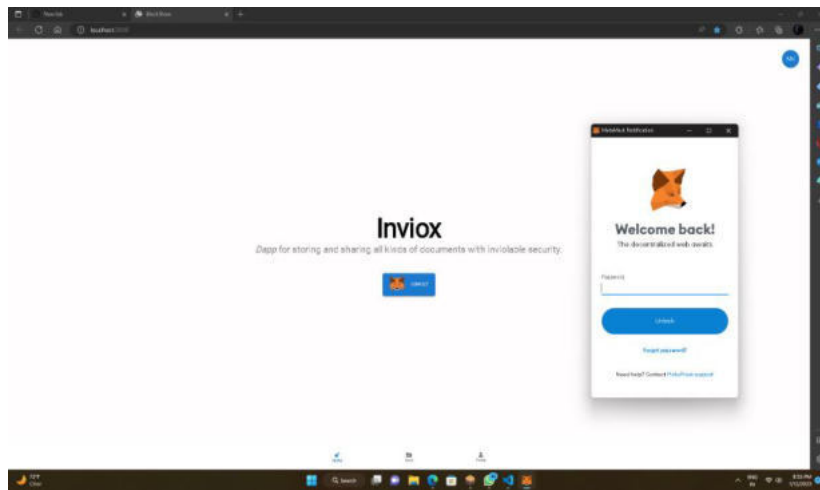


Fig 2: Metamask login of Securing & Sharing the Documents using Blockchain and IPFS Technologies

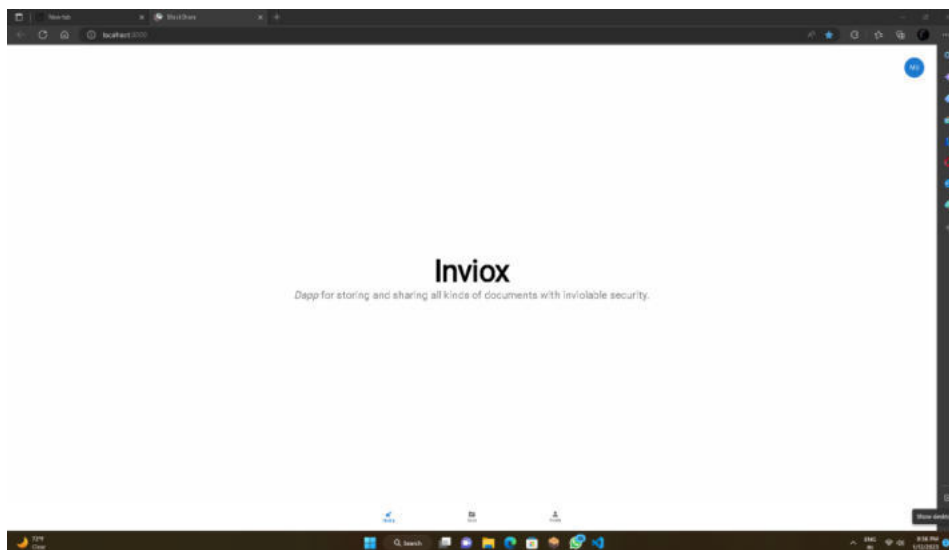


Fig 3: Home page of Securing & Sharing the Documents using Blockchain and IPFS Technologies

Blockchain and IPFS Technologies

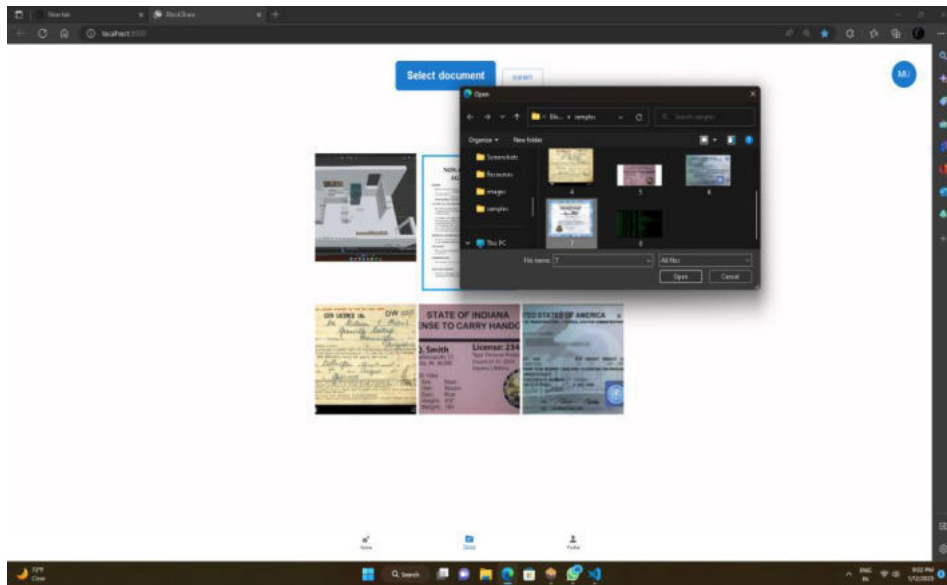


Fig 4: Select Document for upload of Securing & Sharing the Documents using Blockchain and IPFS Technologies

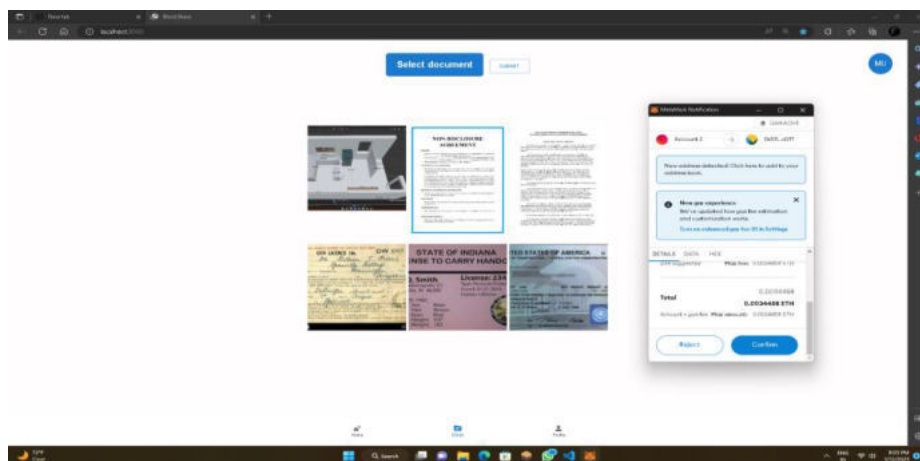


Fig 5: Transaction fee from Metamask

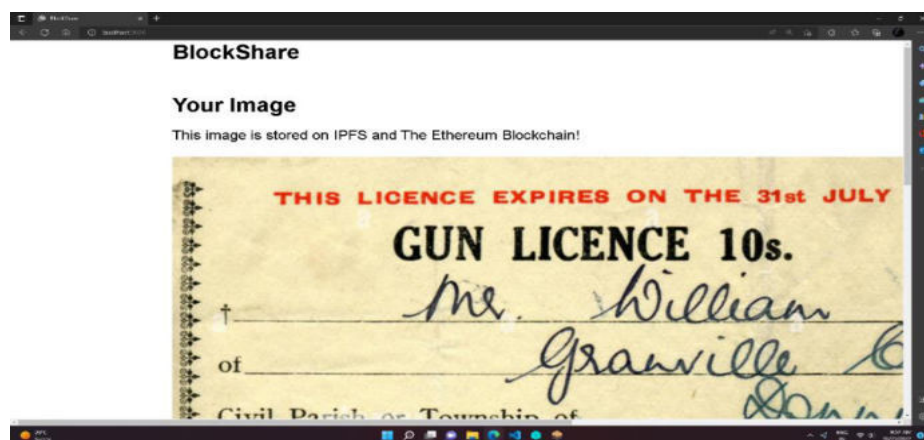


Fig 6: Image is stored on Ethereum blockchain by IPFS

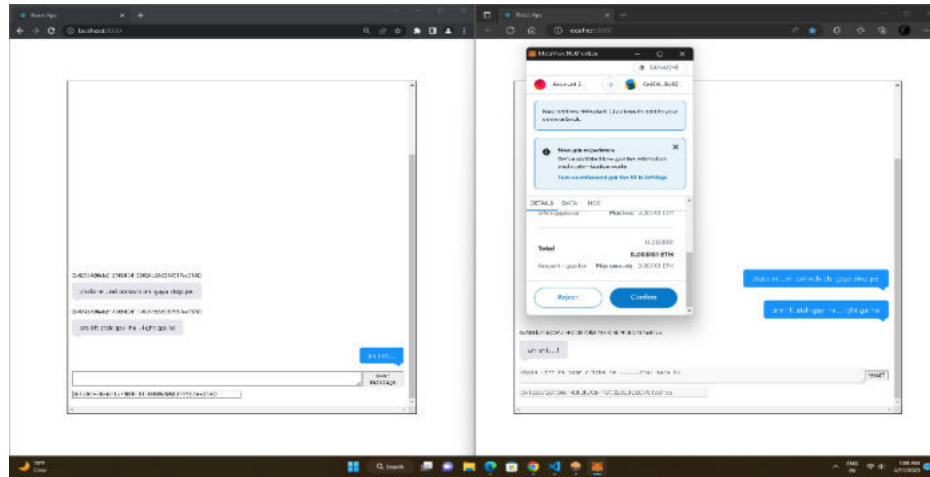


Fig 7: Chatting system for peer to peer sharing the hash Of document

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Image Forgery Identification Using Deep Learning

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ABSTRACT

In the discipline of forensics, copy-move forgery detection is likely one of the most active research fields. The majority of known algorithms rely on block and key-point approaches, alone or in combination. Deep convolutional neural network techniques have recently been used in picture classification, image forensics, image hashing retrieval, and other areas. These techniques have outperformed more conventional techniques in these areas. In the paper, a brand-new convolutional neural network-based copy-move forgery detection approach is provided. The suggested approach makes use of the CNN algorithm and Error Level Analysis, where ELA determines the compression ratio between the original image and the fake image since the compression of the original image and the fake image differ. Results from the experiments demonstrate that the method we suggested produces a forgery image created automatically by computer with a simple copy-move operation in a satisfactory manner. A convolutional neural network is used in the proposed system to automatically build hierarchical representations from the input RGB colour photographs. This innovative method of image forgery detection is based on deep learning. The Error Level Analysis is a forensic technique on the picture to evaluate images across various levels of compression, in contrast to the proposed CNN, which is specifically built for image splicing and copy-move detection applications.

Keywords – *Image Forgery Detection, Convolutional Neural Network, Deep Neural Network.*

1.INTRODUCTION

The most typical form of tampering involves copying one portion of an image and pasting it into another portion of the same image. Undoubtedly one of the most active study areas in blind image forensics is copy-move forgery detection. In the literature, numerous cmfd techniques have been documented. Key-point based methods and block based methods can be used to loosely classify them. The first category methods frequently employ the scale-invariant feature transform and speeded up robust feature techniques. From the entire image, features of the important spot are first extracted. Then, in order to identify traits that are comparable to each key point, each key point is compared to these features. . If a clustering zone produced by matching pairings with the same affine transformation is sizable enough, a forging region may be recognized. In addition to effectively locating duplicated regions, key-point-based algorithms also perform well when dealing with geometric distortions like rotation, scaling, and translation. The disadvantage of key point-based approaches is that it can be challenging to find repeated regions with weak visual structures or key-points. The image is divided into overlapping blocks using block-based algorithms, which then extract some features from each block and search for matching block features. If there are enough matching pairings that share the same shift vector to reach a predetermined number, such matching pairs are taken into account to be a part of duplicated areas.

1.1Problem Statement

Since the invention of photography, individuals and organizations have often sought ways to manipulate and modify images in order to deceive the viewer. Existing projects have worked on the comparison of image forgery detection methods, these are often limited in scope and only compare variants of the same algorithm on images that are specifically created for that type of method. There are also forged images which cannot be detected by the existing applications.

2. LITERATURE SURVEY

Yuna Rao¹, Jiangqun Ni², Humid Zhao Deep Learning Local Descriptor for Image Splicing Detection and Localization. A two-branch CNN, which serves as an expressive local descriptor is presented and applied to learn hierarchical representations from the input RGB color or grayscale test images.

Yagi Liu¹, Xianfeng Zhao² Constrained Image Splicing Detection and Localization With Attention-Aware Encoder-Decoder And Convolution. Constrained image splicing detection and localization is a newly formulated image forensics task. CISDL conducts dense matching between two investigated images and detects whether one image has forged regions pasted from the other.

Giulia Boata¹, Duc-tien Dang- Nguyen², Francesco G. B. De natal³ Morphological Filter Detector For Image Forensics Application Authors: Morphological filters might be used to remove artifacts produced by image manipulation. In this paper we propose a non-trivial extension of a deterministic approach originally for detecting erosion and dilation of binary images.

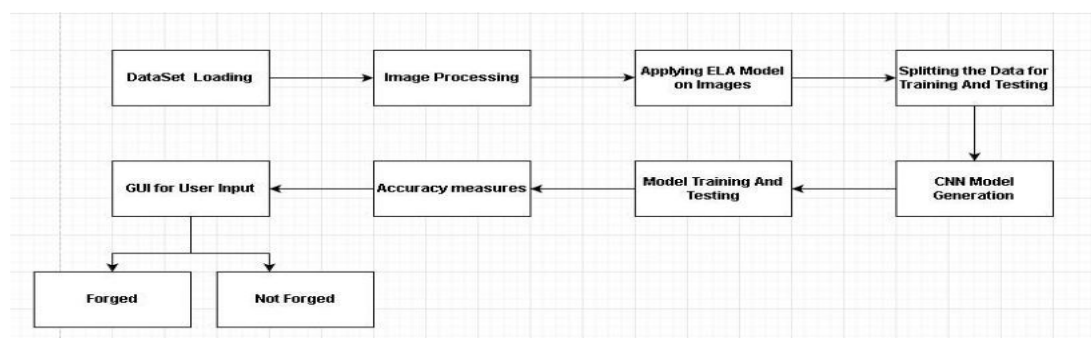
Thuong Le- Tien¹, Hanh Phan-Xuan², Thuy Nguyen Chinh³ Image Forgery Detection: A Low Computational Cost and Effective Data Driven Model Image Forgery Detection contributes indispensable role in digital forensics. There are increasing more sophisticated forgery methods.

Bin Xiao¹, Yang Wei², Xiuli Bi³ Image Splicing Forgery Detection Combing Course to Refined CNN Paper proposes a splicing forgery detection method with two parts: a coarse-to-refined convolutional neural network and adaptive clustering. Image-level CNN is introduced to reduce the computational complexity of the detection process.

3. REQUIREMENTS

Hardware Requirements	Software Requirements
4GB RAM	Windows XP, Windows 7,8
200GB HDD	Python 3.6.3
Intel 1.6 GHz Processor Pentium 4	
GPU (optional) but can be used to train images faster	

4. METHODOLOGY



In this, we propose a novel image forgery detection approach that can automatically learn feature representations based on deep learning framework. We elaborate the proposed technique for feature extraction and classification, for source printer identification. As discussed in previous sections, most of the proposed solutions in literature are text-dependent (i.e. Same content for training and testing is required). This approach has limitations in most real-world scenarios. Therefore, we selected a text

independent approach towards source printer characterization, by employing random patches from document for feature extraction purposes.

The basic algorithm that will be implemented for working of this proposed system is as follows:

Step 1: Upload Dataset: The dataset for our model was taken from Kaggle.

Step 2: Users input the image.

Step 3: In Pre-processing, features of an image are improved by image color conversion, dimension reduction, resizing.

Step 4: In this step features of an image are extracted using methods like DCT based, DWT based, SIFT, SURF etc.

Step 5: On the basis of these extracted features, matching is performed for detection.

In block-based techniques, feature vectors are extracted for each block and in key point-based methods feature vectors are computed for key points.

Step 6: After this, it Checks whether image is forgery or not.

Step 7: If Image is forgery then it will stop and if it is not then it will follow again the step 3.

4.1 Flowchart

A flowchart is a diagram that depicts a process, system or computer algorithm. They are widely used in multiple fields to document, study, plan, improve and communicate often complex processes in clear, easy-to-understand diagrams.

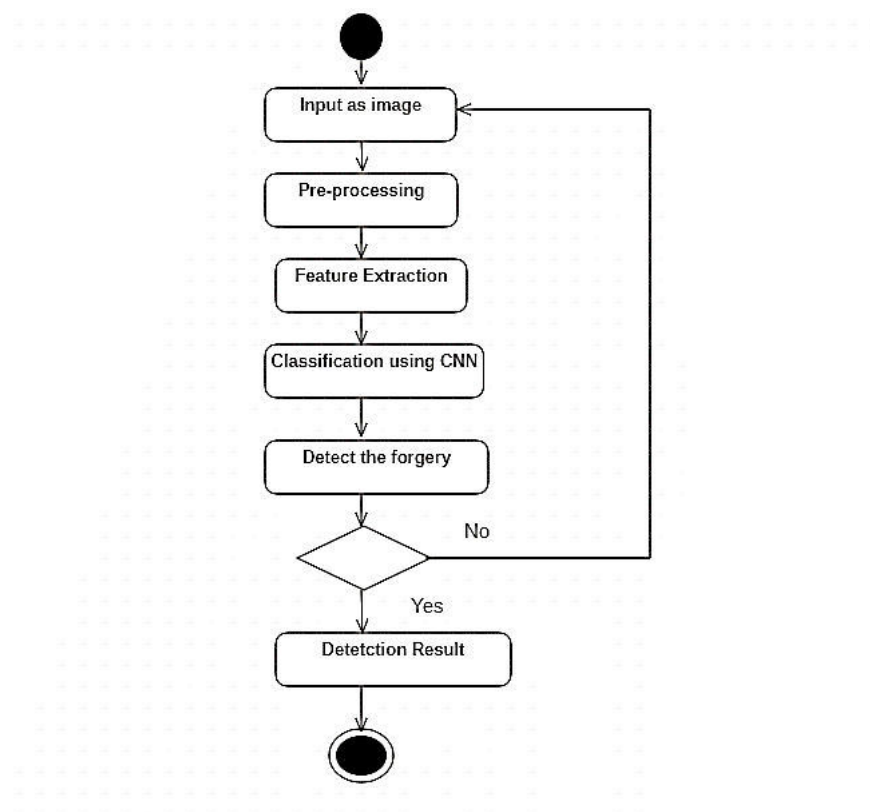


Fig 1: Flow Chart for Image Forgery Identification

5. RESULT S

Deep learning models have shown promising results in identifying various types of image forgeries such as copy-move, splicing, and image tampering. These models are trained on large datasets of

authentic and manipulated images to learn features that differentiate between the two types of images. Some of the popular deep learning models used in image forgery detection include Convolutional Neural Networks and Error Level Analysis.

When a user launches the software, this screen is the first thing that appears, allowing them to enter an image as well as shows image information and image name box as well as the model name.

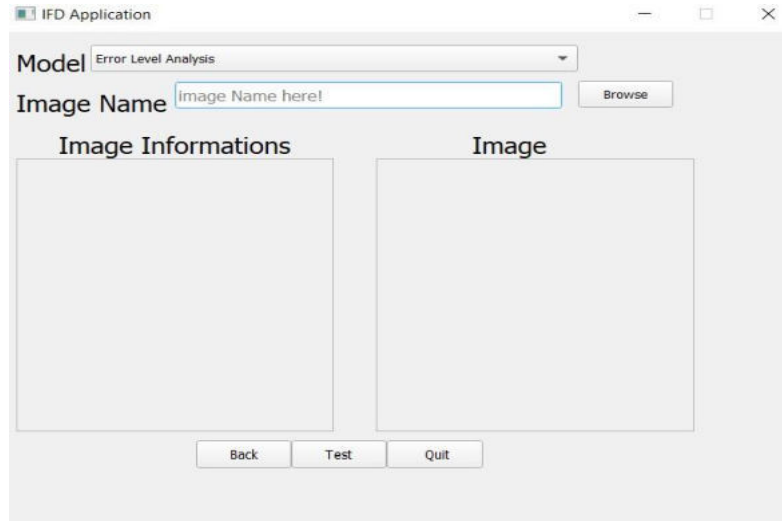


Fig 2: Input Image

When a user clicks the browse button, a new window opens up so they may choose an image. so that the user can choose the image they want to test. Choose a photo and press the open button.

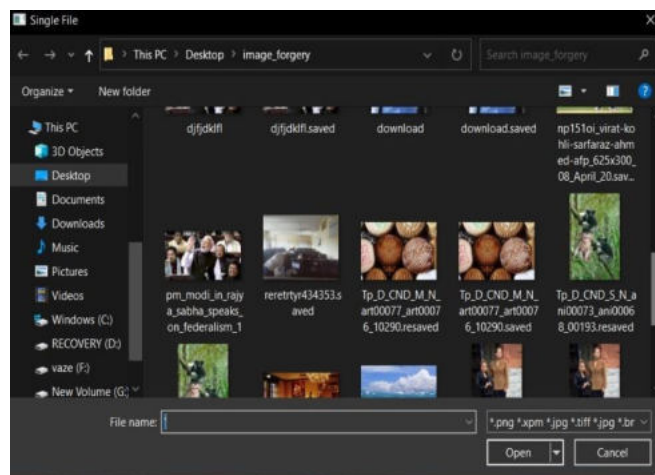


Fig 3: Select Image

When a user clicks the open button, a new window opens with the selected image displayed along with the image name and other information.

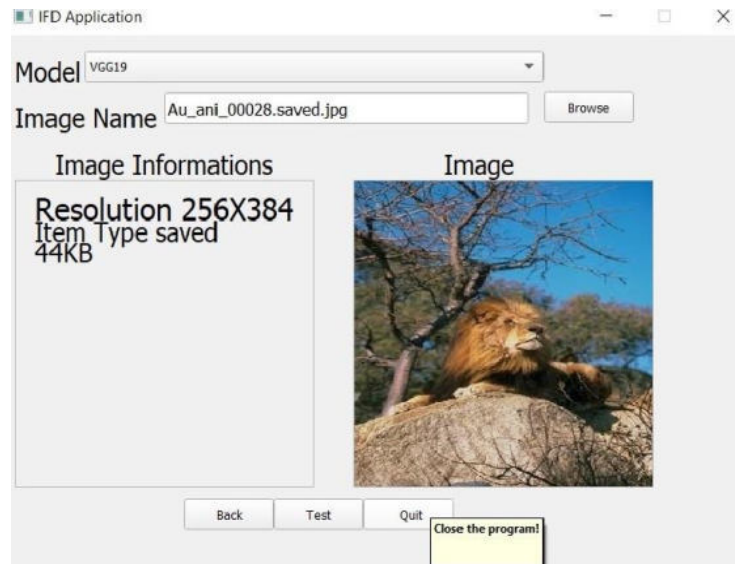


Fig 4: Selected Image Display

When a user clicks the test button, the testing image is started by the model, and it returns the results as a graph as shown in the picture. Click the Test Again button to retest the image if necessary; otherwise, click the Quit button.

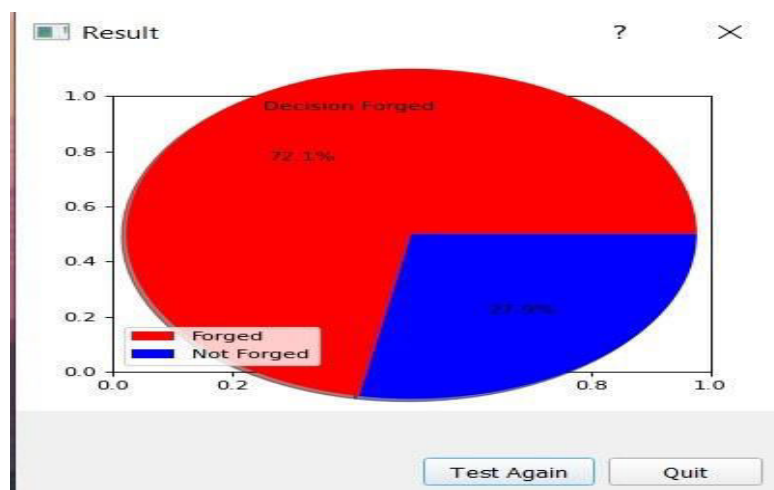


fig : Display Output

6. CONCLUSION

To solve these issues, we propose an innovative system that combines Error Level Analysis with Convolutional Neural Network in machine learning and computer vision. The dataset is split between altered and original photos, and then the architecture for training the recognition is decided. Because CNN is ideal for training with little datasets, we decided to employ it in our training. The outcome of our experiment shows that, after 10 iterations, we achieve the best accuracy for training at 80% and validation at 86.46%.

ACKNOWLEDGEMENT

We would like to extend our appreciation to the participants who took part in this study and generously shared their time and insights. Their contributions have greatly improved the quality of this manuscript.

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Vehicle Accident Detection and Prevention Using IoT

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ABSTRACT

Internet of Things (IoT) has a great impact on the new era of technology. Technological advancement and invention of smarter devices are going neck and neck in today's world. A common incident such as car accidents hampers the advancement of human life. Most common reasons for the accidents are driver's unawareness and uncontrolled speed of vehicle. We have developed an IoT based solution to detect and prevent such incidents. This paper focuses on a smart system that alerts and controls the speed of the vehicle. It measures real-time distance between vehicles and/or obstacles in front of the vehicle using Ultrasonic sensor. It controls speed of the vehicle and alerts respective individuals if an accident occurs. The core processing unit of the proposed system is Arduino incorporating Naïve Bayes Classifier. This paper presents an accident prevention mechanism developed through alcohol detection using an MQ3 alcohol sensor followed by automatic engine locking. The detection part uses an SW-420 vibration sensor to detect any sort of abnormal vibrations that may occur from a collision. The proposed system is implemented and the experimental results show that the system works properly in different road traffic situations and the proposed system provides an efficient, cost-effective, and real-time solution to prevent vehicle accident.

Keywords: *Arduino, Sensors, Accident, Vehicle, IoT, Ultrasonic Sensor, Eye Blink monitoring System, Alcohol Sensor.*

1. INTRODUCTION

Internet of Things (IoT) brings the human civilization one step closer to direct communication between machines. It enables devices to communicate and exchange information between them, which lead them to take decisions and perform actions. IoT allows real world devices a secure connection and exchange of real-time data. By using this technology, billions of smart devices such as sensors or actuators connected to the internet, collect, and share real world data and information.

Machine Learning is a fascinating term in this modern era of advanced technology that can enrich IoT by enabling devices to take decisions on their own. Emerging IoT devices apply Machine Learning technologies that capture and understand data from the environment and help in more intelligent decision. Sensors, actuators, etc. collect data the from environment which can be used as raw materials for the Deep Learning that help IoT devices perform more intelligently.

As technology advances, human civilization is facing problems also. Vehicle accidents is one of them, which is a destructive incident that interferes with civilization advancement by taking valuable lives. According to a statistic of the World Health Organization (WHO), every year about 1.25 million people die in road traffic crashes. In addition to that, approximately 20-50 million become injured or disabled. According to a study, 2.2% of deaths occur due to road traffic crashes, establishing it as the 9th leading cause death around the globe. This phenomenon cost USD \$518 billion globally, which is 1-2% of annual GDP of an individual country. The advancement of technology helps us to aid the challenge of reducing the number of road traffic accidents. IoT and Machine Learning application on vehicles can provide us a better solution to preventing road accidents and therefore increase the numbers of lives saved. A proper alert system to the responsible persons like police, ambulance, relatives can save many injured people from losing their lives.

In this paper, a smart system for vehicles is proposed which can reduce the number of accidents by controlling the vehicle speed, together with a proper alert system. One of the main focuses of this system is its speed controlling mechanism. As the vehicle speed can vary from road to road and time to time, a light Machine Learning strategy named Naïve Bayes Classifier, is used in this proposed system to update the speed control mechanism, and alert the system behavior of vehicle.

1.1 Problem Statement

Vehicle tracking is the process of locating a moving vehicle using a camera. Capture vehicle in video sequence from surveillance camera is demanding application to improve tracking performance. This technology is increasing the number of applications such as traffic control, traffic monitoring, traffic flow, security etc. The estimated cost using this technology will be very less. Video and image processing has been used for traffic surveillance, analysis, and monitoring of traffic conditions in many cities and urban areas. Various methods for speed estimation are proposed in recent years. All approaches attempt to increase accuracy and decrease cost of hardware implementation. The aim is to build an automatic system that can accurately localise and track the speed of any vehicles that appear in aerial video frames.

2. LITERATURE REVIEW

Many researchers carried out their studies on vehicle accident detection system. In this project an increasing number of vehicles, the number of accidents is also increasing at an unprecedented rate. Each year, among the total number of deaths 1.24 million deaths occurred due to the vehicle accident. In India, the root causes of these accidents are due to the drunken driver, drowsiness, and badly designed speed breakers. There is no effective mechanism to prevent these root causes. There is no effective mechanism to prevent these root causes. Our proposed system provides an efficient, cost-effective and real-time solution to prevent vehicle accident.

[1] [Sayanee Nanda^{\[1\]}](#); [Harshada Joshi^{\[2\]}](#); [Smita Khairnar^{\[3\]}](#); An IOT based Smart system for accident prevention and Detection: Nowadays, the number of accidents has increased rapidly. About 17 accidents take place every hour.

[2] [Elie Nasr^{\[1\]}](#); [Elie Kfoury^{\[2\]}](#); [David Khoury^{\[3\]}](#); An IOT Approach to vehicle Accident detection reporting and navigation: One particular concern that Public Safety Organizations (PSO) must account for whilst engaging in many activities is decreasing the effect of vehicle accidents, aiding as many injured people as possible and providing 24/7 on the spot rescue.

[3] Dr. D. Karunkuzhali ^[1]; D. Madhubala ^[2]; Y. Nisha ^[3]; S. Rajeshwari ^[4]; Accident Detection and Monitoring system using IOT: Nowadays we faced the lot of accidents and many people lose their life due to the accidents. So, our project will provide an optimum solution to this drawback.

[4] Mohammad Sanaullah Chowdhury ^[1]; Mubashir Murshed ^[2]; IoT based car accident detection and prevention using Naïve Bayes Classifier: Internet of Things (IoT) together with Machine Learning has a great impact on the new era of technology.

[5] [Md. Yousuf Hossain^{\[1\]}](#); [Fabian Parsia George^{\[2\]}](#); IOT Based Real-Time Drowsy Driving Detection Systems for the Prevention of Road Accidents: According to statistics, a large number of road accidents occur due to drowsy driving which results in severe injuries and deaths.

3. MATERIALS AND METHODS

3.1 Methodology

In this project, all the sensors will be wired inside the vehicle. The sensors value will be uploaded in a centralized cloud server. The system is composed of a few components that perform operations individually to run the overall system contains the camera, Ultrasonic sensor, Infrared sensor, MQ-3 Sensor, Accelerometer ADXL-330 and Arduino Uno R3. Arduino is a microcontroller which is used to process data and control sensors. Our proposed system uses MQ-3 sensor to detect the alcohol consumption. Our proposed system uses infrared sensor to monitor the eye of the human being. The infrared sensor contains IR LED and IR photo-diode. Our proposed system uses “OpenCV Library” to monitor mouth. Our proposed algorithm detects the number of yawns from the detected mouth. Our proposed system uses ultrasonic sensor to detect speed Bumpers on road.

[1] **Alcohol Detection:** Our proposed system uses MQ-3 sensor to detect the alcohol consumption. The reason to choose MQ-3 sensor is that it is low cost and have high sensitivity to alcohol. It detects the ethanol in the air or human breath. It contains total 6 pins. It is basically alumina tube covered by tin oxide. When alcohol molecules in the human breath meet the electrode between SnO₂ and alumina, ethanol burns into acetic acid and because of this more current is produced. More the alcohol molecules, more current we will get.

[2] Eye Blink Detection: Our proposed system uses infrared sensor to monitor the eye of the human being. The infrared sensor contains IR LED and IR photo-diode. Our proposed system uses IR LED to detect eye blink rate. A maximum amount of light is reflected from the eye when the eye is close because when an eye is closed, our skin part of the eye becomes opaque. If minimum amount of light is reflected then we can conclude that vehicle driver is feeling drowsy.

[3] Obstacle Detection: Obstacle detection is applicable to anything that moves, including robot manipulators and manned or unmanned vehicles for land, sea, air, and space; for brevity, these are all called vehicles here. Obstacle detection and hazard detection are synonymous terms, but are sometimes applied in different domains; for example, obstacle detection is usually applied to ground vehicle navigation, whereas hazard detection is often applied to aircraft or spacecraft in the process of landing, as in “landing hazard detection.”

[4] Temperature Detection: The temperature sensor refers to a sensor that can sense the temperature and convert it into a usable output signal, which is the core part of the temperature measuring instrument. It is divided into 5 types and each type has unique working principles. Besides, some factors need to be noticed in the installation and using process.

[5] Head Movement Detection: Our proposed system uses accelerometer ADXL330 for detection of head movement. ADXL330 provides 3-axis detection. We have set each accelerometer axis two dedicated LED indicators - red and green. Both LEDs become off when there is no acceleration. One LED become “ON” if there is acceleration in any one direction.

3.2 Requirement Analysis

Table 1: Requirements Table

Hardware Requirements	Software Requirements
<ul style="list-style-type: none"> • 16X2 LCD Display • Obstacle Sensor • LM35 Temp Sensor • Accelerometer ADXL 3325 Sensor • MQ-3 Sensor • Eyeblink Sensor • Alarm • DC Motor • GSM GPRS • MAX 232 Converter • Power Supply 	<ul style="list-style-type: none"> • C++ • Arduino 1.8.19

4. SYSTEM ARCHITECTURE

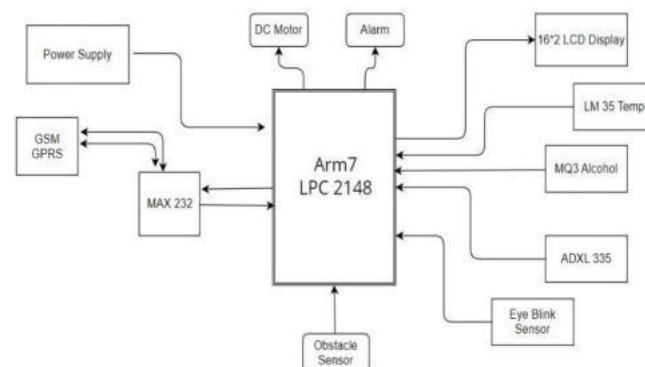


Fig 1: System Architecture of Vehicle Accident Detection and Prevention Using IOT

The architecture of a system reflects how the system is used and how it interacts with other systems and the outside world. It describes the interconnection of all the system's components and the data link between them. The architecture of a system reflects the way it is thought about in terms of its structure, functions, and relationships. In architecture, the term "system" usually refers to the architecture of the hardware itself, rather than the physical structure of the buildings or machinery. The architecture of a system reflects the way it is used, and therefore changes as the system is used.

5. RESULT AND DISCUSSION

Our project vehicle accident detection and prevention are successfully completed and results are obtained satisfactorily. The set of sensors is a device that measures physical input from its environment and converts it into data that can be interpreted by either a human or a machine. This section shows some features that are implemented in our system.

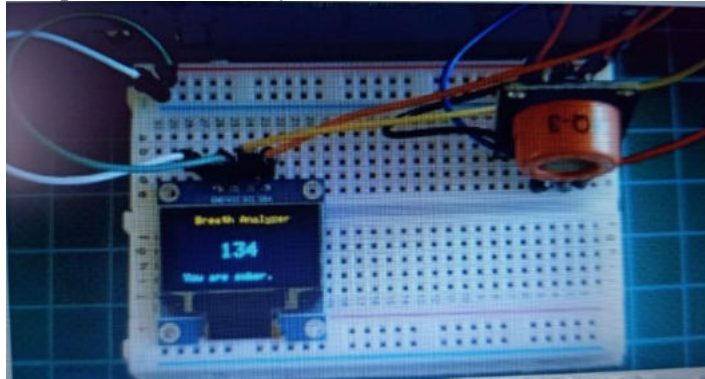


Fig 2: Alcohol Detection

Our proposed system uses MQ-3 sensor to detect the alcohol consumption. The reason to choose MQ-3 sensor is that it is low cost and have high sensitivity to alcohol. It detects the ethanol in the air or human breath.

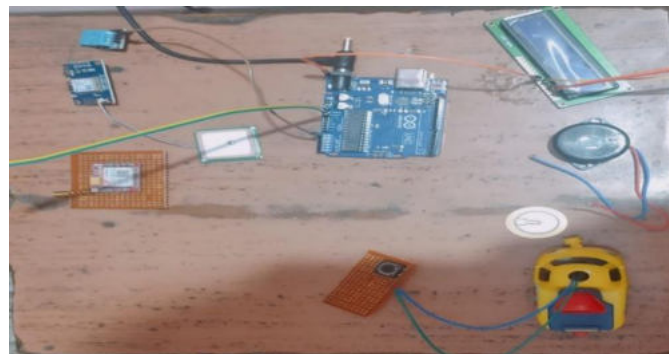


Fig 3: All the Components.



Fig 4: Connection Kit

We use all the components to implement in your system, Figure 3 and Figure 4 are both shows the result that will be shown on the interface. The figure is showing the system alert sent to the messages/ Location to the responder.

CONCLUSION AND FUTURE WORK

With an increasing number of vehicles, the number of accidents is increasing. The main factor for accidents is Consumption of alcohol, drowsiness, and badly designed speed bumpers. The system provides the layout which has the blessings of low price, portability, and small length. It includes accelerometer sensor, GSM and IOT, interfacing which reduces the coincidence. It also triumphs over numerous issues of automatic machine for twist of fate place detection. Consequently, it reduces the time for looking the vicinity as soon as viable the character can deal with right away it results in keep many lives. Main motto of the accident system undertaking is to decrease the probabilities of casualties in such twist of fate. This tool invention is a good deal extra beneficial for the injuries befall in abandoned locations and those taking place at night time. This gadget will play a vital role in day-to-day lifestyles in future.

Our future vision is to enhance the system so that it suits vehicle of all type or model. GSM module can easily be added to our system which will improve email alert system. GSM module is easy to configure in this proposed system without changing much. This facility will help in road side data mining. As a result, an alert message can be sent to the ambulance service and the police station near that accident spot. Henceforth, the performance of the system will increase in upcoming versions.

ACKNOWLEDGMENTS

The success and outcome of this project required a lot of guidance and assistance from many people and we are extremely privileged to have got this all along the completion of our project. All that we have done is only due to such supervision and assistance and we would not forget to thank them.

We respect and thank Prof. Shaikh Sharique Ahmad, for providing us an opportunity to do the project work and giving us all support and guidance, which made us complete the project duly. We are extremely thankful to her for providing such a nice support and guidance, although she had busy schedule managing the college affairs.

We are thankful to and fortunate enough to get constant encouragement, support, and guidance from our HOD (Prof. Sneha Sankhe) and Project Coordinator (Prof. Sonali Karthik) who helped us in successfully completing our project work. Also, we would like to extend our sincere thanks to her. We are glad enough for you being there always for our help.

We would not forget to remember our Principal Dr. Riyazoddin Siddiqui for their encouragement and more over for their timely support and guidance till the completion of our project work.

Lastly, we would like to thank the whole team for supporting and helping us through our needs.

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[3] [Elie Nasr^{\[1\]}](#); [Elie Kfoury^{\[2\]}](#); [David Khoury^{\[3\]}](#); An IOT Approach to Vehicle Accident Detection Reporting and Navigation, Nov 1016.

[4] Dr. D. Karunkuzhali^[1]; D. Madhubala^[2]; Y. Nisha^[3]; S. Rajeshwari^[4]; Accident Detection and Monitoring system using IOT, International Research Journal of Engineering and Technology, Volume 06, Issue 03, Mar 2019.

[5] Mohammad Sanaullah Chowdhury^[1]; Mubashir Murshed^[2]; IoT based car accident detection and prevention using Naïve Bayes Classifier, International journal of computing, Volume 1, Issue 1, 2019 ISSN.

[6] [Md. Yousuf Hossain^{\[1\]}](#); [Fabian Parsia George^{\[2\]}](#); IOT Based Real-Time Drowsy Driving Detection Systems for the Prevention of Road Accidents

Smart Luggage Carries with Real Time Tracking System Using Raspberry-Pi

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ABSTRACT

Smart luggage is a revolutionary invention that utilizes sensor to follow its owner's movements, providing ease and convenience for people suffering from spinal cord or back-related issues. The luggage is equipped with a Wi-Fi module that can connect to the user devices. If any obstacles are detected, an alarm is triggered, and a notification is sent to the owner. The smart luggage system is not restricted to a particular age group or sector; it caters to everyone, from school-going students to senior citizens. The technology used in this system is NodeMCU ESP-8266. Additionally, an ultrasonic sensor is installed in the luggage to detect and sense any objects in its path. This innovative technology provides a practical solution for people with disabilities or those who are unable to carry their luggage due to back-related issues. The smart luggage system's ability to follow its owner's movements allows them to navigate easily through crowded places without any inconvenience. With its advanced technology and user-friendly features, it is sure to become a game-changer in the luggage industry.

Keywords- NLP: Natural Language Processing, UML: Unified Modeling Language, DFD: Data Flow Diagram, GPS: Global Positioning System, Wi-Fi: Wireless Fidelity.

I. INTRODUCTION

The development of a user-friendly luggage system that offers practical applications is the primary focus of this project. While robotics technology is incorporated, the system is primarily a luggage system that is designed to provide travelers with enhanced convenience and practicality. The luggage system is operated through a pre-installed mobile phone application that utilizes Machine to Machine (M2M) communication to send commands to the embedded microcontroller in the luggage. This microcontroller then acts on these instructions, which can include tracking the location of the luggage and sending it to the user or providing the weight of the luggage. The luggage system's location tracking function is achieved through a GPS module that is activated upon the user's command. This ensures that the user has complete control over when the luggage's location is tracked, providing an added layer of security. The luggage system also aims to enhance its balance through the use of motorized wheels. This function is achieved through a motor controller IC that is connected to the microcontroller. The luggage can be set to semi-automatic or manual mode of travel, and the user's movements are tracked using an accelerometer, allowing the motors to move accordingly. Overall, this innovative luggage system is designed to provide a seamless travel experience for users by offering practical applications that enhance convenience and security. The use of M2M communication and embedded microcontroller technology ensures that the luggage system is user-friendly and easy to operate.

1.1 PROBLEM STATEMENT

Dragging the luggage all over the place has been done since the golden ages. Smart luggage has become a growing need for modern travelers who require a more efficient and secure way of carrying their belongings. However, traditional luggage systems lack the features that cater to this need, resulting in a range of issues, including lost luggage, theft, damage, and inconvenience. Therefore, there is a need to develop an innovative solution that addresses.

II. LITERATURE SURVEY

These references are publications on the topic of smart luggage and related systems. P.L. Santhana Krishnan, R. Valli, and R. Priya published a paper in 2021 titled "Smart Luggage Carrier System With Theft Prevention And Real Time Tracking Using Nano Arduino Structure". In 2016, Shweta Ma, Tanvi Pb, Poonam Sc, and Nilashree Md published a paper titled "Multipurpose Smart Bag". V. Madhava Sarma, S.V.Y.S. Samraj, S.R. Deepika, N. Neha, and K. Prabhakara Rao published a paper titled "Smart Luggage" in 2017. In 2020, Bhanu Prakash Tiwari, Anchal Gupta, Yash Garg, and Priyanshu Pandey published a paper titled "Smart Luggage Carrier" from the Department of Electronics and Communication Engineering at ABES Institute of

Technology in Ghaziabad, India. Also, in 2020, Prathwik R Amin, Krishna Karanth S, Sharanya M S, Akshatha K, and Manjunatha Badiger published a paper titled "Smart Travel Bag". In 2019, Kolekar Dipali, Kore Pallavi, Mulani Tabbasum, and Pathan Hameed published a paper titled "Smart Luggage Carrying Robot Using Raspberry Pi". These publications highlight the growing interest in developing smart luggage systems with various features, such as real-time tracking, theft prevention, and automated transportation.

III. REQUIREMENTS

3.1 Software Requirements:

- Xampp
- Eclipse Photon
- Java 8

3.2 Hardware Requirements:

Ultrasonic sensor	Cables
Metal frame	Breadboard
Wheel	Finger print Sensor
Battery 12V	Buzzer
Arduino	Adapter
Motors	Bluetooth
Power Supply Connectors	Wi-Fi Model

IV. METHODOLOGY

As we provide application for controlling bag, it will follow the owner with his leg moment using uno you can control or pass the statement. Battery gives the power to motor and then wheel through which it can move in the s do not collide with it. The bag has two IR sensors, which is used to follow the owner, that is human detection is possible here. The distance detection is done using Bluetooth. All the sensors and hardware is embedded in the luggage itself. It does not have any web applications. If the range of the Bluetooth is lost, then it is difficult to detect the bag.

V. RESULTS

The results of implementing a smart luggage system are significant and can enhance the travel experience for users. The system's real-time tracking feature allows users to locate their luggage easily and quickly. This tracking feature can be particularly useful in situations where luggage is lost or misplaced during transit. The system's remote monitoring feature also provides users with an added layer of security by enabling them to monitor their luggage in real-time.

VI. CONCLUSION

In this part, the development of inbuilt power bank, and intelligent features is a significant advancement in the luggage industry. The integration of NodeMCU, Arduino Nano, and a 9V battery, along with an ultrasonic sensor for obstacle detection, makes the bag even more efficient and convenient for users. This innovation can revolutionize the way we travel, making it easier and more comfortable. As technology continues to evolve, we can only imagine the endless possibilities for creating smarter and more advanced products to enhance our daily lives.

ACKNOWLEDGEMENTS

I also thank to our project guide Prof. Sharique Ahmad Shaikh and Project coordinator Prof. Sonali Karthik for giving us the constant source of inspiration and help in preparing the project, personally correcting my work and providing encouragement throughout the project, and my team members for steering through the tough as well as easy phases of the project in a result-oriented manner with concern attention.

TABLE AND FIGURES

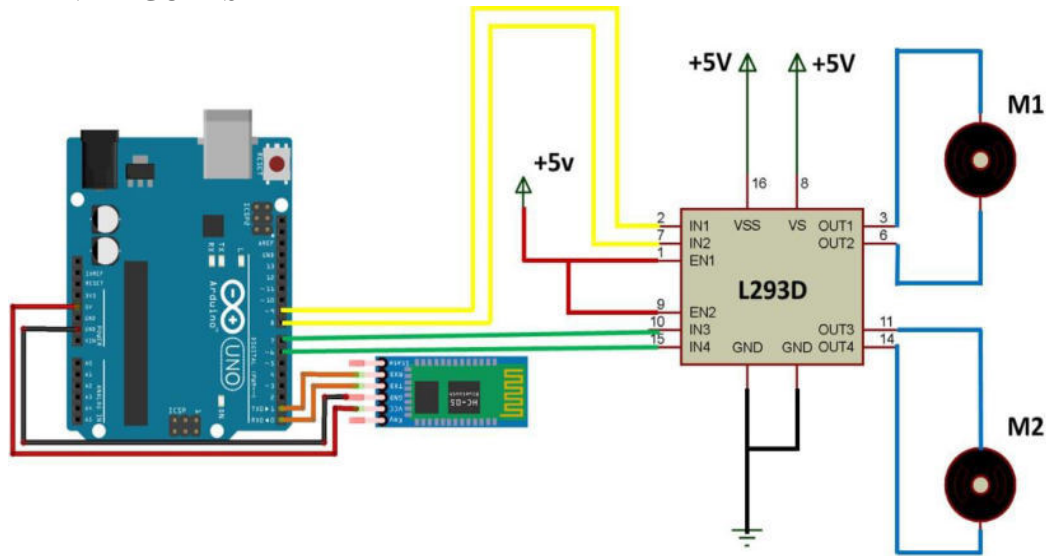


Fig. Architecture of smart Luggage

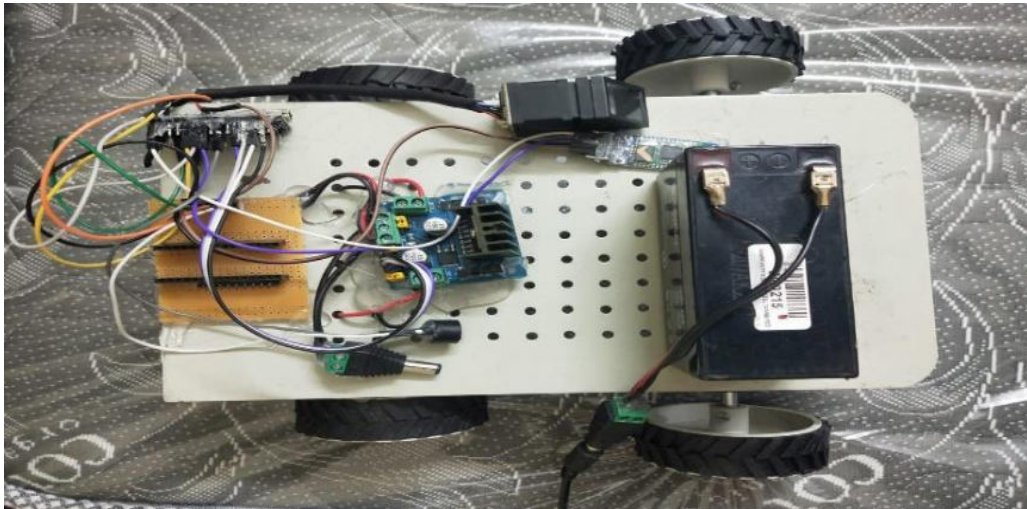


Fig: Smart Luggage

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A Deep Learning Approach for Reconstruction of Images using Auto-Encoder

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ABSTRACT

Object detection problem in terms of different lighting conditions has been a challenging issue. Existing algorithms can only detect the objects with their shapes. However, when the color of an object changes in different times of a day for its various lighting conditions, these models fail to detect the shape of those color changing objects. As a result, the reliability of those models decreases. This model proposes an Autoencoder technique which can transfer an image of an object to its exact color. A new dataset is created where the image of an object is taken in two different lighting conditions to represent change in color of the same object. Then an autoencoder technique is applied on this dataset. The main function of an Autoencoder is to reconstruct its input image which is given in output through a neural network. Once the object is reconstructed to its exact color, understanding the object for any model becomes much more efficient in comparison with existing object detection models.

1. INTRODUCTION

Camera sensors can only capture a limited range of luminance simultaneously, and in order to create high dynamic range (HDR) images a set of different exposures are typically combined. We address the problem of predicting information that have been lost in saturated image areas. We show that this problem is well-suited for deep learning algorithms, and propose a deep convolutional neural network (CNN) that is specifically designed taking into account the challenges in predicting HDR values. We demonstrate that our approach can reconstruct high-resolution visually convincing HDR results in a wide range of situations, and that it generalizes well to reconstruction of images captured with arbitrary and low-end cameras that use unknown camera response functions and post-processing. Furthermore, we compare to existing methods for HDR expansion, and show high quality results also for image based lighting. Finally, we evaluate the results in a subjective experiment performed on an HDR display. This shows that the reconstructed HDR images are visually convincing, with large improvements as compared to existing methods.

1.1 Problem Statement

Lighting is a key factor in creating a successful image. Lighting determines not only brightness and darkness, but also tone, mood, and atmosphere. Therefore, it is necessary to control and manipulate light correctly in order to get the best texture, vibrancy of colour, and luminosity on your objects. Camera sensors should be able to detect objects in different lightning conditions. In different times of day these sensors work properly but when it comes to night these sensors fail to detect those objects. Our model proposes a solution which can detect the objects capture in low light conditions and can transfer the image of the object to its exact color

.LITERATURE SURVEY

P. Prystavka[1], O. Cholyshkina,S. Dolgikh[2], and D. Karpenko[3],“Automated Object Recognition System Based On Convolutional Autoencoder”.

In this paper, they have implemented and tested an automated technology for object recognition based on digital images obtained from aerial photography that employed informative latent feature extraction with a deep convolutional autoencoder.

A.Raghunandan[1], Mohana, P. Raghav[2] and H. V. R. Aradhya[3], "Object Detection Algorithms For Video Surveillance Applications".

In this paper,the various object detection algorithms such as skin detection, colour detection, face detection and target detection are simulated using MATLAB 2017b with an accuracy of approximately

95%. In LIBS, the model fails to provide the most accurate results in the presence of dynamic objects in the background. If there are small changes in the background like the waving of leaves or any subtle changes that may occur in the background. only people in upright position can be detected using the cardboard model.

S. Park[1], S. Yu, M. Kim[2], K. Park[4], and J. Paik[5], “Dual Autoencoder Network For Retinex-Based Low-Light Image Enhancement”.

In this paper, we proposed the novel low-light image enhancement framework using the dual autoencoder network model based on the retinex theory. The histogram-based method can provide contrast enhanced image by redistributing the histogram bins in each sub-histogram, but it cannot successfully improve the quality of the dark region of the background. The variational retinex approach provided better enhanced images, but it shows the over-enhancement with amplified noise and black halo near edges.

Fang Ming[1], Li Hongna, Liang Ming[2], “A Review On Low Light Video Image Enhancement Algorithm”.

This paper proposes an improves spatio-temporal clustering filtering algorithm Against the problems existing in the low-light video images and the shortcomings of current low-light video image enhancement algorithms. But the project fails when it come to lightening condition of an object and the noise removal process is also not so accurate.

Partha Pratim Banik[1], Rappy Saha, Ki-Doo Kim[2], “Hdr Image From Single Ldr Image After Removing Highlight”.

In this paper, it is shown that the HDR contents of an LDR image are explored by removing highlight and recovering object details in weakly exposed region. The drawback is that the algorithm mainly focuses on some particular region and even with focusing on unexposed region the out image is not so sharp.

2. REQUIREMENTS

I) Software Requirements:

Tensorflow
 Keras
 TensorBoard
 Python
 Numpy
 Anaconda

II) Hardware Requirements:

4GB RAM minimum
 Processor: 800MHZ Intel Pentium and above.
 Memory: 512 MB
 Disk Space: 750 MB of free disk space

3. MATERIALS AND METHODS

We propose a novel method for reconstructing HDR images from low dynamic range (LDR) input images, by estimating missing information in bright image parts, such as highlights, lost due to saturation of the camera sensor. We base our approach on a fully convolutional neural network (CNN) design in the form of a hybrid dynamic range autoencoder. Similarly to deep autoencoder architectures; the LDR input image is transformed by an encoder network to produce a compact feature representation of the spatial context of the image. The 8 encoded image is then fed to an HDR decoder network, operating in the log domain, to reconstruct an HDR image.

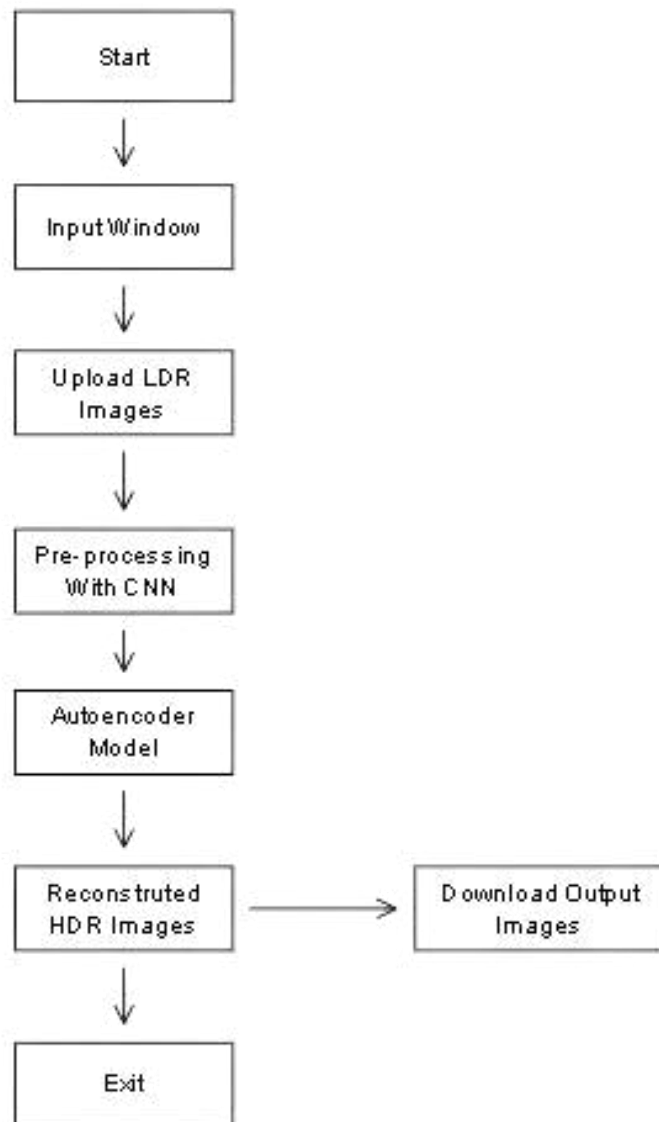


Fig.1 Flow chart of Image Reconstruction model

4. RESULTS

In order to verify the experimental results, this paper uses four sets of experiments under different scenes. Each scene is under low light condition and makes the camera slightly display. We have used an auto-encoder technique that captures the particular part of images, which are not clear and reconstruct those images. The experimental results are as follows:

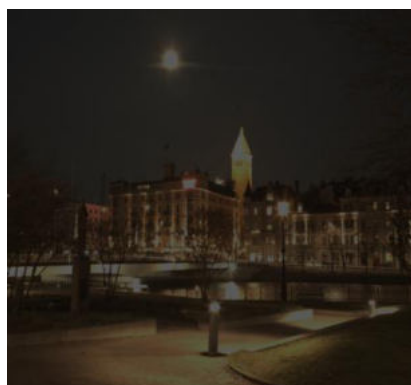


Fig.2(a) input

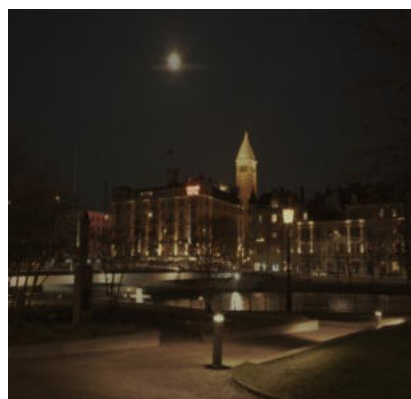


Fig.2(b) output

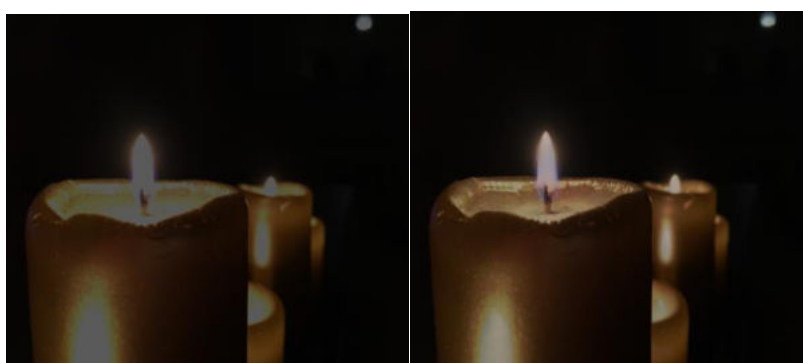


Fig.3(a)

5. CONCLUSION

HDR reconstruction from an LDR image is a challenging task. To solve this problem, we have presented a hybrid dynamic range autoencoder. This is designed and trained taking into account the characteristics of HDR images in the model architecture, training data and optimization procedure. The quality and versatility of the HDR reconstruction have been demonstrated through a number of examples, as well as in a subjective experiment it is shown that the HDR contents of an LDR image are explored by removing highlight and recovering object details in weakly exposed region. The quality of the HDR image is measured by comparing standard deviation of input LDR and output HDR image.

If the model is not able to produce a good level of accuracy then we can work on to improve the accuracy. As our project is specific to image reconstruction only in future we can future implement a model for reconstructing high dynamic range videos from a low dynamic range videos. Recovering saturated image regions is only one of the problems in reconstructing HDR images. Another, less prominent issue is quantization artifacts, which can be alleviated using existing methods. However, we believe that bit-depth extension also can be achieved by means of deep learning. For this purpose existing architectures for compression artifact or super resolution are probably better suited ACM Transactions.

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We would like to extend our appreciation to the participants who took part in this study and generously shared their time and insights. Their contributions have greatly improved the quality of this manuscript.

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Three-Phase Asynchronous Motor using Industry 4.0 with Load Expedient

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ABSTRACT

The asynchronous motor leads industrial applications in the current environment. Asynchronous motors' main advantage is its robust and straightforward construction. It is quite costly and can operate in any environment. In order to apply industry 4.0 in a safe and cost-effective manner, this project provides information on the load expedient of an asynchronous motor in several industries. Asynchronous motors are protected by the design from failures such as overcurrent, overvoltage, under voltage, and single phasing. Voltage and current are also observed, and manual and automatic methods of controlling an asynchronous motor are provided. Due to their high level of robustness, dependability, cheap cost, maintenance, and high efficiency, asynchronous motors are used in the majority of industrial applications, so protecting them is crucial. The sensors collect data on variables such as an asynchronous machine's load current and voltage and communicate it to the processing unit (Arduino). It will check the parameters and display results. This project provides automatic and manual induction machine start and stop control to communicate data for web monitoring in order to prevent system failure. In order to automate and user-friendly the system, it also offers an industrial application.

Keywords: *Asynchronous motor, industry 4.0, Wireless area network (WLAN), ATmega 328 Microcontroller, Contactor, Relay.*

1. INTRODUCTION

DC motors were widely used in the advancement of electrical technology for many different industrial applications. Due to the significant advantages of asynchronous motors, the outlook of industry altered after the advent of AC motors, particularly asynchronous motors. An asynchronous motor has two major components: a rotating component and a stationary component. Mutual induction, which is based on the same principles as the transformer, is used to connect the two components. Another name for an induction is a revolving transformer. The primary benefits of 3-phase asynchronous motors are self-starting, durable design, strong power factor, and inexpensive cost, however the speed cannot be regulated without sacrificing efficiency: The following variables, such as an unbalanced 3-phase supply, overvoltage, and overload, can contribute to electrical problems. Mechanical faults: The mechanical faults can be caused by a broken rotor bar, an eccentric air gap, bearing damage, rotor and stator winding failure.

Due to technological development, monitoring and control is automatic. Industry 4.0 is the latest development to control and monitor the motor from a remote location. This method provides easy control and reliability. The reliability of the motor is achieved by continuous monitoring of electrical and mechanical parameters. The performance of the asynchronous motor depends on the above electrical and mechanical parameters. Therefore, continuous monitoring of the induction motor is required for safe and reliable operation of industrial motors.

The drivers of these motors are mostly focused on motor control and the predictive maintenance schedules of the motors are not calculated. Enterprise resource planning (ERP) is being used to increase efficiency, particularly in 7/24 manufacturing companies. However, unexpected failures are not predicted by the ERP system, which may cause disruptions in the production process. In this study, the temperature, current, voltage, cycle, speed, frequency, torque, and flux data of single-phase and three-phase asynchronous motors (S / 3PIM) were read using TCP/IP protocol via Wi-Fi. These characteristics were read and transferred to the central programme utilising the already-existing Internet network, avoiding the need for new wiring. All of the motors' parameters were gathered by the central software, which also established the appropriate maintenance schedules. This system was applied and used in a textile factory. Frequency controlled motors have special 50/60 Hz filters in their structure, which make it impossible to measure the energy with the uniform integrations developed for normal energy measurement.

2. LITERATURE REVIEW AND OBJECTIVE

Mehmet Şen and Basri Kul et2017, In this study A factory induction motor (IM) was monitored with wireless TCP/IP protocol in order to detect and predict deviations from normal operating parameters before the occurrence of motor failure[1].

V. Bhaskar, T. Gowri Manohar in 2012, The design aspects of an embedded device which can control up to 8 devices by sending a specific SMS message from a mobile phone to monitor the induction motor are presented[2].

Minh-Quang Tran, Mahmoud Elsis, Karar Mahmoud, Meng-Kun Liu, Matti Lehtonen, And Mohamed M. F. Darwish, in 2021, This paper proposes a new IoT architecture based on utilizing machine learning techniques to suppress cyber-attacks for providing reliable and secure online monitoring for the induction motor status[3].

Adim Firmansah, Aripriharta, Nandang Mufti, Arif Nur Affandi, Ilham Ari Elbaith Zaeni, in 2018, The vibration of the motor provides information for failure diagnostic and prediction through signal processing. Each self-powered IoT node is supplied by the motor vibration its self by utilizing two 27mm piezoelectrics in series[4].

M. Ashmitha, D.J. Dhanusha, M.S.Vijitlin, G. Biju George, in the year 2021, This paper shows how to monitor the start and stop of an induction machine using both automatic and manual methods to avoid failiure. The motor system monitoring entails the measure of a variety of attributes, including the motor's vibration, speed, temperature, supply voltage, humidity and motor current[5].

Ashwini B Kaule, M.R.Bachawad, in 2020, In this paper thesis deals with the hardware part for monitoring the continuous parameters and speed control part of Induction Motor[6].

This project grants the information regarding industry 4.0 based with load expedient of an asynchronous motor in industries for implementation, In order for protected and economic conditions. The design gives protection of asynchronous motor from faults i.e., overcurrent, overvoltage, under-voltage and single phasing, observation for voltage and current, manual and automatic ways to control asynchronous motor and load sharing.

3. METHODOLOGY

The power supply is turned ON, the Arduino and all interface components receive the required supply. First, the main power supply is passed to the phase failure circuit, which detects the phase failure and cuts off the power supply. The current sensor provides the current value of individual 3-phase asynchronous motor. Overvoltage and undervoltage problems are identified using the voltage sensor. We observe the parameters of the 3-phase asynchronous motor such as voltage, current, p.f, power.

The load is shifted to the different phases depending on the availability of the phases. For this, a relay is used to develop a phase shifter or a phase selector which selects the phase according to the availability of the phase and avoids short circuit of the three phases available here and provides under voltage protection. we have connected every motor individually with connect switch as a contactor. Arduino reads the data from various sensors and also reads the commands from the internet and gives control signals to the relay controlling the asynchronous motor through contactor analysis according to the given instructions. The sensor information is visually displayed on the server. Control of the asynchronous motor is based on the sensed parameters and, in manual mode, on alerts received via the web. The control is done by a relay and contactor circuit. The motor is switched ON /OFF when an abnormal value is detected.

4. COMPONENTS USED

4.1 Contactor

Contactors are employed in high-current load applications and are intended to control and minimize the arc that results from the interruption of the large motor currents. They are set up with Normally Open contacts in addition to the low current connectors. These are gadgets that can take 100 kilowatts of electricity and more than 20 amps of current. The coil input of the contactor is powered by an AC/DC supply. A lower voltage PLC will primarily be in charge of controlling this coil. The motor voltage has the ability to control them as well. The motor may contain a network of connected coils that are used to control the resistance or the acceleration.

A magnetic field is created when current is allowed to flow through the contactor, which causes the electromagnet to begin to expand. As a result, the contactor's core begins to wind up. This method aids in reviving the moving contact. Thus, a short circuit is created between the moving and fixed contacts. As a result, the current flows through them and into the subsequent circuit. High current is initially drawn into the armature coil. As soon as the metal core reaches the coil, this decreases. The contacts become open circuited when the current is cut off because the coil becomes de-energized.

4.2 Relay

The armature of the magnetic field in the relay which opens or closes the connections is moved by the relay. The small power relay has only one contact, while the high-power relay has two contacts for opening the switch. The inner portion of the relay is shown in the picture below. The iron core is wound by a control coil to produce the magnetic field around it. The power supply is applied to the coil via the contact of the control switch to produce the current. As a result, the magnetic field attracts the lower arm of the magnet, which closes the circuit. Hence, if the contact is already closed, current passes through the load. As it oppositely moves, the contacts are opened.

4.3 Current Transformer

The fundamental workings of a current transformer are identical to those of a power transformer. The power transformer, Included are the current transformer's primary and secondary windings. When the main winding experiences alternating current, alternating magnetic flux is generated, which subsequently causes alternating current to flow through the secondary winding. The load impedance, or "burden," for current transformers, is incredibly low. The current transformer therefore operates in a short circuit. Additionally, the current in the secondary winding is not dependent on the load impedance but rather on the primary winding's current.

4.4 Potential Transformer

Potential transformers are frequently used in grid stations, power stations, and other locations where power is produced, controlled, and distributed to measure the voltage and power of transmission and distribution lines. They are also used to measure high voltage and power between high power cables. A potential transformer functions by stepping down high voltage and supplying power in accordance with the reading of a measuring device that is installed for measuring voltage or power. Therefore, its primary function is to supply voltage in accordance with the measuring device so that the power is controlled in accordance with its rating.

4.5 Atmega328 Microcontroller

AVR micro-controllers, such as the ATmega-328, are essentially virtual RISC processors. Up to eight bits of data can be supported by it. The 32KB internal built-in memory of the ATmega-328. There are many other features of this micro-controller. To contrast how these two microcontrollers do their respective tasks, you should also look at Introduction to PIC16F877a (a PIC Microcontroller). Electrically Erasable Programmable Read-Only Memory for the ATmega328 is 1KB (EEPROM). The microcontroller can still store data and provide results after receiving an electric source, as shown by this feature, even if the electric supply is cut off. Additionally, the ATmega-328 features a 2KB Static Random Access Memory (SRAM). The ATmega 328 is the most popular product on the market right now due to a variety of features. These characteristics include configurable Serial USART, advanced RISC architecture, good performance, low power consumption, real timer counter with separate oscillator, 6 PWM pins, Up to 20 MIPS of processing speed, programming lock for software security, etc. Arduino mostly uses the ATmega-328.

4.6 ESP8266 WIFI Module

The microcontroller can connect to your WiFi network using the ESP8266 WiFi Module's built-in TCP/IP protocol stack. The ESP8266 is capable of offloading all WiFi networking tasks from another application processor or hosting an application. An AT command set firmware is preprogrammed into each ESP8266 module. Hence, all you have to do is connect it to your Arduino device to obtain nearly the same WiFi functionality as a WiFi Shield. The on-board processing and storage power of this module is sufficient to enable integration with sensors and other application-specific devices via its GPIOs with minimal development required in advance and minimal loading required during runtime. It only needs a small amount of external circuitry because to its high level of on-chip integration, and even the frontend module is made to take up little space on the PCB. The ESP8266 includes a self-calibrated RF that enables it to operate in all operational environments and does not require any external RF components. It also supports APSD for VoIP applications and Bluetooth co-existence interfaces.

4.7 LCD (Liquid Crystal Display)

In this work, a 16x2 LCD panel is utilised to display data that is continuously collected from sensors. There are 16 pins on the LCD. The LCD display's anode and cathode pins get a 5V supply. Pins 3, 4, and 5 are connected to a pot to modify the LCD display's brightness. 8 data pins and 2 control pins are present on the LCD display. The method is programmed so that the data is continuously shown on the LCD panel. Four data pins, two control pins, and two supply wires (i.e., 5V and Ground) must be connected to Arduino in order to interface an LCD display. One by one, the processed data is shown on the LCD screen. Additionally, the need for a smooth motor functioning is demonstrated.

4.8 Power Supply

The circuit from which we obtain the desired dc voltage to power the other circuits is the control supply. While the other parts of our circuit need 5V DC, the voltage we receive from the majority of lines is 230V AC. Therefore, a stepdown transformer is used to generate 12V AC, which is then converted to 12V DC using a rectifier. Despite the fact that the rectifier's output could be a DC flag, it still has some swells, which is why it is also known as a throbbing DC. It is necessary to have a channel circuit to discharge output voltage swell. In this case, a capacitor is used. Using a positive voltage controller chip 705, the 12V DC is evaluated down to 5V. This produces a steady DC voltage of 5V.

5. MERITS AND APPLICATIONS

5.1 Merits:

- Reduced human labour and boosted staff productivity
- Effective management of operations
- Cost-effective operating through business development and marketing
- The motor will always be in good working condition.
- No Over current
- Speed can be easily regulated since it has good speed regulation, a sustainable overload capacity, and a high starting torque.

5.2 Applications:

- Highly used in Industries
- Electric Vehicles

6. CONCLUSION

In this project the concept of Industry 4.0 for early fault detection, monitoring, controlling and load sharing of 3 phase asynchronous motor. The system may combine different detected parameters in real time to increase the accuracy of defect identification in motors. When the motor system is seen, several metrics, including speed, p.f., supply voltage, and motor current, can be measured. As a result, this system has more fields than other standard ways, enabling alarm, alert messages, and quick controlling. Here, the idea of Industry 4.0 is offered for distant monitoring and motor control. In addition, the data is shown sequentially. Additional fields have been added to the work for valuable control. Every electrical system nowadays requires the application of the system. The system's unique benefits include less maintenance, quick and simple control, and remote data access. Results from the experiments support the system's viability for

implementation. Science and technological advancement are ongoing processes. New products and technologies are constantly being developed. Since technology develops every day, humans might imagine a time when we occupy every place.

ACKNOWLEDGEMENT

We take this opportunity to express our deep regards those who offered their invaluable assistance and guidance in the hour of needs. After process of our project 3 Phase Asynchronous Motor using Industry 4.0 with Load Expedient. We look back in respect to people who have helped us in our work. Without their invaluable help and guidance, the completion of this project would have been a difficult task. We would like to express our sincere gratitude towards the people who guided us throughout our project. Co-ordination and guidance of our internal guide Prof. Naeem Shaikh and who helped us sail smoothly to completion of our project and provided us his helping hand in all technical aspects. We are very grateful to our Head of Department Prof. Raees Ahmad, principal Dr. S. Riyazoddin and our college authorities for providing facilities and excellent infrastructure

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FIGURES

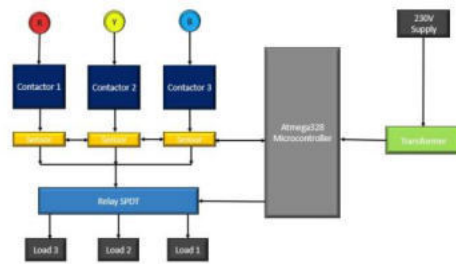


FIGURE 1: BLOCK DIAGRAM



FIGURE 2: CONTACTOR

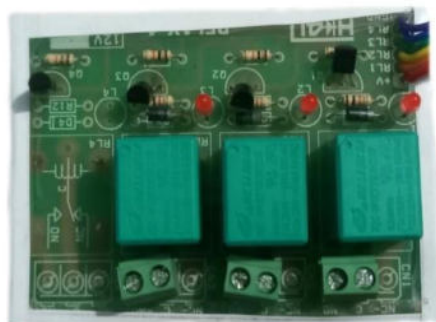


FIGURE 3: RELAY



FIGURE 4: CURRENT TRANSFORMER



**FIGURE 5: POTENTIAL TRANSFORMER
ATmega328**

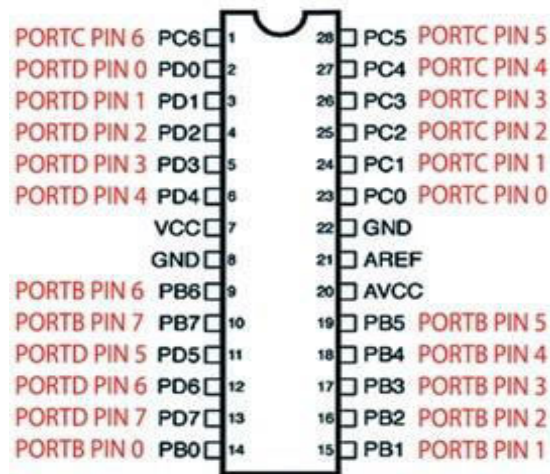


FIGURE 6: PIN DIAGRAM



FIGURE 7: WIFI MODULE

Integrated DC-DC Converter Based Grid Connected Transformerless Inverter

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Abstract

Owing to low cost, small size, and low weight, transformerless inverters became prominent in single-phase grid connected photovoltaic (PV) systems. Key issues pertaining to these inverters include suppression of common mode (CM) leakage current and improvement of conversion efficiency. Achieving higher efficiency in single-phase grid-connected photovoltaic systems depends on the number of stages involved in feeding power to the grid, predominantly, if the PV array voltage is less than the peak value of the grid voltage. In this paper, an integrated dc-dc converter based grid-connected transformerless PV inverter is proposed which is aimed at maintaining high efficiency, even if the PV array voltage falls below the peak value of grid voltage (efficient operation at an extended input voltage range). A modulation strategy is discussed in order to minimize the flow of CM leakage current. Further, the efficiencies of certain transformerless inverter topologies are analyzed and compared with that of the proposed topology.

Literature Review

In recent years, Photovoltaic (PV) holds a pivotal position in ever-increasing energy demand due to easy accessibility, easy installation, high return on investment, and low maintenance cost. A complete PV system consists of a PV array, DC–DC converter (optional), DC-link (DCL) capacitor, inverter, filter, and a grid. Therefore, based on the devices, the PV system configuration is categorized into two types i.e., single-stage and two-stage configuration systems.

A single-stage system consists of a PV array, DCL capacitor, inverter, filter, and a grid. In this system, the weight and size of the system are considerably reduced but complexity is greatly increased due to the handling of different functionalities (Maximum Power Point Tracking (MPPT), current control, voltage control, and grid synchronization) by the inverter alone. Moreover, for some applications, the PV voltage needed to be increased to the desired level that cannot be achieved without the use of a DC–DC converter. Therefore, to reduce the system complexity and widen its applications range, a DC–DC converter is introduced in the two-stage configuration system [2].

In the 1st stage of the PV system, a DC–DC boost converter is used to extract the maximum power from the PV panel through the maximum power point technique and lift-up the voltage level according to the desired application. Generally, the classical converters such as boost, Single Ended Primary Inductor Converter (SEPIC), and cuk, etc. are used to attain a High Voltage Gain (HVG). For this purpose, a converter is needed to be operated at a high duty cycle, which has some disadvantages, such as

- increased duty cycle causing lower efficiency due to increased losses in parasitic resistances of a diode, capacitor, and inductor;
- as the duty cycle increases, the voltage stress on the switch increases; and
- increased conduction and switching losses [3].

To overcome the above-mentioned limitations, numerous researchers have designed different converter topologies that can be categorized into isolated and non-isolated topologies based on coupling [4].

A transformer is used in isolated topologies to attain a HVG; however, due to the heavy weight of the transformer and its core and winding losses, they are not feasible for low power PV applications. Consequently, the authors used non-isolated topologies to overcome the issues in isolated topologies [5–9]. A coupled inductor-based Switch Inductor (SL) configured high lift-up converters for renewable application is proposed in [5].

Due to the usage of coupled inductors, the efficiency of these topologies is low due to the leakage inductances of the windings. The authors proposed single inductor-based converter topologies that can achieve a HVG while maintaining good efficiency [6–9].

In [6], eight different SL-based converter topologies are presented, in which SL is configured with traditional boost, cuk, and SEPIC. Although HVG is achieved by most of these topologies, usage of high

component count increases the operational complexity and cost of the converters. An SL and Switch Capacitor (SC)-based improved cuk converter is presented in [7]. This topology is very attractive in terms of HVG but the utilization of two switches and a high number of magnetizing components causes an increment in the control, complexity, and cost. A single switch SEPIC-based modified converter topology is proposed in [8]. However, even though a high voltage gain is achieved for continuous input current, the converter initially suffers from high conduction losses as voltage stress on the switch is equal to the output voltage. An SL/SCbased cascaded boost converter proposed in [9] can achieve HVG with reduced component count but is unable to attain high efficiency.

To overcome the limitations in the abovediscussed topologies, in this research work, an SL configured hybrid topology that combines the Voltage Doubler Circuit (VDC) with the SEPIC converter is proposed. The most prominent features include high voltage conversion ratio, fewer components, single switch, low voltage stress on semiconductor components, and contiguous input current.

In the second stage of the PV system, besides DC-AC inversion, the functionality of the inverter also involves grid synchronization, current control and protection, and DCL voltage regulation, etc. Therefore, for the smooth and stable performance of the PV system, the inverter control plays a prominent role and is usually implemented in the form of two cascaded loops i.e., outer Voltage Control Loop (VCL) and inner Current Control Loop (CCL).

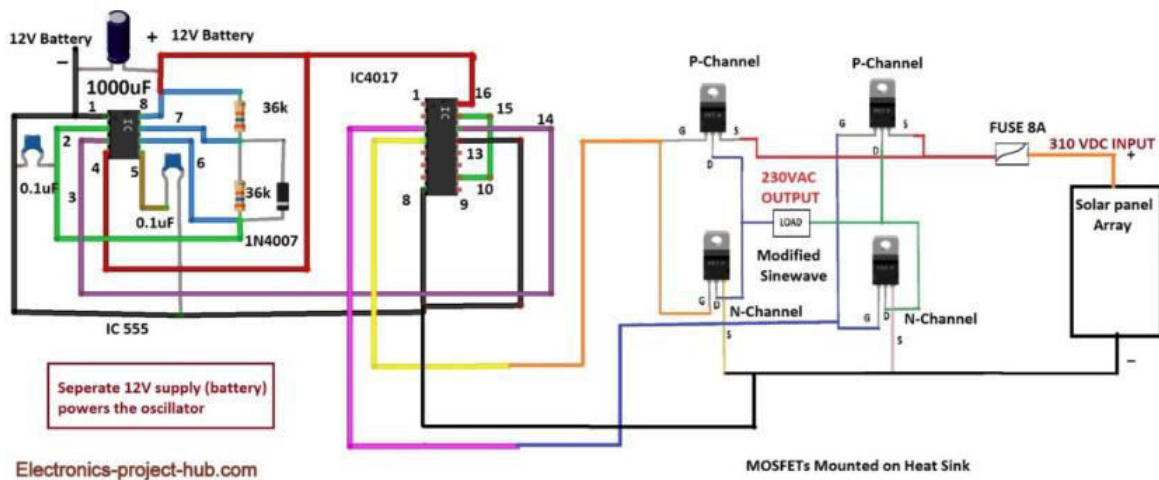
A VCL is responsible for maintaining a constant DCL voltage and generates a reference for the current loop. A CCL is responsible for grid synchronization and injection of a high-quality current [2]. Generally, a Proportional Integral (PI) controller is implemented in the VCL, however, due to PV intermittency, a PI controller fails to maintain a constant DCL voltage due to its fixed gain parameters [10].

Introduction

In this project, we are going to construct a transformerless inverter circuit which can be power via solar panels and also using batteries. The proposed transformerless inverter design is a modified sine wave type which is better than square wave counterpart. We will learn the different stages of this inverter in-depth.

Method

Transformerless Inverter Circuit Diagram:



Circuit Description:

The circuit consists of commonly available components like IC 555 and IC 4017 and some passive components like resistors and capacitors. The IC 555 and IC 4017 constitute the oscillator stage which outputs modified sine wave. The MOSFETs do the job of switching the high voltage which is configured as H-bridge. The MOSFETs are rated above 400V which can drive 230V load without any issue. Since this inverter doesn't boast a transformer unlike traditional inverters which can step-up the low voltage, we have to apply 310 VDC to the MOSFET stage. The MOSFETs will convert the high voltage DC to nominal 230 VAC, the waveform and frequency is determined by the oscillator stage.

Now let's learn how each stage of this inverter functions in-depth:

The proposed inverter has 3 stages:

- Oscillator stage.
- MOSFET / Switching Stage.
- Power Input Stage.

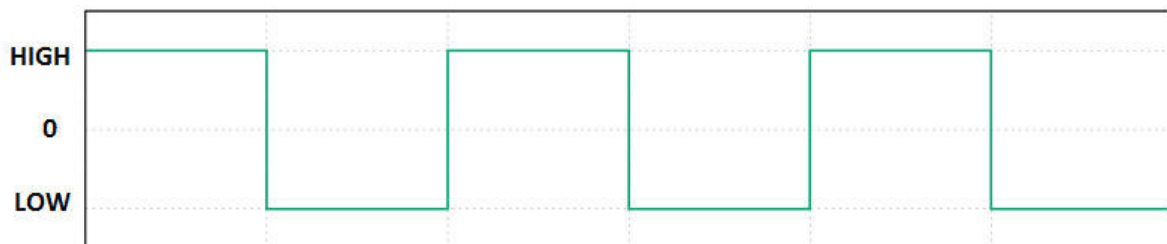
These three stages will determine the output frequency, voltage and the quality (wave form).

Oscillator Stage:

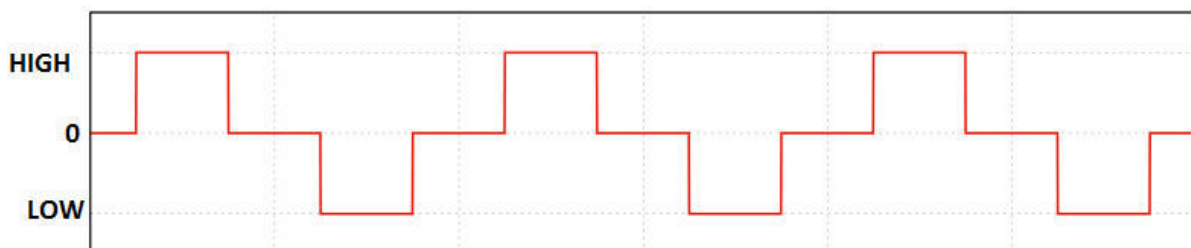
The frequency and the wave form are determined in this stage. The IC 555 and IC 4017 combinedly make the oscillator stage and IC 555 is the heart of this project as it generates the pulse for the inverter. The IC 555 generates square pulse at 200Hz at pin #3; the frequency is determined by the network of RC component connected to IC 555. We can also see a diode connected across pin #6 and #7; this is for generating pulse at 50% duty cycle.

The role of IC 4017 is to convert the square wave generated by IC 555 to 50 Hz modified sine wave. Let's have a look at how a modified sine wave looks like compare to square wave.

Square wave:



Modified Sine wave:



The modified sine wave is technically a better waveform than square wave and it is less noisy. Modified sine wave is used in many cheap commercially made inverters to power home appliances, but this doesn't mean that modified sine wave is perfect.

Calculation of IC 555:

To get the desired frequency of 50Hz, the IC 555 has to generate 200Hz and the IC 4017 must divide the wave from by four. The IC 4017 can divide the wave form without any external components. To get 200Hz and 50% duty cycle from IC 555, we can use the frequency formula:

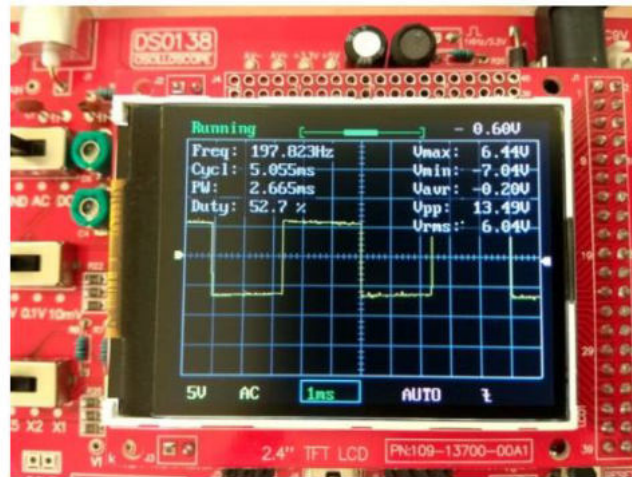
$$F = 1.44 / (R1 + R2) \times C$$

$$F = 1.44 / (36000 + 36000) \times 0.1 \times 10^{-6}$$

$$F = 200\text{Hz (exactly)}$$

So, using two 36K resistor and 0.1 microfarad capacitor we got precisely 200Hz.

Let's check the same using an oscilloscope at pin #3 of IC 555:

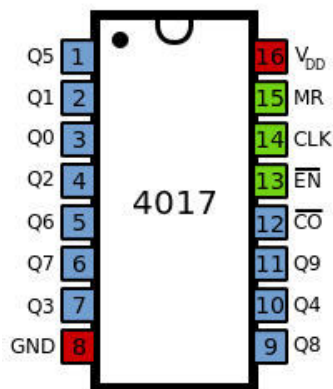


IC 555 output

We got 197Hz and 52% duty cycle which is close enough; the slight variation is due to the tolerance of the resistors and capacitor.

Now let's convert this square wave into modified sine wave using IC 4017.

Pin configuration of IC 4017:



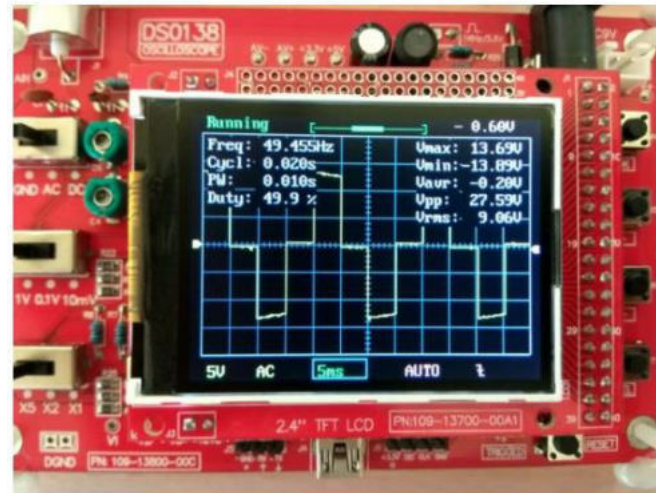
IC 4017 Pin Diagram

IC 4017 is a decade counter which can count from Q0 to Q9 (10 outputs). For successive pulses applied at pin #14, successive outputs (Q0 to Q9) gets high. Here we don't need all the 10 outputs, we just need 4 outputs so that we can divide the 200Hz input to 50Hz output.

To enable only four outputs we have connected the reset pin #15 to pin #10 (Q4 – 5th output), by doing so we are disabling outputs Q4 to Q9. Now the outputs get HIGH and LOW from Q0 to Q3 (First four outputs).

Out of the four outputs we are utilizing only 2 outputs which give the modified sine-wave shape. In the wave form we can see couple of pauses at 0V twice in a cycle this is because of the unused remaining two outputs which ultimately gives the required waveform.

Now let's hook the oscilloscope and see the waveform at the outputs of pin# 3 and #4 of IC 4017:

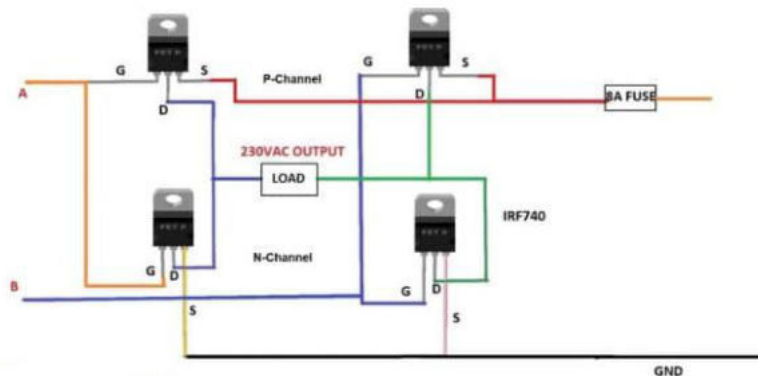


Readings of Modified Sine Wave

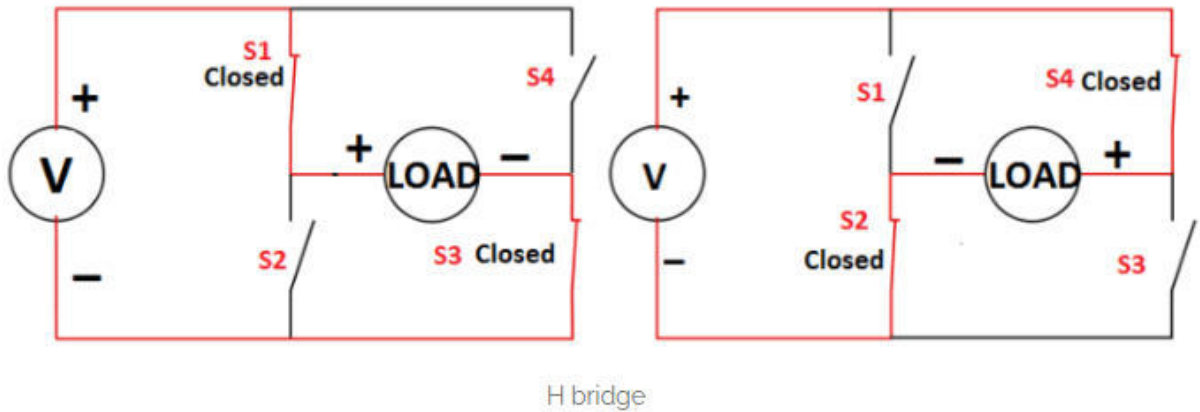
As we can see, we got the exact anticipated waveform at 50Hz and 50% duty cycle. Now this waveform need to be amplified, to do this in the next stage we are using some powerful MOSFETs which will drive the connected 230VAC gadgets.

MOSFET / Switching stage:

In this stage the generated weak signal from the oscillator gets amplified. We are using 4 MOSFETs, two N-channels and two P-channels in H-bridge configuration.



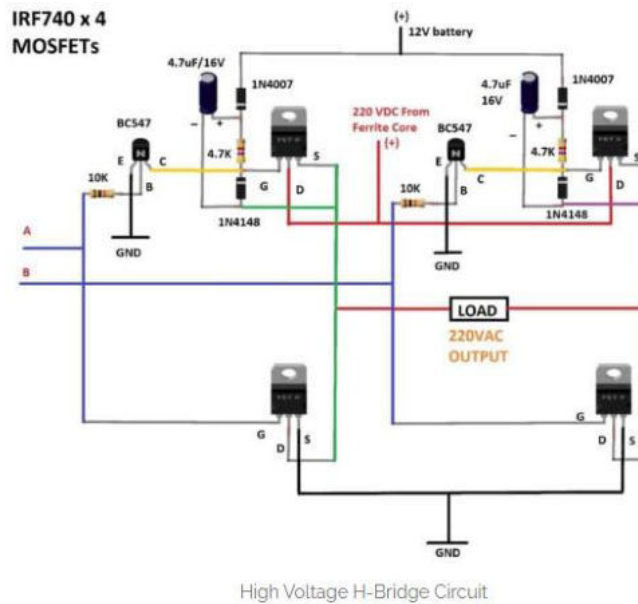
H-bridge is the best way to alternate the polarity (converting DC to AC) across the connected load. To do this we need to switch the four MOSFETs in the following sequence.



Now let's consider the diagram on left side, the S1 and S3 (MOSFETs) are closed, now look at the polarity across the load, on left we have +Ve and on right we have -Ve. Now let's open these two switches (MOSFETs) and close S2 and S4, now the polarity cross the load is reversed (diagram on the right side). To get 0V across the load, we just open all the MOSFETs, this sequence will repeat

Alternate H-bridge configuration:

You can also build an H-bridge using 4 N-channel MOSFET with bootstrapping. Please note that BC547's pins are flipped horizontally for drawing convenience, the transistor's flat surface should face away from you in real life.



Specifications of MOSFETs:

IRF740 N-Channel MOSFET:

- Voltage Drain to Source (Vds): 400V
- Voltage Gate to Source (Vgs): +/-20V (Max)
- Continues Drain Current: 10A (Continuous)

IxTP10P50P P-Channel MOSFET:

- Voltage Drain to Source (V_{ds}): -500V
- Voltage Gate to Source (V_{gs}): +/-20V (Max continuous)
- Continues Drain Current: -10A (continuous)

The MOSFETs used here can handle voltage as high as 400VDC and 310VDC from solar panel should not be an issue for these MOSFETs. If you could not find MOSFETs of these part numbers, you may utilize any other N and P channel MOSFETs with similar specifications.

Power Source:

The power source we are going to use is arrays of solar panels, the combined series output voltage around of 310 VDC. You can also use bank of batteries to get similar voltage level.

You need to get help of professionals to install solar panels. In real life solar panels are not directly connected to an inverter, they are installed with batteries with battery management system.

[Why do I need around 310 VDC input to get 230 VAC output?](#)

The modified sine wave need 310V peaks to get 230VAC RMS output. Ok, what do I mean by that? If you hook an oscilloscope to AC mains of our home, you will see that peak to peak voltage is 325VAC and not 230VAC.

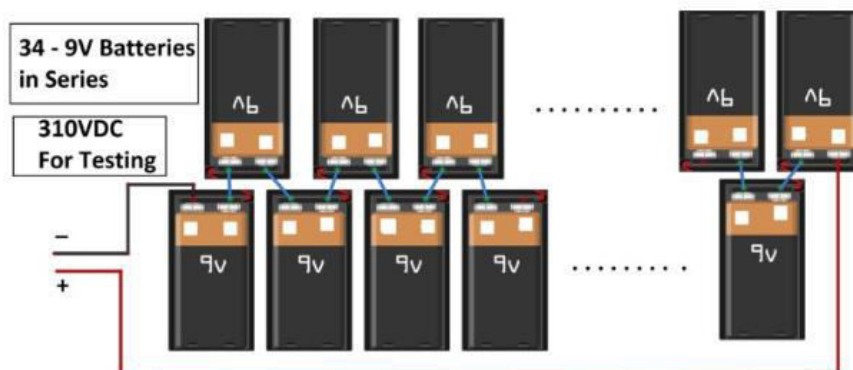
The 230VAC is called the RMS (root mean square) and 325V is called peak to peak voltage. The RMS is the average voltage, since the voltage is varying with time from 0 to 325V and vice-versa; we cannot conclude a voltage measurement at any given instant. So, we are measuring the average voltage of the AC sinusoidal cycle, our multimeters and volt meters designed to measure RMS.

This is same for modified sine wave; we need around 310V peaks at 50Hz to get average of 230VAC.

But in the case of square wave the RMS = Peak voltage, meaning if we apply 230 VDC to the input we will get 230 VAC RMS.

[How to Test this Transformerless Inverter Circuit:](#)

Once you complete the construction of this inverter circuit, you need to connect the oscillator to a 12V power source. You also need a high voltage DC source which can output 310 VDC, you may use high voltage DC lab power supply or you can connect 34 nine-volt batteries in series to obtain 310 VDC as a cheap testing solution.



Battery for transformerless inverter

Connect a tungsten bulb of 40 watt across the output terminals of the inverter, power the oscillator first and connect 310 VDC to MOSFETs second. As soon as you connect the high voltage DC to MOSFETs, the bulb should glow instantly at full brightness. Now your inverter is working fine.

[How much power can it deliver?](#)

From our estimation, it can deliver about 1000 watt or 1KW with MOSFETs cooled adequately. You need to apply 310VDC at 4A or above from solar panel / batteries to this inverter.

Advantages of this inverter

- Simple design with reasonable output quality.
- High Efficiency as the loss due a transformer doesn't exist.
- Dirt cheap price to construct and zero maintenance for the inverter.
- It can power most of the home appliances.

Conclusion

An integrated dc-dc converter based transformerless PV inverter with a wide input voltage range is presented in this project. The main characteristics of the proposed inverter are summarized as follows:

- 1) Higher efficiency at low solar radiations as conventional systems, since there is no double stage conversion of power.
- 2) Multi-levels in the inverter output voltage is achieved when the dc-dc converter is energized, which improves the quality of the grid current.
- 3) Low CM leakage current flows through the system by employing corresponding modulation strategy, thereby meeting leakage current standards.

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Energy Audit in Viraj Profiles Ltd. (Wire Division) MIDC Tarapur

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ABSTRACT : Today India having less electrical power availability. Industrial sector is major sector in high energy consumption in the world. The demand of electrical energy is increasing due to this gap between demand and supply is increasing. There are two ways to reduce this gap, first electrical conservation and second electricity generation. Due to limited energy resources Increasing electric power generation is very difficult. The effective way to solve this problem is use the available energy in efficient manner. This can be possible by controlling the use of energy. Hence to find out potential for improvements in energy use, to suggest the method with or without finical investment, to accomplish estimated energy saving and cost of energy without affecting production process. This paper suggest ways and means to conduct an energy audit in an industry.

Keywords- *Energy Audit, Energy Conservation, Energy Efficiency.*

INTRODUCTION :

As per the energy conservation act 2001. “Energy audit is defined as the verification, monitoring and analysis of use of energy including submission of technical report.” Containing recommendation for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption. In general energy audit is the strategy of adjusting and optimizing energy using systems and methods to minimize energy requirements. The energy, labor and material are three top ranker operating expenses in an industry. An energy is first ranker in them. Hence management of energy is most important for operating cost reduction. An energy audit give methods for energy saving opportunities, information of new improved technologies in energy saving, Maintenance methods, quality control of energy, area which require energy conservation and improvements.

ENERGY AUDIT : An energy audit is survey, observation and analysis of energy flow to conserve energy. The energy audit method is help to minimize amount of energy consumption. In which energy conservation measures, recommendations for improvements, solutions on existing problems, cost benefit analysis with payback period calculation. The recommendations are of three types. One is no cost, second is low cost and third is high cost investment. The final answer to problem is not given by an audit it identify area. where improvements require and where energy management is required.

NEED AND IMPORTANCE : The industrial sector is the biggest consumer of energy. In the form of electricity of accounts for 48% of the total commercial energy consumption. The competition in the market the industrial sector has to take the steps. continuously to cut down costs mainly through better technology and improved efficiency of resources employed. An energy is an important resource. and energy cost is always rising due to increase in cost of energy resources. As demand and cost of energy is increasing the improvement of energy efficiency. The conservation of energy and proper management of energy is required.

This can be achieved through following methods;

- Reducing wastage of energy
- By using proper technology, energy improves efficiency of energy.
- Use of proper resources of energy which have environmental benefits.
- Buying an energy at economic price
- Wherever possible to make best use of energy by modifying the appliances.
- Raising awareness in staff about energy conservation.

OBJECTIVES :

- Audit can help you to reduce your energy expenses on a sustainable basis at a cost which is negligible as compared with the savings.
- Identification of highest achievable potential of energy and cost saving.
- Locating visible as well as hidden technical parameters of measures.
- Calculation of investment needs of measures, their economical, technical, environmental impact.
- Proposing procedure for realization of measures of offering a technical, economical management tool for investment decision process going out of economical modeling.
- Creation of a process of effective control of energy consumption and also operation cost.

The plan includes :

1. Efficient purchasing-purchasing the energy at lower available cost.
2. Efficient equipment-upgrading or replacing existing equipment with more energy efficient versions whenever it is cost effective to do so.
3. Efficient operation-operating the equipment that consumes energy as efficient as possible.

TYPES OF AUDIT : The type of audit to be perform depends on

1. Function and type of industry
2. Depth to which final audit is needed
3. Magnitude and potential of cost reduction desired.

PROBLEM STATEMENT :

- | Machine maintenance is not done by industries regularly. They repair and check the machine whenever problems arise. This leads to decrease in efficiency of machine and more energy consumption than required quantity. Energy increases losses in machine and wastage of energy also the energy bill increases.
- | In industry sodium vapour lamps are used for the illumination. These lamps has more starting time (10-15 min). Because of this they take more starting time as compare to LED. And this requires earlier switch ON that is 5-10 min. before starting work. This leads to wastage of energy in some amount. Also the output of lamp reduce due to aging effect. The output of sodium vapour lamp is 80- 125 lux of existing lighting system.
- | As per the IS 3043 rule eight earthing should be provide for plinth mounted transformer. But only four earthing are provided to existing system. This is problematic to transformer.

ENERGY AUDIT FOR VIRAJ PROFILES

About company : We planned to conduct Energy Audit of one small scale industry “viraj Profiles Ltd.(Wire division)” Tarapur. The Viraj Profiles Company is a manufacturing company its work is design, development, manufacturing and supply of metal components for storage, racking and shelving manufacture and supply of cold rolled formed metal sections and sheet metal components. We planned and conduct energy audit of company at Viraj Profiles Ltd. and ideas for energy saving in an industry.

Details of electrical load :

1. Total connected load: 600 HP
2. Available power source Transformer: 3.5 MVA, 33 KV / 440 V
4 MVA, 33KV /440V

TABLE :

Avg. Monthly Consumption of an year 2022

Months	Total KWH
Jan 2022	13,58,324
Fab 2022	13,98,815
Mar 2022	13,76,406
Apr 2022	13,95,218
May 2022	7,73,404
Jun 2022	13,74,402
July 2022	14,80,811
Aug 2022	15,81,074

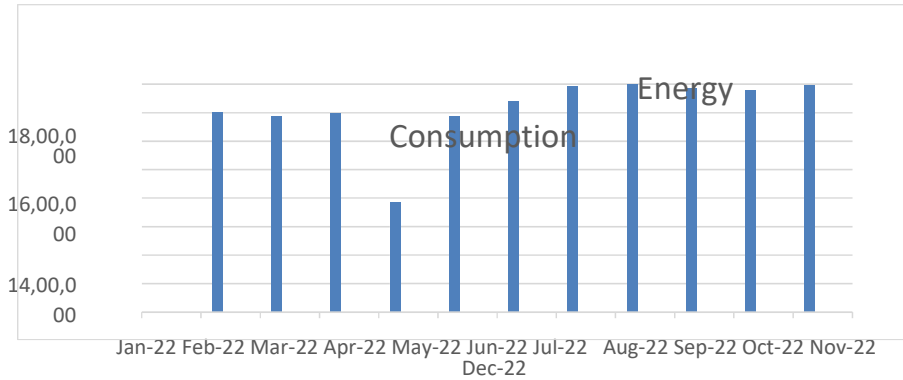


Fig.1 Energy Consumptions in KWH Year 2022

METHODOLOGY

- Deciding specific areas for form and study the audit group.
- Collection and observation of required data.
- Observation on the general working condition of machines, appliances.
- Finding energy consumption and other parameters by measurements.

Quantification by end use : This loads were separated based energy consumption. It is important to know the quantity of energy used by each equipment out of total supplied 100% energy. This energy quantity is in percentage and this help to find maximum energy consuming part and energy distribution. And this is use for planning operational decisions. Generally it can be represent by pie diagram.

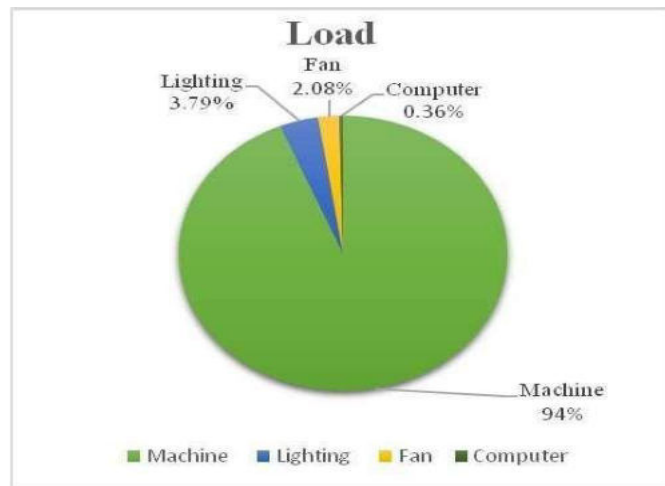


Fig. 2 Distribution of loads

Lighting : In general residential or commercial or industrial lighting is 50%. The 50% or more of the lighting energy is wasted. To overcome the dependency on manpower, we have implemented the automatic ON /OFF controller. Which is having the programmable timer which will make ON and OFF the shed lights according to the 24- hrs clock. There is option available to bypass the controller in case of failure of programmable device. Programmable device as well as during rainy season we need to switch on the lights during day time.

TABLE II

ILLUSTRATION OF POSSIBLE SAVINGS DUE TO AUTO LED LIGHTS

Details	LED lamp 80 W	LED lamp 80 W
Consumption for 24hrs. working Electricity charges	126 KWH	100 KWH
Rate of Rs. 9.0/KWh	Rs. 1134	Rs. 900
Monthly charges (30 days)	Rs. 34020	Rs. 1134
Yearly charges (12 months)	Rs. 408240	Rs. 324000

- | Net Saving Per Day = Rs. 234
- | Net Saving Per Month = Rs. 7020
- | Net saving per Year = Rs. 84240
- | Total power saving Year on 102 lighting lamps = 9360 KWH
- | Now the lights ON time is 17:30 PM and OFF time is 7:30 AM

Motor : The electric motor is most energy consuming part of industrial sector. The all machines are generally include motor. The types of motors are DC, AC synchronous, AC induction or wound types, the squirrel cage motors are most commonly used. Because of their low cost, rugged design and cost of maintenance.

Points to be consider for selection of motor :

1. Control and speed required for process
2. Convert the Slip ring motor to caged induction motor on drive.
3. Considering Technical aspects such as breakdown torque, starting torque, load cycle and operating conditions.
4. Availability, durability and maintenance requirement
5. Motor cost

Opportunities:

1. Operate at rated voltage and balance supply.
2. Regular maintenance
3. Improved cooling
4. Replace oversize motors which affect an efficiency and power factor with those of lower rating.
5. Replace existing motors with energy efficient once.
6. Use of proper controls

By applying these proper methods and improving motor efficiency energy consume by motor can be hence operating cost and minimize of motor reduce.

Power factor : The electrical power is generated at generating station and terminated through transmission lines. And then distributed to the consumer. The quality of power distributed and transmitted is based on load power factor and parameter of the lines. Almost all the power system loads are inductive type and have low lagging power factor. Which is undesirable the power factor of power system closed to unity is desirable for economical and better distribution of electrical energy.

Effect of low power factor

$$1. \text{ Load current } I_L = \frac{P}{\sqrt{3}VL \cos \phi}$$

If power factor is low I_L is higher.

This effects on electric equipment.

2. Transmission line - increases in losses with reduction in efficiency of the line.
3. Transformer- reduction in low capacity of transformer.
4. Generator - reduction in low capacity of generator.
5. Prime movers- alternators develops more reactive power also efficiency is reduced.
6. Equipment in power system over loading of equipment during full load

Methods of improving power factor : Lagging power factor can be compensated by using compensator such as static capacitor, synchronous condenser, phase advancer, power capacitor.

Load factor : Electrical load factor is a measure of the utilization rate, as efficiency of electrical energy usage. It is the ratio of total energy consumption in the billing period to total energy used in the period. Control of load factor will help to reduce power charges. Consumer having load factor more than 75% and up to 85% will get concession of 0.75% or as per rules of supplier on energy charges.

CONCLUSION : The industry in India is highly energy consuming. and have low energy efficiency as compare to other countries. There is a very much scope for improvement of energy opportunities for conservation. The energy audit is one of the best way for finding recommendations to efficient use of energy without affecting production. This can help to reduce cost of production, cost of energy bill and as energy is saved at user. Energy audit can help to reduce gap between demand and supply. In Viraj profiles the energy savings can be achieved through energy management, improvement in lighting, motor working improvement, power factor correction, load factor correction and choosing an appropriate electric appliances. All these points are considered in energy audit. More efficient use of energy can be achieved by replacing existing lighting system, Fans, motor etc. It is observed that upto 72% lighting load can be reduced by suggested scheme.

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Speed control of BLDC motor using IOT

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ABSTRACT – Brushless DC (BLDC) motors are widely used for many industrial applications because of their high torque, high efficiency and low volume. motors are employed in fans called super fans, electric and hybrid vehicles, industrial automation as actuators for industrial robots, extruder drive motors and feed drives for Computer Numerical Control (CNC) machine tools are employed in fans called super fans, electric and hybrid vehicles, industrial automation as actuators for industrial robots, extruder drive motors and feed drives for Computer Numerical Control (CNC) machine tools and home appliances The aim of this research is to develop a model of the BLDC motor and to design an optimal controller for its position control. Generally, PID controller is used for many control problems because of its simple structure and easy implementation. But, in practice, we often do not get the optimum results with the conventionally tuned PID controllers. The purpose of this project is to control and monitor the Brushless DC (BLDC) motor by using IOT and PWM techniques. The speed regulation of sensor less BLDC drive using four-switch three-phase inverter BLDC motor and ESP32 logic controller is proposed here compared the PID controller and Fuzzy logic controller. Our main aim is to design a system which is advanced, useful, easy to handle and cheapest. So why we are control the speed control of BLDC motor using ESP32 Microcontroller, android app & PWM technique.

Keywords – BLDC motor, IOT, PWM, ESP32 microcontroller.

1. INTRODUCTION - BLDC motors are very popular in areas which need high performance because of their smaller volume, high force, and simple system structure. Brushless Direct Current (BLDC) motors are AC synchronous motors with windings on the stator and permanent magnets on the rotor. Permanent magnets create the rotor flux and the energized stator windings create electromagnetic poles. The rotor is attracted by the energized stator phase. In practice, the design of the BLDCM drive involves a complex process such as modeling, control scheme selection and parameters tuning etc. An expert knowledge of the system is required for tuning the controller parameters of the servo system to get the optimal performance. Recently, various modern control solutions are proposed for the optimal control design of BLDC motors [1][2]. However, these methods are very complex in nature and require excessive computation. In contrast, PID control provides a simple and yet effective solution to many control problems [3]. Although PID controllers have a simple structure but it is quite challenging to find the optimized PID gains. The continuing performance improvements of computational systems have made Genetic Algorithm appropriate for finding global optimal solution for control system such as the search of optimal PID controller parameters [4][5]. A sensor less six switch three phase inverter BLDC motor drive is designed using a ESP32 logic controller which eliminates Hall position sensors and operates using a reduced number of switches. The sensor-less speed regulation ensures reliability and can provide a wide speed range with high starting torque for the BLDC motor drive system. The BLDC motor in closed loop control is analyzed and a hardware model of sensor-less three phase six- switch BLDC drive using ESP32 logic controller and Android app is developed.

2. LITERATURE SURVEY

Permanent Magnet Brushless DC motors, known as BLDCM succeeded to gain a great importance in various traditional and critical industries that require speed stability, high force power and high efficiency. Beside their better characteristics in affecting the performance of the whole system, BLDC is characterized by their simple structure, small size, light weight, high force power & efficiency and low maintenance & repair [1], [2], [3]. In the last decade, due to their mechanical friction and electric erosion, BLDC started to replace other famous traditional kinds of motors such as Brushed DC motor, induction motor, etc. Moreover, BLDC guarantees high system efficiency and low audible noise by the total elimination of the brush/commutator assembly [2], [3], [4]. Speed regulation of BLDC is an important control challenge for any brushless DC motor. The stability of the BLDC speed allows the motor to produce a desired high torque. Conventional control techniques such as Proportional-integral-derivative (PID) and proportional integral (PI) were used widely in the field of BLDC speed control. These control techniques are characterized by their simple structure, low cost, fast response, small settling and rise time and low overshoot. The main disadvantage of using these traditional control

techniques appears in the presence of a dynamic load condition where the response becomes slower with a variable set point [5], [6], [7]. On the other hand, advanced and intelligent control strategies such as fuzzy logic control (FLC), neural network control (NNC), genetic algorithms (GA) and sliding mode control (SMC) start to play an important role in the speed control of BLDCM individually or combined together. For instance, FLC approaches were applied for speed control of the BLDCM depending on their ability to deal with ill-defined mathematical models generating the required control commands. However, the FLC requires more time than conventional control techniques to solve the complex fuzzification and defuzzification processes [4], [8], [9]. In [10], NNC was applied to control the speed of BLDCM, however their performance results were affected by the uncertainty and load disturbances. A combination between one of the intelligent control approaches with a traditional control technique is widely used in BLDC motor control. These combinations are applied on dynamic systems guaranteeing highly efficient performance with better steady state response, small rise and settling time and low overshoot. On one hand, the conventional control techniques are the main controller on the system, while on the other hand, the advanced control techniques are used in the online tuning of gains. [4], [11]. In [12], two approaches to speed control of BLDC motor used with the UAV propeller were introduced. The first approach is an adaptive neuro fuzzy inference system (ANFIS) which is a hybrid control approach combining both fuzzy logic controller and artificial neural network. The second approach is a self-adaptive PID controller, where it combines the advantages of both PID controller and FLC. From all the above-mentioned advanced control techniques, Sliding Mode Control (SMC) one of the unconventional control theories that was used widely in the control of BLDCM. SMC is characterized by its fast response, strong robustness, ability to handle parametric uncertainties, simple structure and easy implementation leading that SMC become an attractive and suitable control method to motion control systems such as BLDCM [13], [14].

3. METHODOLOGY

3.1 Block diagram

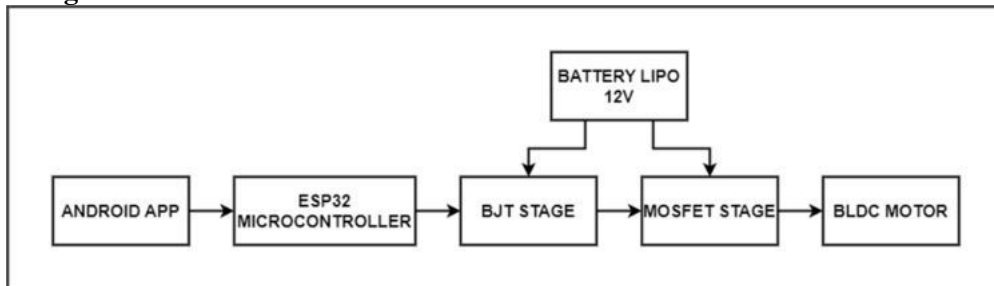


Fig. 1- Block diagram of the system

3.2 Schematic diagram

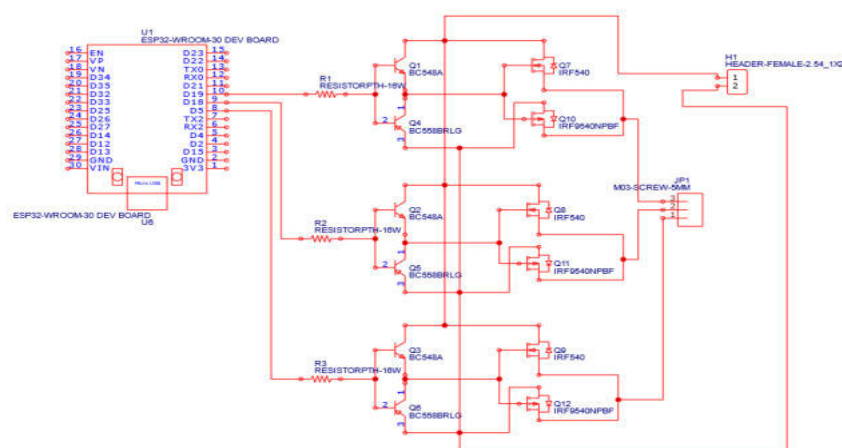


Fig. 2 - Schematic diagram

3.3 Proposed Methodology

- The system comprises ESP32 Microcontroller.
- The reason for selecting ESP32 is it has inbuilt Wi-Fi which makes it suitable for our application.

- c) A BJT Push Pull Configuration is used as an amplifier stage which comprises BC548 and BC558.
- d) We have selected the A2212 (BLDC) brushless dc motor.
- e) 6 Switch MOSFET Configuration consisting of IR540 and IRF9540 are used for generating 3 Phase used for actuating BLDC MOTOR.
- f) LiPo Battery 11.1V 2200 mAh is used to power this system.
- g) Android App will be designed using MIT App Inventor 2.
- h) This app will be connected to Hardware System over local Wi-Fi connection.
- i) The BLDC motor will be controlled using the PWM method which depends on varying duty cycle.

3.4 Technology required

- a) ESP32 Microcontroller:-ESP32 is a series of low-cost, low-power system on a chip microcontroller with integrated Wi-Fi and dual-mode Bluetooth.ESP32 is created and developed by Espressif Systems, a Shanghai-based Chinese company, and is manufactured by TSMC.ESP32 can perform as a complete standalone system or as a slave device to a host MCU, reducing communication stack overhead on the main application processor. ESP32 can interface with other systems to provide Wi-Fi and Bluetooth functionality through its SPI / SDIO or I2C / UART interfaces.



Fig. 3 - ESP32 microcontroller

- b) Arduino ide:- The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution. The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.
- c) MIT app inventor 2:-App Inventor is a web application integrated development environment originally provided by Google, and now maintained by the Massachusetts Institute of Technology (MIT). It allows newcomers to computer programming to create application software (apps) for two operating systems (OS): Android, and iOS, which, as of 8 July 2019, is in final beta testing, scheduled to be released publicly in summer 2019. It is free and open-source software released under dual licensing: a Creative Commons Attribution ShareAlike 3.0 Unported license, and an Apache License 2.0 for the source code. It uses a graphical user interface (GUI) very similar to the programming languages Scratch and the StarLogo TNG user interface, which allows users to drag and drop visual objects to create an application that can run on mobile devices. In creating App Inventor, Google drew upon significant prior research in educational computing, and work done within Google on online development environments. App Inventor and the projects on which it is based are informed by constructionist learning theories, which emphasize that

programming can be a vehicle for engaging powerful ideas through active learning. As such, it is part of an ongoing movement in computers and education that began with the work of Seymour Papert and the MIT Logo Group in the 1960s, and has also manifested itself with Mitchel Resnick's work on Lego Mindstorms and StarLogo.

4. RESULT

For the calculation of the duty cycle we have use following steps,

- First we have opened the MIT App Inventor 2 app where we have selected the value of 12 bit ADC which is ranging from 0 to 4095, For the example we have selected the 512 bit ADC.
- Then this command value is sent to the ESP32 microcontroller through wifi connection.
- This selected value is sent to the PWM controller , where we use the external source Lipo battery.
- Then the PWM controller controls the BLDC motor with varying duty cycle.

Calculation for Duty cycle

$$\begin{aligned} \text{Duty cycle} &= \frac{T_m}{T} * 100\% \\ &= \frac{T_m}{4095} * 100 \end{aligned}$$

$$\text{Where } T = T_{ON} + T_{OFF}$$

We have select $T_{ON} = 512$

$$\begin{aligned} \text{Duty cycle} &= \frac{512}{4095} * 100 \\ &= 125\% \end{aligned}$$

Duty cycle is 125%.

5. DISCUSSION - In this project, we faced some problems and difficulties during building parts of the system. The main difficulties were caused by converting the theoretical parts to physical circuits. But we have solved that type of particular difficulties and also we understand the speed control of bldc motor using android phone is very easy to understanding. Also we have find number of merits and application of this system. So the merits and application of this project is given below,

5.1 Merits

- System provides controlling BLDC motor remotely.
- It is easy to use.
- This system gives the real time control of the bldc motor.
- Bldc motor have high power and this motor have the high running torque inch per cube as compared to the any DC motor
- Bldc motors having high reliability because of absence of brushes results in more reliable and Higher life expectancies.
- Bldc motor accelerates and decelerates quickly due to low inertia.
- Bldc motors have high rotating speed and a bldc motor can be operated at speed above 11,000 rpm under both loaded and unloaded conditions.

5.2 Applications

- Computer hard drives and DVD/CD players.
- Electric vehicles, hybrid vehicles, and electric bicycles.
- Industrial robots, CNC machine tools, and simple belt driven systems.
- Washing machines, compressors and dryers.
- Fans, pumps and blowers.

6. CONCLUSION - A new algorithm for BLDC motor controller has been represented which is low cost and easier to understand. The modelling and analysis of brushless dc motor controller is done in microcontroller (ESP compiler, proteus). The results of simulation give help in building hardware with expected results. The novelty of this proposed designed BLDC controller is that it is simple in terms of design, cost effective and can be implemented by using low-cost microcontroller and ICs available in the market. In previous the entire BLDC controller that was design is expensive, difficult to understand. But the proposed controller is easier to understand and this is too much good to use in various application and has been successfully implemented on hardware. And the future scope of this project is the system can be implemented on a hosted server so that it can be controlled from anywhere in the world and

second future scope is. It can be automatically switched on/off by adding a relay mechanism which can be controlled over internet.

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Analysis of HEMS (EV, PV, ESS, RT Appliances) using MATLAB

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ABSTRACT: In this project, we proposed a home energy management system (HEMS) that includes photovoltaic (PV), electric vehicle (EV), and energy storage systems (ESS). The proposed HEMS fully utilizes the PV power in operating domestic appliances and charging EV/ESS. The surplus power is fed back to the grid to achieve economic benefits. A novel charging and discharging scheme of EV/ESS is presented to minimize the energy cost, control the maximum load demand, increase the battery life, and satisfy the user's-traveling needs. The EV/ESS charges during low pricing periods and discharges in high pricing periods. In the proposed method, a multi-objective problem is formulated, which simultaneously minimizes the energy cost, peak to average ratio (PAR), and customer dissatisfaction. The multi-objective optimization is solved using binary particle swarm optimization (BPSO). The results clearly show that it minimizes the operating cost from 402.89 cents to 191.46 cents, so that a reduction of 52.47% is obtained. Moreover, it reduces the PAR and discomfort index by 15.11% and 16.67%, respectively, in a 24 h time span. Furthermore, the home has home to grid (H2G) capability as it sells the surplus energy, and the total cost is further reduced by 29.41%.

KEYWORDS: Energy Grid, Electric Vehicle, Single Feed, Solar, Photo Voltaic, Battery, Distribution, Bidirectional Controller.

INTRODUCTION: Energy demand increases very sharply day by day. To overcome this problem and optimize the power generated, researchers have proposed various effective strategy. Consumers may shift their domestic appliances usage from peak hour to off-peak hour to achieve economic benefits. To achieve the benefits a HEMS is required at home. The HEMS optimally schedules domestic usage to reduce electricity bills. Moreover, HEMS increases consumer comfort, reduces peak-to-average ratio (PAR), and minimizes the burden on the grid. Several HEMS strategies have been proposed in the literature. They formulate a multiobjective optimization problem that considers bill minimization and user comfort as system objectives. Optimum scheduling of home appliances in an off-peak period may increase the peak-to-average ratio, which increases the burden on power utility and causes grid failure. To handle the problem of overloading, some researchers have considered PAR as one of the objectives or constraints in optimization problems. The contribution of this project concludes as follows:

1. Includes PV, EV, and ESS simultaneously to minimize the operating cost.
2. Fully utilizes the PV power by shiftable appliances, EV, and ESS while the surplus power is fed back to the grid for economic benefits.
3. The charging and discharging schemes have been presented, including the constraints of ESS and EV. The scheme utilizes the RTP, maximum demand limit, and availability of EV to rationally manage the energy flow between home and utility. The EV and ESS are charged during low RTP periods and provide power to peak energy periods. The discharging power is utilized by domestic appliances while the surplus power is sold back to the grid.
4. A multi-objective problem is formulated, which minimizes the operating cost, PAR, and user's discomfort simultaneously in the HEMS paradigm.

LITERATURE REVIEW: Not only does the shift to low-carbon energy and transportation systems need widespread adoption of clean technology and efficiency measures, but it also necessitates innovative energy management methods to effectively integrate these advances into existing infrastructure. Issues with grid integration of clean technologies may arise on both the energy supply and demand sides, with technologies such as photovoltaics (PV) and electric cars, respectively (EV). Sophisticated energy management may assist in resolving these challenges and optimising resource allocation, such as charging electric vehicles using solar power rather than electricity from coal or gas-fired power plants. There is an imbalance between PV power supply and energy consumption in the residential sector. PV panels provide the greatest power throughout the day [1,2], whereas home electricity consumption peaks in the morning and evening. In addition, typical EV charging patterns contribute to current residential power consumption peaks. Increased PV and EV adoption will increase power transit across the electrical system, necessitating infrastructure expenditures to avoid overloads

[3,4]. Several European nations have begun to introduce laws to encourage the selfconsumption of locally produced energy [5]. To guarantee grid stability and functionality, selfconsumption of PV electricity should rise. A smart grid combines information and communication technology with a regular power grid or microgrid (i.e., a local, low-voltage distribution system) [6]. Load shifting is a key feature of smart grids, and it may be used to boost PV power self-consumption [7] and EV charging off-peak [8]. Vehicle-to-grid (V2G) technology allows EVs to be utilised as both a variable demand source and a storage option in smart grids, which is a significant benefit [9–13]. We utilise a case study to describe and simulate the implementation of smart charging algorithms for electric vehicles in this work. The majority of simulation research on employing EVs for PV grid integration utilise a high degree of EV aggregation in their models. Two studies, for example, have been discovered that investigate the use of parking lots to merge EV and PV. Tulpule et al. [14] conducted research for a parking lot at a company in Columbus, OH, and Los Angeles, CA, and found that such a system is feasible in terms of costs and CO₂ emissions when compared to home charging. Birnie [15] utilised a simple technique to discover that solar power could provide most driving demands in the summer but not in the winter at a parking lot in New Jersey, NJ, USA. Other studies look at electric vehicle fleets at the local or regional level.

SOFTWARE USED: MATLAB

MATLAB is a programming and numeric computing platform used by millions of engineers and scientists to analyze data, develop algorithms, and create models. MATLAB® combines a desktop environment tuned for iterative analysis and design processes with a programming language that expresses matrix and array mathematics directly. It includes the Live Editor for creating scripts that combine code, output, and formatted text in an executable notebook. MATLAB toolboxes are professionally developed, rigorously tested, and fully documented. MATLAB apps let you see how different algorithms work with your data. Iterate until you've got the results you want, then automatically generate a MATLAB program to reproduce or automate your work. Scale your analyses to run on clusters, GPUs, and clouds with only minor code changes. There's no need to rewrite your code or learn big data programming and out-of-memory techniques. MATLAB (an abbreviation of "MATrix LABoratory") is a proprietary multi-paradigm programming language and numeric computing environment developed by MathWorks. MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages. Although MATLAB is intended primarily for numeric computing, an optional toolbox uses the MuPAD symbolic engine allowing access to symbolic computing abilities. An additional package, Simulink, adds graphical multi-domain simulation and modelbased design for dynamic and embedded systems. As of 2020, MATLAB has more than 4 million users worldwide. They come from various backgrounds of engineering, science, and economics.

OBJECTIVE: The main objectives of the system are as follows:

1. Include RT Loads, PV, EV, and ESS simultaneously to minimize the operating cost.
2. Fully utilize the PV power by real time appliances, EV, and ESS while the surplus power is fed back to the grid for economic benefits.
3. The charging and discharging schemes need to be presented, including the constraints of ESS and EV. The scheme utilizes the RTP, maximum demand limit, and availability of EV to rationally manage the energy flow between home and utility. The EV and ESS are charged during low RTP periods and provide power to peak energy periods. The discharging power is utilized by domestic appliances while the surplus power is sold back to the grid.
4. A multi-objective problem is formulated, which minimizes the operating cost, PAR, and user's discomfort simultaneously in the HEMS paradigm.

PROBLEM STATEMENT: Home energy management system (HEMS) concept rises from the development of smart homes that build interaction between users with their home appliances in order to operate automatically, multi-functionally, adaptably and efficiently. In line with technological developments and published regulations related to environmental issues, smart home applications evolve into HEMS applications which are not only to provide ease and convenience, but also to monitor and to make efficient energy use at home, thereby reducing peak power quantity and electricity bill. Smart grid is an intelligent power grid starting from its generation, transmission and distribution. It combines computing technology, artificial intelligence and communications technology which creates a smarter

power system and is able to produce better power quality and lower generation cost. In the smart grid scheme, by means of HEMS applications, consumers can participate in improving the quality of power systems. This study will discuss about the development of HEMS in associated with smart grid technology particularly the role of HEMS application with its DSM (Demand Side Management) and PEV (Plug-in Electric Vehicles) programs in the smart grid scheme to improve quality of power systems. Several studies have shown that the contribution of HEMS to the smart grid system can improve the power losses and voltage profile.

PROPOSED METHODOLOGY:

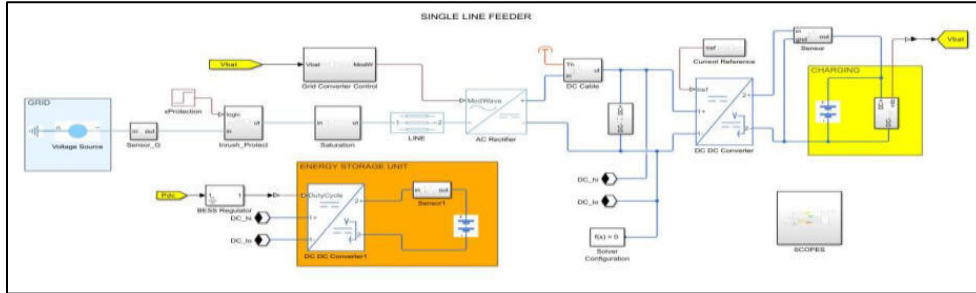


Figure 1: Single Line Feeder

Single Line Feeder: The role played by in-rush and transient currents on the grid transformer is captured.

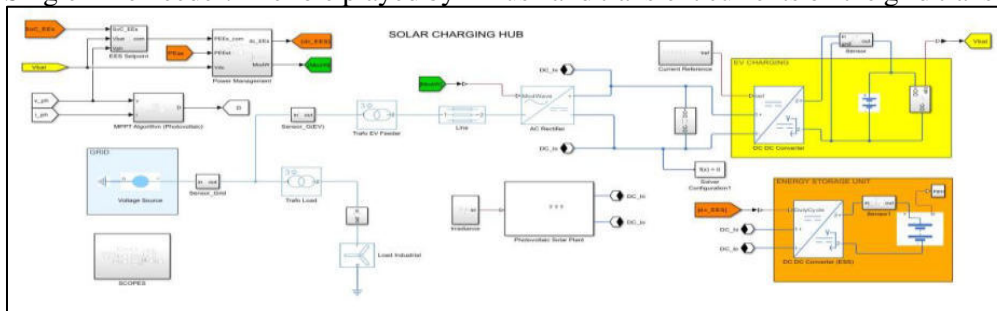


Figure 2: Solar Charging Hub

Solar Charging Hub: this model showcases the strength of simscape to evaluate a concept for EV charging based on photovoltaic solar energy.

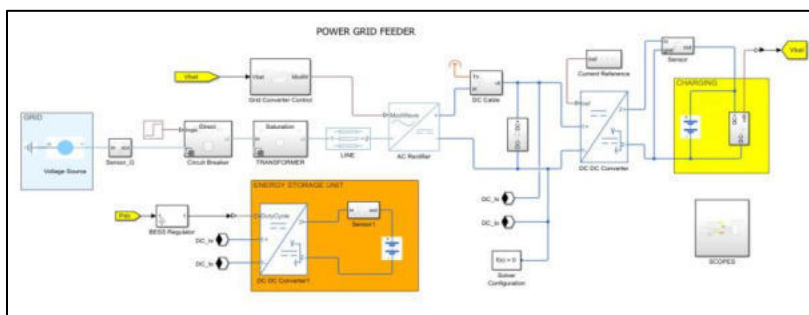


Figure 3: Power Grid Feeder

Power Grid Feeder: regulation of absorbed grid power for an EV charging event.

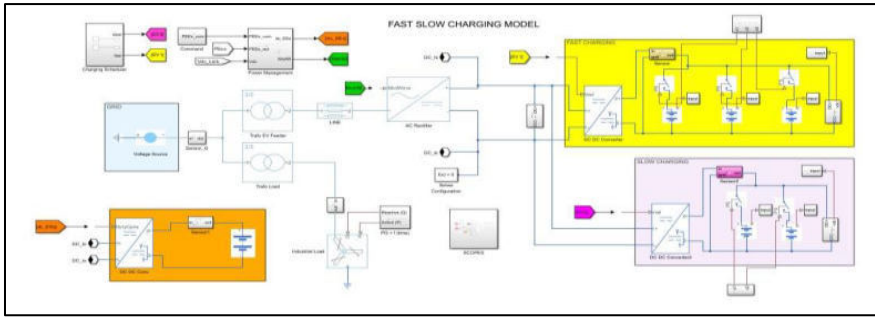


Figure 4: Fast Slow Charging Model

Fast Slow Charging Model: studies the overlapping effect of fast and slow charging on the grid. The benefits of peak shaving with the energy storage unit are encapsulated.

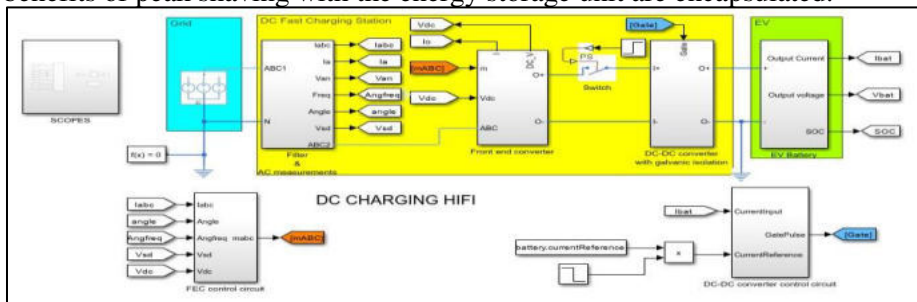
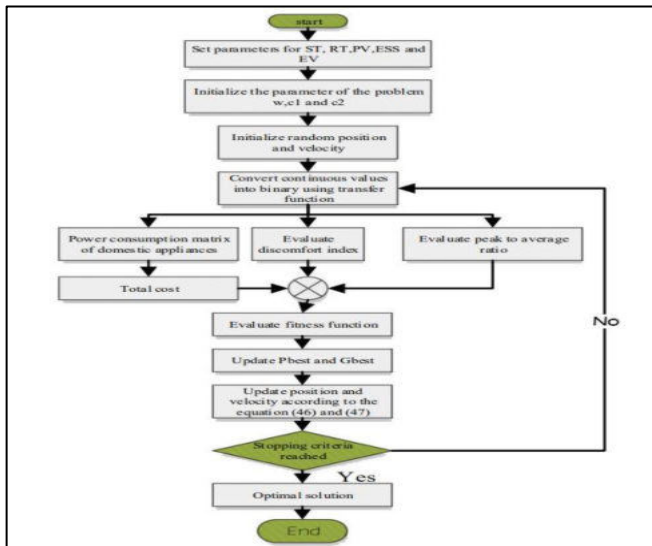


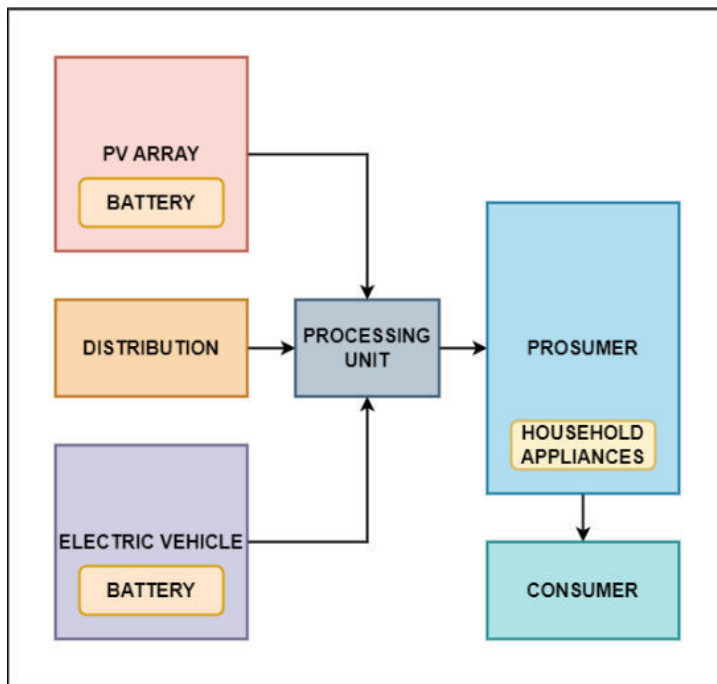
Figure 5: DC Charging HiFi

DC Charging HiFi: representation of a power conversion chain with switching DC-DC and AC-DC converters. Harmonic Analysis Possible.

FLOWCHART:



SYSTEM ARCHITECTURE / BLOCK DIAGRAM:



CONCLUSION & FUTURE SCOPE: The contribution of HEMS application to the smart grid scheme in improving the power system reliability is conducted through demand side management (DSM) program. DSM implements one of them with demand response and improved system power reliability. Penetration of electric vehicles in the smart grid scheme can also improve the reliability of power systems through V2G and G2V. When the electric vehicle is at home then HEMS application will handle the mechanism of V2G or G2V. Contribution of HEMS to the smart grid system can improve the power losses and voltage profile; one of the studies showed that voltage fluctuations resulting from large disturbances can be reduced up to five times. Also, PV and ESS is taken into consideration in the project.

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Simulation Based In-built Charging Hybrid EV with IC Engine & External SourceSurya Gounder¹, Ganesh Kolekar¹, Pooja Aarekar¹, Pratyush Dave¹, Navajyothi Katela¹¹Department of Electrical Engineering, Theem College of Engineering,
Boisar-401501, India.**ABSTRACT --**

This paper presents a detailed Hybrid Electric Vehicle (HEV) modelling method based on a multi-physics approach. The model is introduced in order to provide design engineers with the capability to investigate effects of component selection and to develop control systems and automatic optimization processes for HEV vehicles. A full drive train system of a series/parallel HEV is developed including the internal combustion engine (ICE), the motor generator (MG) and the power split device (PSD) along with the vehicle longitudinal dynamics. All aspects of rotational inertial dynamics, friction, damping and stiffness properties are considered. The interaction between all these modules is implemented in the MATLAB/Simulation/Sims-cape block-set environment. The concepts of modularity, flexibility, and user-friendly interface are emphasized during the model development. The numerical simulation results are compared with the analytical results of the same hybrid power train. The convergence between the results makes the model convenient for the future optimization techniques on HEV.

KEY WORDS

Hybrid vehicles, MATLAB/SIMULINK, modelling, simulation, PSD

3. INTRODUCTION

Over the past decade, the lack of petroleum resources and the increased emission rates have stimulated the automotive research all over the world to find more sustainable and clean energy resources. While the limited fossil fuel reserves are being continuously depleted, both the demand and the production rates are growing rapidly. Hybrid Electric Vehicle (HEV) has been considered as a short term solution to not only improve the fuel economy but also reduce its harmful emissions. It is widely known that, HEV combines two sources of energy namely; the conventional ICE and the electric propulsion systems which in turn reduce the dependency on petroleum fuels. Furthermore, the concept of having dual power sources enables the engine downsizing, load leveling and range extending. Proper engine sizing enables running the engine near to its economic conditions, regardless of the vehicle's required power and accordingly less emission levels.

Generally, according to the architecture of hybrid propulsion, there are three basic layouts of HEVs namely; series, parallel and series/parallel HEVs. In series HEV, the mechanical energy is produced by the engine and converted to electric energy through the generator. This electric energy is stored in the battery back and again is converted to mechanical energy via the electric motors to propel the vehicle as illustrated. Ease of both installation and operation are the main features of this type but double energy conversion represents its major disadvantages. Also, the series power flow reduces the power-train redundancy. In parallel HEV, both the mechanical power from the engine and electric power from the motor are combined to drive the vehicle. While this layout provides more choices of operation, it is practically complex to implement in the drive-train. Series/parallel HEV layout joins the advantages of the aforementioned layouts and provides the choice of utilizing both the mechanical and electric energies either sequentially or simultaneously. Additionally, regenerative brakes can be applied to transform the vehicle kinetic energy into potential electric one. Nevertheless, the construction complexity is one of its main drawbacks

Accurate modelling and simulation of HEVs enables better understanding and control of their operation. Among the well-known published literature, Khan developed a model for 'Honda Integrated Motor Assist' (IMA) in MATLAB/Simulation environment. Three parameters were considered and compared during two different standard drive cycles; these are fuel consumption, regenerated energy and consumed energy. Peng and Liu introduced an optimization algorithm for the series/parallel 'Toyota Hybrid System' (THS). Later, they discussed the argument between improvements of component sizing or power-train architecture for 'Toyota Hybrid System' (THSII) considering rule based optimization. Peng et al. developed another control algorithm for the model of parallel HEV considering adaptive energy management control systems. Stein et al. introduced a MATLAB/ Simulation model to apply a dynamic programming algorithm. Using ADVISOR, Wipke et al. developed a simulator to simulate the full HEV power-train. While the reviewed work has contributed to the state of the art in HEV, it should

be noted that, most of them were either dedicated to a certain hybrid topology or constrained to limited access simulator. However, there is a need to develop more generic models, yet adequate to represent HEV performance accurately. A simplified model is presented in this paper with a code such that it is accessible to modify its subsystems and subjected for further optimization techniques. Particular attention is paid to the modelling of series/parallel HEV due its wide application in modern vehicles.

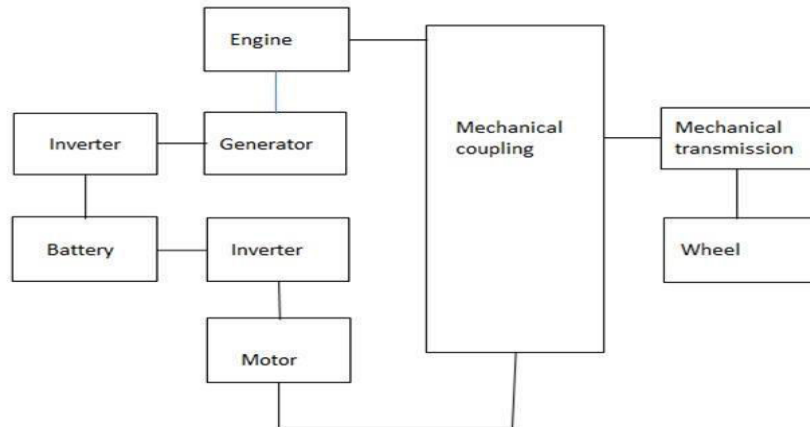
4. LITERATURE SURVEY

System proposes a solution by retrofitting existing scooters into hybrid electric which runs on IC Engine. Here scooter with an engine capacity of 125cc petrol IC engine is used. Also, the rear wheel gets an electric hub motor. It becomes a conventional engine powering the rear wheel and the electric motor driving wheel. Conventional engine is pretty inefficient during start-stop traffic. The engine uses a lot of fuel during such situations and reduces the mileage significantly. By using economy mode for these in which scooter will start and run on rear wheeled electric motor. Hub mounted electric motor works during crossing traffic and does not need the fuel. Electric motors are much more efficient as they do not draw any power from the battery while waiting in traffic and idling. Second mode is power drive mode. In this case, scooter will start and run on conventional IC engine, which is coupled with the rear wheel. This mode can be used for required condition when batteries are completely drained or if there is any problem in motor. The third mode is hybrid mode. A DC/DC boost converter includes a first boost driving unit, a second boost driving unit connected in parallel with the first boost driving unit, and a capacitor electrically connected to the first and second boost driving units. The first boost driving unit is utilized for performing a first driving operation according to an input voltage and a first control signal. The first driving operation includes the first energy-storing operation and a first energy-releasing operation. The second boost driving unit is utilized for performing a second driving operation according to the input voltage and a second control signal different from the first control signal. In accordance with an embodiment, a DC/DC boost converter having alternator boost driving mechanism is provided. The paper deals with the modeling of the processes of charge-discharge of battery assemblies taking into account their degradation. The results of simulating the cyclic operation of battery assemblies in the Electronics Workbench electronic laboratory are presented, possible schemes of inclusion are given, and options for re-switching batteries during operation are considered as well as connecting additional elements to extend the life of the connection. The simulation took into account the presence of one defective battery in the assembly. The operation of the assembly with a defective battery and a reference battery was compared. As a result of the analysis of parallel-series and series-parallel battery connections, the first one is considered preferable. For an assembly with a parallel-series connection, the time parameters of operation remained almost unchanged, but the differences in the voltages of the defective and other batteries changed more than twice as compared with a series-parallel connection. The battery plays a major role in electric vehicle (EV) and for that on-board battery charger is essential. Therefore, this paper focuses on the design of charging circuit for EV. The proposed charger circuit comprises of diode bridge rectifier, interleaved boost DC-DC converter and single phase DC-AC inverter. The design and operation of interleaved boost converter is discussed. Single phase DC-AC inverter is modeled and analyzed with different modulation techniques. From the comparison, the sinusoidal PWM (SPWM) is chosen for the proposed network. Inductive power transfer (IPT) technology is used for the charging of EV batteries. A method includes controlling an engine according to a control map, the control map specifying control settings according to a predetermined relationship with respect to engine speed and engine load. The method further includes estimating fuel consumption of the engine based on each of: an engine load indicated by an electric machine coupled to the engine and the predetermined relationship. Controlling the engine includes determining fuel injection parameters, such as timing and amount, based on the engine speed and load. The Battery management system must ensure many complex features such as charge control, battery-capacity monitoring, remaining run-time information and charge-cycle counting. An optimization of the BMS can improve the vehicle's security, the performance of the engine, energy optimization, and extension of the life of the battery. The main objective of this work is to develop a simulation environment based on System C to design and optimize the Battery Management System including a lithium-ion battery model and CAN communication interface. The BMS has been validated using real-world scenarios and data. The applications of Brush-less motors are mostly used in electric vehicle, fan, motor pump. The Brush-less DC motor have good speed response & high torque. The Brush-less DC motors have many advantages like less maintenance, less noise more efficiency,

more torque and less volume. Hence BLDC motor having many advantages so it is widely used in automobile sector & most popular application is electrical vehicle. To get control over it we have to study its different characteristics. By studying different modes of operation in BLDC motor we can control BLDC motor using a PID controller. At slant road emf will generate that emf will be feed back to battery for charging. Also, parameters like, speed Back EMF, torque and current are calculated in BLDC motor which we are going to model using PID

5. Methodology—

5.1 Block Diagram—



6. THE MODEL DESCRIPTION—

The core of the series/parallel HEV is a power split device which combines the power from the engine and the electric motor generator (MG). The output power from PSD is then delivered to the wheels through transmission elements such as propeller shaft, open differential and back axle. These elements are modeled and implemented using Sims-cape block-set library including SimDriveline, Sim-electronics and SimPowerSystems toolboxes. Sims-cape block-set is part of Simulation physical modelling, encompassing the modelling and design of systems according to basic physical principles. Physical modelling runs within the Simulation environment and interfaces seamlessly with the rest of Simulation and with MATLAB. Unlike other Simulation blocks, which represent mathematical operations, physical modelling blocks represent physical components or relationships directly such that, it is possible to represent a HEV drive-train system with a connected block diagram. The engine characteristics are included in the model as a look-up table of engine torque versus engine speed and throttle position, see Figure 3. Rotational motion can be initiated and maintained in a drive line with actuators while measuring, via sensors, the motions of drive line elements and the torques acting on them. The torque converter is modeled with the physical characteristics. The model of the DC motor's equivalent circuit is represented by the armature resistance (R). For the steady-state torque-speed relationship the inductance (L) is assumed to have no effect. Considering the motor inertia (J) and damping (γ), the generated torque by the DC motor (T) is proportional to the armature current, the strength of the magnetic field and rotational speed (ω) as follows:

Where, are the torque and back emf constants, is the induced back voltage in the armature. The battery model implements a generic dynamic model parameterized to represent most popular types of rechargeable batteries. The battery is modeled as a series resistor with a charge-dependent voltage source whose voltage is given as a function of charge of the following reciprocal relationship. For a given battery nominal voltage (V_0), the voltage across the battery terminals (V) is calculated as follows:

Where (x) is the ratio of the ampere-hours left to the rated ampere-hours of the battery, ($\alpha \beta$,) are empirical constants. The initial and maximum states of charge of the battery are mentioned in table1. The power split device (PSD) is a key component that directly controls the power flow among the engine and electric motor. The model of PSD considers a single-row planetary gear mechanism consisting of three basic components; a sun gear which is connected to the MG, a planet carrier equipped with planetary gear which is connected to the ICE and a ring gear which resembles the output to rear axle.

Depending on which shaft is driving, driven, or fixed, the planetary gear train can achieve a variety of speed reduction ratios. These ratios are a function of the sun and ring radii ($\xi = R_S / R_R$), and therefore of their tooth numbers. The planetary gear imposes two kinematic and two geometric constraints on the three connected axes and the fourth constraint; the internal wheel (planet):

The power split device is controlled by two actuators of brake band type. Each of them represents frictional brake with a flexible band that wraps around the periphery of a rotating drum to produce a braking action. A positive actuating force causes the band to tighten around the rotating drum and it places the friction surfaces in contact. The model employs a simple parameterization with readily accessible brake geometry and friction parameters

The braking torque (T) is calculated according to required tension force (F_{in}) and is restricted by the contact friction coefficient (μ), wrap angle (ϕ) and the drum radius (r_d). Where (ω , ω_{th}) are the shaft angular and threshold speeds respectively. The control system monitors the throttle valve position signal and accordingly switches the motor/generator and outputs the brake band signals as given in Table 1. The brake bands are controlled via a slider gain that feed the input brake force to the model. The motor/generator switch either electrifies or ground the motor generator circuit. The model behaves instantaneously with parameters change, which enables the user to apply, and monitor changes in the model dynamics in real time. The controllers are joined together in a guide user interface (GUI) to provide a user friendly environment to control, monitor and judge the behavior of the system. The vehicle body is assumed to be rigid with a lumped mass (m) which is concentrated at its center of gravity CG

Table 1: Modes of Operation and control for the proposed model of HEV

Mode	Brake Band Sun	Brake Band Ring	Description
Charging	OFF	ON	Power is delivered from ICE to the carrier and then to the sun gear. The MG is driven to generate electric energy which is stored in the battery bank.
ICE only	ON	OFF	Power is delivered from ICE to the carrier and then to the ring gear. While the MG is off, ICE power drives the vehicle back axle.
Synergy	OFF	OFF	Power is delivered from ICE to the carrier and then to the ring gear. While the MG is on, power from both ICE and MG drive the vehicle back axle.

7. RESULTS AND ANALYSIS

7.1 Engine Drive Mode:

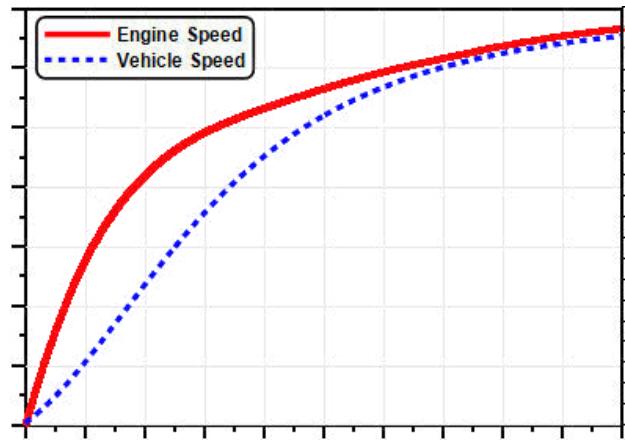
In this state, the engine drives the vehicle without the synergy of the MG output power. The MG switch is turned off and the brake band of the sun side BB2 is applied to prevent the engine power from leaking to the MG. the throttle is set to 30%. the engine speed accelerating from its idle speed at 800rpm to 1500rpm while the vehicle accelerating to its final speed.

7.3 MG Recharging Mode:

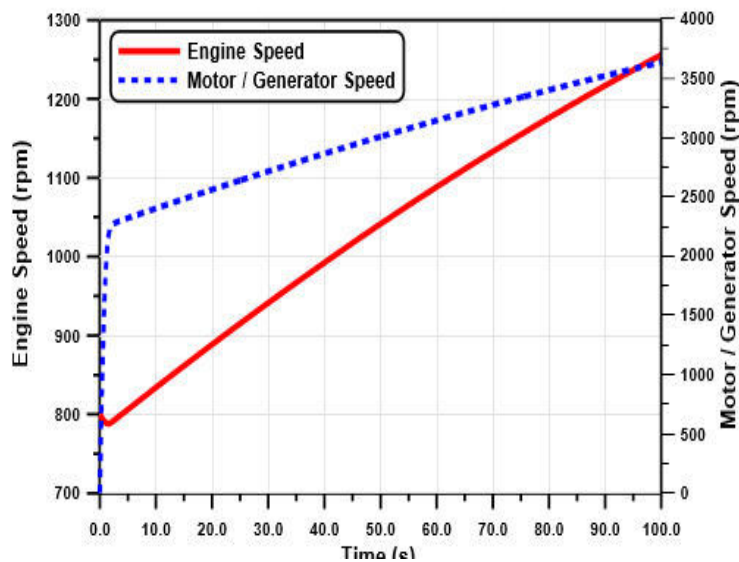
The MG is driven by the engine in order to function as a generator. The vehicle is stopped and the whole engine output is used to drive the MG to charge the batteries. The brake band of the ring side BB1 is activated and that of the sun side BB2 is deactivated. The throttle valve is set to be 5% as expected in similar idle condition of the engine. the engine speed accelerating from its idle speed at 800rpm to 1100rpm which is the limit of the idle range, and the MG speed reaches 3850 rpm. The batteries initial state of charge are set to be 50%.

7.4 ICE-MG Synergy Mode:

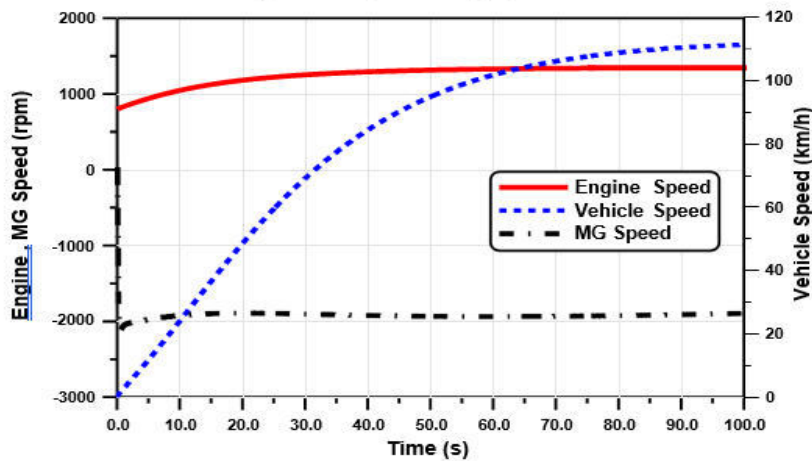
In this mode, both the ICE output and the MG output are used to empower the vehicle. Both brake bands of the sun and ring sides are deactivated so that they can deliver power to the vehicle at the same time. The throttle valve in this mode is set to 30% as in Engine Drive Mode, so the consumed power in both states can be compared. The engine accelerating to 1500rpm and the vehicle accelerating to 28.54m/s. A negative value of the MG rpm, which indicates its rotational direction to be opposite to those of ICE and Vehicle's propeller shaft.



Engine Drive Mode



Battery Recharging Mode



Synergy mode

A fairly compression is carried out during the engine drive and synergy modes of operation. It is clear that, during the synergy mode, both fuel economy and driven mileage are improved as shown in Table 2.

Table2: Fuel economy during the engine drive and synergy modes

Mode	Engine drive mode	Synergy mode
Fuel Consumption (G/kW.Hr)	74.0678	62.7008
Mileage (Km/Liter)	65	102.7

8.DISCUSSION— In this project, we faced some problems and difficulties during building simulation for the proposed system. The main difficulties we faced during the parameters in the simulation to set the parameters for each block and theoretical parts to simulation circuit. But we have solved that type of particular difficulties and also we understand. Also we have find number of merits and application of this system . So the merits and application of this project is given below,

8.1 Merits –

- Running cost per/KM fuel cost can be reduce by 58%
- By proposed system end user can able to use the vehicle as normal IC engine vehicle
- Charging time is eliminated as in-built
- Overall efficiency of vehicle is increased by 58%
- Existing vehicle can be convert to hybrid vehicle

9. Conclusion :-

Hybrid Electric Vehicles are one of the promising challenges in energy management applications. Exact simulation and control of the possible states of hybrid power train can achieve many numerous virtues such as fuel consumption optimization and emissions reduction. The proposed model in this work shows some promising results for the different modes of operation matching the real case. As the model behaved in an accepted matter, many optimization and control methods can be applied on the model to experience their effect on the overall vehicle's efficiency.

Appendix : Vehicle and Simulation Parameters

The Vehicle		The Engine	
Vehicle gross mass (kg)	130	Max. power (kw@rpm)	220@5000
No. of Driving Axles	1	Max. torque (N.m@rpm)	9.5@4000
Frontal Area (m ²)	2	Idle speed (rpm)	1800
		Max. speed (rpm)	4000
Power Split Devise		The Electric System	
Type of planetary GB	Single row	Rated motor speed (rpm)	1800
Control Actuators	Brake bands	Rated motor power (kw)	2.5
Ring to sun ration	2	Rated DC voltage (v)	56
		Battery voltage (v)	48

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RFID-based Smart Public Transportation System

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Abstract

In today's world, smart ticketing systems for public transport serve multiple useful purposes. Given India's position as the second most populous country globally, a significant number of people rely on public transport. However, issuing tickets to every passenger manually during peak hours can be a tedious and time-consuming task, and providing exact change to passengers can also be problematic. This can result in a higher probability of ticket fraud. To address these issues, this project proposes a single ticketing system for all modes of public transport using an RFID (Radio Frequency Identification) reader machine. The tickets will be e-generated and sent to passengers via SMS, eliminating the need for paper tickets that contribute to deforestation. According to the Forest Resource Assessment, nearly 80,000 to 160,000 trees are felled globally each day for paper production, exacerbating climate change. Additionally, paper tickets are of no use once a passenger disembarks from the bus and require passengers to safeguard them until they reach their destination. The proposed smart ticketing system aims to overcome these difficulties by providing an efficient and eco-friendly method of issuing tickets to passengers.

Keywords— Public Transport, RFID, Ticketing, Ticketless Travel, Smart, Node MCU.

I. INTRODUCTION

Introducing the cutting-edge innovation of a Smart Ticketing system, a game-changer in the realm of public transportation. While some may argue that transitioning to a paperless system would incur higher costs in terms of software and hardware requirements compared to the traditional paper-based approach, the benefits far outweigh the perceived drawbacks.

By leveraging the power of RFID (Radio Frequency Identification) technology in conjunction with a state-of-the-art microcontroller, such as the highly capable Nodemcu ESP32, this Smart Ticketing system takes public transportation to new heights of efficiency and sustainability. RFID has emerged as a top contender in the technology landscape, with its affordability and versatility making it a prime choice for various tracking and locating applications.

At the heart of this innovative system lies the RFID Reader, a powerful tool for detecting RFID cards carried by passengers. Coupled with the advanced capabilities of the Nodemcu ESP32 microcontroller, seamless communication between the RFID Reader and the system is achieved, ensuring smooth and reliable ticketing operations.

One of the standout features of this Smart Ticketing system is its eco-friendly approach. Gone are the days of wasteful ink and paper, as the system generates e-tickets that are sent directly to users' smartphones via SMS. This eliminates the need for physical tickets that are discarded after reaching the destination, contributing to a greener and more sustainable environment.

Furthermore, the system goes beyond ticketing by providing location updates at specific intervals during travel. This feature is particularly valuable for commuters with children, as it allows parents or guardians to have peace of mind by keeping track of their kids' whereabouts in real-time. This parental guardian approach adds an additional layer of safety and security to the daily commute, making the Smart Ticketing system a comprehensive solution for modern transportation needs.

In conclusion, the Smart Ticketing system with RFID technology and a microcontroller is a testament to the power of innovation in revolutionizing traditional systems. With its eco-friendly approach, seamless communication, and added safety features, this system represents the future of public transportation - a smarter, more sustainable, and customer-centric solution that brings benefits to both passengers and the environment alike.

II. LITERATURE SURVEY

In [1], a system was developed by Deepali Kayande, Sarita Saldanha, Sisil Sunny, and Bianca Alphonso that employs Near Field Communication (NFC) and RFID technology to track bus ticketing and location. The system provides an automated and user-friendly ticketing process that automatically deducts the passenger's fare based on the distance travelled, while also allowing real-time tracking of the bus so that passengers can know the exact time of arrival.

Another study [2] proposes a smart ticketing system that utilizes a combination of RFID and GPS technology for commuters. The system calculates the bus fare between the starting and destination points, deducting it from the passenger's balance when they disembark from the bus.

In [3], the authors suggest a GPS-based transportation system that tracks both the real-time location of passengers and buses, calculating the distance between them. The system also offers real-time bus location monitoring and employs an Artificial Neural Network (ANN) technique to predict the arrival time of the bus.

III. OVERVIEW OF TECHNOLOGY USED

A. Radio Frequency Identification (RFID)

The Radio-frequency identification (RFID) is a wireless technology that uses radio signals ranging from 3 kHz to 300 GHz. It is mainly used to transmit data of a few bits. An RFID device consists of two fundamental components: tags and readers. A reader, also known as the interrogator, emits radio frequency signal which interacts with the tag. The tag then responds by sending its Unique Permanent Identification (UID) number burned-in during manufacturing.

IV. HARDWARE DESCRIPTION

1. RFID Tags:

RFID tags, the core of our system, come in two types: Active and Passive. Embedded with a microchip and an integrated antenna, these tiny marvels hold a unique identifier (UID) that enables seamless tracking and identification. The Passive tags, which don't require batteries, boast an impressive lifespan and are cost-effective for large-scale identification needs. Our project specifically utilizes S50 RFID cards in sleek card-shaped form, making them perfect for public transport usage.

2. RFID Reader:

At the heart of our UHF-based system lies a state-of-the-art RFID reader with an impressive interrogation range of a few centimetres. Compliant with the ISO8000-6C protocol, this advanced reader has the ability to simultaneously read multiple tags, thanks to its powerful transmission capabilities. With its electric vector-powered transmission, this active reader sets the bar for efficient and reliable RFID scanning.

3. Node MCU ESP32:

Empowering our system is the highly capable NodeMCU-ESP32, offering unparalleled prototyping convenience with its Lua script or Arduino IDE programming options and breadboard-compatible design. Boasting dual-mode Wi-Fi and BT wireless connectivity at 2.4 GHz, this microcontroller development board also packs a punch with 512 KB SRAM and a whopping 4MB flash memory.

4. 20x4 LCD Display:

Our system's user interface comes to life with a cutting-edge 20x4 LCD display. This high-resolution display boasts the ability to showcase 20 characters per line across its four lines, all in a crisp 5x7 pixel matrix. Equipped with two registers, namely Command and Data, and utilizing the standard HD44780 controller, this LCD display adds a touch of sophistication to our project.

5. 4x4 Keypad:

Seamless user interaction is made possible with our intuitive 4x4 keypad. With a total of 8 connections, including 4 for columns and the remaining for rows, this matrix of switches allows

for easy input. When a button is pressed, a connection is established between the rows and columns, enabling smooth and efficient data entry for our system.

V. SOFTWARE DESCRIPTION

1. Node JS (Software Stack used in Backend)

Node.js is a JavaScript runtime environment that allows for scalable network applications to be built using back-end JavaScript. It is an open-source, cross-platform platform that executes JavaScript code outside of web browsers. Written in C++, Node.js provides many system-level APIs, such as file operations and web programming. It uses the Google Chrome V8 engine for optimal performance. Compared to client-side JavaScript, which is subject to runtime security restrictions and limited in terms of client system operation, Node.js is designed for network services and utilizes event-driven, asynchronous programming. The core design of Node.js revolves around event-driven programming, and the majority of its APIs are event-based and use an asynchronous style. For example, the Net module's net Socket object has several events, including connect, data, end, timeout, drain, error, and close, which developers using Node.js can register callback functions for, according to their business logic.

2. Express JS (for creating the Server):

Express JS is a web application framework that is built on top of Node.js and offers features for developing web and mobile applications. It simplifies the management of servers and routes, and can be used to create a variety of web applications, including single page, multi-page, and hybrid ones. Express was designed to facilitate the development of APIs and web applications, saving time and increasing efficiency. As it is written in JavaScript, it is accessible for new developers entering the field of web development.

3. MongoDB:(for creating and managing Database)

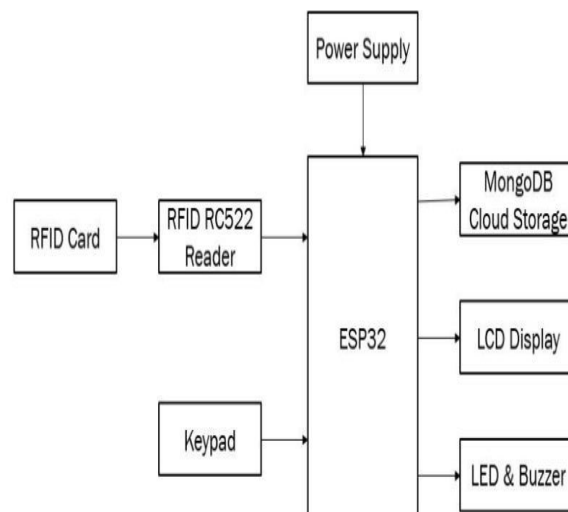
MongoDB is a NoSQL database that uses a document-oriented approach and is open-source. In contrast to relational databases that store data in a tabular format, MongoDB employs BSON, a more versatile format for storing and retrieving data. NoSQL databases like MongoDB are more scalable and provide better performance than relational databases, making them ideal for managing big data in contemporary applications. MongoDB is capable of scaling by adding more servers and features a flexible document model.

4. React Native (for creating App):

React Native is a JavaScript framework designed for developing mobile applications that run on iOS and Android platforms. It is built upon React, which is a JavaScript library developed by Facebook for creating user interfaces. React Native makes it possible for web developers to create mobile applications that provide a native look and feel, using a JavaScript library that they are already familiar with and enjoy working with.

VI. SUGGESTED SOLUTION IN DETAIL

A. Methodology



The heart of the architecture is the NodeMCU ESP32 microcontroller, which serves as the central component that interacts with other modules, including the RFID Reader and I2C Module, as well as the LCD display. The system is designed to provide various functionalities for an RFID-based fare collection system for buses, including:

- Fare calculation based on the number of stations traveled, which is done by the RFID Reader when passengers tap their RFID cards or tags while boarding and alighting from the bus or at bus stations.
- Issuance of RFID tags to passengers, which are used to uniquely identify them when tapped on the RFID Reader.
- NodeMCU ESP32 acts as a microcontroller and database, storing relevant passenger information such as bus stations, fares, and more.
- The system utilizes the GET API method to send messages to users and their guardians, providing information about their RFID or Smart card balance.
- An LCD display is used to show relevant information about the user when their card is tapped, providing details such as remaining balance, trip details, and more.
- A buzzer is employed to notify the user and conductor in case of insufficient balance on the RFID card, prompting the user to recharge their card.

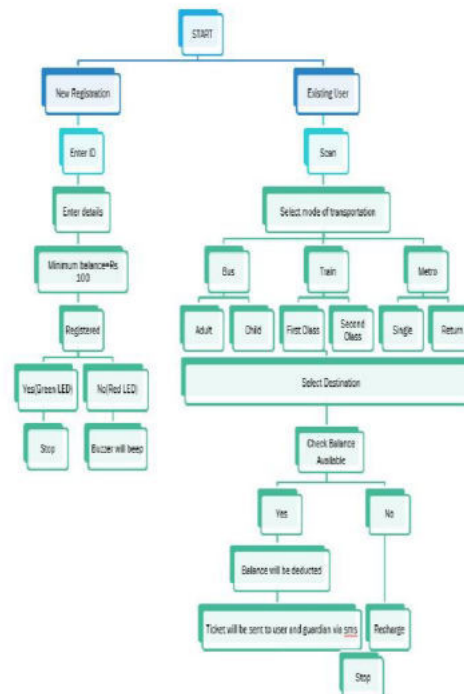


Figure 2: User Case Diagram

B. Software Challenge for Geolocation.

The software implementation Geolocation helps in minimizing hardware complexity to a great extent. The biggest advantage of the software is maintenance. If there is a plan to include means to upgrade or change the firmware, it enables deploying as many revisions as possible to match the requirements which are not possible on the hardware. Other than that, it is a matter of complexity. If the hardware solution turns out not to be too complex, it is preferable to go without software and the required microcontroller or processor. If it reaches a point where the hardware design would become too complex and/or take up too much PCB space, then the hardware solution would not be commercially viable.

The proposed solution has software implementation for obtaining Geolocation. The proposed solution involves using the Geolocation API provided by vendors like Google, which allows HTTP requests to obtain location coordinates. This API provides a high-level interface to location information, including latitude and longitude, sourced from various devices such as GPS, IP address, RFID, Wi-Fi and Bluetooth MAC addresses, and GSM/CDMA cell IDs.

C. Working:

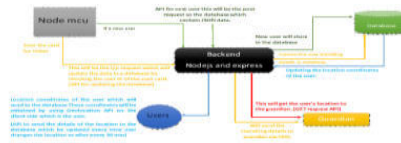


Figure 3: Flowchart showing the working.

The RFID reader system consists of an RFID reader that is primarily responsible for detecting RFID cards carried by passengers. The NodeMCU ESP32 microcontroller acts as the communication interface between the RFID reader and the system. RFID cards are encoded with unique identification numbers, which are detected by the reader using electromagnetic fields. The microcontroller retrieves details from the RFID reader system, such as card balance and stations, when cards are detected by the reader.

The system utilizes Radio Frequency Identification (RFID) cards and associated technology to calculate fares based on the distance travelled by passengers. As passengers typically carry reusable RFID cards, it reduces paper waste from tickets. The RFID card contains digital data, including the passenger's name, card balance, and travel distance, which is scanned by the passenger to identify the tag ID. The reader circuit sends data to the system with all passenger details. Passengers simply need to hold their RFID tags in front of the reader while boarding and alighting from the bus to deduct the fare from the tag based on the distance travelled.

RFID technology is well-known and widely used in various fields for identification and security purposes. Two RFID modules are employed at different boarding places in the vehicle, allowing passengers to easily scan their RFID tags. The current location of the vehicle is determined using GPS technology, and the traveling distance of passengers is displayed on Liquid Crystal Displays (LCDs).

The proposed solution also includes a software implementation of Geolocation, which reduces hardware complexity and provides the advantage of flexibility in revisions to match requirements. This allows for easy maintenance and updates as needed. The Geolocation API offered by various vendors, such as Google, enables the operator to make HTTP requests to obtain coordinates of the current position. Common sources of location information include GPS, network signals such as IP address, RFID, Wi-Fi, Bluetooth MAC addresses, and GSM/CDMA cell IDs.

VII. 3D PRINTING TECHNOLOGY

Over the next decade, 3D printing is poised to revolutionize global manufacturing, paving the way for lightweight and ergonomic devices. Our cutting-edge ticketing system boasts a 3D printed enclosure, crafted with eco-friendly PLA (Polylactic acid) filament, which requires minimal energy for processing, making it a superior choice compared to ABS plastic. PLA's favourable environmental impact and energy-efficient production processes make it a preferred option. This breakthrough technology has the potential to transform traditional manufacturing, enabling easy handling and reducing the weight of devices, providing a more sustainable and efficient approach to manufacturing worldwide.

VIII. ADVANTAGES

1. An all-in-one smart master card approach that integrates all public transport systems together and allows for a single master card and a centralized system for all transportation mediums.
2. Ensures a seamless ticketing experience for travellers.
3. Provides hassle-free travel to commuters.
4. Makes the ticketing system more transparent and avoids duplicity of tickets.
5. With the mobile application commuter guardians are alerted about their whereabouts using GPS tracking.
6. Elimination of queue time which was affecting our transport at a greater scale.
7. In any public transport system, once the passenger reaches the destination, the printed ticket is no longer useful and is eventually thrown away leading to pollution. This can be avoided as the tickets generated will be e-generated and sent via SMS to the user's smartphone.

IX. APPLICATIONS

1. The most useful application provided by our ticketing system is that it integrates all modes of public transport into a single system and a single smart card.
2. One of the key applications is Women and child safety which can be ensured as the user's parent/guardian will get notified of any ticket purchase as well as they can track the user's location.
3. Tickets can be generated quickly and with ease thus saving precious time that is been wasted standing in long queues for tickets.

X. CONCLUSION

Our innovative ticketing system, which generates e-tickets sent via SMS, addresses the pressing issue of printed tickets becoming useless and adding to pollution. By eliminating the need for physical tickets, we're reducing waste and promoting sustainability. Additionally, our system includes a parental-guardian feature that ensures the safe travel of children, enhancing the overall security of commuters. Through seamless integration with various public transport systems, our smart ticketing system delivers a convenient and secure experience for passengers, elevating the standards of modern transportation. Our design and implementation reflect our commitment to creating a smarter, more sustainable, and passenger-centric approach to ticketing.

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E-Commerce for Artisans

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ABSTRACT

Locart offers a wide range of seller services and tools that help creative entrepreneurs start, grow, and manage their businesses that come under the Handloom and Handicraft sector. The Indian Handloom and Handicraft industries have also been much-appreciated elements of society. The Locart community includes creative entrepreneurs who sell on our platform, thoughtful consumers looking to buy unique goods in our marketplace, retailers, and manufacturers who partner with Handloom sellers to help them grow their businesses and employees who maintain our platform and nurture our ecosystem. Our mission is to reimagine commerce in ways that build a more fulfilling and lasting world. We will take the Handloom sector to its apex in the market. The value, as well as the prevalent status of the Handloom and Handicraft, will be redefined. We are committed to using the power of business to strengthen communities and empower people.

Keywords: E-commerce for artisans, selling product online, low commission.

INTRODUCTION

The Locart community includes creative entrepreneurs who sell on our platform, thoughtful consumers looking to buy unique goods in our marketplace, retailers, and manufacturers who partner with Handloom sellers to help them grow their businesses and employees who maintain our platform and nurture our ecosystem. Our mission is to reimagine commerce in ways that build a more fulfilling and lasting world. We will take the Handloom sector to its apex in the market. The value, as well as the prevalent status of the Handloom and Handicraft, will be redefined. We are committed to using the power of business to strengthen communities and empower people. The Indian handloom industry is the largest in the world but is slowly vanishing. Economically, it only precedes the agricultural sector in terms of the provision of livelihood for the rural population in India. The beginning of the 21st century saw the growth of Globalizations in the world. Along with that, we also saw a drastic fall in one of the largest employment industries in India, the Handloom Industry. Globalization has adversely affected this sector in India. Various news websites and channels have been reporting about the dying culture of handloom in India due to the lack of policies and support.

2. LITERATURE REVIEW AND OBJECTIVE

[1] In a study published in the Beyond computation: Information technology, organizational transformation and business performance, the author Brynjolfsson, E. Hitt, L.M. writes Companies using information technology to change the way they conduct business often say that their investment in information IT.

[2] In a paper published in the opportunity to rejuvenate the traditional crafts of India, the author Kumar Pandey writes that the Promotion of traditional crafts can be one of the strategies to tackle this crisis in the making.

[3] In a report published by the E-Commerce and Rural Handicraft Artisans, the author Amisha Shah and Rajiv Patel writes that the Handicrafts, E-Commerce, Rural Artisans, Rural Development, SWOT Analysis.

3. MOTIVATION AND OBJECTIVE

In India small shop owners still don't go for online platform to sell their products as specially the people like Artisans who make hand made products, because they don't have that much of knowledge about

online selling, and those who have knowledge they are not ready for online selling because of high commission taken by website owners like Amazon and Flipkart.

The Indian Handloom and Handicraft industries have also been much-appreciated elements of society. The Locart community includes creative entrepreneurs who sell on our platform, thoughtful consumers looking to buy unique goods in our marketplace, retailers and manufacturers who partner with Handloom sellers to help them grow their businesses and employees who maintain our platform and nurture our ecosystem.

4. SOFTWARE AND PROGRAMMING LANGUAGES

1. **Visual Studio Code:** - Visual Studio is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs including websites, web apps, web services and mobile apps.
2. **HTML:** - HTML is an acronym which stands for Hyper Text Markup Language which is used for creating web pages and web applications. Let us see what is meant by Hypertext Markup Language, and Web page.
3. **CSS:** - CSS (Cascading Style Sheets) allows you to create great-looking web pages, but how does it work under the hood? This article explains what CSS is with a simple syntax example and covers some key terms about the language.
4. **JavaScript:** - JavaScript is a scripting or programming language that allows you to implement complex features on web pages every time a web page does more than just sit there and display static information for you to look at displaying timely content updates, interactive maps, animated 2D/3D graphics, scrolling video jukeboxes, etc.
5. **PHP:** - PHP (recursive acronym for PHP: Hypertext Pre-processor) is a widely-used open-source general-purpose scripting language that is especially suited for web development and can be embedded into HTML.
6. **Bootstrap:** - Bootstrap is the most popular CSS Framework for developing responsive and mobile-first websites.
7. **XAMPP:** - XAMPP is one of the widely used cross-platform web servers, which helps developers to create and test their programs on a local webserver.

5. RESULTS AND DISCUSSION

Locart is completely made for the local artisans to expand the Handloom industry on online platform. The making of the website is completed including the collection of data of the users were required. It is an easy process; nothing complicated the user can view the product available on the site as this website is in the developing stage the function like tracking or order and net payment are not available.

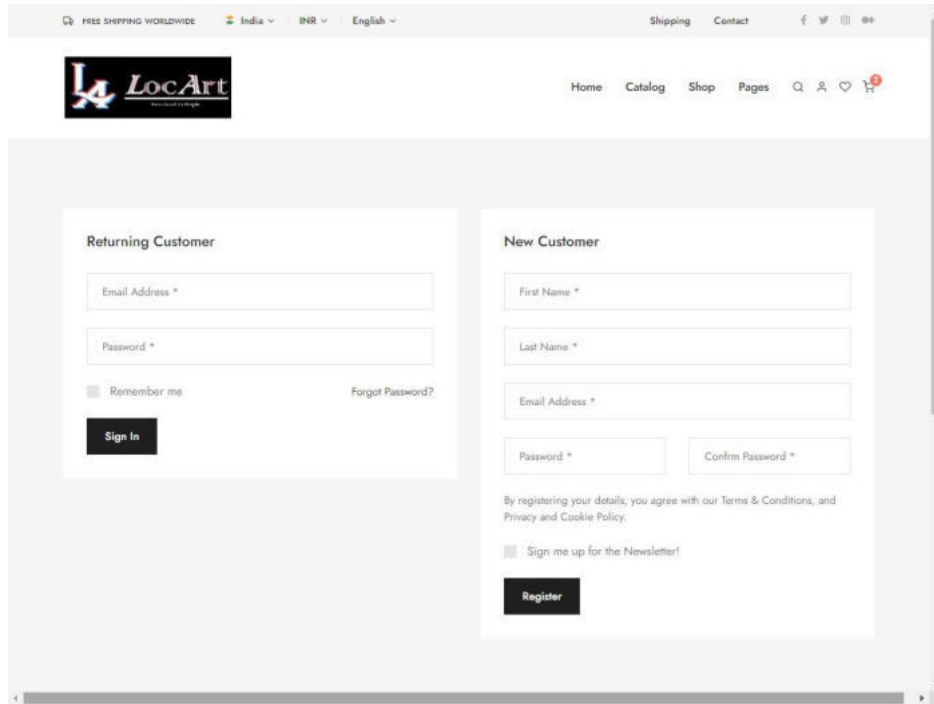


Figure 1: Login Page

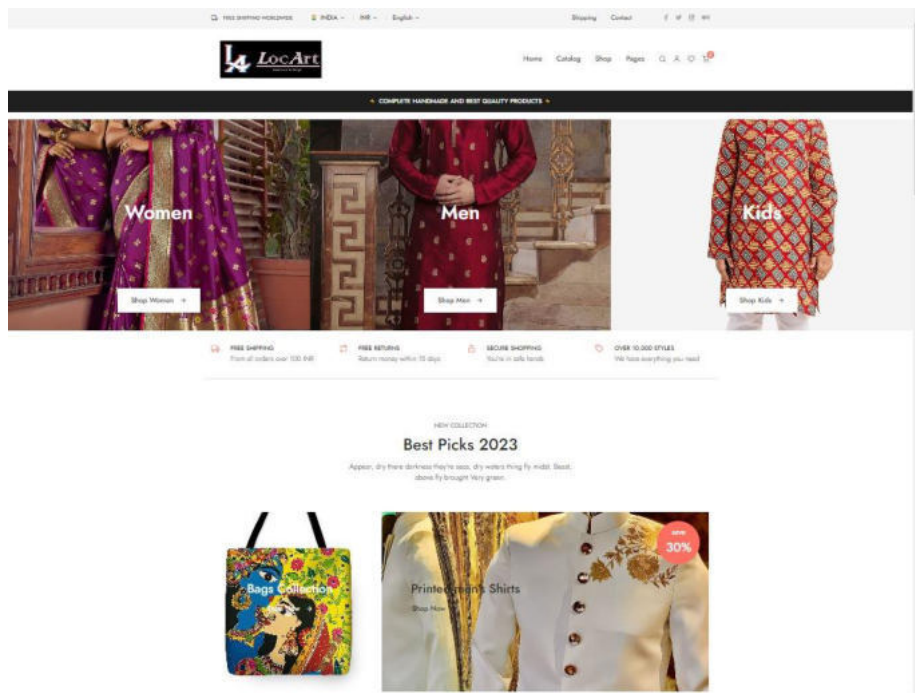


Figure 2: Homepage

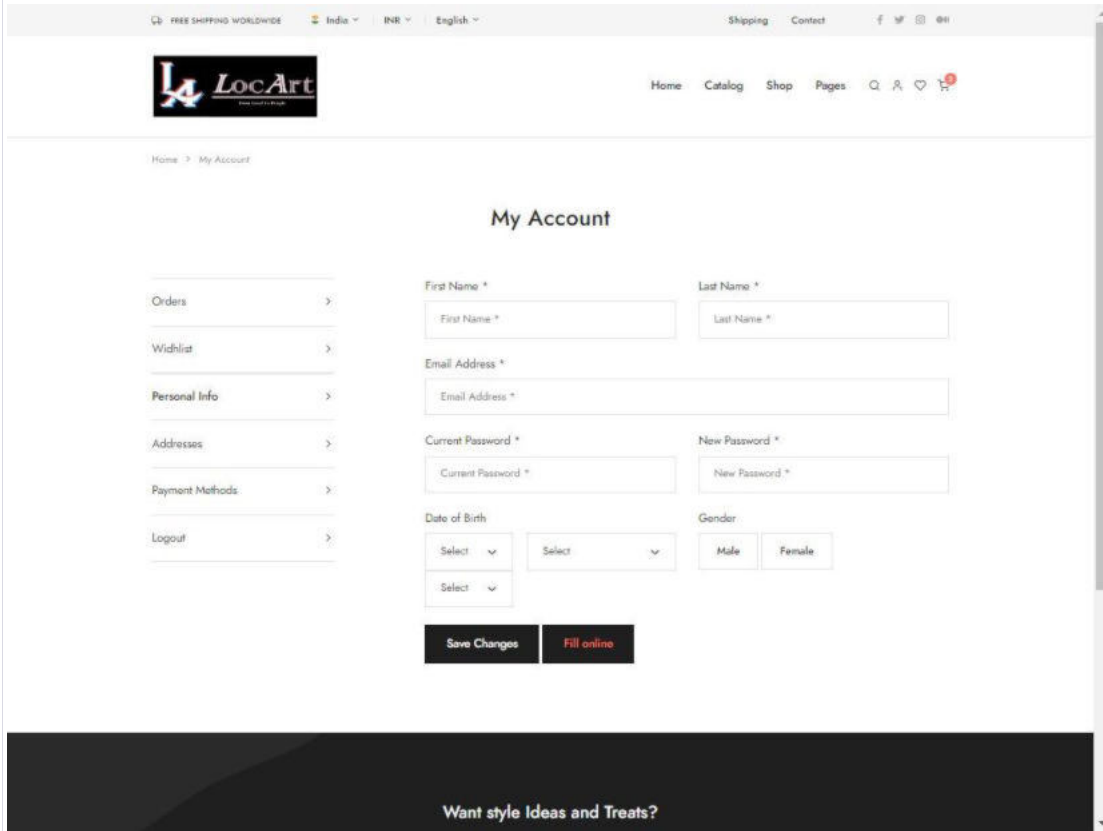


Figure 3: Account Page

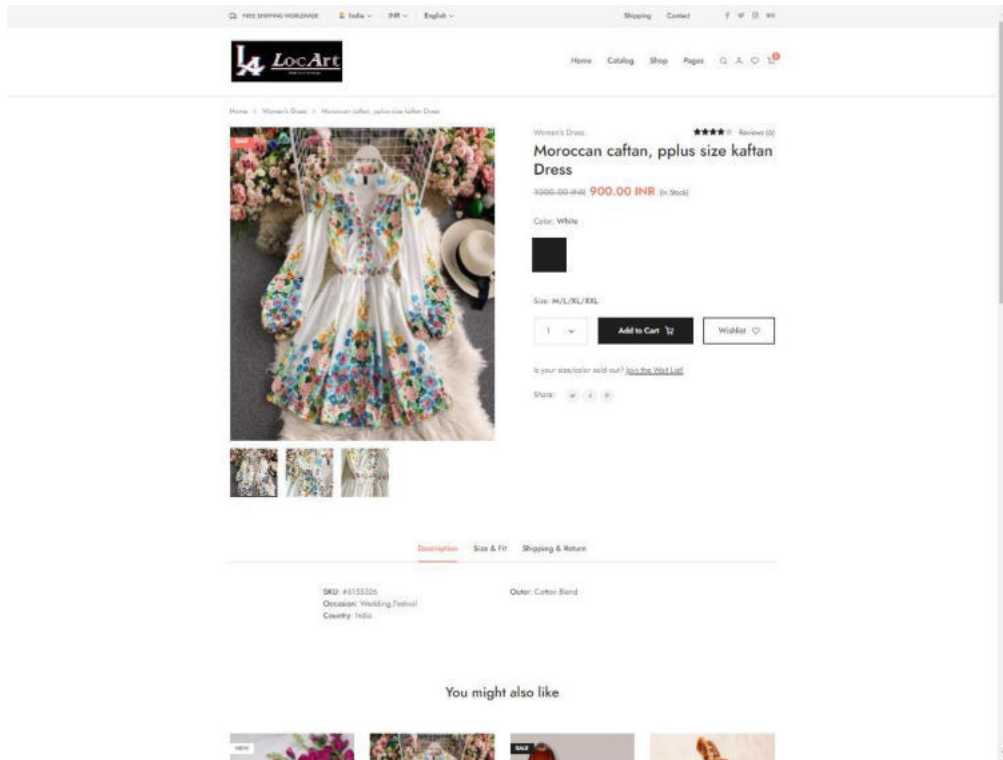


Figure 4: Product Page

The screenshot shows a web browser window displaying the 'Contact Us' page for 'LocArt'. The browser's address bar shows 'FREE SHIPPING WORLDWIDE' and the page is in English. The website's navigation menu includes 'Home', 'Catalog', 'Shop', and 'Pages'. The 'Contact Us' page is divided into three main sections:

- Call to Us:** This section provides contact information, including a phone number (6-146-389-574) and a note that they are available from 10 am - 10 pm EST, 7 days a week. It also lists 'Customer Service' and 'Careers' with the same phone number.
- Write to Us:** This section contains a contact form with fields for 'Your Name *', 'Your Email *', 'Title *', and 'Message *'. A 'Send Message' button is located below the form.
- Find Us:** This section asks if the user wants to visit an offline store and provides a link to a 'Store Locator'.

Figure 5: Contact page

6. CONCLUSIONS

The conclusion is that our website provides employment as well various products to customers and, we customize products according to the wish of the customer, we have flexibility in our process, from ordering of the product to the delivery. Also returns and refunds will be easier than ever, the product is guaranteed for damage, one can request for a replacement or a refund. Also, the products are completely handmade and no machines are used in the manufacture of the items, we have a wide range of products including handlooms, paper dolls, clay toys, Leathers Shoes, and belts.

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Court Cases Management System

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ABSTRACT

A Court Case Management System (CCMS) is an essential tool for streamlining court processes and managing cases loads effectively. This system is designed to help courts manage cases more efficiently by automating many of the administrative tasks associated with case management. The CCMS is a web-based application that provides a centralized platform for managing case files, court calendars, and scheduling hearings. The system includes features such as case tracking, document management, and communication tools that allow judges, attorneys, and court personnel to collaborate and exchange information more easily. The CCMS also provides a range of analytics and reporting tools to help courts monitor and analyze their cases loads, identify bottlenecks, and improve their overall efficiency. The implementation of a CCMS has been shown to increase the efficiency of court proceedings, reduce case processing times, and improve access to justice for all parties involved in a case.

Keywords: Court case management, Case tracking, Document management, hearing management, scheduling.

1. INTRODUCTION

A Court Case Management System (CCMS) is a software solution designed to improve the efficiency of the justice system by streamlining court case management. The CCMS is an electronic platform that automates the administrative tasks associated with managing court cases, such as case tracking, document management, scheduling, and communication between stakeholders in the justice system. The system provides a centralized platform for managing court calendars, tracking cases, and managing documents, making it easier for judges, attorneys, and court personnel to collaborate and exchange information. The traditional manual processes of managing cases are often, time-consuming, and prone to errors, leading to delays, backlog of cases, and inefficiencies in court proceedings. The lack of a centralized system for managing cases and communication between stakeholders further exacerbates the problem, leading to longer wait times for parties involved in a case, lack of access to justice, and a negative impact on the credibility of the justice system.

Overall, the CCMS is a crucial step towards a more efficient, accessible, and credible justice system. It helps courts manage cases more effectively, reduce processing times, and improve access to justice for all parties involved in a case.

2. LITERATURE REVIEW AND OBJECTIVE

[1] In a study published in the International Journal of Computer Applications in Technology, researchers investigated the impact of implementing a CCMS in the Indian justice system. The study found that the implementation of the system led to a reduction in case processing time, improved efficiency, and a decrease in the backlog of cases.

[2] In a paper published in the Journal of Court Innovation, the authors examined the benefits of implementing a CCMS in the U.S. court system. The authors found that the system improved the efficiency of court processes, reduced case processing times, and increased access to justice for all parties involved in a case.

[3] In a report published by the National Center for State Courts, the authors analyzed the implementation of CCMS in state courts across the U.S. The report found that the implementation of the system led to a reduction in case processing times, improved accuracy, and increased access to court records.

[4] In a study published in the Journal of Empirical Legal Studies, the authors investigated the impact of implementing a CCMS on the performance of judges in the U.S. The study found that the system led to an increase in the number of cases handled by judges and a reduction in the time judges spent on administrative tasks.

[5] In a paper published in the Journal of Court Technology and Trial, the authors examined the implementation of CCMS in the Nigerian justice system. The study found that the system led to an improvement in the efficiency of court processes, reduced case backlog, and increased access to justice.

3. MOTIVATION AND OBJECTIVE

The motivation for developing a court case management system from the need to improve the efficiency and accessibility of the justice system. The traditional manual processes of managing cases are often, time-consuming, and prone to errors, leading to delays, backlog of cases, and inefficiencies in court proceedings. This results in longer wait times for parties involved in a case, lack of access to justice, and a negative impact on the credibility of the justice system.

The advent of legal technology has provided an opportunity to revolutionize the justice system, and the development of a CCMS is one such initiative.

In summary, the motivation and background for the development of CCMS are driven by the need to improve the efficiency and accessibility of the justice system, and the development of legal technology has provided an opportunity to achieve this.

4. PROPOSED SYSTEM AND PROJECT OUTLINE

Proposed System: The proposed Court Case Management System (CCMS) is an electronic platform designed to streamline court processes, improve efficiency, and increase access to justice.

Project Outline: The development of the proposed CCMS will be divided into the following phases:

Requirements Gathering: In this phase, the project team will work with stakeholders in the justice system to gather requirements for the system. This will involve identifying the needs of judges, attorneys, court personnel, and other stakeholders and documenting these requirements.

System Design: In this phase, the project team will design the system based on the requirements gathered in the previous phase. This will involve designing the user interface, data models, and system architecture.

System Development: In this phase, the project team will develop the system using the latest legal technology. This will involve programming, testing, and debugging the system.

System Integration: In this phase, the project team will integrate the system with other systems used in the justice system. This will involve testing the integration of the system with other systems and resolving any issues that arise.

System Deployment: In this phase, the project team will deploy the system to the justice system. This will involve training users on how to use the system and providing ongoing support to users.

System Maintenance: In this phase, the project team will provide ongoing maintenance and support for the system. This will involve monitoring the system, resolving any issues that arise, and making updates to the system as needed.

5. RESULTS AND DISCUSSION



login

Figure 2: Admin sign up

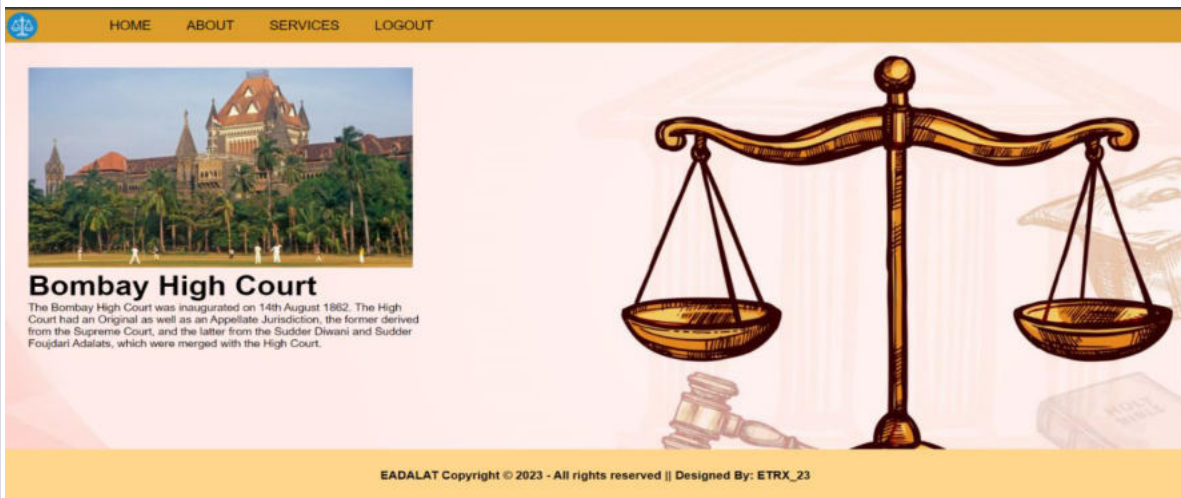


Figure 3: Home page

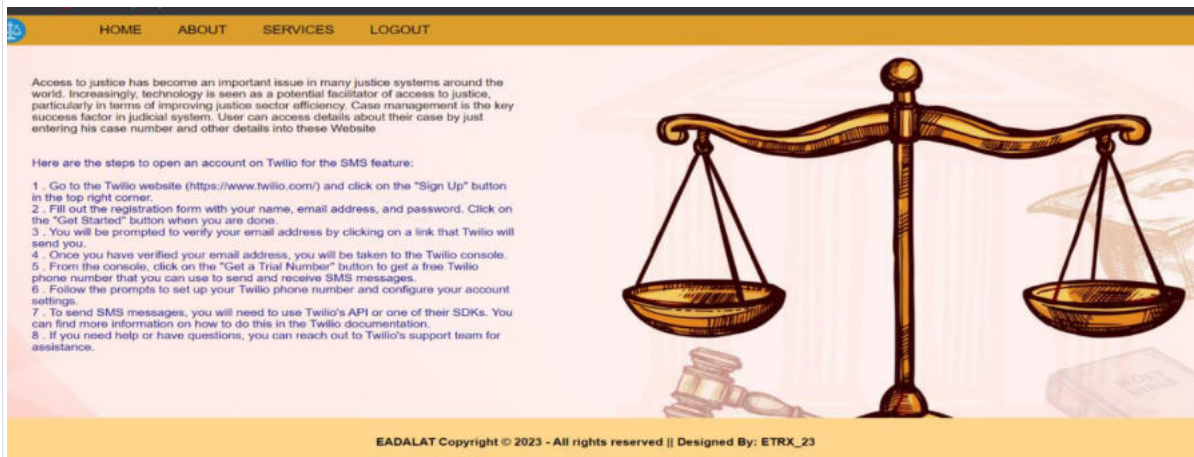


Figure 4: About page

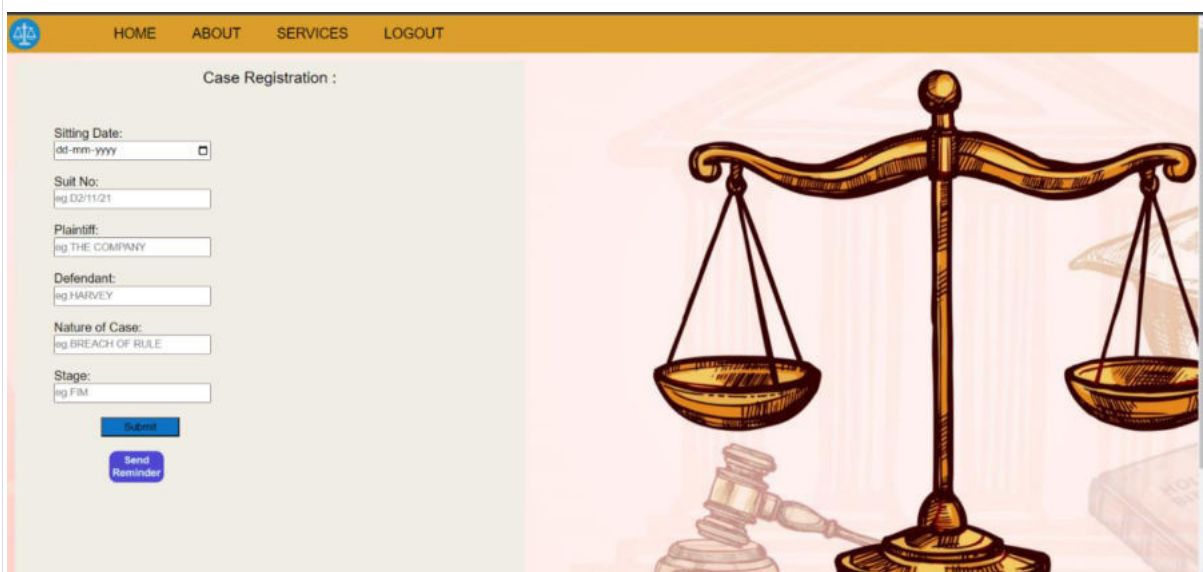


Figure 5: Registration page

6.CONCLUSIONS

A court case management system is a critical tool used to manage court cases efficiently and effectively. The development of such a system requires a systematic approach that involves thorough research, a well-defined problem statement, a clear framework, and an effective design and implementation strategy. Overall, a well-developed court case management system can significantly improve the efficiency and effectiveness of court proceedings, resulting in better outcomes for all parties involved.

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Why You Should Strive To Be an Entrepreneurial Engineer

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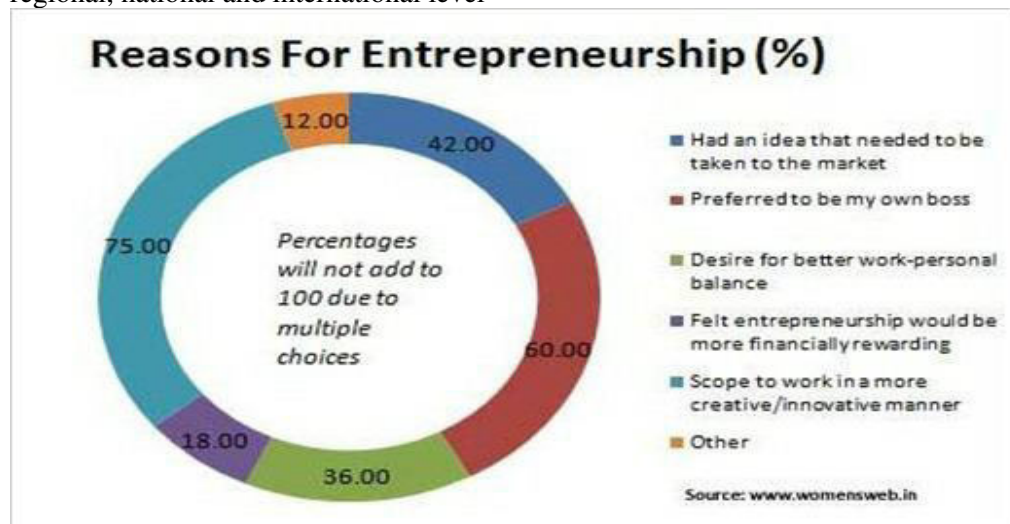
Abstract

The main purpose of this paper is to present a innovation to Entrepreneurship Education in engineering courses. Conducting a research with the keywords Entrepreneurship and Education, and restricting to articles in journals and the engineering field. This paper Emphasizes on entrepreneurship and how it becomes an important aspect to integrate within the engineering curriculum due to it's focus on the development of collaborative skills, technical, analytical skills, flexibility, resiliency, creativity, empathy the ability to recognize and seize opportunities. A few research studies have examined the practices and beliefs in entrepreneurship education. Thus, this paper consolidates concepts from literature to help understand, develop and drive models of the entrepreneurship education in engineering. Based on the Report review, this paper provides a useful core of references that includes the oldest, the newest and the highest citations of Entrepreneurship Education in engineering

Keywords: entrepreneurship education; technology transfer; entrepreneurship business.

I) Introduction

Due to its great importance in the establishment of companies to contribute to economic growth around the world, entrepreneurship is one of the most currently discussed academic subject's. According to Stamboulis and Barlas, entrepreneurship and new businesses have become a valuable potential for development and economic growth in modern society. Since the 1960s, the number of entrepreneurship courses offered by universities has increased expressively; primarily due to increased government emphasis on creating new ventures and alleviating unemployment. The increase in entrepreneurship education opened a number of issues that still surrounds the delivery of entrepreneurship in universities. It has become a necessity for universities to cultivate students' entrepreneurial ability to adapt to the economic transformation and upgrading, as well as to construction and development of entrepreneurial economy. It is also important to improve education system in colleges and universities, strengthening innovation training of entrepreneurial talent. Universities are increasingly including technology entrepreneurship in engineering education to follow expansion of the subject of engineering design education in recent decades . Ruda, Martin, Arnold and Danko suggest that innovative opportunities at regional, national and international level



are able to build basic conditions for achieving economic stability. A proposal to deal with such innovative issues is through the spread of entrepreneurial culture, i.e., in educational projects in production engineering undergraduate courses where the entrepreneurship discipline has been implemented. Advanced countries, such as the United States and Japan, have been strongly promoting entrepreneurship education. In addition, they also provide relevant supporting measures to encourage graduates to start an enterprise as one of the major measures to increase the employability of students .

The involvement of undergraduates in intellectual property protection leads to interesting questions related to how best to align student interests with institutional policies and practices since most are not employed by their universities in the way that faculty and many graduate students are. The number of entrepreneurship programs at universities targeting engineering students has grown substantially in the last decade. However, few research studies have examined the practices and beliefs of instructors in these programs. Understanding these practices and beliefs will help the development of pedagogical and theoretical models to drive entrepreneurship education.

II) Literature Review

The main purpose of this paper is to present a literature review of Entrepreneurship Education in engineering courses through Webibliomining model. As a contribution, this study is expected to provide an initial core of references that enables to reveal ideas or criteria to be used in a building process of a model that can be able to evaluate the influence of entrepreneurship education in engineering courses.

Whether you're part of a high-growth startup or a publicly traded company, it's important to strive to be entrepreneurial in your everyday work. When you understand the bigger picture and couple that with the customer's needs, everyone wins.

Here are four ways you can start performing as an entrepreneurial engineer.

4 WAYS TO START PERFORMING AS AN ENTREPRENEURIAL ENGINEER

- Be an out-of-the-box problem solver.
- Be a team player and excellent collaborator.
- Be flexible.
- Be resilient.

Be an Out-of-the-Box Problem Solver

Entrepreneurial engineers are creative, out-of-the-box problem solvers. And part of being an out-of-the-box problem solver is being a deep thinker — understanding the problem in depth, dedicating time with your team to brainstorm solutions, and thinking creatively about long-term optionality. Often it means reimagining the traditional way of doing something and creating a brand new path. A good problem solver also understands the priorities of the business and is laser-focused on them. Being in tune with business priorities makes you in tune with the overall company vision and enables you to see the bigger picture, not just the tactical work before you.

Be a Team Player and Excellent Collaborator

While entrepreneurial engineers are self-starters by nature and can work independently, that does not mean that they always work by themselves. It takes a true team player and collaborator to solve the challenging business problems before them. An entrepreneurial engineer can effectively work across teams and disciplines, from product and design teams to operations and executive teams. They know how and when to tap into other teams, collaborate, and most importantly, get on the same page about the problems that need to be solved and the process of addressing them.

Be Flexible

An entrepreneurial engineer is also a flexible engineer. They wear different hats and can jump in almost anywhere — they are chameleons. This is an incredibly important skill to hone, especially while at a high-growth startup because more often than not, there is minimal structure and limited headcount. Entrepreneurial engineers are ready to take on anything but can also help teams prioritize where they should be spending their time. At Opendoor, for instance, our engineers spend their time on three things: quick and smart wins, big bets, and tech excellence. Quality is of the utmost importance to entrepreneurial engineers, and they strive to produce and ship extraordinary code.

These engineers also thrive in environments where they can learn from and share their learnings with their teams or the engineering community around them. They pass on valuable information and are energized by learning something new.

Be Resilient

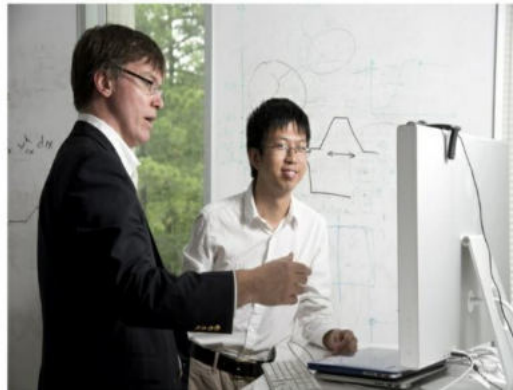
Lastly, entrepreneurial engineers are resilient. It's hard to find a successful entrepreneur who hasn't failed once or twice. Most are successful because they've failed, learned, and got it right the next time. Entrepreneurial engineers are the same way. At some point, things will go wrong; bad code will be deployed; systems will break. But entrepreneurial engineers learn from their mistakes through a blameless postmortem and use it to propel themselves forward to find alternative paths to solutions.

While all these skills develop over time, there's no time like the present to foster a business-minded approach to your work. Take on new challenges, learn from your mistakes, and ask for and incorporate feedback from others.

III) Importance of Entrepreneurship in Engineering

The importance of entrepreneurship in the engineering field

STUDY INTERNATIONAL STAFF | 27 FEB 2019



Concepts and definitions: In this section, theoretical and conceptual foundations about Entrepreneurship are described. Also, some previous studies that used the entrepreneurship education as a differential in economic development are cited.

3.1 Entrepreneurship

Karimi, Chizari, Biemans and Mulder define Entrepreneurship like the behavior of a person who displays the traits (need for achievement, need for power, risk-taking tendency and competitiveness) necessary to obtain or attain something in life, to research and become self-sufficient. Gomezelj and Kusće provide another definition that Entrepreneurship is a global process and a phenomenon of recent decades, and it seems it will be even more prominent in the coming years. Cristian-Aurelian and Cristina consider Entrepreneurship as an innovative process through which entrepreneurs identify business opportunities and exploit them by allocating resources, and creating value. Entrepreneurship is relevant for all sectors, technological or traditional, for small and large firms and for different ownership structures. Entrepreneurship contributes to job creation and economic growth and competitiveness, unlocks personal potential and provides a focal point for many local communities. Furthermore, it has been increasingly recognized as a major driver of economic development. In the recent decades, the role of new firms has been recognized as one of the key elements for economic and social development. While governments dedicated their efforts to design policies and strategies for the support of the entrepreneurial activity, the academy has focused its interest, among other topics, on the analysis of conditioning factors to entrepreneurship. Rezai, Mohamed and Shamsudin introduce Agri-entrepreneurship as a means of coping with the changes in the environment and thus contributing to the survival and success of farming businesses in the present, as well as in the future. Entrepreneurship is a powerful tool for economic growth as it facilitates the creation of new companies and jobs, develops new markets and demonstrates new skills and capabilities. Investing in the promotion of entrepreneurship and education for engineers is one of the best return investments that countries around the world can make.

3.1.1 Entrepreneurship education

Hamilton, Crawford and Suuberg claim that, despite the existence of entrepreneurship for a long time in organized societies, the idea of educating entrepreneurs, as such, is a new concept; and that eighty per cent of students surveyed at the end of an entrepreneurship course said they plan to start their own business at some point in his career. Entrepreneurship education tries to prepare people, particularly youth, to be responsible, take risks, manage the business and learn from the outcomes by immersing them in real life learning experiences. Entrepreneurship presents a good career opportunity for

engineering students, because of its increasingly importance in developed countries as well as in developing countries. A technology-based entrepreneurship course can be an educationally rewarding experience for both students and faculty. Providing students with a simulated, but realistic, entrepreneurship experience allows them to gain a greater understanding of what it truly means to be an entrepreneur. This ‘real-world’ experience helps students decide whether or not a career as a high technology entrepreneur appeals to them. Entrepreneurship educators have an opportunity to learn from the entrepreneurship programs at both small colleges and large universities that have already emerged and with experienced growth, challenges, failures, and ultimate successes. In addition, implementing a strategy that includes faculty partnerships, designated advisory boards, and refined bootstrapping skills helps to ensure that robust human and capital resources are available for program delivery, growth, and sustainability. The new imperatives of the knowledge-based society require engineering students to equip themselves with a broad range of skills, among which entrepreneurship plays a critical role. The purpose of entrepreneurship education should not only be the foundation sensitization but also in general entrepreneurial competences within the scope of an interdisciplinary intersection. This approach to teaching entrepreneurial foundation in effect encourages of new business ideas by the students. Higher education plays an important role in laying the foundation for competence development for sustainable entrepreneurship. Whereas entrepreneurship education is traditionally located in the business schools, education for sustainable development often has its origin in the environment education faculty. There is little work from an educational point of view which explores and/or crosses the boundaries of these two disciplines, let alone work in which an effort is made to integrate these perspectives. Entrepreneurship Education consists in teaching students the process, knowledge and skills required for starting a new business. The skills that the students need to develop during the course are very different to those acquired in other courses. For example, while most IT courses focus on developing inquiry/research and problem-solving skills, the Entrepreneurship course places a strong emphasis on writing and speaking skills and aims to improve the broader business, communication, and management skills that graduates need in order to succeed in starting a business enterprise. According to Yang and Zhao, if universities actively cultivate the entrepreneurial ability in their students, they will improve the system of entrepreneurship education management and entrepreneurship education system and create entrepreneurship training base and so on. Therefore, in the process of entrepreneurship education, universities should pay more attention to the core and important business knowledge, while the simple and easy knowledge can be learned by students themselves. The entrepreneurial university thus responds by generating technology transfer, knowledge-based start-ups and human capital. However, in the entrepreneurial society, the focus should be broadened by enhancing entrepreneurship capital and facilitating behavior to prosper. Due to professional requirements, many of the institutes of science and engineering require some business education for membership. Enterprise education is particularly relevant and important in that it has a role in promoting enterprise within the SET (economy Science, Engineering and Technology) industries and it is this ‘enterprise’ ability and orientation that is acknowledged by government, industry and research as a driver in terms of maintaining and developing competitiveness. Scholars widely acknowledge that university research is critical to innovation and entrepreneurship. Much of the literature on university research, however, evokes a linear model from “‘science to products’” and focuses, therefore, upon a limited set of indicators such as patents and licenses. Such perspective risks missing the myriad ways in which science and commerce are intertwined and the myriad ways in which these activities might be assessed. Many engineering programs emphasize the importance of technological innovation by offering entrepreneurship electives and programs. Integration of entrepreneurship into the required engineering curriculum has predominantly focused on senior capstone design courses. Engineering education has an indomitable role in entrepreneurship development. Since entrepreneurship is a dynamic process of vision, change and creation, the education provides energy and passion towards creation and implementation of new ideas on a continual basis. Engineering institutions have mostly played a passive role, resulting in many myths and fears among students on entrepreneurship. While entrepreneurship has emerged as an important mechanism for the generation of social returns in terms of economic growth and job creation, entrepreneurship education is still something new in Europe and the debate about the need and the way of introduction of specific entrepreneurship courses in higher education is ongoing.

3.1.2 Entrepreneurship business

Li defines entrepreneurship as a particular condition of people finding business motivation and then integrates resources related to entrepreneurship, thus forming a valuable capacity that is the ability of entrepreneurs in performing business processes. According to Novotny, in East Europe, the relatively weak links between universities and the industry derives mainly from the socialist past of the countries that still has repercussions on the environment, governance and culture of institutions, as well as on faculties attitude to entrepreneurship. A prototype of academic entrepreneurship, Stanford University, developed its technology transfer skills in parallel with the rise of Silicon Valley. Despite these early archetypes, university technology transfer in the U.S. began to receive increased attention from scholars only in the aftermath of the Bayh-Dole Act (1980). Entrepreneurship can happen in any business context, all the way from large corporations (that can afford to take on large opportunities, yet often encounter difficulties executing new ideas), to startup companies (are the best way to pursue point solutions that extend an existing context or pursue ideas that are more radical and yet require fewer resources). Definitions of enterprise education describe something around innovation or the creation of new ventures and some encouragement for individuals to take responsibility for their own learning, careers and life. It may focus on entrepreneurship or on intrapreneurship or social entrepreneurship. Currently, the new role of higher education has tended to concentrate on describing infrastructural reform and institutional innovation that promote a culture of entrepreneurship within the academic institutions—Education entrepreneurship. Entrepreneurship skills and attitudes can be trained through business simulations experiences. Entrepreneurial-minded individuals around the world play an extremely vital role in society performance businesses that contribute to the growth of the national economy, create new jobs, and when producing new products and services they improve the quality of life. Foster and Lin claim that the concept of entrepreneurship is often allied with the concept of innovation. Such innovation does not always have to be technical or even result in a tradeable product. Innovation can be social. Changes for example in an education system or a national health service can be considered to be social innovations, because they have a profound impact on society and economy as a whole.

Methodology

To develop an exploratory study about entrepreneurship education in engineering, a bibliometric tool was chosen to trace the knowledge. Guedes and Borschiver define bibliometrics as a statistical tool that allows mapping and generates different indicators of treatment and management of information and knowledge, necessary for the planning, evaluation and management of science and technology of a particular community or scientific parents.

Others related terms as: Informetric—more recent term that used bibliometric concepts in a nonacademic context; Scientometrics, used for the study of all aspects of the literature of science and technology; webmetric, as an emergent area in information science that consists in the application of informetric methods in the World Wide Web. Proposed by Costa , the Webibliomining Model is a bibliometric model that integrates concepts of different areas, and it was applied in a bibliographical study of adoption of MCDA methods in the management and planning of the petroleum and gas industry and in mapping a core starting of references in Data Mining from journals published in Brazil.

Webibliomining model

Webibliomining model has the purpose of providing an initial set of references for a literature review. It integrates concepts of Bibliometrics, Webmetrics, Informetrics and Bibliomining and consists of the following six steps: Define survey sample; Research in the sample, with the keywords; Identify journals with the largest number of published articles on the subject; Identify authors with the highest number of publications; Identify “the largest production cycles” (Chronology of production); Selection of references for the composition of starting core (SC) for literature review. SC must include: – the most relevant references; – the first authors to write about the subject; – the latter authors to write on the subject; – the most relevant references in each “major production cycle.”

Webibliomining model application

In this section, the Webibliomining model is applied at the literature review from Entrepreneurship Education in engineering

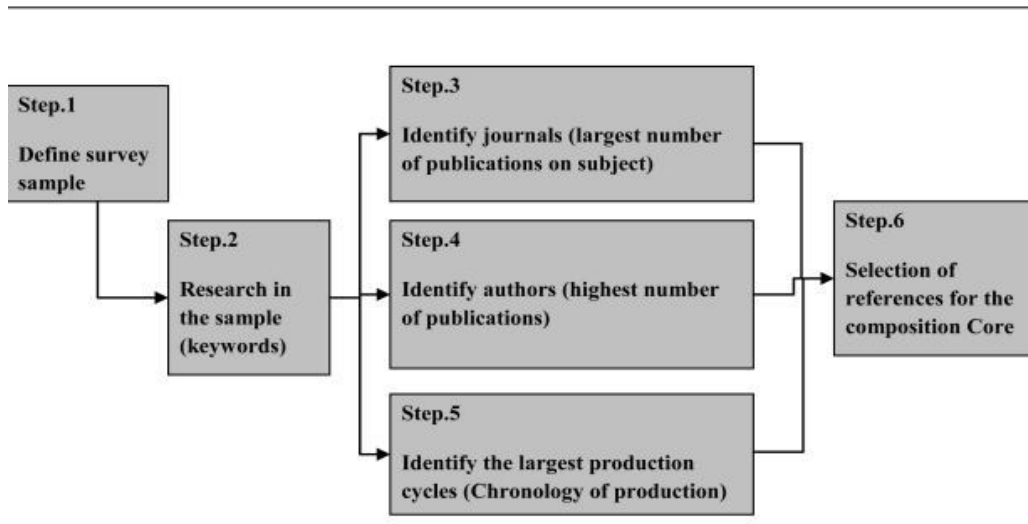


Fig. 1. Webibliomining Model

4.1 Definition of the survey sample; and Research in the sample, with the keywords

Sample corresponds to articles indexed in Scopus library database. The choice of this database was due to accessibility and because the admission criteria of the documents in the collection are representative and that provides the most valuable information to researchers and practitioners. Contemplating all the years that were available in the database, the research was undertaken until October (2014). First, the term “Entrepreneurship” was defined like keyword for research; as a result 16.835 documents were obtained. In complement of initial research, seeking to filter the documents, a new research was conducted with a combination of terms “Entrepreneurship” and “Education” and with restriction to articles in journals and engineering area, resulting in 74 articles. A list was created with 205 Keywords and from this a cloud of words was generated, as shown in Fig. 2. The highest occurrences were: Entrepreneurship (31), Entrepreneurship Education (11), Technology Transfer (6), Education (6), Higher Education (5) e Academic Entrepreneurship (4). Figure 3 shows a tree formed from the abstracts of the articles found during the mapping of the literature review. As recommended by Gambette and Ve’ronis [42], all abstract words were placed in lower case. A total of 12,517 words the terms Universities and Courses University were replaced by University and course (25) respectively. A custom stoplist with the words: (study, purpose, research, paper, should, support, based, findings, related, approach, start, results) were removed because they were not significant for the analysis of the context. A visual inspection indicates that two major segments can be identified and sectioned in Fig. 3



Figure. 2.

Keywords cloud from researched articles.

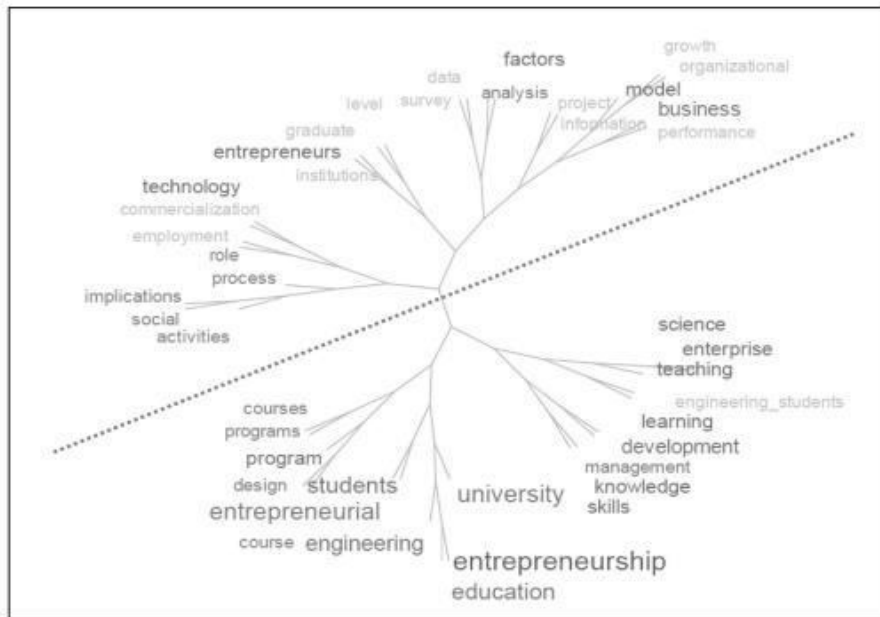


Figure. 3. Tree built from abstracts of the researched articles.

by a dotted line: a business area that encompasses organizational issues to implications and social aspects; and an academic area (the larger one), which appears to cover two branches: the structuring of courses/programs and another focused on the development of science and on learning theme.

4.2 Identification of the journals with the largest number of published articles on the subject

The 74 articles selected from research are distributed in 38 different journals that were ranked in Table 1 by SJR index. SCImago Journal Rank (SJR) is weighted by the prestige of a journal. Subject field, quality and reputation of the journal have a direct effect on the value of a citation. SJR also normalizes for differences in citation behavior between subject fields. For details about SJR, see [44]. Source Normalized Impact per Paper (SNIP) measures contextual citation impact by weighting citations based on the total number of citations in a subject field.

4.3 Identification of the authors

There were no observed authors that stand out compared to the others by the number of articles published on the subject. Aside from Audretsch, D.B, with three articles; Buang, N.A.; Danko, B.; and Galloway, L. with two articles, the other authors had only one work related. From the Gephi tool, where each node represents one author (176 nodes) and each edge represents at least one article published between authors (173 edges), some statistics about authors network graph (Fig. 4) were obtained: Average degree— 1.97; Density—0.01; Connected components—69. For grouping the authors, as a criteria: Country— Institute of affiliation was adopted; Fig. 5 summarizes the countries that have at least 5% of all authors and which together account for over 70% of the total, i.e.: United States (22.73%); Spain (13.05%); United Kingdom (7.95%); Malaysia (7.39%); Netherlands (6.25%); Iran (5.68%); Romania (5.68%), and China (5.11%), as shown below:

Table 1. List of Journals ranked by SJR index

Journals	QTD	ISSN	SJR	SNIP
Journal of Engineering Education	1	1069-4730	6,515	13,976
Research Policy	4	0048-7333	2,635	2,883
Technovation	2	0166-4972	2,027	2,139
IEEE Signal Processing Magazine	1	1053-5888	1,831	4,906
Journal of Cleaner Production	1	0959-6526	1,699	2,516
Journal of Technology Transfer	6	0892-9912	1,558	1,509
British Journal of Educational Technology	1	0007-1013	1,523	1,709
Annals of Biomedical Engineering	1	0090-6964	1,302	1,414
International Journal of Engineering Education	7	0949-149X	1,280	1,096
Engineering Management International*/Journal of Engineering and Technology Management	1	0923-4748	1,273	1,701
IEEE Transactions on Education	1	0018-9359	1,205	2,500
European Journal of Engineering Education	2	0304-3797	1,040	1,206
Advances in Engineering Education	2	1941-1766	1,029	3,010
Maritime Policy and Management	1	0308-8839	1,009	1,497
Industrial Management and Data Systems	3	0263-5577	0,989	1,381
IEEE Antennas and Propagation Magazine	1	1045-9243	0,757	1,249
Journal of Manufacturing Technology Management	1	1741-038X	0,656	1,196
International Journal of Technology Management	1	0267-5730	0,324	0,510
Kybernetes	1	0368-492X	0,298	0,670
International Journal of Mechanical Engineering Education	1	0306-4190	0,274	0,232
Mathematical Problems in Engineering	1	1563-5147	0,267	0,746
Human Factors and Ergonomics In Manufacturing	1	1090-8471	0,256	0,798
Acta Polytechnica Hungarica	2	1785-8860	0,245	0,828
Research Journal of Applied Sciences	1	1815-932X	0,237	0,259
EMJ—Engineering Management Journal	1	1042-9247	0,232	0,369
International Journal of Continuing Engineering Education and Life-Long Learning	6	1560-4624	0,220	0,529
Business: Theory and Practice	2	1648-0627	0,211	0,423
Dyna (Spain)	1	0012-7361	0,207	0,208
Metalurgia International	2	1582-2214	0,206	0,327
Journal of Electrical and Electronics Engineering	1	1844-6035	0,204	0,229
World Transactions on Engineering and Technology Education	3	1446-2257	0,189	0,096
European Journal of Scientific Research	5	1450-202X	0,150	0,699
International Journal of Construction Management	1	1562-3599	0,136	0,131
Jurnal Teknologi (Sciences and Engineering)	1	0127-9696	0,132	0,137
Periodica Polytechnica, Social and Management Sciences	1	1416-3837	0,131	0,817
World Academy of Science, Engineering and Technology	2	2010-376X	0,125	0,252
Technics Technologies Education Management	2	1840-1503	0,123	0,320
Journal of Information Systems Education	1	1055-3096	0,105	0,044

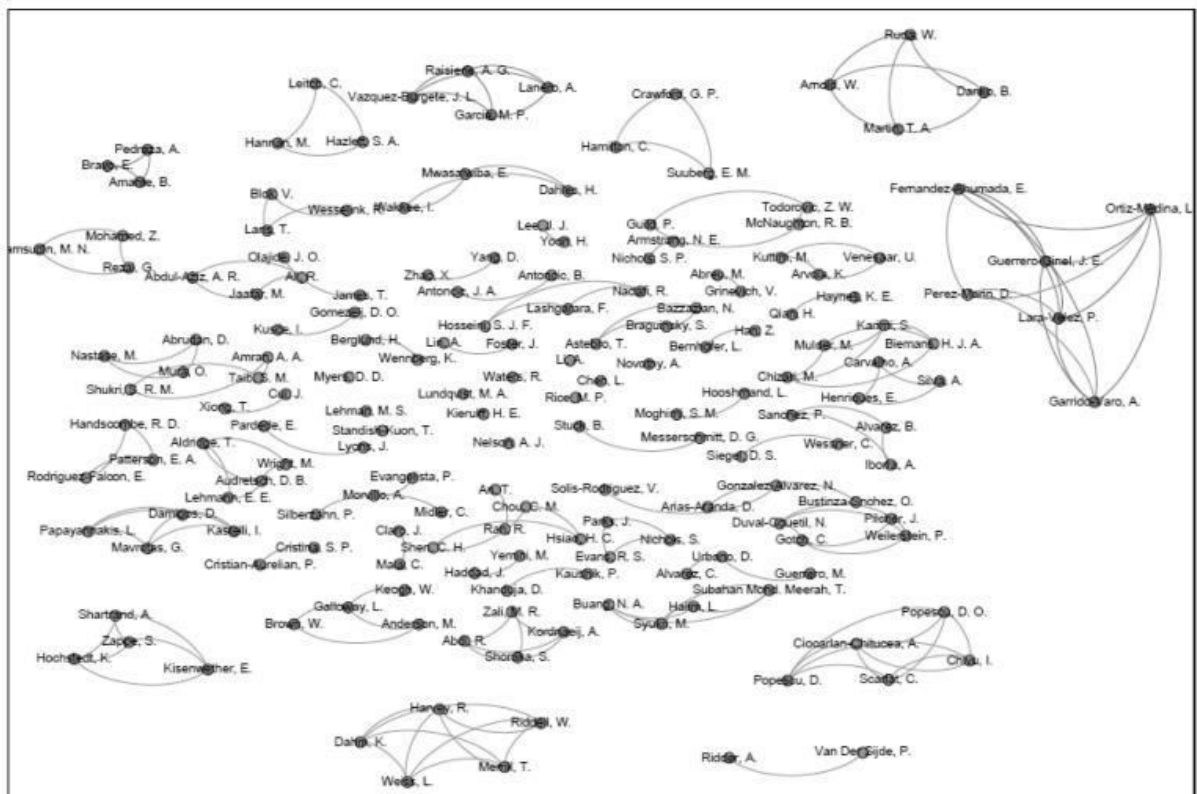


Figure. 4. Relations among researchers—Network Graph.

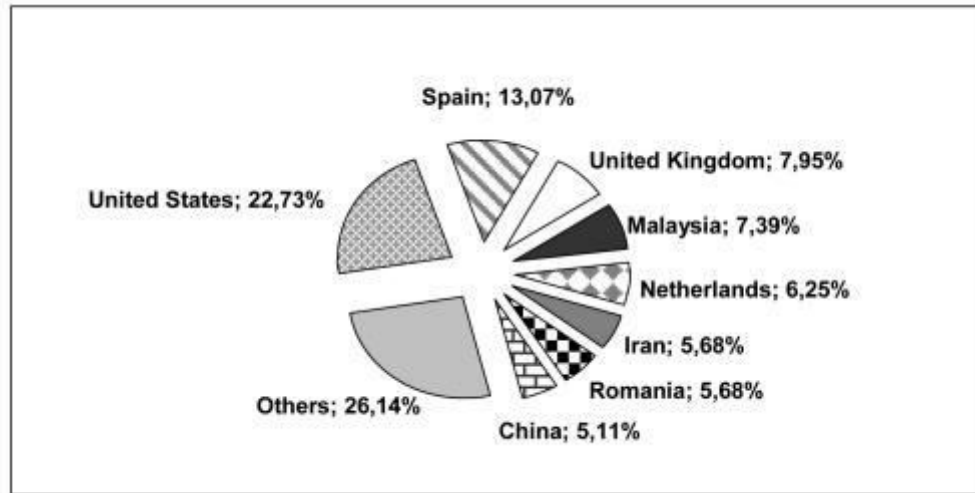


Figure. 5. Distribution of authors by Country Affiliation.

4.4 Identifying the largest production cycles (Chronology of production)

In order to enable the observation of the evolution of scientific production in Entrepreneurship, quantitative data on the distribution records of published articles is consolidated in Fig. 6, grouped by year of publication. The scatter plot (Fig. 7) shows the number of citations of published papers, seeking to indicate, in terms of citations, the most relevant publications; moreover, it is possible to identify that the works with the largest number of citations were published in 2002, 2009, 2011 and 2012. 5. Selection of references for the composition of starting core (Sc) Based on Webibliomining model, the following rules were adapted to the present work. 5.1 Selecting 10% of older articles from different authors The purpose of this rule is to identify different lines of thinking in the initial discussions; uncovering the requirement: identification of the first authors to write about the subject. Applying this rule, the following results were obtained: [22, 40, 45–49].

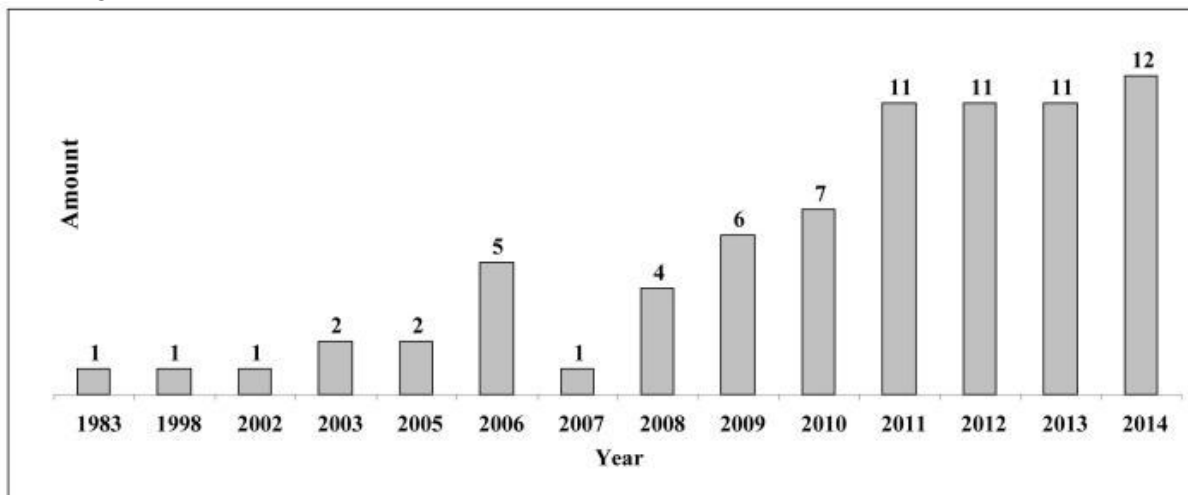


Fig. 6. Distribution of papers by year.

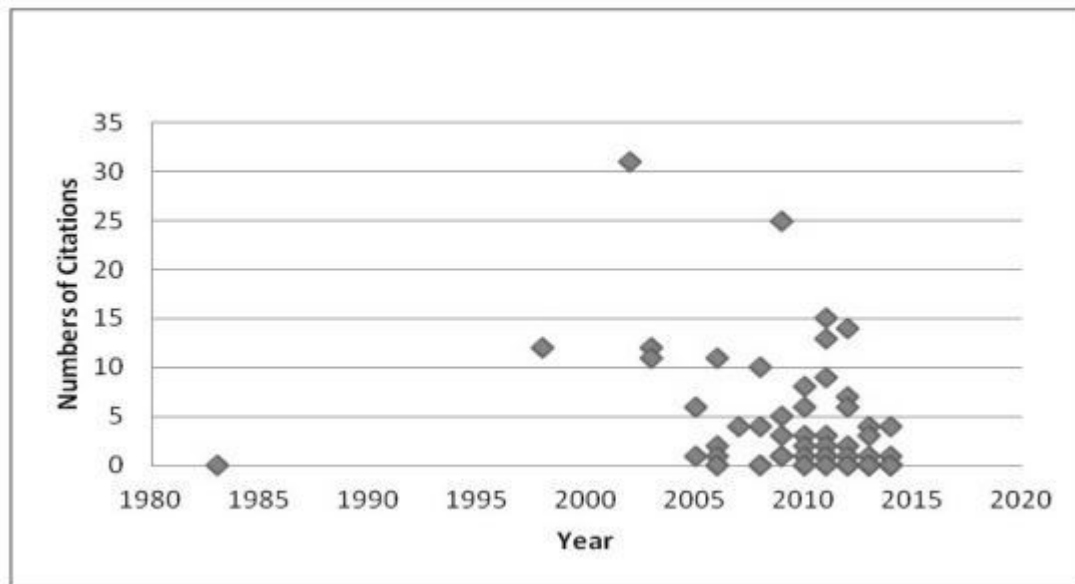


Fig. 7. Scatter plot—numbers of citations by year.

Selecting 15% of newer articles from different authors

The purpose of this rule is to cover different trends in the most recent discussions; uncovering the requirement: identification of the latter authors to write on the subject. The percentage value assigned to the newer works tries to ensure a greater emphasis on them. As a result of the application of this rule, the following works were obtained: [1, 3, 7, 18, 21, 26, 28, 34, 50–52].

5.3 Selecting 15% of articles with highest citations The purpose of this rule is to select articles with highest number of citations. Applying this rule, the following results were obtained: [33, 36, 40, 45–46, 49, 53–57].

5.4 Merging the rules The Starting Core with 25 articles is obtained by merging the three previous rules: [1, 3, 7, 18, 21–22, 26, 28, 33–34, 36, 40, 45–57]

Conclusion

Entrepreneurship plays an increasingly important role in knowledge-based economic development. Previous works on the topic consider that discovering entrepreneurial opportunities constitutes an important entrepreneurial skill, a source of competitive advantage and an important content area in entrepreneurship education in engineering. Based on the reviewed literature with a Webibliomining model, this study provides an initial and useful core of references that includes old and new articles, and the ones with the highest number of citations on Entrepreneurship Education in engineering. The boundaries established in Webibliomining model (percentage) are flexible and can be adapted in accordance with the sample. The definition of the starting core is presented as a fast and useful tool, for future works, to reveal ideas or criteria to be used in a building process of a model that can be able to evaluate the influence of entrepreneurship education in engineering courses.

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Smart Attendance Capturing System

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ABSTRACT

Nowadays Educational institutions are concerned about regularity of student attendance. Mainly there are two conventional methods of marking attendance which are calling out the roll call or by taking student sign on paper. They both were more time consuming and difficult. Hence, there is a requirement of computer-based student attendance management system which will assist the faculty for maintaining attendance record automatically. In this project we have implemented the automated attendance system using python. We have projected our ideas to implement “Automated Attendance System Based on Facial Recognition”. The application includes face identification, which saves time and eliminates chances of proxy attendance because of the face authorization. The system deployed Haar cascade classifier to find the positive and negative of the face and LBPH (Local binary pattern histogram) algorithm for face recognition by using python programming and OpenCV library. Here we use the tkinter GUI interface for user interface purpose. Firstly, our app asks to fill the details of the student and take image of the particular student. It takes 60 images as sample and store them in folder Training Image.

Keyword : - Smart attendance system, using face recognition, open CV, Python, capturing face in LBPH, detecting face and marking as present .

1. INTRODUCTION

One of the foremost reminiscences everyone has about college is the morning roll call that the lecturers would in person call upon our names, and we tend to reply in affirmation to prove our attendance. Attendance being a very important side of administration might usually become a time constraint, repetitive job, loaning itself to inaccuracies. Organizations need to keep a track of individuals inside the organization like staff and students to maximize their performance. Managing student’s attendance at lecture periods has become a tough challenge. The ability to work out the attendance proportion becomes a significant task as manual computation produces errors, and wastes a great deal of our time. The existing techniques and methodologies to detect and recognize faces fail to overcome primal issues such as scaling, pose, illumination, rotation and occlusions.

1.1 PROBLEM STATEMENT

Every year number of students take admissions into school and colleges. Currently the attendance system for the students is done manually. Hence requirement of a robust and low-cost system is needed. Addressing this problem will ensure the proper attendance and will help teachers in taking attendance.

2. LITERATURE SURVEY

1]Rizk Adiningrat's book "Attendance System with Face Recognition" provides a comprehensive overview of face recognition-based attendance systems. The book covers various topics related to face recognition technology, such as image processing, machine learning algorithms, and database management.

2]Atta-ur-Rahman and Gomathi Krishnasamy's paper "Smart Attendance Management System" presents a face recognition-based attendance system that uses deep learning algorithms for increased accuracy. The system is designed to be scalable and can handle large amounts of data.

3]J. Joseph and K. Zacharia's paper "Automated Jeremia Attendance Management System using Face Recognition" proposes an attendance system that uses face recognition technology to automate the attendance process. The system is designed to be used in educational institutions.

4]R. Tharanga, Samarakoon, Karunaratne, Liyanage, and D. Parer's paper "Smart Attendance using Real Time Face Recognition (Smart-FR)" proposes an attendance system that uses real-time face recognition technology. The system is designed to be used in educational institutions and workplaces.

5]F. Ibikunle, Agbetuvi F., and Ukpere G.'s paper "Face Recognition Using Line Edge Mapping Approach" proposes a face recognition system that uses line edge mapping techniques to extract facial features. The system is designed to be used in security applications.

3. PROPOSED SYSTEM

- Haar Cascade Classifier
- Local Binary Patterns Histogram

These two methodologies come under OpenCV. OpenCV comes with a trainer and as well as a detector. So, if you want to train your classifier for any object then you can use this classifier called Haar Cascade Classifier.

3.1 Haar Cascade Classifier:

Detecting objects with the help of Haar cascade classifiers is an effective method proposed by Paul Viola and Michael Jones in their paper, "Rapid Object Detection using a Boosted Cascade of Simple Features" in 2001. Object Detection comes under machine learning based approach where a cascade function is trained from lots of positive and negative images.

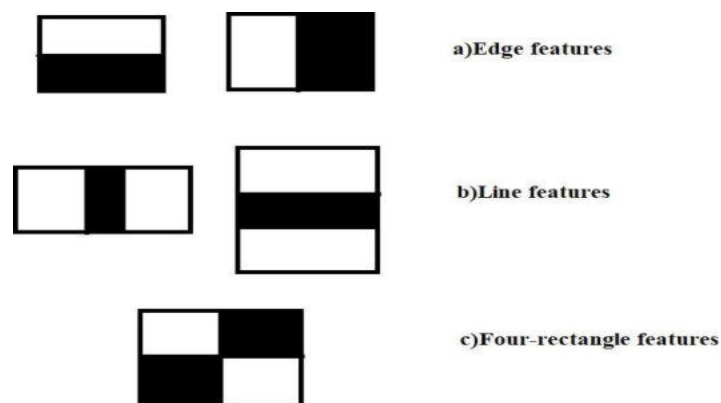
Now what are these positive and negative images?

A classifier (namely cascade of boosted classifiers working with haar like features) which is trained with many samples of a specific object (i.e., a face or a car), called positive example. So, whatever you want to detect if you train your classifier with those kinds of values. For example, if you want to detect face then you need to train your classifier with number of images which contain faces. So, these are called positive images which contain the object which you want to detect.

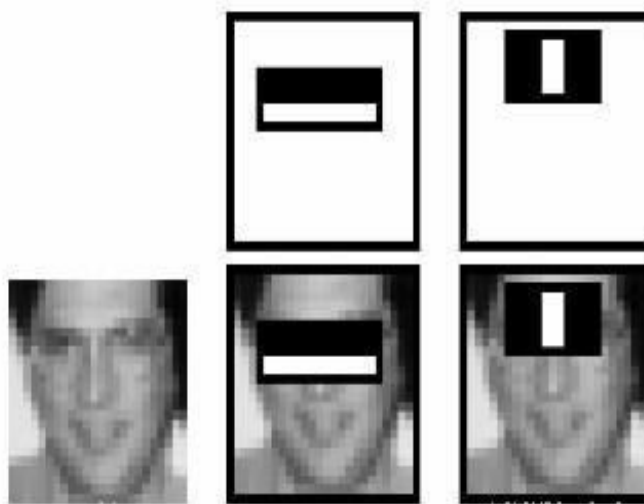
Similarly, we want to train the classifier with negative images that means the images which doesn't contain object that you want to detect. For example, if we want to detect the face then the image which doesn't contain the face is called negative image. In the same way if the image contains face or number of faces then it is called positive images.

After a classifier is trained it can be applied to the region of interest in an input image and classifier outputs 1 if the region is likely to show the object or 0 otherwise.

Here we will work with face detection. Initially, in order to train the classifier, the cascade function needs a lot of positive images (images which contains faces) and negative images (images without faces). Then we need to extract features from it. For this, we use Haar features shown in the below image are used. They are just like our convolutional kernel. Each feature is claimed to be one value which is obtained by subtracting the sum of pixels under the white rectangle from the sum of pixels under the black rectangle



Now to calculate lots of features, all possible sizes and locations of each kernel are used. (Just imagine how much computation it needs? Even a 24x24 window results over 160000 features). In order to calculate each feature, we need to find the sum of the pixels under white and black rectangles. To get over from it, they introduced the integral image. Calculation depends upon the size of the image if How large your image, it reduces the calculations for a given pixel to an operation involving just four pixels. Nice, isn't it? It makes things super-fast. But among all these features most of them are irrelevant that we calculated. For example, consider the image below. The top row shows two good features. In the first feature it focuses on the region of the eyes which is commonly darker than the region of the nose and cheeks. When comes to the second feature it focuses on the property that the eyes are often darker than the bridge of the nose. But if it is applied to cheeks or any other place is irrelevant that you can observe in the image. By using Adaboost we select the best features out of 160000+ features.



the features with minimum error rate because they are the features that most accurately classify the face and non-face images. This process is not as simple as this .Each and every image a equal weight in the begining .After each classification,there will be a change in weight in which weights of misclassified image are increased. Then the same process is done again.new error rate and new weights are calculate. The process will be continued until the required accuracy or error rate is achieved or the required in the same way we have apply each and

The finalclassifier is obtained by weighted sum of these week classifier.It is then called weak clasifier because it alone can't classify the image ,but together with other form a strong classifier

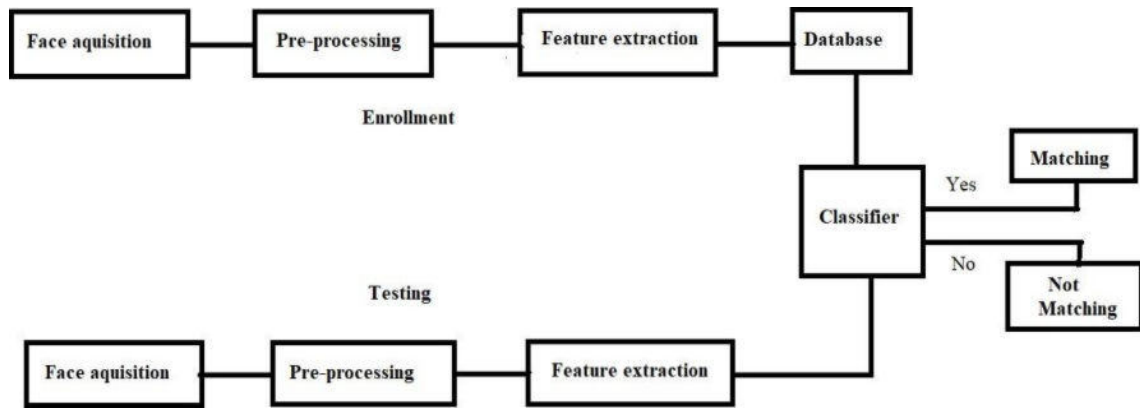
3.2 Local binary pattern:

Local Binary Patterns Histogram algorithm (LBPH) is for face recognition. It is based on local binary operator, and it is one of the best performing textures descriptor. The need for facial recognition systems increasing day by day as per today's busy schedule. They are being used in entrance control, surveillance systems, smartphone unlocking etc. In this article, we will use LBPH to extract features from an input test image and match them with the faces in system's database.

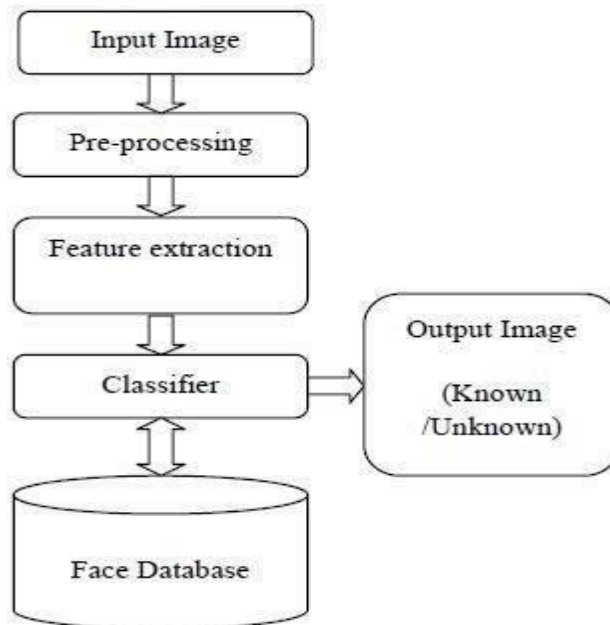
Local Binary Patterns Histogram algorithm was proposed in 2006. It is based on local binary operator. It is widely used in facial recognition due to its computational simplicity and discriminating power. The steps involved to achieve this are:

- 1 creating datasets
- 2 face acquisition
- 3 feature extraction
- 4 classification

3.2.1 Steps involved in LBPH:



3.1 BLOCK DIAGRAM



3.2 FLOWCHART

A flowchart is a visual representation of the sequence of steps and decisions needed to perform a process. Each step in the sequence is noted within a diagram shape. Steps are linked by connecting lines and directional arrows. This allows anyone to view the flowchart and logically follow the process from beginning to end.

A flowchart is a powerful business tool. With proper design and construction, it communicates the steps in a process very effectively and efficiently.



4. CONCLUSIONS

Thus, the aim of our project is to capture the images of the students, convert it into frames, relate it with the database to ensure their presence or absence, mark attendance to the particular student to maintain the record. The Automated face Recognition Attendance System helps in increasing the accuracy and speed ultimately achieve the high-precision realtime attendance to meet the need for automatic classroom evaluation. This system is designed to minimize the human effort for taking the attendance manually that take place in every college. As the attendance marking process is done without any human interference, which is the main scope in the system

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Automatic Car Washer

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Abstract

The automatic car wash system is very commonly used in metro cities and towns in India. This system is used for all types of cars i.e., sedans, hatchbacks, SUVs, etc. The production of cars in India is increasing day by day due to the high demand by people in India. The number of cars on Indian roads has increased significantly so high-end technology must be developed which must be efficient, must use less water, and should be eco-friendly. The appearance of the car is important for people nowadays. So, this project would solve this problem very efficiently. Various steps involved in automatic car washing are rinsing, shampooing, washing, drying, and then waxing. The design of the pipe nozzle and water regulation system used in automatic car washers is discussed in this report. This system reduces the excessive use of water and reduces labor work. We hope this report will be useful to understand the basics of automatic car wash systems.

Keywords: Car wash, PLC, Pipe, Nozzle

INTRODUCTION

Nobody likes a dirty car, and while you may prefer washing your car with a particular method, knowing the strengths and weaknesses of different car wash processes is a must. The automatic car wash method has been around for many years. But determining if it is the best method to wash your car can be tricky. When we look at the world in the 21st century, there is no single industry left that does not use machines and their automated functions. The car washing industry is no different. An Automatic Car Washer is a machine designed to automatically wash cars. The system typically consists of a control unit, motors, sensors, a user interface, a water supply, wash components, and a drain. The control unit manages the washing process, the motors drive the washing components, the sensors detect the position of the car and obstacles, the user interface allows the user to control the process, the water supply supplies water to the wash components, the wash components clean the car, and the drain removes the used water. Automatic car washers offer a convenient, efficient, and consistent way to wash cars, reducing the time and effort required compared to washing by hand. They can also conserve water, reduce the risk of injury, and generate revenue by providing a paid car washing service.

TYPES OF AUTOMATIC CAR WASHERS

1. Touchless Car Washers:

Touchless car washers are machines that use high-pressure water jets and detergents to clean cars without physical contact. The water jets spray water at high pressure to remove dirt and grime. The detergents are usually pre-applied to the car's surface and allowed to soak for a few minutes before the water jets are activated.

2. Brush Car Washers:

Brush car washers use soft brushes to clean the car's surface. The brushes are mounted on a rotating arm that moves around the car, cleaning the car's surface. The brushes are usually made of soft materials to prevent scratches and damages to the car's surface.

3. Combination Car Washers:

Combination car washers use both touchless and brush technologies to clean cars. The machines use high-pressure water jets to remove dirt and grime and soft brushes to clean the car's surface.

FUNCTIONALITIES OF AUTOMATIC CAR WASHERS

1. **High-pressure water jets:** The high-pressure water jets are designed to remove dirt, grime, and other contaminants from the car's surface.

2. **Detergents:** The detergents are applied to the car's surface to help remove stubborn dirt and grime.
3. **Soft Brushes:** The soft brushes are designed to clean the car's surface gently and prevent scratches or damages.
4. **Drying System:** The drying system is designed to remove excess water from the car's surface and prevent water spots.

PROPOSED METHODOLOGY

1. Prewash
2. Soap wash
3. Cleaning with brushes
4. Rinsing with clean water
5. Drying with air

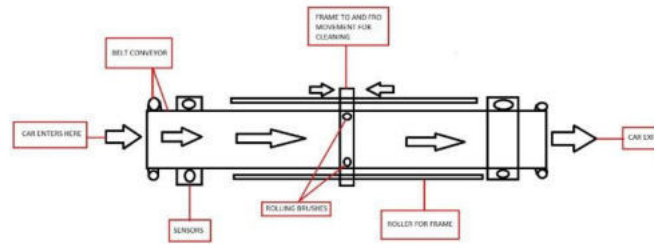
The automatic car washing system consists of a passage through which the car will enter the washing area, automatic car washing consists of five stages of cleaning the car when the car comes near the conveyor belt the first stage begins with the adjustment of the angular nozzle with the help of the sensor for the downside wash of the car while entering on the conveyor belt the first stage gets completed with cleaning the downside of the car. When the car gets on the conveyor belt the sensor detects the car and the conveyor belt starts moving in the forward direction, as soon as the sensor detects the car conveyor belt stops for the second stage of pre-wash.

In the second stage, the prewash of the exterior body of the car takes place after the pre-wash. All the water used in the pre-wash is drained into a water storage tank which is fitted below the prototype model for the reuse of the water for gardening. In the second stage, the soap water solution is also spread on the exterior of the car.

Then the third stage cleaning of the car is done with the help of the brushes. after the cleaning stage is completed, the conveyor belt will move in the forward direction towards the rinsing stage where the clean water will be sprayed on the car to remove all the soap water solution. and in the last stage, the drying of the car is done, and again the conveyor moves and the car will exit from there.

COMPONENTS

- 1) 12v DC Motor with attached gear
- 2) Pump Motor 12v
- 3) 2–3-liter water tank
- 4) Conveyor Belt
- 5) Arduino UNO & NANO
- 6) Conveyor Base
- 7) Ultrasonic Sensor & IR Sensor
- 8) Micro-controller
- 9) LCD Display (16*2)
- 10) Node MCU
- 11) The frame (Acrylic Material)
- 12) Brush
- 13) Solenoid Valve
- 14) Brass Nozzle
- 15) Blower
- 16) 12v 5A Power Supply Adapter
- 17) L298 Motor Driver
- 18) 12v Diaphragm Pump



WORKING

The main steps involved in the car wash system consist of movable platforms (conveyor belts), ultrasonic sensors, and adjustable revolving brushes. In the initial step, object movement is achieved using a suitable sensor system. Subsequently, data acquired from the sensor is processed and the car is moved on the conveyor belt after 60 seconds time intervals when the car reaches the sensor in the platform (for convenience). Once the car is moved by the conveyor belt to the washing zone foam spray, water sprays from the nozzle fixed in the frame and the adjustable moving revolving brushes start to clean the car and the drying is initiated finally. The washing process is initiated which includes foam spray, water spray, and drying. In this paper, the simulation model of the proposed is followed by the development of a small-scale hardware prototype. With the information merged in the design, the developed system can considerably clean off the exterior dimensions of objects for an efficient washing method.

ADVANTAGES

Convenience: Automatically washing a car saves time and effort compared to washing a car by hand.

Consistency: Automatic car washers can provide a consistent level of cleaning and can be programmed to wash a car in a specific way.

Efficiency: Automatic car washers can wash cars faster and more effectively than washing by hand.

Water conservation: Automatic car washers can be designed to use less water than washing by hand, helping to conserve water.

Labor savings: Automatically washing cars eliminates the need for manual labor, potentially reducing labor costs.

Improved safety: Automatic car washers can reduce the risk of injury from manual washing, such as slipping or falling.

Customization: Some automatic car washers can be customized to meet specific needs or requirements, such as wash time or pressure.

Environmentally friendly: Some automatic car washers use environmentally friendly cleaning solutions, reducing the environmental impact of washing cars.

Revenue generation: Automatic car washers can generate revenue by providing a paid car washing service.

CHALLENGES AND LIMITATIONS OF AUTOMATIC CAR WASHERS

Cost: Automatic car washers can be expensive to install and maintain, making it challenging for some car wash operators to afford them.

Technical Issues: Automatic car washers can experience technical issues that can affect their performance.

Environmental Impact: Automatic car washers can use a significant amount of water and chemicals, which can have environmental impacts.

IMPROVING THE PERFORMANCE OF AUTOMATIC CAR WASHERS

Regular Maintenance: Automatic car washers should be regularly maintained to ensure they function correctly.

Environmentally Friendly Technologies: The use of environmentally friendly technologies can reduce the environmental impact of automatic car washers.

Improved User Interfaces: Improved user interfaces can make it easier for car owners to use automatic car washers.

RESULTS

There are many research papers and studies that have investigated the results and performance of automatic car washers. In general, the following are some potential benefits and drawbacks of using automatic car washers:

BENEFITS

Saves time and effort compared to hand washing. Can provide a thorough and consistent cleaning of the vehicle's exterior. Can potentially reduce the risk of scratches or other damage to the vehicle's paint. May be more environmentally friendly than traditional hand washing, as some automatic car washes use water recycling and conservation systems.

DRAWBACKS

Some automatic car washers may not be effective at removing certain types of dirt or debris, such as bird droppings or tar. May not be suitable for certain types of vehicles or aftermarket modifications, such as lifted trucks or vehicles with oversize tires. Can be expensive, especially for high-end automatic car washers or for frequent use. Some automatic car washers may use harsh chemicals or detergents that can damage the vehicle's paint or finish if used excessively. Overall, the results of using an automatic car washer may vary depending on the specific machine used, the condition of the vehicle, and other factors.

CONCLUSION

The Automatic Car Washer is a beneficial addition to the car washing industry, providing a convenient and efficient solution for car owners. The machine effectively cleans the exterior of a car, reducing the manual effort and time required for the task. With the use of sensors and advanced technology, the machine ensures safety for the car and its surroundings during operation, while also reducing the environmental impact by minimizing water and soap usage. The implementation of this system can provide a more sustainable and efficient option for car owners to keep their vehicles clean.

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Literature Review on Design and Analysis of Floater

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ABSTRACT:

Floaters are structures designed to provide a stable platform for floating solar panels on bodies of water. They typically consist of a buoyant platform that is anchored to the bottom of the body of water and a support structure that holds the solar panels above the water's surface. The main advantage of using floaters for floating PV panels is that they can be installed in bodies of water that are not suitable for other types of solar installations, such as rooftops or land-based systems. The design of floaters must take into account several factors, including the strength of the anchoring system, the potential impact of waves and wind, and the effects of water currents and tides. Floaters also need to be able to withstand the corrosive effects of exposure to water and sunlight, and they must be designed to minimize the risk of environmental damage. Overall, floaters offer a promising solution for expanding the use of solar energy in areas where land-based installations are not feasible. As solar technology continues to improve and the demand for renewable energy grows, floaters are likely to become an increasingly important component of the energy landscape.

Keywords: Floaters, Solar Panels, Anchored, Floating PV panels.

1.INTRODUCTION:

A floating solar PV panel, also known as a floating solar array or floating photovoltaic (FPV) system, is a type of solar energy system where solar panels are mounted on a floating structure on a body of water, such as a lake, pond, or reservoir. The floating platform is anchored to the bottom of the water body and connected to the shore through a cable, where it can transmit the generated electricity to the grid or to a nearby facility. Floating solar PV panels have several advantages over traditional land-based solar systems. They make use of water surfaces that are often unused, providing an alternative location for solar installations in areas where land is scarce or expensive. Additionally, the natural cooling effect of the water can help to increase the efficiency of the solar panels, as they operate more efficiently at lower temperatures. Floating solar PV panels can also help to reduce water evaporation and algae growth, as they provide shading for the water surface. This can be particularly beneficial in arid regions where water resources are limited. Overall, floating solar PV panels offer a promising renewable energy solution for areas with limited land resources, and have the potential to significantly increase the global capacity of solar power. The floaters used for floating PV panels are typically made of high-density polyethylene (HDPE) or other materials such as fiberglass, steel or aluminum. HDPE is a durable, lightweight, and environmentally-friendly material that is resistant to ultraviolet (UV) rays, corrosion, and chemicals, making it an ideal choice for floating structures. The floaters can come in different shapes and sizes, depending on the specific design requirements of the project. Overall, the choice of floaters depends on a variety of factors, such as the size and weight of the PV panels, the water conditions, and the environmental regulations of the project site. The design and installation of the floaters are critical to ensuring the stability, durability, and safety of the floating PV system. Floating solar PV panels have several advantages over traditional land-based solar systems. They make use of water surfaces that are often unused, providing an alternative location for solar installations in areas where land is scarce or expensive. Additionally, the natural cooling effect of the water can help to increase the efficiency of the solar panels, as they operate more efficiently at lower temperatures. Floating solar PV panels can also help to reduce water evaporation and algae growth, as they provide shading for the water surface. This can be particularly beneficial in arid regions where water resources are limited. Overall, floating solar PV panels offer a promising renewable energy solution for areas with limited land resources, and have the potential to significantly increase the global capacity of solar power.

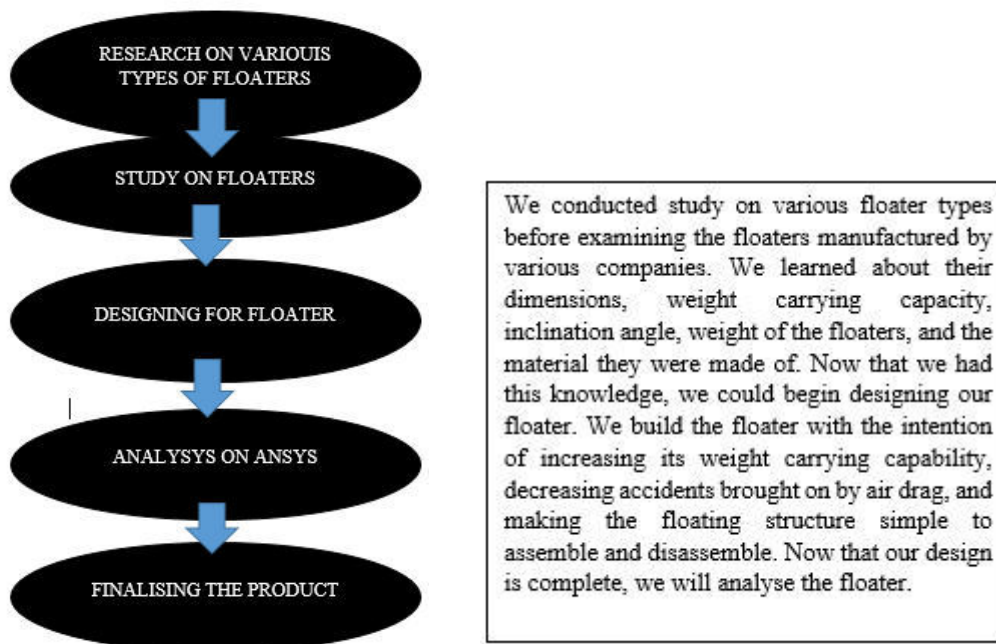
2.LITERATURE REVIEW:

Washington DC et al, studies conducted by the Solar Energy Research Institute of Singapore (SERIS) has the stature of a research institute at the level of the NUS states the Site identification, Energy yield analysis, Engineering design, Financial and legal consideration, Environmental and social consideration, Procurement and construction, Testing and commission, Operation and maintenance,

Conclusion and next steps.[1] Gerrit Olbert MARIN et al, states that there is a growing shortage of land for people to reside, grow food, and gather renewable energy as the population grows and the sea level rises. In addition, many people reside in areas that could experience flooding due to sea level increase. Utilizing ocean area for human needs is one way to meet this challenge. From the ancient Mexican city built on stilts to the still-existing settlements in Brunei, Cambodia, or Nigeria, water-based settlements have been used for millennia. Nevertheless, since the middle of the 20th century, the idea of floating cities on the ocean has drawn more and more interest as a futuristic option to traditional urban expansion. [2] Ahmed A. El-Shihy et al, this paper provides architectural design guidelines for floating structures and novel approaches of floating community model for addressing SLR impacts on Abu-Qir to architects and urban planners when designing floating structures. [3] A. Ghafooripour et al, states the new concepts for offshore construction have emerged as a result of the beneficial effects that the marine environment has on human life. The use of offshore pile-deck structures, sea reclamation by offshore soil embankment for building artificial islands, and floating structures (pontoon) in the Gulf area have all been examined in this new generation of offshore projects. [4] Fitch Recharge et al, states the growing investor interest and government backing are pushing fast-growing technology outside of Asia, according to Fitch Solutions. According to a bullish prediction from Fitch Solutions for the quickly developing renewable technology, rising levels of governmental support and investor interest will help drive the deployment of nearly 10GW of new floating solar by 2025. [5] Martin, Jose Rojo et al, BayWa r.e. has successfully completed two utility-scale floating solar projects in the Netherlands, giving the European market a significant boost in installed power. Midway through October, the renewable energy company completed the 14.5 MWp Sekdoorn installation close to the Dutch city of Zwolle, about three months after finishing the 8.5 MWp Tynaarlo installation in the neighbouring Drenthe province. [6] **Deepanwita Gita Niyogi et al**, “Do floating solar panels work better “Floating solar plants”, also called floatovoltaics, are the newest craze in India. Experts note out that floating solar power plants have a number of benefits, one of which is that no land is needed. However, these are more expensive than conventional solar cells and require extensive upkeep. The initial expense for the Ramagundam project is 450 crores. The expense is almost comparable to a ground-mounted solar project, according to NTPC.[7] Patil (Desai) Sujay S. et al, shows the overview of concepts and floating solar pv projects that have been created to date is shown in this paper. These systems were either built for business use or for research purposes. pontoons or floats are used to keep all grid-connected systems afloat, and panels are rigidly attached to these floats.[8] PV Magazine France, states the source of the fire is promptly located by the maintenance team. In fact, since October 2021, signs of wear had been noticed on the cables connecting the units to the transmission terminals. Akuo acknowledged underestimating the risk posed by the weather and the impact of wear in the medium run.[9] Sade K. Cromratie Clemons et al, reported the High-density polyethylene 6 of 39 (HDPE) pontoons are used to support the frameworks and give them buoyancy. The substance can be used to build pontoons because of its lightweight and robust qualities. Rotational casting or blow moulding are both used to make the floats. A 50-year lifespan is typical for HDPE. The modules and cables are supported by the pontoons, and additional floats are used to hold the inverters.[10] Maria Ikhennicheu et al, found that the demand for solar panels is rising as the green energy revolution spreads across the globe. We can move solar panels from land to water reservoirs because water provides cooling and takes up less space on land. Installing solar floating panels in reservoirs, lakes, or water basins also increases their efficiency.[11] Carlos Ferrer-Gisbert et al, shows the structure needs to be stiffer because it must withstand multiple design loads, including dead and live loads, wind uplift, and drifting. The module's upper side is made up of a number of rectangular gutters. The platform is divided into smaller sections by these components, which enhance the system's stiffness and load bearing capacity. [12] Giles Exley et al, reported that by using FPV, you can protect the water from the impacts of wind mixing, which can change the temperature of the water and cause stratification. The duration of stratification was comparable to WindErmere without FPV (about three days) when reductions to the forcing variables were 1:1 and did not surpass 45%.[13] Samer Sulaeman et al, found that due to the lack of greenhouse gas emissions from fuel combustion and decreased risk of fuel spillage both on-site and during transportation to various locations, a PV

system is a more environmentally friendly choice than the current diesel generator systems. [14] Erica Ferraz de Camposa et al, the research showed that during extreme drought events, a large-scale PV could have a significant impact in regions with high dependent water demand. While electricity dispatches grew by an average of 17–63% during the most critical year, the water reserve met the water demand for 0.7–2.3 years. [15]Jian Dai et al, studied that solar energy was quickly understood. Due to the region's high average annual solar irradiance of about 1663 kWh/m², it may be a viable choice. Over their land-based peers, floating PV systems have a number of benefits, including the ability to naturally cool the environment. The advantages of floating PV 14 of 39 panels on bodies of water quickly drew attention in the energy industry, and several demonstration and commercial projects have been completed.[16] Mert temiz et al, states when solar energy is not available, a fuel cell generator that produces and stores hydrogen has been used to balance the electric demand. Alternative uses for possible water and land preservation include floating PV systems.[17] Siliang Chen et al, studied a floating solar still that was influenced by nature and based on how mangrove trees extract freshwater was created. The thermal insulation material was used to encase the water supply channels, which served as the tree roots in the bionic design, and an array of wicks was used to distribute them for more even water absorption and a more stable structure. Due to the bionic design, it was possible to greatly reduce the heat losses at the still's bottom, leading to a high freshwater yield.[18]

3.METHODOLOGY:

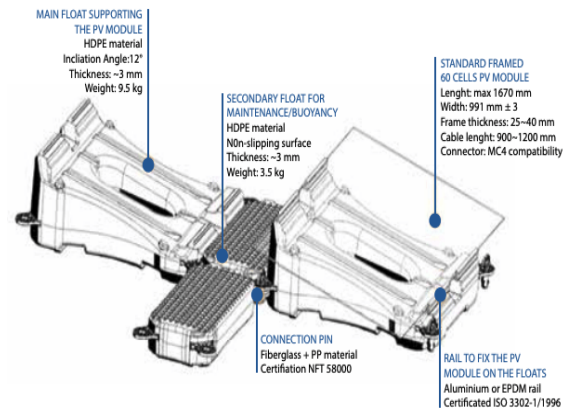


Xiamen Jesfer Industry & Trade Co., Ltd.

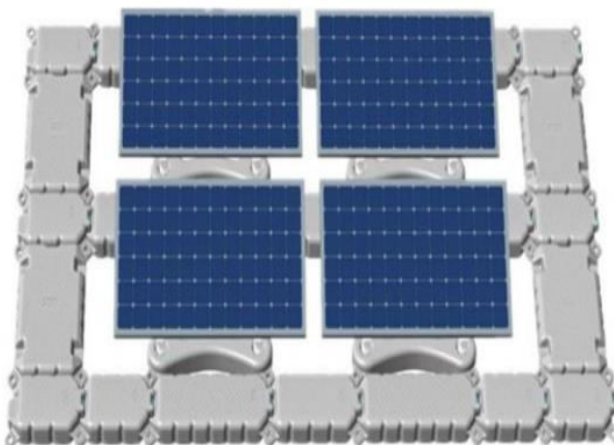


Install site:	Solar floating system
Tilt Angle:	5/10/15 ° ; Customized
Module Type:	Portrait or Landscape
Max Snow Load:	1.4KN/m2
Max Wind Load:	60m/s
Material:	HDPE
Loading Capacity:	150kg/m2

Sumitomo Mitsui Construction Co. Ltd.



XIAMEN EMPERY SOLAR TECHNOLOGY Co. Ltd.



Product Name	Empery Solar Floating PV Mounting System F1	Design Standard	AS/NZS 1170, DIN 1055, JS C1895, 2011, International Building Code (IBC 2009)
Install Site	Lake, Reservoir	Material	HDPE
Tilt Angle	10° or 15°	Fastener Material	Zinc-Nickel Alloy Electroplated Steel & DPPE
Wind Load	50m/s	Accessories Material	AL6005-T5 (Anodized)
SN Load	1KN/m²	Color	Gray or Customized
Surface Clearance	330-350mm	Bearing Weight	Main Floater 70KGS/m², Axle 155 KGS/m²
Panel Type	Frame or Double Glass	Certificates	TUV, SGS, UL, ISO 9001
Panel Orientation	Landscape, Double Row's Same Facing, Symmetrical Facing	Hot Sales Zone	CHN, AU, JP, ASEAN, EU, USA

4.CONCLUSION:

We got to learn about floaters used in floating solar system. What should be their properties and physical properties should carry. The kind of extreme high and low condition they go through for that what thermal properties a material should and many more thing about it.

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Computation Modeling on Polygon Pin Profile Effect on the FSW of Dissimilar Material AA6061-T6 and Pure Copper

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Abstract

In the present work, the two dissimilar metals of aluminium and copper plates are selected with different polygon tool pin geometry such as a hexagon, pentagon, square, triangle and cylindrical to understand the temperature and fluid flow behaviour during friction stir welding. From the computational results, the temperature and dynamic viscosity values are found by coupled Heat transfer and material flow physics when two dissimilar welding is performed. Here we are discussed the effect of temperature on the tool and work-piece of friction stir welding process when tool geometry changes with the help of simulation modeling. The probe is in tapered shape where outer radius for the top and bottom position of the probe is the same for all the probe design. In this case, the triangular tool pin shows the highest temperature (816 K) among all the tool pin geometry and cylindrical probe shows the lowest temperature (629 K), the welding parameter and boundary conditions were same for all the cases.

Keywords: Polygon pin profile, computation modeling, COMSOL Multiphysics, AA6061-T6 and pure copper, FSW

1. Introduction

Friction stir welding (FSW)/friction stir processing (FSP) is a solid-state joining process is invented in 1991 in The Welding Institute (TWI) [1]. The heat generation in the FSW process is due to two reasons. First one is the frictional heat generation when contact between tool shoulder and work-piece and the next is heat generation due to the plastic deformation [2]. In this process, the tool is rotated with certain rpm and contacts with the stationary plates. Plates are tight by the strong clamping devices because of large vibration is induced when tool and work-piece are in contact. With the frictional heat between work-piece and tool, a large amount of heat is generated, and this heat plastically deforms the plates, and a solid-state joint is formed [3]. Initially, the FSW process used for joining the aluminium materials, but later on it is used for joining the high strength materials like copper, steel, and nickel [4-10]. The friction stir additive manufacturing (FSAM) techniques are also used in the field of additive manufacturing [11-13]. Further, the FSW is also used for the fabrication particulate reinforced aluminium matrix composite (PRAMC) [14,15].

M. Song et al. [16] presented heat generation model with the help of moving coordinate system in comsol multiphysics software. The temperature results was plotted with varying time in plunging and welding stage and simulation results are validate by experiments. Tool pin assumed to be cylindrical with no thread and the heat generated between tool shoulder, and workpiece interface is due to friction only. Jian Luo et al. [17] presented 3-D heat transfer finite element model on FSW process, heat generation in shoulder, pin side and pin bottom region was presented. The model presented the material flow around the pin and shoulder, weld shape and defect on welded surface was analysed. V. S. Gadhakh et al. [18] presented an analytical modeling of heat generation equation using different straight pin geometries such as triangular, square, pentagon and hexagon. They reported that temperature increases with the increase of number of flats on the tool pin from triangle to hexagon pin. Tanmoy Medhi et al. [19] experiment to find out the coefficient of friction with different temperature by using the Tribometer and done the heat transfer analysis experiment as well as analytical by software with different welding parameter used. Basim M. A. Al Bhadle et al. [20] presented the heat generation analytical modeling for tapered polygon tool pin geometries, and as per the results, they find that the hexagon tapered pin having the highest temperature among the all others geometry.

Furthermore, Behzad Sadeghian et al. [21] presented friction stir welding of aluminium and stainless steel joint; they present the simulation results of velocity, strain rate dynamic viscosity at 350, 500 and 700rpm with same welding speed. Carter Hamilton et al. [22] did the Comsol simulation of thermal and material flow CFD based model on similar material plates of AA7042-T6 at different rotational speed from 175 to 400 rpm. R. Nandan et al. [23] done the numerical simulation of Friction stir welding on

heat transfer and fluid flow with a combination of different rotational and welding speed on the aluminium plate of grade AA-6061-T6 and plotted the results of dynamic viscosity, strain rate and velocity. S Emamian et al. [24] present a review paper on friction stir welding tool profile, and they observed that all the tool profile gives almost equal results slight changes are there, and the threaded pin profile are most effective on performance due to the material mixing in threaded pin was uniform and easily flowable.

K. Elangovan et al. [25] presented a paper the effect of material properties on aluminium alloy (AA-6061) using straight, tapered and threaded cylindrical probes and polygon (square and triangular) probe at different rotational speed and they find that the polygon pin (square) at rotational speed of 1200rpm gives the superior tensile properties compared to other tool profile. Hamed Jamshidi Aval [26] presented the heat transfer analysis of dissimilar aluminium alloy plates joint with square frustum and conical grooves tool pin design, and the results show that the joining with square pin gives the uniform mixing of both metals at the weld nugget zone, highest maximum temperature reported on the advancing side by the conical groove tool pin. R. Beygi et al. [27] investigated the dissimilar pure aluminium, and pure copper plate butt joint welding, the material flow and mechanical properties of the welded joint were established by the experiment done using conically threaded, straight cylindrical threaded and tapered square tool pin with concave shoulder surface. They found that the conical threaded tool pin appears a sound quality joint with no defect and uniform mixing of both metals and highest tensile strength. Ch. Venkata Rao et al. [28] reported the effect of dissimilar welding joint of AA 22019 and copper on the microstructure, mechanical properties and corrosion behaviour with the tapered polygon tool pin design. They found that pitting corrosion effect on the hexagon pin design was better compared to others and the maximum temperature in case of hexagon pin. High hardness, good microstructure profile, defect-free joint and uniform distribution of grains were found in the hexagon pin. Hexagon pin was the optimum tool pin design in that case.

In the present work, a 3-D heat transfer analysis with couple CFD material flow simulation study is conducted with the different polygon tool pin design. Here the analysis is done on the dissimilar metal plates of aluminium 6061-T6 and a pure copper plate. The model is computed by a COMSOL Multiphysics V5.3a software. The tool geometry is prepared by a solidworks design software and import to COMSOL Multiphysics for computation. The other geometry (workpiece and backing plate) is designed on COMSOL software. The tetrahedral mesh design is selected for the whole domain. Figure 1 shows the schematic geometry of tool pin design. The tool pins are tapered in design with a 14.5° taper angle. The size of each working plate of aluminium and copper was 100×50×5.3mm³. In Fig. 2, the backup plate image is shows which used as a heat sink and this backup plate made with the mild steel. The tool material is H-13 steel. The shoulder, pin top and pin bottom radius for the cylindrical pin are 9 mm, 3 mm and 1.8 mm respectively.

2. Numerical model

2.1 Heat Transfer analysis

The 3-D heat transfer governing equation is given in the Eq. (1), in this equation c_p, k, ρ are the temperature dependent physical properties of metal specific heat, thermal conductivity and density respectively, u welding velocity or flow velocity and Q is the heat generation [21].

$$\rho \cdot c_p \cdot u \cdot \nabla T = \Delta \cdot (k \cdot \nabla T) + Q \quad (1)$$

Heat generation on the tool shoulder surface due to frictional contact with the work-piece is given in the Eq. (2), where the μ coefficient of friction, ω is the rotational speed, P_N is the normal pressure on the tool shoulder surface, $r_{shoulder}$ is the radius of shoulder, $r_{pin\ top}$ pin radius at top, $r_{pin\ bottom}$ radius of pin at the bottom, A_s is shoulder contact area = $\pi(r_{shoulder}^2 - r_{pin\ top}^2)$. δ_E Is the sticking parameter, which values in between 0 and 1 ($0 < \delta_E < 1$) [22].

$$q_{shoulder} = \frac{2 \delta_E \mu P_N \omega (r_{shoulder}^3 - r_{pin\ top}^3)}{3 (r_{shoulder}^2 - r_{pin\ top}^2)} \left(\frac{W}{m^2} \right) \quad (2)$$

The heat generation on the tool pin ($q_{pin\ bottom}$) is given in the equation (3) and the area of pin bottom is, $A_{pin\ bottom} = \pi r_{pin\ bottom}^2$.

$$q_{pin\ bottom} = \frac{2 \delta_E \mu P_N \omega r_{pin\ bottom}}{3} \left(\frac{W}{m^2} \right) \quad (3)$$

2.2 Fluid flow analysis

For fluid flow analysis, the computational fluid dynamic model is applied. In this model, the continuity equation is given in the Eq. (4) and momentum equation is used according to Eq. (5) For defining the velocity field in the steady-state condition. In the momentum equation, η is the dynamic viscosity of the fluid, which depends on the temperature (T) and strain rate ($\dot{\epsilon}$). $\sigma(T, \dot{\epsilon})$ Is the flow stress of the material. $Z(T, \dot{\epsilon})$ The Zener-Holloman function depends on strain rate, temperature and other constant [21].

$$\nabla \cdot u = 0 \quad (4)$$

$$\rho u \cdot \nabla u = -\nabla p + \eta \nabla^2 \cdot u \quad (5)$$

$$\eta = \frac{\sigma(T, \dot{\epsilon})}{3\dot{\epsilon}} \quad (6)$$

$$Z(T, \dot{\epsilon}) = \dot{\epsilon} \exp\left(\frac{Q}{RT}\right) \quad (7)$$

$$\sigma(T, \dot{\epsilon}) = \frac{1}{\alpha} \sinh^{-1} \left[\left(\frac{Z(T, \dot{\epsilon})}{A} \right)^{\frac{1}{n}} \right] \quad (8)$$

2.3 Boundary Condition

For heat transfer: The upper surfaces of plates are in atmospheric contact condition, and these surfaces are convective and diffusive surfaces, with the heat transfer coefficient of $15 \left(\frac{W}{m^2K}\right)$ and diffusivity was 0.3, the heat transfer coefficient on the bottom surface of the backing plate was $200 \left(\frac{W}{m^2K}\right)$ and the heat transfer coefficient for the sides of backing plates are $150 \left(\frac{W}{m^2K}\right)$. The sides of both plates were taken at ambient temperature (300K) condition.

For CFD model: The Flow velocity at the inlet wall is the same as the welding velocity. Only x-direction inlet velocity is considered, and the velocity along y and z-directions are zero.

$$u = u_{weld}, v = 0, w = 0 \quad (9)$$

In the Eq. (9) u, v, w velocity in x, y and z-direction respectively. The flow velocity boundary condition for shoulder, pin side and pin bottom surface region are given in the Eq. (10), the velocity component only in x and y-direction, because vertical direction velocity is taken as zero because of tool pin surface is flat, if the tool pin have threads on the surface then the vertical velocity component are considered [22].

$$u = \omega y, v = -\omega x, w = 0 \quad (10)$$

The average effective maximum strain rate is considered, due to simplicity in the calculation of dynamic viscosity and flow stress.

$$\dot{\epsilon} = \frac{r_{shoulder}}{3h} \omega \sqrt{6} \quad (11)$$

Where, h is the workpiece thickness. The welding parameters for the FSW process are listed in Table 1. In the FSW process, the welding parameter is the major impact on the weld quality and the strength of the joint. The heat generation in the weld zone depended on the welding speed, rotational speed and tool geometry. Higher the rotational speed and lower the welding speed and maximum shoulder diameter and minimum tool pin diameter are responsible for high heat generation.

Table 1: Welding parameters

Shoulder radius	Pin radius top	Pin radius bottom	Pin length	Normal load	Welding speed	Rotational speed	Friction coefficient
9 mm	3 mm	1.8 mm	5 mm	9 kN	50 mm/min	800 rpm	0.4

3. Results and discussions

Figure 3 shows the temperature flow distribution for the tapered pin such as cylindrical, hexagon, pentagon, square and triangle. The maximum temperature 816 K obtained when the welding simulation is done on triangle pin, and a tapered cylindrical pin shows the minimum temperature 629 K. On the advancing side (AS) aluminium plate and the retreating side (RS) the copper plate is kept. The aluminium plate side shows the maximum temperature compare to copper because of the low thermal conductivity of the aluminium plate. The number of flat surface increase with the decrease in

temperature and heat generation from triangle to hexagon pin profile. Also, the flat surface presence on the FSW tool pin profile creates additional torque at the workpiece/tool interface region [29]. The higher temperature rise in the triangular pin due to maximum surface contact area between tool and workpiece.

From Figure 4 the dynamic viscosity plots, we understand that the dynamic viscosity near the tool pin and shoulder region that is the Heat affected zone (HAZ) and welded zone is much lower in aluminium side plate compared to copper side, this is due to the temperature is higher in aluminium region and dynamic viscosity inversely proportional to the temperature, beyond the thermal affected and heat affected zone the dynamic viscosity shows the maximum value. The dynamic viscosity value minimum in case of the triangular pin that means the flow of material is very easy and uniform in that case. Figure 5 shows the temperature profile on the tool pin tip. The cylindrical and hexagon pin shows almost equal temperature and highest temperature on the triangular pin tip.

Table 2: Tool geometry with a maximum temperature

Tool geometry	Maximum Temperature (K)
Triangular pin	814
Square	714
Pentagon	662
Hexagon	647
Cylindrical	629

4. Conclusion

The Simulation modeling of Friction Stir Welding Process of aluminium alloy 6061-T6 and pure copper was presented, and the following points are concluded:

1. Triangular shape pin shows the maximum temperature in the welded zone because of the maximum effective frictional contact area.
2. Number of flats surface increases (triangular to hexagon) with a decrease in temperature.
3. Easy and uniform material flow by triangular pin, due to low viscosity near the tool pin surface.
4. Lowest frictional contact area in the cylindrical tool pin comparison to all polygon pin, this results of lower heat generation and temperature in the welded region.

Acknowledgement

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List of Figures

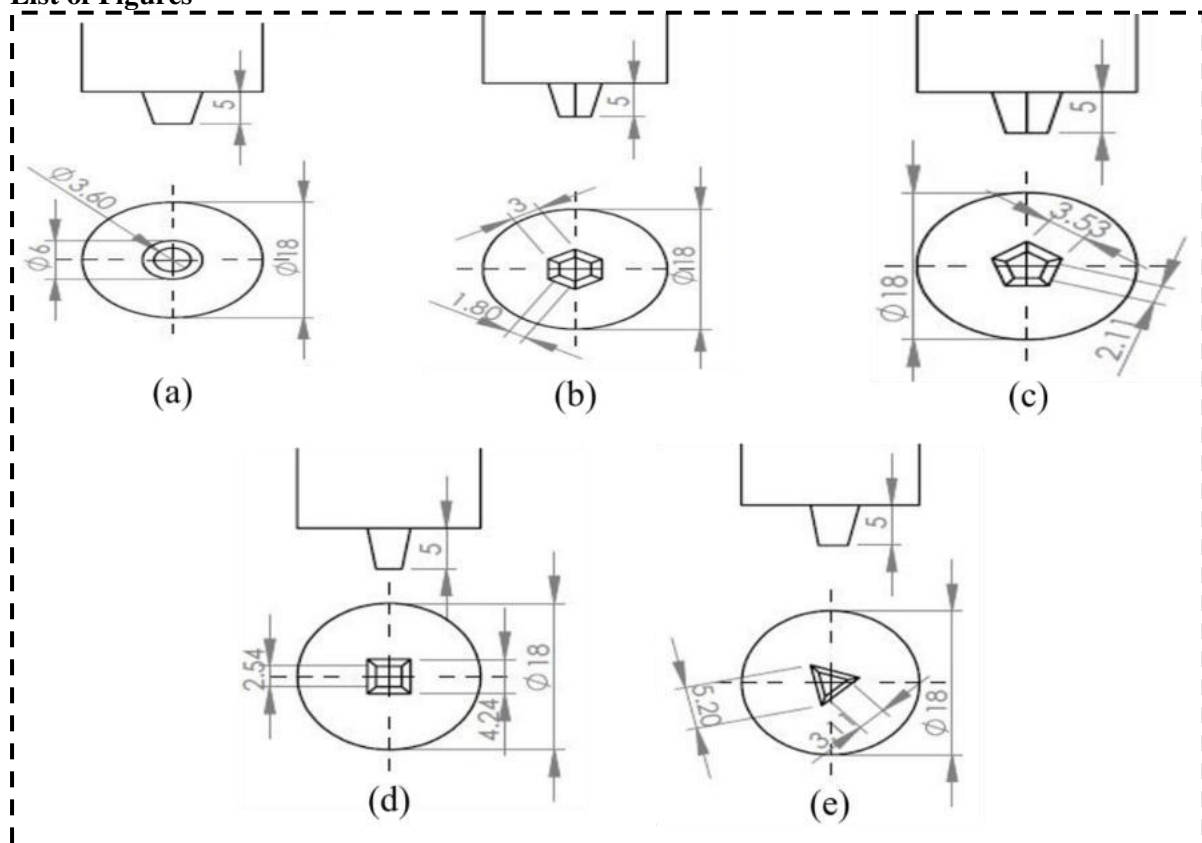


Figure 1: Schematic diagram of cylindrical, hexagon, pentagon, square, and triangle tapered tool pin geometry with dimension (mm).

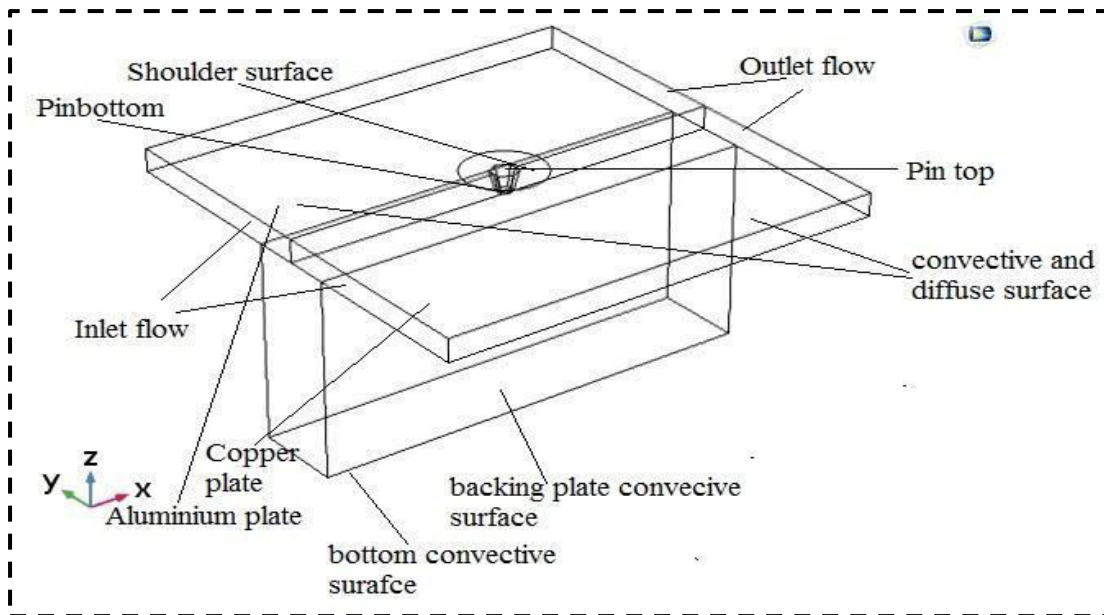


Figure 2: Boundary condition for heat transfer and fluid flow in FSW process modeling.

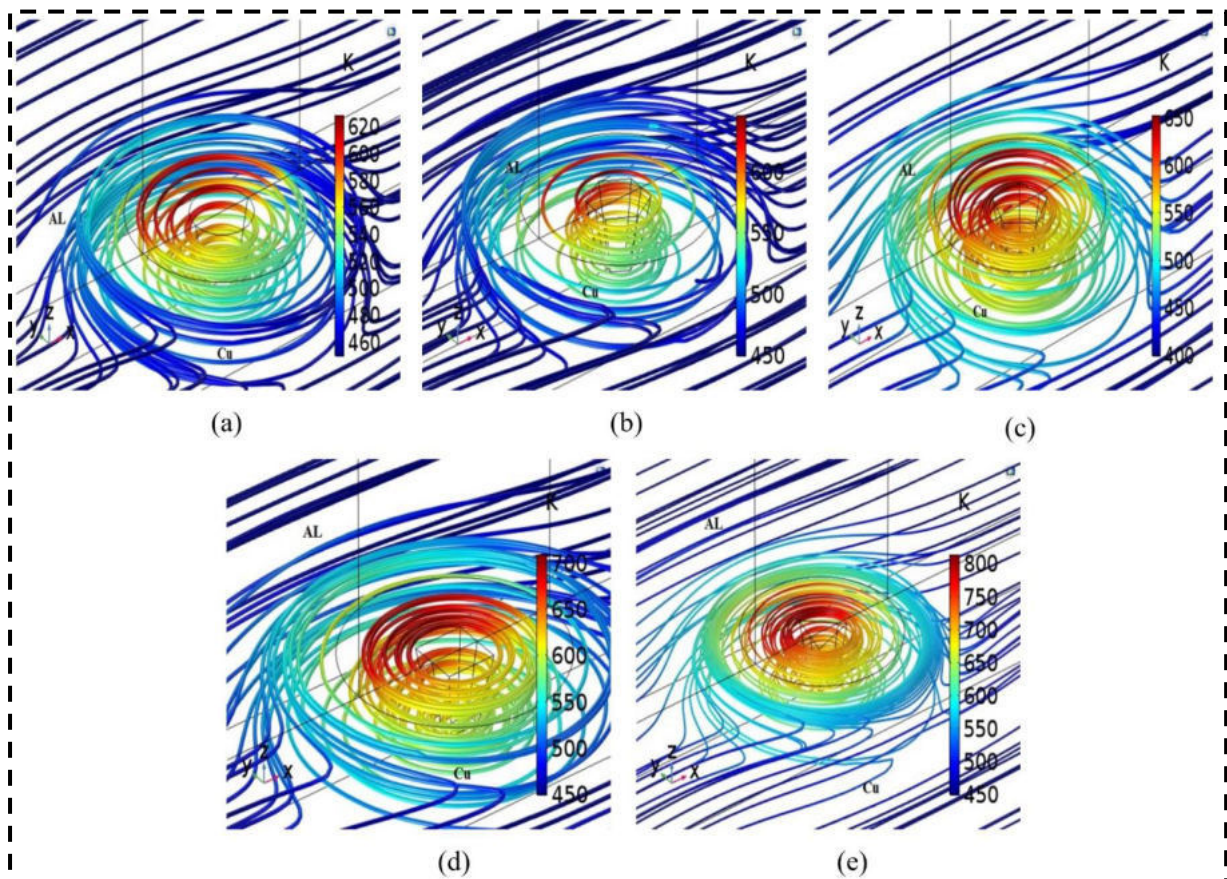


Figure 3: Temperature flow for cylindrical, hexagon, pentagon, square and triangular shape pin.

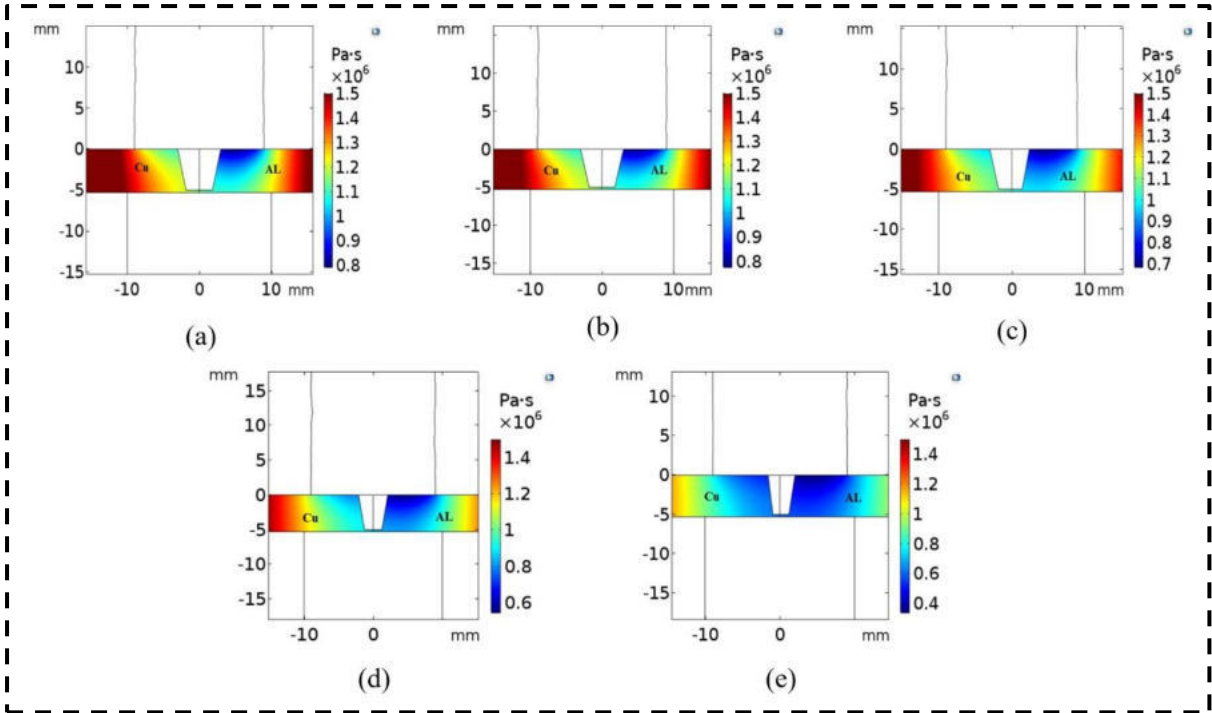


Figure 4: 2-D dynamic viscosity plots for cylindrical, hexagon, pentagon, square and triangular shape pin.

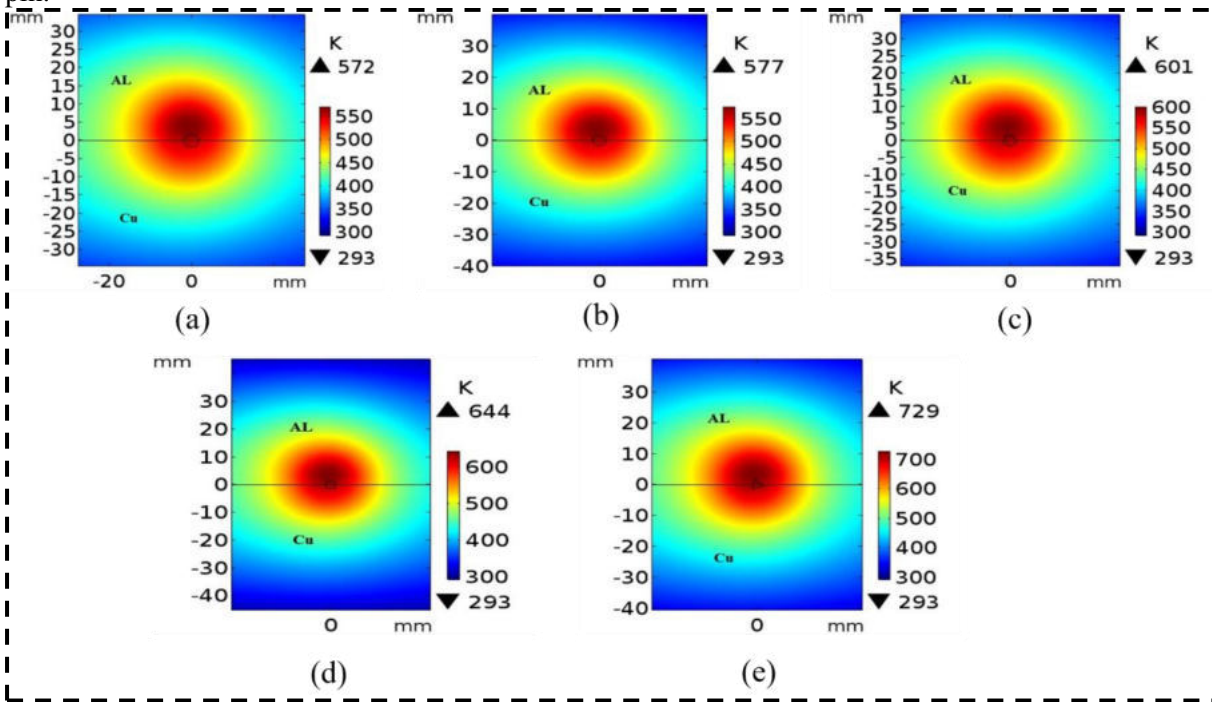


Figure 5: Temperature distribution on the pin tip for cylindrical, hexagon, pentagon, square and triangular shape pin.

Solar-Powered Water Purification System

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ABSTRACT: A solar-powered water purification system is a technology that uses solar energy to purify water from various sources, such as rivers, lakes, or underground wells. This system works by using solar panels to collect and convert sunlight into electricity, which powers a water pump or a filtration system. The process of purification usually involves the removal of impurities and contaminants, such as bacteria, viruses, and minerals. This is achieved through different methods, including reverse osmosis, ultraviolet (UV) disinfection, and activated carbon filtration. The use of solar energy in water purification systems has several advantages. Firstly, it is a sustainable and renewable energy source that does not produce any harmful emissions or pollutants. Secondly, it reduces the dependence on traditional sources of energy, such as fossil fuels, which are becoming increasingly scarce and expensive. Finally, it can provide clean and safe drinking water to remote or off-grid communities that do not have access to electricity or clean water. One of the key advantages of a solar-powered water purification system is that it can operate in areas where there is no access to electricity. This makes it ideal for remote communities that rely on contaminated water sources. Additionally, the system is environmentally friendly and sustainable, as it relies on renewable energy sources and does not produce greenhouse gas emissions.

KEYWORDS: *Water Filter, Reverse Osmosis (RO), Solar Panel, Battery, Motor, Membrane*

INTRODUCTION

The decreasing availability of water has necessitated in the search for fresh sources of drinking water. There are many processes available for purification of drinking water like Chlorine tablets, Pot chlorination of wells, Slow and rapid sand filters, Fluoride removal, Reverse osmosis plants, etc. In this project, we are making a water purifier which works on solar energy. We are using solar energy which is a renewable source, abundant and cheap. The basic principle behind this project is reverse osmosis(RO). The use of solar energy in water purification systems has several advantages. Firstly, it is a sustainable and renewable energy source that does not produce any harmful emissions or pollutants. Secondly, it reduces the dependence on traditional sources of energy, such as fossil fuels, which are becoming increasingly scarce and expensive. Finally, it can provide clean and safe drinking water to remote or off-grid communities that do not have access to electricity or clean water.

METHODS AND MATERIALS

Materials:

- Solar panel(s)
- DC water pump
- Water filter (such as activated carbon, reverse osmosis, or UV filter)
- Water storage tank
- Plumbing materials (such as PVC pipes and fittings)
- Electrical wiring and connectors
- Batteries (optional, for energy storage)

Methodology:

1. Determine the water source and quality: Identify the water source that needs to be purified and assess its quality. Depending on the level of contamination and impurities, different types of water filters may be required.
2. Choose the appropriate solar panels: Select the appropriate solar panel(s) based on the required power output and water flow rate. The solar panel should be able to generate enough power to run the water pump and the filter.
3. Install the solar panels: Install the solar panels in a location where they receive maximum sunlight exposure. They can be mounted on a rooftop, ground-mounted, or integrated into a solar canopy. Connect the solar panels to the water pump using electrical wiring and connectors.

4. Install the water pump and filter: Install the water pump and the filter in the plumbing system. The pump should be connected to the solar panels and the filter should be placed downstream from the pump. The type of filter used will depend on the level of impurities in the water.

5. Connect the water storage tank: Connect the water storage tank to the plumbing system downstream from the filter. The tank should have a capacity that is 400-700 ppm in normal water
10-40 ppm after filtering the water

SALT IN WATER

removes 90% of salt

IMPURITIES

Remove all types of bacteria & Dust

CAPACITY IN liter per hour

10-1 liter

Solar Panel

Panel Area = 64 x 35 cm

Power Generate – 25W

Battery

12v

We are using 2, 12V battery in series to gain 24V of power to run motor

Motor

Working pressure :90 PSI

Suction Height :2 miter

Working AMP :1

Voltage :24 VDC

DISCUSSION

Water purification systems using solar panels to run the motor have become an increasingly popular technology in recent years, especially in areas where access to clean water is limited or expensive. The system operates by harnessing the power of solar energy through solar panels to generate electricity that powers the motor, which in turn drives the water purification process.

One of the main benefits of using a solar-powered water purification system is that it provides a reliable and sustainable source of energy that does not require any fuel, unlike traditional water purification systems that depend on electricity from the grid or fossil fuels. Additionally, solar energy is a renewable and clean energy source that does not produce harmful emissions, which is critical for ensuring that the water being purified remains clean and safe.

Another advantage of using a solar-powered water purification system is that it is cost-effective, especially in remote or off-grid locations. By harnessing the energy of the sun, communities can significantly reduce their energy costs, making it more affordable to maintain and operate the water purification system. Furthermore, the availability of solar energy ensures that the system is operational even during power outages, which is a common occurrence in many parts of the world.

However, there are also some limitations to using a solar-powered water purification system. Firstly, the efficiency of the system depends on the availability of sunlight, which may vary depending on the time of day, season, and weather conditions. Secondly, the initial investment required for installing the system, including the solar panels, motor, and purification equipment, can be relatively high. This may be a significant barrier for communities with limited financial resources.

In conclusion, water purification systems using solar panels to run the motor is an innovative and practical solution to the challenges of providing clean and safe drinking water in remote or off-grid locations. While there are some limitations to the technology, the benefits of using a solar-powered water purification system significantly outweigh the costs, especially in areas where access to clean water is limited or expensive.

CONCLUSION

The work of operating is simple assembly which is a good prototype to have a portable source of RO purified water this has less weight. And smaller size. And testing calculation showed that this is quite a good product to have in situations of floods and remote areas where the water purification is needed to

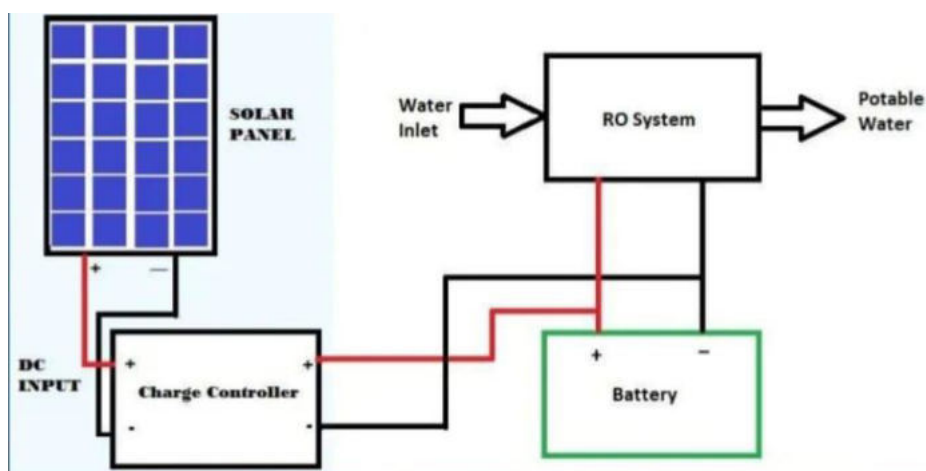
be done. Future purifiers may be less costly and convenient to use. This paper concludes fully utilization of renewable energy by using small RO unit which reduce energy cost and totally independent of grid network. So as per our goal off this project, we design a dependable way to purify water for locations those are off grid and don't have constant sources of clean water. This design also fulfills the requirement of low budget product considering the most of the places don't provide potable water to their citizens. Water purification through solar power is one of the best inventions to save energy and to have uncontaminated water. An electric purifier system requires more power and costs a lot more too. As solar energy is being used for the purification of water, which is cheap and abundant, it can be used everywhere where electricity is not available. Here, the micro controller which is used also prevents the water from overflowing. Moreover, reverse osmosis is a good disinfectant process. This project has only capital cost and almost no running cost. Hence, it will prove to be useful in the near future.

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I would like to convey my heartfelt gratitude to **Prof IQBAL MANSURI** FOR his tremendous support and assistance in the completion of our project. I would also like to thank our HOD, **Mr, WASIM KHAN**, for providing us with this wonderful opportunity to work on a project with the topic **SOLAR POWERED WATER PURIFICATION SYSTEM** The completion of the project would not have been possible without their help and insights.

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Automated Seat Belt Integrated Brake System

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ABSTRACT

It has been observed that people who drive vehicles prefer places other than metropolitan cities. Wearing a seat belt is generally not compulsory in urban areas. Not only violates traffic rules, but also poses safety concerns for drivers and passengers. To overcome this and make seat belts mandatory, we are going to implement this system to keep drivers safe. In safety point of view, we have been developing project "Design and development of automatic seat belt integrated secure parking brake system" for automotive safety. The main objective of this project is to ensure the safety of drivers by modernizing the handbrake of the car. The handbrake is an additional braking mechanism fitted to all commercial vehicles and this completely separate from the pedals - In a car, the parking brake, also called a handbrake, emergency brake or brake, is a locking brake and generally used for stopping the vehicle. Most often used to prevent a vehicle from rolling when parked. Car handbrakes consist of a cable that connects directly to the brake mechanism on one side and to a lever at the driver's station. Using the handbrake to stop a moving car could damage the braking system. The project brief is to design and manufacture a safety parking brake for use in automotive safety brakes. The main benefit of this system is passenger/driver safety, if you are not wearing a seat belt, the vehicle's handbrake will not be removed for added safety. The system reduces the extra effort involved in operating the handbrake release process when the vehicle's brake system is activated. It performs the strictest operation with a safety braking system when starting and stopping the vehicle

KEYWORDS: Hand Break, Seat Belt, Pneumatic Compressor, Sensor

INTRODUCTION

The purpose of this project is to secure the driver with a handbrake system set on the safety car. The handbrake is an additional braking mechanism fitted to all commercial vehicles and operates completely independently of the pedals. In a car, the parking brake, also called a handbrake, emergency brake or brake, is a locking brake that is generally used to stop a vehicle. Most often used to prevent a vehicle from rolling when parked. Car handbrakes consist of a cable that connects directly to the brake mechanism on one side and to a lever at the driver's station. Using the handbrake to stop a moving car could damage the braking system. Seat belts are installed inside the car to ensure driver safety. The increase in the number of fatalities in accidents is due to drivers carelessly wearing their seat belts, despite strict enforcement of the law. The purpose of our article is to impose the wearing of seat belts while driving. We can do this using pneumatic tires and hand brakes. Changes to be made Ensure that drivers wear their seat belts while driving. Here, the car's seat belt activates the handbrake (parking brake) via a cylinder. The air compressor used to release the handbrake gets an outward stroke in the cylinder when the seat belt activates the push-button DC valve. Also, on the retract stroke of the piston, the handbrake engages

BLOCK DIAGRAM

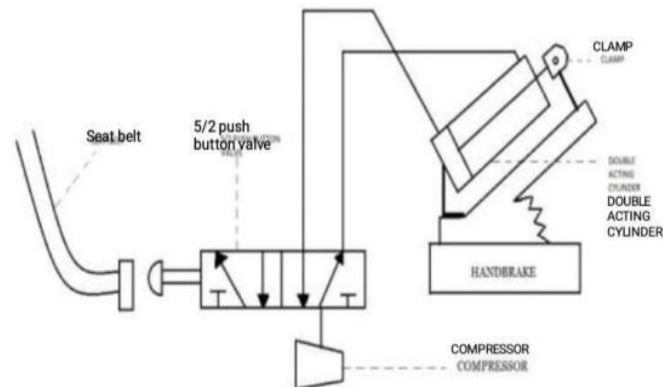


Figure 4.1: General layout of safety hand brake

LIST OF COMPONENTS:

- | Pneumatic cylinder
- | Air Compressor
- | Hand brake set
- | Seat belt and locket
- | Clamp
- | Push button type 5/2 DC Valve
- | Hoses

METHODOLOGY

The design of an automatic parking brake system integrated into the seat belt using a pneumatic compressor involves several steps. Below is an overview of possible approaches to the design process.

Determine system requirements: The first step is to determine system requirements. This includes design goals such as the level of security the system should provide, the functions it should have, and the target market.

Identify system components: After defining the requirements, the next step is to identify the components needed to build the system. This includes air compressors, seat belt retractors, parking brake actuators, sensors and control systems.

Design of the control system: The control system is an important part of the system because it will control the operation of the seat belts and the handbrake. Control systems must be designed to receive information from sensors and activate seat belts and hand brakes if necessary.

Location of components: Once the components have been selected, their location in the vehicle must be determined. This will involve evaluating the available space and choosing a location that will provide the best performance and accessibility for maintenance.

Designing the installation process: The installation process requires careful planning to ensure that components are installed correctly and the system operates reliably. This may involve designing custom mounting brackets, using pneumatic hoses and cables, and testing the system to ensure proper operation.

Test and validate the system: Once the system is installed, it must be tested and validated to ensure that it meets the design requirements. This may involve testing the system under different conditions, such as varying vehicle speeds and braking forces, to ensure that it operates as intended.

System of record: Documentation is essential for maintenance, repairs and future upgrades. Documentation should include detailed drawings, schematics, wiring diagrams, and operation and maintenance instructions.

Overall, designing a seatbelt-integrated automatic parking brake system using an air compressor is a complex process that requires careful planning, component selection, and testing. By following a well-defined methodology, designers can ensure that the system meets the required performance criteria and provides a reliable and safe solution for vehicle occupants

CALCULATION

Double Acting Cylinder Calculator - output Stroke

The force exerted by a double acting pneumatic

cylinder can be expressed as

$$F = p A$$

$$F = p \pi d^2/4 \text{ ----- (1)}$$

where,

F = force exerted (N) p = gauge pressure (N/m², Pa)

A = full bore area (m²)

d = full bore piston diameter (m)

Double Acting Cylinder Calculator - Input Stroke

The force exerted by double acting pneumatic cylinder on outstroke can be expressed as (1). The force exerted on in stroke can be expressed as

$$F = p \pi (d_1^2 - d_2^2) / 4 \text{ ----- (2)}$$

where

d₁ = full bore piston diameter (m)

d₂ = piston rod diameter (m)

FORCE CALCULATIONS:

Pressure of the cylinder = 200kpa

Diameter of the cylinder = 25mm

Diameter of the piston rod = 10mm

Calculation – double Acting Piston outstroke:

The force exerted by a single acting pneumatic cylinder with 1 bar (105 N/m²) and full bore diameter of 100 mm (0.1 m) can be calculated as

$$F = p \pi d^2/ 4$$

$$= (2 \times 105 \text{ N/m}^2) \pi (0.025 \text{ m})^2/ 4$$

$$= 98 \text{ N}$$

Calculation - Double Acting Piston in-stroke:

The force exerted from a single acting pneumatic

cylinder with 2 bar (105 N/m²), full bore diameter

of 25 mm (0.025 m) and rod diameter 10 mm (0.01 m)
can be calculated as

$$F = p \pi (d_1^2 - d_2^2) / 4$$

$$= (2 \times 105 \text{ N/m}^2) \pi [(0.025 \text{ m})^2 - (0.01 \text{ m})^2] / 4$$

$$= 82 \text{ N}$$

DISCUSSION

The idea of a handbrake system integrated into the automatic seat belt using a pneumatic compressor is interesting. First, let's break down the components of the system: Automatic Seat Belt - This is a seat belt that automatically tightens when the doors are closed and the ignition is on. This helps improve safety by ensuring that drivers and passengers are always well protected. Handbrake - This is a brake operated manually by the driver using a lever or pedal. It is used to hold the car stationary when parked or to slow it down when moving. Air Compressor - This is a device that uses compressed air to power various components of a system, such as seat belt mechanisms and parking brakes. Now let's see how these components work together in the proposed system: When the driver gets into the car and switches on the ignition, the automatic seat belts are automatically tightened. At the same time, the air compressor will activate and begin to compress air to power the system. When drivers want to stop or slow down, they pull the handbrake lever. This will restart the air compressor, then unfasten the seat belt and apply the handbrake. Overall, the system has the potential to improve driver and passenger safety and comfort. However, it is important to ensure that the system is reliable and safe to use, as any malfunction or failure can have serious consequences. Also, the cost of implementing such a system should be considered as it can be quite expensive.

CONCLUSION

As an AI language model, I can't get any specific research or data on an automatic seat belt integrated handbrake system using a pneumatic compressor. In general, however, automatic seat belt systems are designed to improve vehicle occupant safety by automatically tightening the seat belts when the car is started. Integrating it with the handbrake system can potentially improve overall vehicle safety, especially in emergency situations where the driver may need to apply the handbrake quickly. The use of an air compressor provides an efficient and reliable method of system operation. However, the effectiveness of such a system will depend on several factors, including the design, implementation and quality of the components used. It also requires regular maintenance and testing to ensure it is working properly and does not break down. Overall, further research and testing is needed to determine the feasibility and effectiveness of a seatbelt-integrated automatic handbrake system using a pneumatic compressor, and whether it is a viable option for improving vehicle safety. With 120RPM we have achieved 96W of power

ACKNOWLEDGMENT

I would like to convey my heartfelt gratitude to Prof MOIN SABRI FOR his tremendous support and assistance in the completion of our project. I would also like to thank our HOD, Mr. WASIM KHAN, for providing us with this wonderful opportunity to work on a project with the topic AUTOMATED SEAT BELT INTEGRATED HAND BRAKE SYSTEM The completion of the project would not have been possible without their help and insights.

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Advance Parking System

Abubakar Thim, Maaz Shaikh, Aditya Singh, ShahFaisal Shaikh and Iqbal Mansuri.

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ABSTRACT

An Advance Parking System is an Automatic type of parking system where we can exclude the work of mortal. This system can lock the vehicle automatically by using detector and these advance system can also handle plutocrat deals without any mortal need. This system is more secure and enhances also being parking system. The design and working mechanics of advanced parking system is bandied in this report. This system eliminates the mortal hindrance and makes Parking of two wheels more secure. We hope this report will be useful to understand the basics of Advanced parking system.

Keywords: More secure, Advanced, No need of Human.

1. INTRODUCTION

The growing population of India has created numerous problems, one of the grueling bones being bike parking which we defy nearly every day. So don't you feel the need for further systematized parking system? This being the problem, my platoon wants to contribute to it. So we've come up with an idea that's advance Parking system. Principally, parking system first appeared in Europe as early as the 1900's ad in the North America in 1920's. The need for automated parking system was the same as it's now.

Maximize the value of available land by condensing parking. The 1950's saw the peak of the assiduity in North America with a number of high profile system erected, as the demand was growing in Japan, Korea and corridor of Europe. The technology has been around for a long time. Extensively used in other corridor of the country and world. But there's a excrescence in this system, it requires mortal resource. So our idea will help to exclude the mortal coffers, as this is a automated parking system and will make the parking system more systematized.

2. LITERATURE REVIEW AND OBJECTIVE

In Transportation operation system parking niche allotment is a measure issue. It takes 43 seconds to steal a bike with no security. Just 20 of bike that are stolen are recovered in UK the rate is indeed worst in India.

IOT use of microprocessor and high resolution camera for parking system. This system uses jeer processor. By using cameras we can identify empty spot for parking. If you have been in a London lately you have seen a long line of rent-a-cycle situated up and securely fastened to existent. Concerning theft also have part is start up. A start up in UK carpeted around 40k motor cycle from theft annually with total timber value of 3 million Euros.

Objective:

To produce a secure and amicable parking service to insure the safety of vehicle and to save the time of guests.

To produce a parking system that can operate automatically with minimal stoner hindrance.

To fulfill the request demand of secure automatic parking with charging installation for EVs.

3. MATERIALS AND METHODS

When it comes to material considerations for a bike rack, there are two areas to punctuate the material of the bike rack itself, and the material of the installation surface.

A. Bike rack material

Bike racks can be constructed from colorful accoutrements as long as the material covers a many important principles it's durable, water- resistant, and functional.

Popular construction accoutrements for bike racks

- Stainless steel
- Steel
- Recycled plastic
- Thermoplastic

Construction of bike racks can be completed with a finishing material. This enhances the overall appearance of the bike rack and helps it to endure harsh rainfall conditions. Exemplifications of homestretches include galvanized coating, makeup, greaspaint- coating, or Iron Armor, Frame Safe.

B. Surface material

Bike racks can be installed on different face accoutrements. Some accoutrements give a stronger footing, while others may be too soft for face installation styles.

Concrete

Concrete is the most ideal face material for bike rack installation. Concrete provides a stable face for colorful mounts.

Asphalt or pipe

Asphalt and pipe is a respectable faces for bike rack installation but may not offer the same stability as a concrete face. The consistence of the material, girding climate, and what lies below the face grade will eventually affect the functionality.

Lawn or dirt

Lawn or dirt doesn't give sufficient grounding for utmost bike rack systems. A freestanding bike rack may be the only option for these shells.

METHODS:

INSTALLATION METHODS FOR BIKE RACKS

In- ground mount

The base of the bike rack is bedded into the ground, and secured with an anchor leg for stability. These mounts are known to offer the loftiest security.

Surface mount

Flanges that extend from the base of the bike rack are secured into the concrete face with bolts. For more support, face mounts can be corroborated with redundant tackle when secured into a being piece of concrete.

Rail mount

Rail mounts are useful for connecting multiple-racks rather of installing each U-rack collectively. This is a provident option that reduces labor costs and the number of holes drilled into the concrete face.

Wall Mount

Some bike racks are designed to be mounted to the wall. Bolts are used to connect the flanges of the bike rack to a steady wall. This operation is best when bottom space is minimum and practical for long-term storehouse.

Removable Mount

A removable underpinning system allows the bike rack to come temporarily removable when needed. Removable reinforcements are especially useful in areas with a changing geography where it may be necessary to remove bike racks to allow temporary access to delivery, conservation, or exigency vehicles.

4. RESULTS

In our design we're trying to make a secure parking service for two wheelers in addition we will add a charging harborage and QR for payment services.

Design will be veritably useful for methodical parking of two wheelers in low space.

The feedback that we've entered on this original creativity is veritably positive which motivates us for farther development in this space.

5. CONCLUSION

The main reason for parking systems is there's a lack of parking spaces in metropolitan metropolises. This due to the metropolises was developed a long time back when vehicle were considered a luxury. In this paper, the conception of smart parking was also bandied, which uses detectors and IoT to descry whether there's a free parking space available or not.

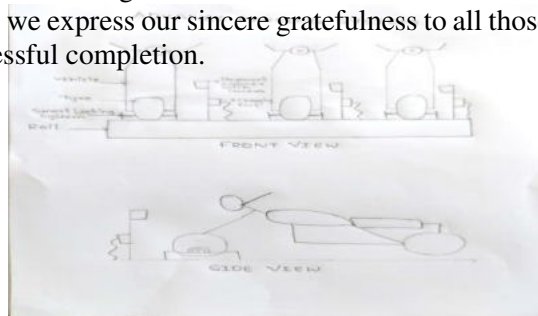
In our idea we're using current technology for better understanding of space utilization we can use camera, RFID detectors and AI software for relating the empty space available on the APP the guests can also reserve the empty niche and can situated the two wheelers under our locking system and CCTV camera surveillance bone can also come back and reading there vehicle by surveying the QR and paying the quantum for time of parking bone can also charge the EVs by using charging harborage available at parking station.

ACKNOWLEDGEMENTS

We'd like to thank our administrator for furnishing precious guidance and support throughout the design. Their perceptivity and moxie were necessary in shaping the direction and compass of this work.

We also extend our appreciation to all the actors who took part in the check, which was a pivotal part of this design. Their feedback and perceptivity were inestimable in assessing the website's performance and stoner satisfaction.

Eventually, we'd like to thank the open- source community for developing and maintaining the tools and technologies used in this design. Without their benefactions, this design would not have been possible. Formerly again, we express our sincere gratefulness to all those who contributed to this design and helped us in its successful completion.



FIGURES:

Figure 1

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Refrigeration using LPG Cylinder

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Mechanical Engineering Department, Theem College of Engineering, Boisar-401501

ABSTRACT

In this project we have designed and analysed a refrigerator using LPG as refrigerant. As the pressure of LPG is high this stored in cylinder. As this pressurised LPG is passed through the capillary tube of small internal diameter, the pressure of LPG is decreased due to expansion and phase change of LPG occurs in an isenthalpic process. Due to phase change from liquid to gas latent heat of evaporation is gained by the liquid refrigerant and the temperature decreased. In this way LPG can produce refrigerating effect in the surrounding. From experimental investigations, we have found that the COP of a LPG Refrigerator is higher than a domestic refrigerator.

Key Words: LPG Refrigeration, Capillary tube, Evaporator, COP, Vapour Compression Refrigeration system, Refrigerating Effect.

INTRODUCTION

LPG (Liquefied Petroleum Gas) refrigeration is a cooling system that uses LPG (propane or butane) as the refrigerant. It operates on the vapor-compression cycle and is commonly used in remote or off-grid locations where electricity is scarce. LPG refrigeration has several advantages, such as energy efficiency, low maintenance costs, and low environmental impact. However, it also requires proper handling and storage of LPG gas, as well as regular maintenance to ensure safe and efficient operation.

PROPOSED METHODOLOGY

1. Design of the project
2. Research and analysis of components
3. Gauge inspection
4. Valve inspection
5. Analysis of safety precautions
6. Cost estimation
7. Implementation of the project
8. Finalization of the project with calculation and inspection

COMPONENTS

1. LPG Cylinder
2. Evaporator box
3. Refrigeration box
4. Temperature sensor
5. Burner
6. Capillary tube
7. Pressure gauge
8. Relief valve
9. Gas pipe

WORKING

The LPG Refrigerator uses evaporation of LPG to absorb heat. LPG is stored high pressure in cylinders and working Pressure at about 70 psi. We lowering this pressure to Atmospheric pressure so that the heat absorbed adiabatically From refrigeration box and cooling is obtained on Surrounding. LPG is stored in

the LPG cylinder under High Pressure. When the gas tank of regulators is opened then High-pressure LPG passes in gas pipe. This LPG passed to Capillary tube at high pressure. High pressure LPG is Converted in low pressure at capillary tube with enthalpy Remains constant. Low pressure LPG is passed through evaporator. LPG is Converted into low pressure and temperature. Vapour from Passing through the evaporator which absorbs heat from the Refrigeration box. Thus, the refrigeration box becomes cool Down. Thus, we can achieve cooling effect in refrigerator. LPG From evaporator is then passed through pipe to the burner.

PROPERTIES OF LPG

1.
 - a. Colourless.
 - b. Odourless – (It's normal to odorize LPG by adding an Odorant prior to supply to the user,
2. To aid the Detection of any leaks).
 - a. Flammable.
3. Heavier than air.
 - a. Approximately half the weight of water.
 - b. Nontoxic but can cause asphyxiation.
 - c. A good mixture: LPG is mainly Propane (C₃H₈), Butane (C₄H₁₀) or a mixture of Propane/Butane.
 - d. Boiling Point: LPG's boiling point ranges from -42 °C To 0 °C depending on its mixture percentage of Butane and Propane.

ADVANTAGES OF LPG REFRIGERATION

- Use of LPG as a refrigerant also improves the overall Efficiency of by 10 to 20 %.
- The ozone depletion potential (ODP) of LPG is 0 and Global warming potential (GWP) is 8 which is significantly negligible as compare to another Refrigerant.
- A part from environment friendly, use of LPG also Gives us lot of cost advantages.
- There is 60% reduction in weight of the system due to Higher density of LPG.
- This fridge works when electricity is off.
- The parts are effectively silent in operation.
- Running cost is zero.
- Eliminates the compressor and condenser.

DISADVANTAGES OF LPG REFRIGERATION

- Efficiency is poor.
- LPG is explosive in nature.
- Put the LPG cylinder in inverted position.
- After the refrigeration process the exhaust of LPG is Burn into burner. Because of the
- Exhausted vapour LPG cannot converted again liquid phase.

APPLICATIONS OF LPG REFRIGERATION

- It can play an important role in restaurants where Continuously cooling and heating is required.
- It can be useful in remote parts where electricity is Not available.
- It can be used in refineries where consumption of LPG is high.

- The system can universally be used in industrial Central cooling and domestic refrigeration and air Conditioning as well.
- It can be used in automobiles running on LPG or Other Gaseous fuels for air conditioning.
- It can be used for zero cost air-conditioning of Spaces like airports, shopping malls, etc. which have Their own gas turbine power-plants.

LITERATURE REVIEW

- A.Baskaran&P.Koshy Mathews

A Performance Comparison of Vapour Compression Refrigeration System Using Eco Friendly. Refrigerants of Low Global Warming Potential VCR system with the new R290/R600a refrigerant mixture as a substitute refrigerant for cfc12a and HFC 134a. The refrigerant 290/R600a had a refrigerating capacity 28.6% to 87.2% higher than that of r134a [1].

- M.Mohanraj et. al.

Have studied experimentally the drop in substitute for R134a with the environment friendly, energy efficient hydrocarbon (HC) mixture which consists of 45% HC290 and 55% R600a at various mass charges of 50g, 70g and 90g in domestic refrigerator. The experiments were carried out in 165 liters domestic refrigerator using R134a with POE oil as lubricant. The power consumption of HC mixture at 50g and 70g are lower by 10.2% and 5.1% respectively and 90g shows higher power consumption by 1.01%. The percentage reduction in pull down time is 18.36%, 21.76% and 28.57% for 50, 70 and 90g mass charges respectively when compared to R134a. The HC mixture because of its high energy efficiency will also reduce the indirect global warming. In conclusion HC mixture of 70g is found to be an effective alternative to R134a in 165 litres of domestic refrigerator [2].

- B.O.Bolaji

Have Experimental study of R152a/R32 to replace R134a in a domestic refrigerator and find out that COP obtained by R152a is 4.7% higher than that of R134a. COP of R32 is 8.5% lower than that of R134a and propane is an attractive and environmentally friendly alternative to CFCs used currently [3].

- R.W.James&J.F.Missenden

Have use of propane in domestic refrigerators and conclude that the implications of using propane in domestic refrigerators are examined in relation to energy consumption, compressor lubrication, costs, availability, environmental factors and safety propane is an attractive and environmentally friendly alternative to cfc's used currently [4].

- Bilal A. Akash et. al.

Has conducted performance tests on the performance of liquefied petroleum gas (LPG) as a possible substitute for R12 in domestic refrigerators. The refrigerator which is initially design to work with R12 is used to conduct the experiment for LPG (30% propane, 55% N-butane and 15% isobutane). Various mass charges of 50, 80 and 100g of LPG were used during the experimentation. LPG compares very well to R12. The COP was higher for all mass charges at evaporator temperatures lower than 15°C. Overall, it was found that at 80g charge, LPG had the best results when used in this refrigerator. The condenser was kept at a constant temperature of 47°C. Cooling capacities were obtained and they were in the order of about three to fourfold higher for LPG than those for R12 [5].

- M. Fatouh et. al.

Investigated substitute for R134a in a single evaporator domestic refrigerator with a total volume of 0.283 m³ with Liquefied petroleum gas (LPG) of 60% propane and 40% commercial butane. The performance of the refrigerator, tests were conducted with different capillary lengths and different charges of R134a and LPG. Experimental results of the refrigerator using LPG of 60g and capillary tube length of 5 m were compared with those using R134a of 100g and capillary tube length of 4 m. Pull-

down time, pressure ratio and power Consumption of LPG refrigerator were lower than those of R134a by about 7.6%, 5.5% and 4.3%, respectively. COP of LPG refrigerator was 7.6% higher than that of R134a. Lower ontime ratio and energy consumption of LPG refrigerator was lower than 14.3% and 10.8%, respectively, compared to R134a. In conclusion, the proposed LPG is dropping in replacement for R134a, to have the better performance, optimization of capillary length and refrigerant charge was needed [6].

- M.A.Hammadet.al.

Has experimentally investigated the performance parameters of a domestic refrigerator with four proportions of R290, R600 and R600a are used as possible alternative replacements to the R12. An unmodified R12 domestic refrigerator was charged and tested with each of the four hydrocarbon mixtures that consist of 100% R290, 75%R290/19. 1%R600/5. 9%R600a, 50%R290/38. 3%R600/11. 7%R600a and 25%R290 57.5%R600/17.5% R600a. The results show that the hydrocarbon mixture with 50%R290/ 38.3%R600/11.7%R600a is the most suitable alternative refrigerant which has COP which is 2.7% higher than the R12 [7].

- Somchai Wongwiset. al.

Has conducted to substitute R134a in a domestic refrigerator with hydrocarbon Mixtures of R290, R600 and R600a. A 239 litre capacity refrigerator initially designed to work with R134a was chosen in the experiment. The experiments are conducted with the refrigerants under the same no-load condition at a surrounding temperature of 25° C. The results show that 60%R290/40%R600 is the most suitable alternative refrigerant to R134a [8].

- Sanjeevsinghpunia&Jagdev Singh

Have Experimental investigation on the performance of coiled adiabatic capillary tube with LPG as refrigerant and conclude that There was an increase in mass flow rate by 106%, When the capillary inner diameter was increased from 1.12mm to 1.52mm. When the coil diameter of capillary tube was decreased from 190mm to 70mm, the mass flow rate was decreased by 13%, 7% and 9% for 1.12mm, 1.4mm and 1.52mm inner diameter of capillary Tube respectively. 1.40mm diameter capillary affected the system more as compared to 1.12 mm diameter capillary tube. Mass flow rate increases with increase in capillary inner diameter and coil diameter whereas mass flow rate decreases with increase in length. It was observed that the COP of system increases with similar change in geometry of capillary tube [9].

- Sanjeev singhpunia&Jagdevsingh

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- Gouvernement du Québec ,Régie du bâtiment du Québec

Propane gas refrigerators, installations designed to be supplied with gas requires that any new propane-powered refrigerator be equipped with a gas detector that can shut off propane supply when the burner gives off CO. The flame produced by the burner must be completely blue; if the flame is partly yellow or orange coloured, it is a sign that the burner needs to be cleaned or adjusted. Installing a propane gas refrigerator propane gas refrigerators require a sufficient supply of fresh air to operate safely and efficiently Inadequate ventilation, incomplete combustion or poor evacuation of the combustion products may all cause the building-up of (CO). the requirements of the Construction Code Verify the

tuning of the burner Make sure that the ventilation of the premises is adequate Install a CO detector [11].

• M. Rasti ,M.S. Hatamipour, S.F. Aghamiri, M. Tavakoli

Have investigate on Enhancement of domestic refrigerator's energy efficiency index using a hydrocarbon mixture refrigerant, and sowed that R436A (a mixture of R290 and R600a with a mass ratio of 56/44) in a 238 L single evaporator domestic refrigerator without any modification in refrigeration cycle. The refrigerator's compressor was charged with different amount of R436A.In comparison with R134a, the charge amount of R436A is reduced by 48%; the ON time ratio is reduced by 13%; the energy consumption is reduced by 5.3% in 24 h; the evaporator inlet temperature is reduced by 3.5 C; The results showed that TEWI of R436A is 11.8% less than R134a.According to our results and known environmental effects, R436A appears to be a suitable replacement for R134a [12].

• N.Austin,Dr.P.Senthil Kumar, N.Kanthavelkumaran

Have performed on Thermodynamic Optimization of Household Refrigerator Using Propane –Butane as Mixed Refrigerant and find that Pull-down time, pressure ratio and power consumption of mixed refrigerant refrigerator was under those of R134a refrigerator by about 7.6%, 5.5% and 4.3%, respectively. Also, actual COP of mixed refrigerant refrigerator was higher than that of R134a by about 7.6%. Lower on-time ratio and energy consumption of mixed refrigerant refrigerator by nearly 14.3% and 10.8%, respectively, compared to those of R134a refrigerator were achieved. R134a with a charge of 100 g or mixed refrigerant with charge of 80 mg or more satisfy the required freezer air temperature of -12°C . The lowest electric energy consumption was achieved using mixed refrigerant with heat level is less than -15°C [13].

• **Moo-Yeon Lee et. al.**

Have studied the cooled refrigerator by using the mixture ofR600a/R290 with mass fraction of 45:55 as an alternative to R134a. The compressor displacement volume of the alternative system with R600a/R290 (45/55) has modified from that of the original system with R134a to match the refrigeration capacity. The refrigerant charge of the optimized R600a/R290 system was approximately 50% of that of the optimized R134a system. The capillary tube lengths for each evaporator in the optimized R600a/R290 system were 500 mm longer than those in the optimized R134a system. The power consumption of the optimized R134a system was 12.3% higher than that of the optimized R600a/R290 system. The cooling speed of the optimized R600a/R290 (45/55) system at evaporator temperature of 15°C was improved by 28.8% over that of the optimized R134a system [14].

• A.S. Raut, U.S.Wankhede

Have worked on Selection of the Capillary Tubes for Retrofitting in Refrigeration Appliances and try to Use of alternative refrigerants play an important role in forming problems such as global warming and ozone depilation the coefficient of performance of refrigeration appliances improves in case of retrofitting the capillary tube. It is possible to obtain the effective size (diameter & length) of capillary tube by using of mathematical techniques and by maintaining proper pressure equalization between condenser and evaporator. The coefficient of performance of refrigeration appliance

CONCLUSION

- From the apparatus setup, the coefficient of performance of the refrigerator using LPG as refrigerant is 1.1 which is comparable to a domestic refrigerator.
- Though the COP is less than the Domestic refrigerator however the cooling effect or Refrigeration effect is observable and effective.
- To reach 10°C within 45min, this is good enough to preserve the consumable products.
- Hence the LPG based refrigerator can be used as an alternative for cooling instead of domestic refrigerator.

Economical

- Reduction in cost by utilizing direct LPG Gas from the cylinder.
- Consumption of Electricity is reduced to nil.

Inexpensive and Affordable

- Refrigeration is made less bulky as compressor and condenser are eliminated.
- The running cost of refrigerator is reduced.

Refrigeration Capacity

- Designing the system to meet the different cooling loads under different pressures.

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Multi Function Security Device for Car

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Abstract

The multi-function security device for cars is an innovative and advanced system designed to provide robust security features to cars. It is a highly integrated system that incorporates various security features such as anti-theft alarms, GPS tracking, immobilizers, and remote-control access. The device is designed to monitor and secure the car from theft, vandalism, and unauthorized access. It can detect any suspicious activity and trigger alarms to alert the owner and relevant authorities. The GPS tracking feature enables the owner to locate the car remotely, which helps in recovering the car if stolen. The device also features a panic button, which can be used to alert the authorities in case of an emergency. The multi-function security device for cars is a highly reliable and efficient solution for car security, and it provides car owners with peace of mind knowing that their cars are well protected

Keywords: Gps Tracking, Anti Theft, Remote Control Access

INTRODUCTION

We are introducing the high-tech car security system in the lowest budget and compact for the car. The Multi-Function Security Device is a highly advanced and versatile security system that utilizes a combination of cutting-edge technology to provide comprehensive protection. With the integration of GPS module, RFID, Wi-Fi module, and ATMEGA328, this device offers a range of features such as real-time location tracking, identification and access control, wireless connectivity, and microcontroller-based automation. Whether used for personal or commercial purposes, this device is designed to deliver reliable and efficient security solutions in a compact and user-friendly package.

FUNCTIONALITIES OF Multi-Function Security Device For Car

1. **Alarm System:** The device has an alarm system that triggers when the car is being tampered with or when someone tries to break into the car. This alarm alerts the car owner and the people around, making it difficult for thieves to steal the car.
2. **GPS Tracking:** The device comes with GPS tracking technology that allows the car owner to track the location of their car in real-time. This feature is useful if the car is stolen or if the car owner forgets where they parked their car.
3. **Remote Locking and Unlocking:** The device allows the car owner to remotely lock and unlock the car doors, which adds an extra layer of security. This feature is useful if the car owner forgets to lock the car or if they want to allow someone to access the car remotely.
4. **Immobilizer:** The device has an immobilizer that prevents the car from being started without the right key or code. This feature makes it difficult for thieves to steal the car, even if they have managed to break into it.

COMPONENTS

1. Micro-controller
2. Rfid tags and receivers
3. Gps tracker
4. Latch
5. Wifi module

WORKING

- The security and tracking system for a car consists of four main components: RFID, Wi-Fi Modular, GPS, and Microcontroller. The module is also connected to an AI system.
- The RFID tag and sensor are used as a key to open the car doors. If someone tries to open the door without the RFID tag, the alarm sets off. Along with the buzzer, the Wi-Fi module sends an alert SMS to the owner.
- RFID receivers are placed at various checkpoints, such as the entrance to a parking lot, to track the car's movements. The receiver data from the RFID will be stored in the cloud using a different server, with the help of the Wi-Fi module.
- Overall, this system provides multiple layers of protection, with various sensors and modules working together to secure and track the car.

ADVANTAGES

1. **RFID (Radio-Frequency Identification) and GPS (Global Positioning System)** are both technologies used for tracking and locating objects, but they have different advantages and disadvantages. Here are some of the advantages of using RFID over GPS.
2. **Cost:** RFID systems are generally less expensive than GPS systems, especially when it comes to the cost of the hardware. RFID tags are also much less expensive than GPS devices.
3. **Accuracy:** RFID can provide very accurate tracking, down to a few centimeters, while GPS accuracy can be affected by factors such as atmospheric interference, which can lead to errors of several meters
4. **Speed:** RFID readers can process data much faster than GPS systems, making it ideal for applications where real-time tracking is required.
5. **Indoor tracking:** RFID is well suited for indoor tracking, as it can penetrate walls and other obstacles that would obstruct GPS signals.

CHALLENGES AND LIMITATIONS

Complexity: The system may be complex to install and maintain, requiring technical expertise and specialized equipment.

Vulnerability to hacking: As the system relies on WIFI connectivity, it could be vulnerable to hacking and cyber-attacks, potentially compromising the vehicle's security.

Interference with other systems: The system's components, such as the GPS and WIFI modules, could interfere with other electronic systems in the vehicle, causing operational issues.

Future Scope

This combination of technologies provides a reliable, real-time and cost-effective way to track vehicles and can be used in a variety of applications, such as fleet management, security, and logistics.

CONCLUSION

In conclusion, the Multi-Function Security Device is an advanced and compact security system that utilizes cutting-edge technology to provide comprehensive protection for vehicles. By integrating RFID, Wi-Fi, GPS, and microcontroller-based automation, the device offers a range of features such as real-time location tracking, identification and access control, wireless connectivity, and more. The system provides multiple layers of protection, with various sensors and modules working together to secure and track the car can be used for personal or commercial purposes. However, before implementing this system, it is important to consider the potential benefits and drawbacks and carefully weigh the costs involved. Overall, this combination of technologies provides a reliable, real-time, and cost-effective way to track vehicles and can be used in various applications, such as fleet management, security, and

logistics.

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Design of Three Wheels Electric Scooters a Personal Mobility Vehicle

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ABSTRACT

In today's world, infrastructure of Airports, Industries, Recreational Parks, Sanctuaries, Palaces, and museum are becoming large so if one has to travel or visit from one place to another, he has to walk long distance and sometimes it becomes very hasty and inconvenient. Sometimes after too many traveling in industrial area causes strain and pain in body. so, to travel these distances two-wheeled or three wheeled electric scooter like Segway PT, Airway were introduced. But these scooters are very costly such as they start from ₹ 50,000. Another problem with those vehicles is that they are difficult to handle when we drive first time. So, in alternate to this product, we developed whole newly designed product and this is Reliable, Eco-friendly, Compact vehicle for mentioned places. Its utilities are college campus, Airports, Industries, Recreational Parks, Sanctuaries, Museums, Palaces, Villas etc. So, our research is on design and development of three-wheel personal mobility vehicle and also its multipurpose utility among the society.

Keywords: Personal Mobility, Front wheel drive, Three-wheel electric scooter, Campus mobility solution, Lithium-ion battery, Electric vehicle.

1.INTRODUCTION

Our proposed three wheels e-scooter as a personal mobility vehicle will plays a promising role in designing and creation So, our main Objectives to design a 3-wheel e-scooter is to development of an economical, compact and eco-friendly electric vehicle for the large infrastructure such as Airports, Industries, Recreational Parks, Sanctuaries, Museums, Palaces, Villas etc which are used to build in large area & when visitors or tourist visit those places, they have to cover a long distance 7 to 8 kilometres by walking, which consume more time & people start feeling tired of walking. Where walking consumes a lot of time. This personal mobility front wheel drive battery operated vehicle, specially design in Solid work 3D designing software for indoor and outdoor mobility in large campuses and long distances area can be cover in short period of time. It is front wheel drive with In-wheel hub motor mounted on front of the vehicle provided with disc brake at rear axle. 10inch 24v 350w front wheel hub motor which will have 100 Kg of endurance capacity of load while giving 20 to 30kmph of speed with 400 RPM of motor. 20ah 25v lithium-ion battery will be use to provide power to motor. A controller will be use to connect all electrical components like battery, motor, throttle. mild steel material will be uses for frame & platform purpose to make vehicle light weight & strength.

LIERATURE REIEW AND OBJECTIVE

[1] In this modelling and analysis of the two wheels electric vehicle were done using Solid-works software. In results it indicated that the Von-mises stress and total deformation were less and the fatigue life was more for the designed vehicle. So, it was concluded that, the proposed design of the lightweight two-wheeler electric vehicle offers sufficient strength and is safe for use. [2] In this project they have design and developed a two wheeled electric scooter. Where hub motor is use in rear wheel which make it rear wheel drive vehicle with providing drum brakes. they have work on various calculation such as vehicle performance, aerodynamic drag, gradient resistance. [3] In this paper an innovative concept for designing the electrical drive of automobiles is presented which allows optimizing the acoustic behaviour on a virtual basis. In special, the acoustics of an electric wheel hub motor is studied in detail. Therefore, a holistic simulation workflow has been developed which takes into account the electromagnetic field as the most important vibration excitation as well as the structural vibrations coupled with air volume around the to calculate the air pressure. [4] In this project, they have work on large size three wheel e-scooter for carriage purpose .this vehicle was integration of the electric scooters with the industrial load carriers into a single vehicle. so that the customer using it can get the privilege of using it for both the transportation purpose and also for load carrying and the proposed model is lighter in weight, requires less maintenance. They analysed frame structure & focused on fabrication

with light weight material. [5] In this research paper Sharad Patel & their team had work on three wheels electric scooter for large college campus use. They designed this three wheel electric scooter by using 250 watt motor as a front wheel & 20 Ah 48 v lithium ion battery. Their project helps us to understand about hub motor and electric power system. [6] A simple BLDC motor control algorithm for low cost motor drive applications using general purpose microcontrollers has been created and presented in this paper the proposed design it allow the user to rotate the motor either clockwise or counter clockwise direction. Depending on the rotor position the sensor will give response to the controller circuit. Then the controller circuit will fix the direction of current following to the stator. The design controller circuit is also implemented. The overall design consists of microcontroller circuit, logic gates, switching devices (MOSFET/BJT), BLDC motor, sensors.

OBJECTIVE

The main objectives that we are looking for in this project are to:

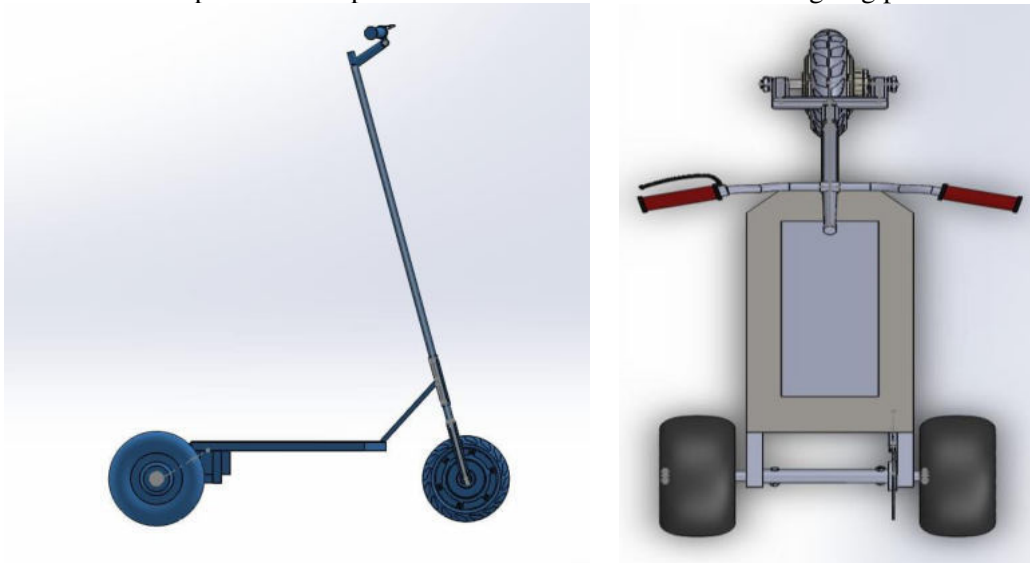
- a) Design and manufacture three-wheel light weight electric scooter for the personal mobility vehicle.
- b) Front wheel is rotated by BLDC hub motor wheel and controlled by speed regulator.
- c) The system will then be planted into three-wheel e-scooter with particular specifications.

1. MATERIALS AND METHODS

After the selection of the project and the topic related to it, we decided to read and study research paper and topic related to the project which were directly or indirectly related to topic and each of us started to read the project report and research paper which were related to our topic after studying paper we get the knowledge of what mechanism was needed for our project and we started to find the various mechanism to active the required work. After that we began serveying the market for various parts needed for our project work and we decided what part should be purchased and which can be oversells so that it becomes more cost effective.

Design

Due to paper which we have studied we finally got the idea or we can say finally comes to know that what should be the design. The main purpose was to make vehicle light weight ergonomic design so that it would be helpful for workplace for needs after that Done the designing part on solidwork.



Frame

For frame and chessis we have considered mild steel. We studied about material and compared their properties, so we can get a good material for our light weight electric scooter. the frame was made up

of two type of mild steel pipe 25 mm diameter where as other frame structure which were made of hollow rectangular mild steel pipe of 45*20 , square section we selected Hollow pipe structure because it has minimum weight and enough strength Design Due to paper which we have studied we finally got the idea or we can say finally comes to know that what should be the design. The main purpose was to make vehicle light weight ergonomic design so that it would be helpful for workplace for needs after that Done the designing part on solidworks.



Motor Controller

In our three- wheel electric scooter, we are using 24v, 350w BLDC motor controller to control the speed of vehicle and provide the power supply to BLDC hub motor wheel. A controller is a component that connects all electrical parts on the e-bike/e-scooter together. It connects the things like the battery, motor, throttle, display, pedal-assist, and various sensors. It is a small computer that acts as the heart of the e-bike or e-scooter. It can manage the overall functioning of the e-scooter.



Lithium ion-battery

In this project 24v, 350w in-wheel hub motor is used.so for the power supply to this transmission system 24v dc supply required. Therefore, we are using 20ah, 25v lithium-ion battery for our project. A Lithium-ion or Li-ion battery is a is a type of rechargeable battery which uses the reversible reduction of lithium ions to store energy. It is the predominant battery type used in

portable consumer electronics and electric vehicles. It also sees significant use for grid-scale energy



storage.

Hub Motor

The wheel rim size is 10Inch power of motor is 24v 350w and weight is 4.5kg. The front wheel is Brushless DC hub motor and also a power source to drive the vehicle. It is also called as an In-wheel motor in which the motor assembly is comes inside the wheel itself. there is no need of extra chain sprocket mechanism as motor is inside the wheel. This way arrangement reduces space for power drive mechanism and makes it more compact and light weight.



Calculation :-

1. Hub motor calculation

Motor Specification Volt (V) = 24v, Power (P) = 350w

Power Equation

Power (P) = Current (I) × Voltage (V)

Hence, $I = P \div V = 350 \div 24 = 14.58 \text{ Amp}$.

2. Speed of Motor In RPM

$N = K \div (d \times 0.001885) = 35 \div (25.4 \times 0.001885) = 731 \text{ RPM}$

Where, N = Speed In RPM, K = Speed In kmph d = Wheel Diameter in cm

• Wheel Diameter (d) is 10 inch (Given) 1 inch = 2.54 cm,

So, d = 10 inch = 25.4cm • Speed In kmph (K) is 35 kmph (Given)

3. Torque of the motor (T)

$T = (P \times 60) \div (2 \times \pi \times N) = (350 \times 60) \div (2 \times 3.14 \times 731) = 4.57 \text{ Nm}$

Torque of the wheel hub motor, T = 4.57 Nm

4. Rolling resistance

Frrolling = $C_{rr} \times M \times g$

Where, C_{rr} = Coefficient of Rolling Resistance, M = mass in kg, g = acceleration due to gravity = 9.81 m/s²

For application consider, $C_{rr} = 0.004$ Bicycle tire on asphalt road

And weight of our scooter = 110 kg

Then, $F_{\text{rolling}} = C_{rr} \times M \times g = 0.004 \times 110 \times 9.81 = 4.316 \text{ N (Newton)}$

5. GRADIENT RESISTANCE

$F_{\text{gradient resistance}} = \pm M \times g \times \sin \theta$

$F_{\text{gradient resistance}} = \pm M \times g \times \sin \theta = 110 \times 9.81 \times \sin 2.50 = 47.069 \text{ N}$

6. Aerodynamic drag

$F_{\text{aerodynamic drag}} = 0.5 \times C_D \times A_f \times \rho \times v^2$

Where, C_D = Drag coefficient, A_f = Frontal area ρ = Air density in kg/m^3 , v = velocity in m/s

For application consider, maximum speed of our scooter is 35 kmph (given) that is 9.72222 m/s and air density is 1.1644 kg/m^3 at 300 temperature and drag coefficient is 0.5, frontal area is 0.7.

Then, $F_{\text{aerodynamic drag}} = 0.5 \times C_D \times A_f \times \rho \times v^2 = 0.5 \times 0.5 \times 0.7 \times 1.1644 \times (9.72222)^2 = 19.2606 \text{ N}$

7. The force required for driving a vehicle is

$F_{\text{total}} = F_{\text{rolling}} + F_{\text{gradient}} + F_{\text{aerodynamic drag}} = 4.316 + 47.069 + 19.2606 = 70.645 \text{ N}$

Then, The power required for driving a vehicle is, $\text{Power} = \text{Force} \times \text{Velocity} \times (350 \div 3600) = 70.645 \times 35 \times (350 \div 3600) = 239.839 \text{ watt}$

8. Battery Calculation

From motor calculation we get, $\text{Wattage} = 350 \text{ W}$, $\text{Voltage} = 24 \text{ V}$

So, To find $\text{watt.hr} = 350 \text{ w} \times 1 \text{ hr} = 350 \text{ w.hr}$

Out of the full battery 80% should in use and 20% should remaining in this case .

To find the battery $\text{watt.hr} = 350 \text{ w.hr} \times 1.20 = 420 \text{ w.hr}$

Hence, $\text{Current (Ah) in battery} = 420 \text{ w.hr} \div 24 \text{ V} = 17.5 \text{ Ah}$

9. Selection of battery charger

Suppose we have to charge a battery in 5 hr.

So our required wattage is 420 w.hr. According to above condition,

$\text{Wattage of charger} = 420 \text{ w.hr} \div 5 \text{ hr} = 84 \text{ w}$ Hence, $\text{current rating of charger} = 84 \text{ w} \div 24 \text{ v} = 3.5 \text{ A}$ As per the above calculation to charge 25v, 20.8 Ah battery in 5 hour we require 25v, 5A charger.

8. CONCLUSION

This project concluded the importance of three-wheel electric scooter as a personal mobility vehicle and its design requirements. Three-wheel e-scooter is making the shift to the source of energy which is cost effective. Three-wheel e-scooter can travel without any noise and without any toxic gas emission, and an environment friendly. In conclusion of this project work, literature review is done on the best candidate for a three-wheel electric scooter for personal mobility vehicle. In this project, distinct importance has been strained to lithium-ion battery as energy as main power source. Also, the main features of the proposed three-wheel e-scooter design of proper balancing and light weight vehicle. The objective of selecting the suitable components for three-wheel e-scooter design is studied and analysed. We selected BLDC hub motor for front wheel. Speed controller is selected to control the speed of motor. We selected these components based on the load requirements for 100 kg at maximum speed of 20-30 km/h. The various components for the same is selected based on analysis and literature review done. The Hub motor power requirements is analysed to achieve maximum speed of 25 km/h with 100kg load. This report is the documentation of the design, analysis and selected components that can be used to produce the actual parts.

9. Acknowledgement

It's my pleasure to take this opportunity to thank with deep sense of gratitude to our guide, staff members of Automobile department and everyone who have directly or indirectly contributed to our project as a success. With immense pleasure we express our deep sense of gratitude and vote of thanks to our project guide Prof. Irshad shaikh for his constant interest, motivation and valuable guidance during work and completion of this project report.

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Design And Fabrication of Automated Lawn Mower

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ABSTRACT

This paper presents an automatic lawn mower which is a device or robot that help human to cut grass automatically. Due to rapid development, many conventional lawn mowers have turn into robotic mowers. But they are expensive and have certain demerits. Hence, we designed autonomous lawn mower that fulfills the requirement of a robotic mower, which is economically feasible and environmentally friendly. Sensors are used to provide feedback from outside world. Arduino UNO and Motor Drive Controller microcontrollers controls the entire system. Every action of the Lawn Mower is monitored by the microcontroller with the help of the sensor. Furthermore, Siemens NX as CAD software used to design the structure of the lawn mower. Also, this lawn mower will be self-guided without a need of human directional control due to ultrasonic sensor and the microcontroller that helps in the movement of the machine. The discharge type of this lawn mower is of bagging type. The overall conclusion of this paper is to select proper components with proper designing calculations and also analysis the structure by using Ansys as Engineering Simulation software.

Key Words: *Robotic Mowers, Arduino Uno, Bagging type, Rapid Development, Siemens NX*

INTRODUCTION

Lawn mowers designed by Edwin Beard have been in existence since the early 1800s. Machines for grass cutting is popular amongst workers in agriculture, gardening, landscaping, horticulture, etc. Automatic lawn mower is a machine that cut grass automatically. It can be state as a machine or robot that helps people to do cutting grass work. The automatic lawn mower will do the cutting grass task with a preset setting by the user. Unlike other robotic lawn mowers on the market, this design requires no perimeter wires to maintain the robot within the lawn. Through an array of sensors, this robot will not only stay on the lawn, it will avoid and detect objects and humans . Lawn care and maintenance is a tedious thing to do for people who are always busy in daily life. Because it's not just about cutting the grass, it also includes services to receive the necessary nutrients to achieve its thickness, colour and overall health benefits. There are many things that are harmful to your lawn. for example, high temperature, draught, weeds, insects etc. Cutting grass cannot be easily accomplished by elderly, younger, or disabled people. Motor powered push lawn mowers and riding lawn mowers create noise pollution due to the loud engine, and local air pollution due to the combustion in the engine. Also, a motor powered engine requires periodic maintenance such as changing the engine oil. Even though electric lawn mowers are environmentally friendly, they too can be an inconvenience. Along with motor powered lawn mowers, electric lawn mowers are also hazardous and cannot be easily used by all.

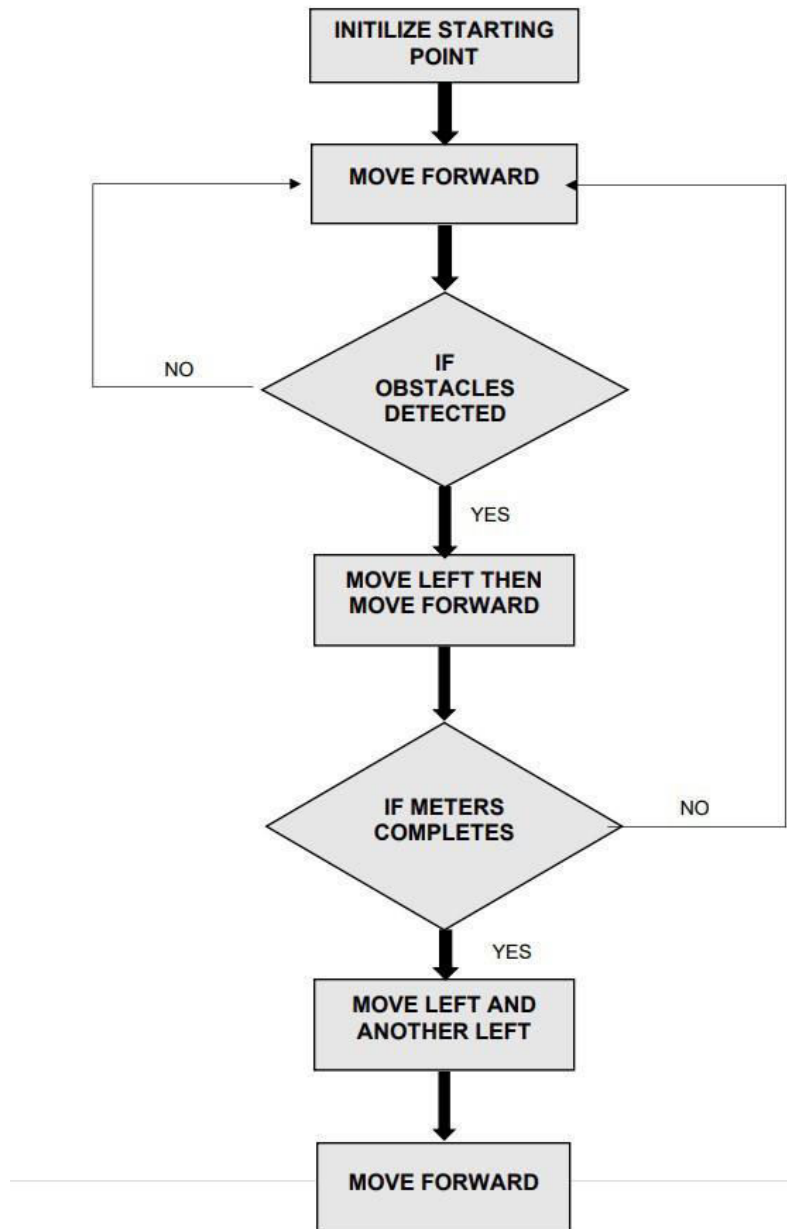
Motivation of the Project:

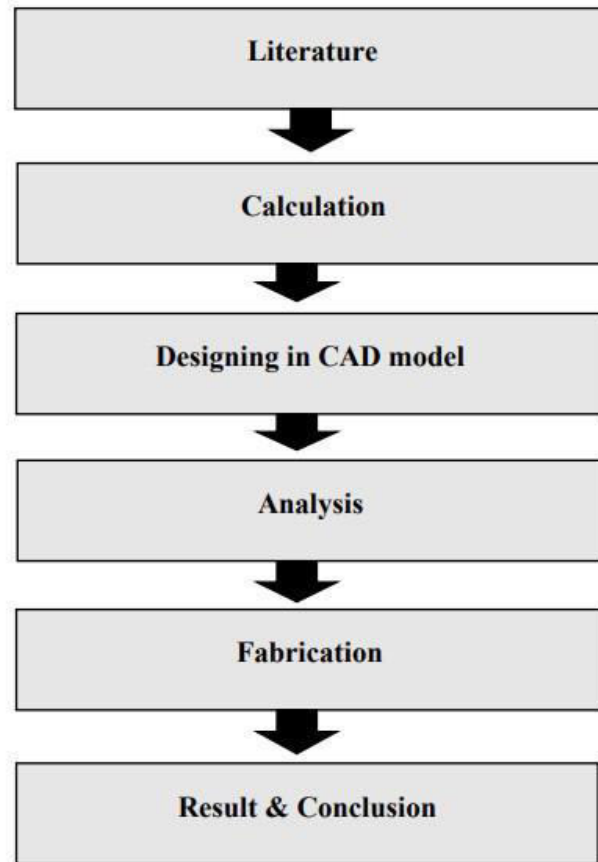
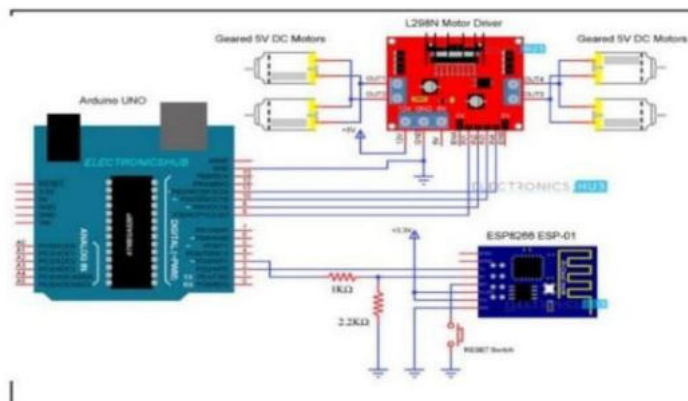
The primary motivation for our project is to remove the chore of mowing your lawn. By creating a lawn mower that handles this task autonomously, t he user is freed from this physically demanding and time consuming task. O ur design helps those with physical limitations who could not otherwise mow their own lawn. Even without a physical limitation, the autonomous lawn mower provides the user with more free time. This freedom is provided in a worry-free platform in which little user

interaction is required. Our project idea was introduced by group member Harsh Bhoir. His design idea was to create a fully autonomous lawn mower that maps the target

LITERATURE REVIEW AND OBJECTIVE

Flow Chart Of Model:



Methodology:**Proposed System:****Hardware Requirements:**

- 8051 family microcontroller
- Solar panel.
- Motor Driver IC.
- Ultrasonic Sensor.

- Batteries.
- Robotic Body **Software requirement:** C Language.

Proposed Code:

```
#include

#include "uart.h"
void init();
void go_left();
void go_right();
void spiral();
void
random();void
backup(); void
pwm();
int isSomethinginproximity();
int isSomethingInMyWay();
int amIonconcrete();
int main()

{
init();//Calls initialize function
while(1)

{
spiral();//Calls spiral function

if( amIonconcrete()) //If detect concrete
{

backup();//Calls backs up function function
_delay_ms(3000); //delay 3 seconds
go_right();// Calls go right function
pwm();//Calls and sets PWM signa l
PORTB = 0xFA; //Forward
}

if ( isSomethingInMyWay()) //If detects object
{

stop();//Calls stop
function
_delay_ms(5000); //delay 5 seconds
backup();//Calls back up
function
go_right(); pwm();//Calls go right function
PORTB = 0xFA; //Forward}
}

}
void int()

{
}
```

Components:

- 8051 family microcontroller.

For any robotic system, the microcontroller is the heart and it's where everything comes together. The ATmega16 has 8 ADC Channels, 4 PWM Channels, 16K Bytes Flash, Low Power, and 32 I/O lines. The ADC channels are being used for the analog to digital conversions from our sensors, four PWM channels which will be used on the enable pins of our H-Bridge which controls the speed of our wheels, and 4 output pins will be used for the DC motors (2 per motor).



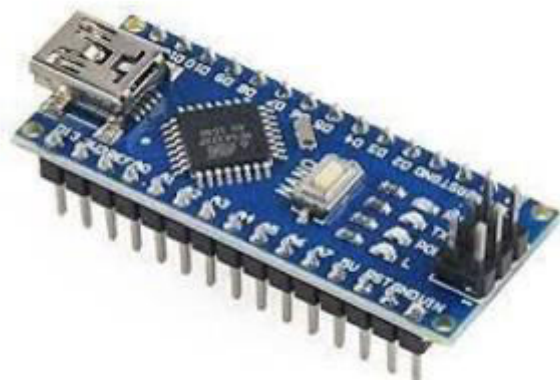
- Robotic chassis.

These will be required for the cause of the motion of the body of the robot. The choice of the wheels largely depends on the shape and size of the grass. It will also depend on the required ground clearance of the robot. As treads of the tires can contribute significantly to the performance of the mower, great caution is needed during the decision to choose the particular tires.



Arduino Nano: We used Arduino Nano in this bot in order to increase the modularity of the bot and also account for future modification. The major advantage of Arduino Nano is its capability to perform in such a small form factor. Also the programming language used for Arduino is C, which is a very popular high level language.

Technical specification
 Microcontroller - ATmega
 328 Operating voltage- 5v
 Flash
 memory - 32
 kb Clock
 speed - 16
 MHz Analog
 IN pins - 8
 PCB size -
 18x45 mm



PCB weight -
7 grams

Lead acid battery:

The image shows the battery pack that used for the project.

Voltage: 12V

Amp

hours: 1.2

Size: 97*25*5

1 mm

Weight: 0.30k

g



L293d9 Motor Driver

This typical motor driver or motor driver ic which allows two DC motors to be driven in either directions.

L293D9 is a 16 pin IC which can control asset of two DC motors simultaneously in any direction. It means that you can control two Dc motors in a single L293D9 IC

Technical specification

- Operating voltage- 5V
- Operating current – 3 amps
- Output current- 1.2 amps
- Dimensions – 44x37 mm



DC Series Motor

The speed controller works by varying the average voltage sent to the motor. It could do this by simply adjusting the voltage sent to the motor, but this an inefficient method. A better way is to switch the motor supply on and off very quickly. If the switching is fast enough, the motor functioning does not get affected, it only notices the average effect.

Technical specification

- Operating voltage- 12V
- Operating current-80 mA
- Rpm-60-80 rpm, 1000 rpm



Solar panel:

The solar panel was installed on the top of th panel to be exposed to direct sunlight to absorb the maximum amount of solar to supply the motors and the associated electronic parts as well as charging the battery with electric power.



Blades & Mop attachments:

o This enables maximum airflow through the blades and produces a vertical suction like no other. The fast circular motion of the blades makes the grass taut and ready for a perfect trim. Thus, it allows you to cut your lawn to utmost precision, giving it a fresh and defined finish. High-lift blades range from 1-21 inches in length and are best suited for yards with tall grass. The high level of suction makes sure there is no accumulation of grass in the chute, preventing blockage.



o A dry mop is designed to pick up dry, loose contamination such as dust, earth, and sand from the surface of the floor. It consists of yarn or microfiber and can be used as a first step in cleaning a floor. Professional dry mops consist of a flat sheet of microfiber textile or sheets with a surface of looped yarn, usually about 15 cm (6 in) wide, lengths (usually 30–100 cm).



- Ultrasonic sensor:

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal.

D = 0.5 x 0.025 x 343 mm.



Features:**Three safety sensors**

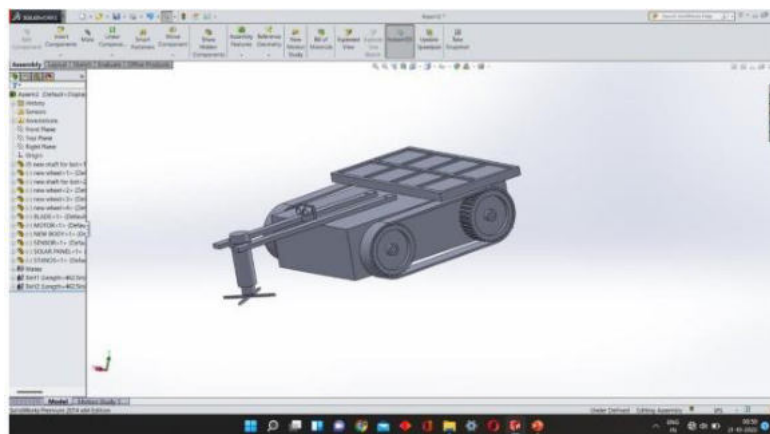
- PIR Sensor (Human detection)
- Ultrasonic Sensor (Object detection)
- Accelerometer (prevents lawn operations while being held)

Cuts grass into tiny pieces that will later fertilize the lawn

- Solar powered.
- “Plug and Cut” Design. No installation required.

Benefits

- Zero emissions
- Helps reduce the 5% of the U.S. pollution caused by gas powered lawn mowers.
- Will not show up on electrical bill.

Solid Works Model:**References:**

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Ramp Pump

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ABSTRACT:

In order to start a hydraulic ram pump, the user must first manually prime the pump. This involves manually opening and closing the waste valve in order to begin the pumping cycle. As part of the ESW Philippines Ram Pump Project I lead the design and construction of a working lever prototype for 3” AIDFI ram pumps here at Northwestern. This summer I then traveled to the pump site in order to fully field test the mechanism. During field testing and observations, it became clear that the originally planned methods of collecting observations would have to be changed due to ram pump construction schedules, time constraints, and cultural respect. Detailed observations of AIDFI technician lever field testing was done at two scheduled primary tests. The field testing provided vital information regarding regular use and conditions of testing. The lever design itself also changed quite drastically during testing with the help of new information.

INTRODUCTION:

A ramp pump, also known as a hydraulic ram pump, is a type of water pump that uses the energy of flowing water to lift a smaller amount of water to a higher elevation without the need for external power or electricity. The pump works by using the kinetic energy of a large volume of water flowing at a low head and diverting a small portion of that water into a vertical delivery pipe, where it is lifted to a higher elevation through a series of valves and a check valve. The ramp pump is an effective and sustainable technology for water supply in rural areas, especially in locations where there is a continuous supply of flowing water. It is low-maintenance, cost-effective, and has no environmental impact. It is often used for irrigation, livestock watering, and household water supply. The ramp pump was invented by the Frenchman Joseph Michel Montgolfier in the late 18th century and has since been refined and improved by many inventors and engineers. Today, ramp pumps are widely used in developing countries and remote areas around the world, where access to electricity and conventional water pumps is limited. A ramp pump is a type of water pump that uses the energy from flowing water to pump a portion of that water to a higher elevation. The pump operates using a simple hydraulic principle known as the water hammer effect, which is caused by the sudden stoppage of a fluid in a pipe. The ramp pump consists of a long, sloping pipe, called the ramp, which is connected to a shorter, vertical pipe, called the delivery pipe. The ramp is placed at a slight angle, usually between 4 and 8 degrees, and water flows down the ramp due to gravity. As the water reaches the bottom of the ramp, it strikes a check valve that causes the water to abruptly stop, creating a pressure wave that travels up the ramp and into the delivery pipe.

MATERIALS FOR RAMP PUMP:

The materials needed to build a ramp pump can vary depending on the design and specifications of the pump. However, here are some common materials that may be required:

PVC pipes: These are usually used as the main body of the pump.

Check valve: This is a one-way valve that allows water to flow in one direction only.

PVC glue: Used to connect the PVC pipes and fittings.

Rubber ball: This is used to create a seal between the PVC pipes and check valve.

Metal screen: This is used to filter out debris from the water before it enters the pump.

PVC fittings: These are used to connect different sections of PVC pipes.

Concrete or cement: This is used to create a base for the pump.

PVC primer: This is used to prepare the PVC pipes and fittings for gluing.

PVC cutter: This is used to cut the PVC pipes to the desired length.

Hose clamps: These are used to secure the hose to the pump and the water outlet.

Water hose: This is used to transfer water from the pump to the desired location.

Teflon tape: This is used to wrap around the threads of the PVC fittings to create a watertight seal.

MATERIALS REQUIRED FOR RAMP PUMP

SNO	MATERIAL	UNIT COST	QTY	TOTAL COST
1	PVC pipes	120	3	360
2	Check valve	350	4	1400
3	PVC glue	200	1	200
4	Rubber ball	500	2	1000
5	Metal screen	850	1.5	1275
6	PVC fittings	1200	2	2400
7	Concrete or cement	300	1	300
8	PVC primer	80	1	80
9	PVC cutter	360	1	360
10	Hose clamps	36	10	360
11	Water hose	80	40	3200
12	Teflon tape	20	5	100
TOTAL COST				11035

THEORETICAL EQUATIONS:

The efficiency of the test device that estimated by using the equation below

$$\eta = q \cdot h / Q \cdot H$$

where η = pump efficiency; H – tank height at inlet (m); h – tank height at exit (m); Q – volume flow rate at inlet (LPM); q – volume flow rate at exit (LPM).

The volume flow rate (Q) at the exit can be calculated by using flow meter as:

$$Q = V \cdot A$$

where V – inlet velocity, m/s; A – cross section area, m².

But, the (q) can be measured by using the simple ways of determine the flow rate by using a) cylinder beaker known volume b) timer as

$$q = V / T,$$

where V – volume, m³; T – time, s.

RESULT:

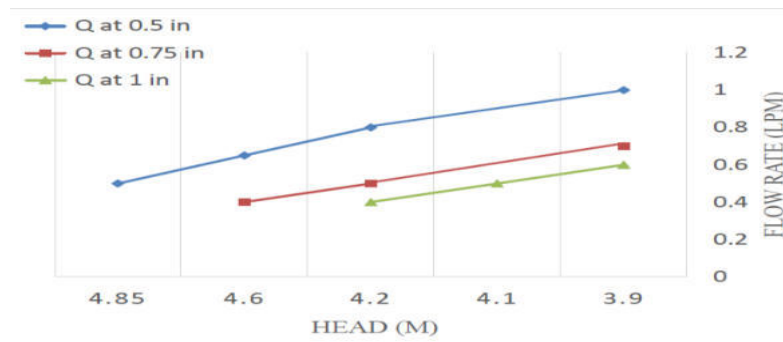
In this study, the head and the flow rate was calculated in three inlet water level (1.9, 1.8 and 1.65) m at three inlet pipe diameter (0.5, 0.75 and 1 in) at constant inlet flow rate 7 LMP.

The results show the head and flow rate at the exit not effected by changing the pressure value in pressure vessel, although changing it by three ways:

- using filter cartridge;
- balloon from rubber;
- pressuring it by air from hole at the outside surface.

discusses the relationship between the head (m) at exit pump at the X-axis and the volume flow rate (LPM) at the Y-axis at height of inlet water supply level at (1.9, 1.8 and 1.65) m. Results show when increased the head, the flow rate was decreased that mean inversely relationship. Also at the diameter (0.5 in) is better from other diameter by the head and flow rate.

Additionally, the maximum flow rate shows in (0.5 in) diameter at 1.9 m water supply level.



DISCUSSION:

Ramp pumps are pumps that require ramps to bring water up from lower ground to higher ground. They are commonly used to move water to higher elevations in agricultural applications, such as irrigating crops or providing a reliable source of drinking water for farm animals. They can also be used to move water to homes and businesses in rural areas. Advantages of ramp pumps include being relatively easy to install and maintain and in many cases less expensive than other solutions such as windmills and electric pumps. They can be powered by either wind or manual labor, depending on the application. Ramp pumps are also more reliable than other solutions because they are not affected by power outages or incidents of bad weather. Disadvantages of ramp pumps include that their maximum flow rate is often quite low, and they cannot provide an adequate amount of water over long distances. Additionally, they are not suitable for areas where there are steep inclines or extremely variable terrain. They also require regular maintenance. A ramp pump is a type of automotive fuel delivery system in which fuel is delivered to the vehicle by a mechanical lifting mechanism, as opposed to the traditional method of fuel injection. The main purpose of this type of system is to increase the pressure at which gas is delivered to the vehicle, which can lead to increased performance and fuel economy. The main components of a ramp pump system include the pump, fuel filter, fuel line, pressure regulator, and in some cases an electronic control unit. The pump utilizes an electric motor to power a system of pistons and valves that increase the pressure at which the fuel is delivered. The filter removes any particles or contaminants and the regulator ensures a consistent fuel pressure throughout the vehicle. The ECU, if present, is used to regulate the system according to the driving conditions present.

CONCLUSION:

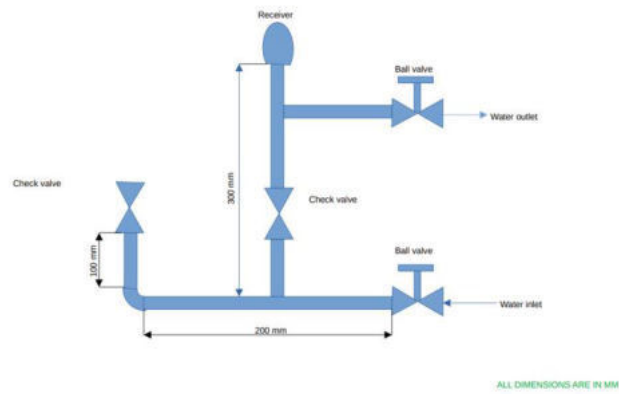
The ramp pump is a powerful, cost-effective and efficient solution for pumping liquid pneumatically. It allows users to take advantage of the flexibility of compressed air to move substantial amounts of liquid or slurry with precision. The ramp pump also provides an efficient, reliable and timely solution for many industrial applications, thereby improving overall productivity and profitability.

ACKNOWLEDGMENT:

We would like to thank the ramp pump team for their hard work and dedication in getting this project off the ground. We are grateful for their support in making our dreams of providing clean, affordable water to the people of our community a reality. We are deeply appreciative of the team's effort, patience and enthusiasm throughout this journey.

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BLOCK DIAGRAM:



Front View:



Top View

Pollution Elimination Device

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ABSTRACT

Air pollution refers to the release of pollutants in the air, it is detrimental to human health as well as the planet also. According to WHO each year air pollution is responsible for nearly seven million deaths around the globe. Nine out of ten human beings currently breathing air that exceeds the WHO's guidelines limit for pollutants. Air pollution in the form of methane and carbon dioxide raises earth's temperature which is resulting in extreme climate changes around the world. In this project we are making an attempt to eliminate exhaust pollutant gases completely. The high pressure exhaust gases will strike the turbine. The turbine is connected to a dynamo, which is used to generate power. Depending upon the airflow the turbine will start rotating, and then the dynamo will also start to rotate. A dynamo is a device that is used to convert kinetic energy into electrical energy. The generated power is stored in the battery. The pressure of exhaust gases will decrease after it hits the turbine. Then after that low pressure exhaust gases will go through exhaust pipe. At the outlet of exhaust pipe we will put carbon filters which will absorb low pressure exhaust gases in it. The pollutant gases will be completely eliminated by this.

1. INTRODUCTION

Human Activities worldwide has been associated with large amounts of emissions of harmful species into the atmosphere. Today the air is severely polluted and this has a tremendous effect on the health and economic factors of the human population.

Industrialization and growth in vehicles has led to rapid deterioration of indoor and outdoor air quality.

In urban areas Transportation sector has the major contribution, producing 74% of all CO and lead emitted into the atmosphere. With the number of vehicles steadily increasing, the situation had gone even more worse. People now even look at the air quality of the locality before choosing new home. The emissions of CO₂, SO₂, NO_x, Unburned HC, PM and N₂O has received great concern. The researchers in different part of the world are engaged in development of technologies for control of these species.

This project aims to explore and put forward the vehicular emission control techniques, technology and allied environmental issues. A complete scenario of the emission control measures from Indian perspective has been included. Government norms, their implications and viewpoints have been presented. We hope that this work would serve as a reference for further work in this field.

LITERATURE REVIEW AND OBJECTIVE

TYPES OF POLLUTANTS EMITTED FROM A VEHICLE:

- Hydrocarbons: This class is made up of unburned or partially burned fuel, and is a major contributor to urban smog, as well as being toxic. They can cause liver damage and even cancer.
- Nitrogen oxides (NO_x): These are generated when nitrogen in the air reacts with oxygen under the high temperature and pressure conditions inside the engine. NO_x emissions contribute to both smog and acid rain.
- Carbon monoxide (CO): A product of incomplete combustion, carbon monoxide reduces the blood's ability to carry oxygen and is dangerous to people

with heart disease.

- Carbon dioxide (CO₂): Emissions of carbon dioxide are an increasing concern as its role in global warming as a greenhouse gas has become more apparent.
- Particulates: Particle of micrometre size and are harmful.
- Sulphur oxide (SO): General term for oxides of sulphur, mostly sulphur dioxide and some sulphur trioxide, from coal or unrefined oil.

Research paper

TITLE	AUTHOR
Methods and Techniques for CO ₂ Capture: Review of Potential Solutions and Applications in Modern Energy Technologies	Karolina Chmiel, Navaneethan Subramanian and Tomasz Ku´
Effects of Carbon Filtration Type on Filter Efficiency : Granular Loose vs Bonded Filters	Chamber Andre : CEO, Air Science LLC
Design and Development of Pollutant Gases Absorbing System	Ram Gopal Narendra, Pawan Bhawsar, Himanshu Gangwal , Vikas Patidar.
A Review of Thermoelectric Generator for Waste Heat Recovery from Engine Exhaust	Dipak Patil1, Dr R. R. Arakerimath
Technologies to recover exhaust heat from internal engines	R. Saidur a, M.Rezaei a, W.K.Muzammil a, M.H.Hassan
The composition of exhaust gases from diesel gasoline and propane powered motor coaches	Martin A. Elliot,Gerge J. Nebel& Fred G. Rounds

- Generation of Electricity by Using Exhaust from Bike by S.Vijaya Kumar, Amit Kumar Singh, Athul Sabu and Mohamed Farhan. P[1]:- According to their study, it has been identified that there are large potentials of energy savings through the use of waste heatrecovery technologies. Waste heat recovery entails capturing and reusing the waste heat from an internal combustion engine and using it for heating or generating mechanical or electrical work

- Study and performance analysis of charging vehicle battery using bike exhaust gas by K. Kuma ravel, P. Balashanmugam, and G. Balasubramanian[2], had done different studies according to their practical inputs. They had approached the problem with different engine RPM. Practically different engine speeds for different turbine power output were observed. Power Generation by Exhaust Gases On Diesel Engine by Kranthi Kumar Guduru, Yakoob Kol ipak, Shanker. B and N. Suresh[3]:-. Waste heat recovery entails capturing and reusing the waste heat from the internal combustion engine and using it for heating or generating mechanical or electrical work. It would also help to recognize the improvement in performance and emissions of the engine if these technologies were adopted by the automotive manufacturers

Objectives

NEED TO REDUCE EMISSION:

The present research indicates the importance of the control technologies for CO₂ and NO_x. Global climate change has also put impetus on the development of the cost-effective way to capture large quantities of CO₂ and NO_x from coal-burning facilities.

Typically the environmental issues related to NO_x pollution are now receiving great public profile. Besides their contribution in global issues like green house effects, global warming and ozone layer depletion, NO_x may combine with water in the atmosphere to form acid which has adverse environmental and health effects. The environmental effects of NO_x vary with the amount and type of NO_x emission sources in the given area. One of the first serious harmful effects of NO_x identified was the role they played in the photochemical smog that appeared over Los Angeles in the mid 1940s. The other effect is due to the formation of acid when it combines with water in the atmosphere. The pH of the acid rain is a result of both NO_x and SO₂, which on average have 30% and 70% share respectively. These oxides work synergistically in the erosion of limestone, marble and travertine causing major damage to work of art in stone.

The NO_x can be highly toxic for human health if inhaled in high concentration. After entering the body it forms nitrite, which oxidizes the iron in haemoglobin rendering it ineffective as an oxygen carrier. Nitrite can also combine with amines to form carcinogenic nitrogen compounds. Short-term exposure of 100 µg/m³ can cause pulmonary damage, increased airway resistance in healthy individuals, scarring of lungs and eventually loss of functional lung tissues. Exposure of NO₂ in low level dose can also induce alteration in the function of kidneys, liver, spleen, red blood cells and cells of immune system.

We will install a mechanism with axial high-pressure reaction rotor with a backward curved reaction rotor (Exhaust Fan Blade) in a single shaft with an electrical generator. In this project, a serious attempt will be made to eliminate exhaust gases pollution completely. Low pressure exhaust gases after striking the rotor fan will go through the exhaust pipe and at the outlet of the exhaust pipe there will be carbon and fiber filters which will absorb low pressure exhaust gases and hence pollutant gases are completely eliminated.

MATERIALS AND METHODS.

The turbine is fixed to the shaft of the generator. It will be a mechanism of axial high pressure turbine and backward curved fan blades with an electrical generator. The exhaust gases will strike on a high-pressure reaction turbine and the pressure energy will convert into mechanical energy. It will generate power. The pressure of the exhaust gases will go down after striking the turbine. Then this low pressure exhaust gases will pass through exhaust pipe. We are going to put carbon and fibre filters at the outlet of casing which will absorb low pressure exhaust gases. Which will eliminate pollution gases entirely.

DESIGN**Construction****Components**

The main component used in this process is

- Frame
- Rotor
- Dynamo
- Nozzle
- Bearing

- Filters

FRAME

The frame is usually made of mild steel. It is strong enough to withstand all types of loads in working conditions. All other parts are fitted to the frame. The frame is helping the supporting of the various light load support. Frame shows a good aesthetic loop. every machine should have required a good frame design. Frame material should have high strength because of the frame balancing of another machine load. in our project, the frame shows an important role. the vertical pulley and sprocket are mounted on the vertical support of the frame. Main whole project assembly our project mounted on the frame. The proper selection of material for the different parts of a machine is the main objective in the fabrication of the machine. For a design engineer, it is just that he be familiar with the effect, that the manufacturing process and heat treatment have on the properties of materials. The Choice of material for engineering purposes depends upon the following factors:

1. Availability of the materials.
2. Suitability of materials for the working condition in service.
3. The cost of materials.
4. Physical and chemical properties of the material.
5. Mechanical properties of the material.

The selection of the materials depends upon the various types of stresses that are set up during operation. The material selected should withstand it. Other criteria for the selection of metal depend upon the type of load because a machine part resist load more easily than a live load and live load more easily than a shock load.

The selection of the material depends upon the factor of safety, which in turn depends upon the following factors.

- Reliabilities of properties
 - Reliability of applied load
 - The certainty as to the exact model of failure
 - The extent of simplifying assumptions
 - The extent of localized
 - The extent of initial stresses set up during manufacturing
- The extent of loss of life if a failure occurs
- The extent of loss of property if a failure occurs

Material used

- Mild steel
- Reasons
:

1. Mild steel is readily available in the market.
2. It is economical to use.

3. It is available in standard sizes.
4. It has good mechanical properties i.e. it is easily Machin able
5. It has a moderate factor of safety because the factor of safety results in unnecessary wastage of material and heavy selection. The low factor of safety results in an unnecessary risk of failure.
6. It has high tensile strength.
7. Low coefficient of thermal expansion.

Properties of Mild Steel:

M.S. has a carbon content from 0.15% to 0.30%. They are easily weldable thus can be hardened only. They are like wrought iron in properties. Both ultimate tensile and compressive 10 strengths of these steel increases with increasing carbon content. They can be easily gas welded or electric or arc welded. With the increase in the carbon percentage weld ability decreases. Mild steel serves the purpose and was hence was selected because of the above purpose

Shaft

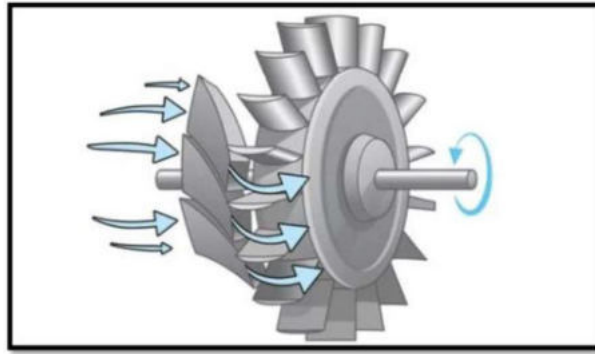
A shaft is a rotating machine element, usually circular in cross-section, which is used to transmit power from one part to another, or from a machine that produces a power machine that absorbs power.



ROTOR

A wind rotor is a mechanical device that extracts KE energy from pressurized wind and converts it into rotary motion. Because the turbine generates rotary motion, it is particularly suited to be used to drive an electrical generator – about 10% of all electricity generation in the United States is by use of wind turbines. A turbine is a turbomachine with at least one moving part called a rotor assembly, which is a shaft or drum with blades attached. When the kinetic energy of exhaust gas acts on the blades so that they move and impart rotational energy to the rotor.

- It is a simple non – conventional energy process.
- This generating power can reduce the need for power
- To generate the power no need for fuel input.

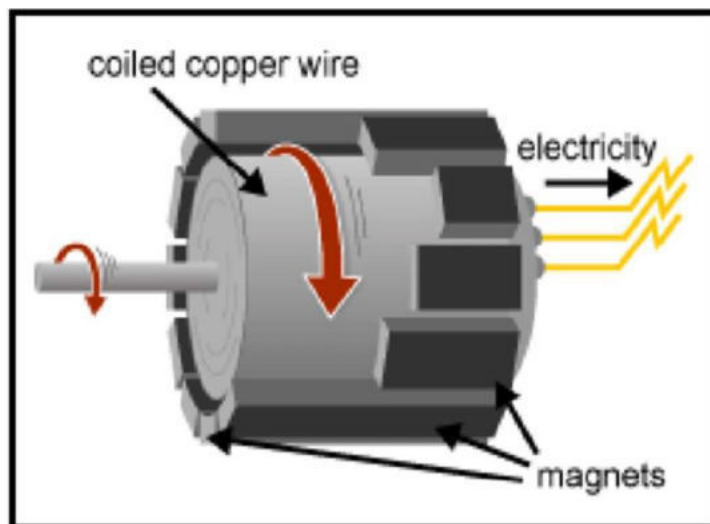


Power Generation

In this the exhaust gases released from the automobile Silencer is used to rotate the turbine (fan blades) by arranging it is very conveniently. The nozzle is attached to the silencer is used for the proper flow of exhaust gases with high velocity and steady flow with uniform direction to rotate the turbine. the dynamo attached to the turbine with the shaft is used to convert the forced kinetic energy (K.E) into electrical energy (E.E) is by rotating motion.

DYNAMO

Dynamo is an electrical generator. This dynamo produces direct current with the use of a commutator. Dynamo was the first generator capable of the power industries. The dynamo uses rotating coils of wire and magnetic fields to convert mechanical rotation into a pulsing direct electric current. A dynamo machine consists of a stationary structure, called the stator, which provides a constant magnetic field, and a set of rotating windings called the armature which turns within that field. On small machines the constant magnetic field may be provided by one or more permanent magnets, larger machines have the constant magnetic field provided by one or more electromagnets, which are usually called field coils.



BEARING

A bearing is a machine element that constrains relative motion to only the desired motion added reducing friction between moving parts. The design of the bearing may, for example, provide for free linear movement of the moving part or rotation around a fixed axis or, it may prevent a motion by controlling the vectors of normal forces that bear on the moving parts. Most bearings facilitate

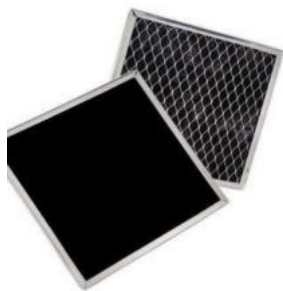
the desired motion by minimizing friction. Bearings are classified broadly according to the type of operation, the motions allowed, or the directions of the loads (forces) applied to the parts. Rotary bearings hold rotating components such as shafts or axles within mechanical systems and transfer axial and radial loads from the source of the load to the structure supporting it. The simplest form of bearing, the plain bearing, consists of a shaft rotating in a hole. Lubrication is often used to reduce friction. In the ball bearing and roller bearing, to prevent sliding friction, rolling elements such as rollers or balls with a circular crosssection are located between the races or journals of the



bearing assembly.

FILTERS

Carbon filters absorb the pollutant gases it is trapped inside the pore structure of carbon substrate. The substrate are made up of many carbon granules, each of which is itself highly porous. As a result pollutant gases from the exhaust will be trapped inside these carbon filters. Fiber filters are used for fine filtration of high volume flows. Combination of both these filters will certainly help at exhaust outlet.



CARBON
ACTIVATED
FILTER



CARBON FILTER
FIBER FILTER



TECHNIQUES TO DETECT EMISSION CONSTITUENTS:

There are various techniques available for detection of pollutants in the given sample. Out of many other, following are some of the most used techniques:

1. Non-dispersive infra red technique for CO measurement.
2. Chemiluminescence to measure NO_x measurement.
1. Flame ionization detector technique for HC measurement.
2. NON DISPERSIVE INFRA RED ANALYZER (NDIR)

(For measurement of CO)

This method is based on selective adsorption of infra red light at 4.3 microns & CO which absorb max infra red light at 4.7 microns. It consists of 2 identical infra red sources which emit infra red emissions of the same frequency. The infra red radiations are filtered by using either optical fibers or gas filters. The instrument cells filled with nitrogen & the sample cell is filled with the gas sample. These cells are made of stainless steel tubes whose ends are closed by optical windows. The infra red radiation after passing through these cells enter the "detector" or "receiver chamber". Detector is a separate compartment which is divided in 2 parts by means of a flexible diaphragm. Both the sides of the detector are filled with the gas of interest CO or CO₂. The flexible diaphragm work as one of the plates of a parallel plate condenser

3. CHEMILUMINESCENCE:

(For measurement of NO_x)

- Chemiluminescence, the word can be divided into, "Chem.", "luminous", "sense".

That is, Chemiluminescence literally means a chemical reaction that produces light, in the absence of heat, perceived by our eyes.

- Chemiluminescence is not like in fluorescence (neon signs), phosphorescence (glow in the dark toys) or incandescence (light bulb), but similar to Bioluminescence just like in Firefly.

The main importance of chemiluminescence is in the fact that it is a cold system. Energy in the form of light is produced directly from the chemical reaction without first going through an intermediate stage involving heat. Chemiluminescent glow products never heat up. not a source of ignition, and are non flammable.

4. FLAME IONIZATION DETECTOR:

A flame ionization detector (FID) is a type of gas detector used in gas chromatography.

- The first flame ionization detector was developed in 1957 by scientists working for the CSIRO in Melbourne, Australia.
- Ionization essentially can only detect components which can be burned.
- Ionization is best for detecting hydrocarbons, and other easily flammable components

4.RESULTS AND DISCUSSION

CALCUATION

A. Exhaust Gas Flow Rate

To determine theoretical nozzle outlet velocity:

Continuity equation,

$$Q=A_1V_1=A_2V_2$$

Velocity at nozzle outlet,

$$V_1 - A_1 V / A_2 V - D^3 V / D^2$$

Where A₁ is the cross-sectional area at section 1 A₂ is the cross-sectional area at section 2

V₁ is the velocity of exhaust gases from silencer.

Table no	Speed of engine	Velocity of exhaust gas	Expected velocity of exhaust gas
1	950	12.9	51.6
2	1120	16.1	64.4
3	1230	18.1	72.4

TABLE 4.1 EXHAUST GAS VELOCITY TEST

where A is c/s area of outlet in m² V is velocity in m/s

$$A = \pi d^4 / 4 = (2.5 \times 10^3) / 4 = 4.9087 \times 10 \text{ m}^2$$

B. Model Calculation

Swept area by the turbine, $A = (22/7) \times \text{radius}^2$

$$A = 3.14 \times (0.115)^2$$

$$A = 0.04152 \text{ m}^2$$

$$12.9$$

$$16.1$$

Therefore,

$$Q = 4.9087 \times 10^{-4} \times 51.6 \text{ (At an engine speed of 950 rpm)} \quad Q = 0.0253 \text{ m}^3/\text{s}$$

$$\text{At an engine speed of 1120 rpm, } Q = 0.0316 \text{ m}^3/\text{s}$$

$$\text{At an engine speed of 1230 rpm, } Q = 0.0355 \text{ m}^3/\text{s}$$

Area Swept.

$$A = (22/7) \times \text{radius}^2 \quad \text{Velocity of the Turbine,}$$

$$V = (22/7) \times D \times N / 60$$

Where D-diameter of turbine

N-number of revolutions per minute Power available at the turbine,

$$P = (1/2) \times \text{Density} \times (\text{Velocity})^3 \times \text{Cp} \times \text{Area swept}$$

C. Impulse Force Acting on the Turbine

Mass flow rate,

$$m = \rho \times Q$$

Where ρ is the density in kg/m³

$$\text{Velocity of the turbine. } V = (22/7) \times D \times N / 60 \quad V = 3.14 \times 0.115 \times 60 / 60$$

$$V = 0.3611 \text{ m/s}$$

$$\text{Power of the flowing exhaust gas} = 1/2 \times \rho \times \text{area} \times (\text{velocity})^3 \times \text{Cp}$$

$$= 1/2 \times 1.23 \times 0.04152 \times (0.3611)^3 \times 0.4$$

$$= 4.8 \times 10^{-4} \text{ Watts}$$

Q is the volume flow rate in m³/s Impulse force,

$$F = m \times V$$

Where V is the velocity of flow of exhaust gases in m/s

end (m/s)

At engine speed of 950rpm,

Mass flow rate,

$$m = 1.23 \times 0.02503$$

$$m = 0.03079 \text{ kg/s Impulse force,}$$

$$F = 0.03079 \times 51.6 \quad F = 1.588 \text{ N}$$

At an engine speed of 1120rpm,

Mass flow rate,

$$m = 1.23 \times 0.0316$$

$$m = 0.03886 \text{ kg/s Impulse force,}$$

$$F = 0.03886 \times 64.4$$

$$F = 2.503 \text{ N}$$

At an engine speed of 1230rpm,

Mass flow rate,

$$m=1.23 \times 0.0353$$

$m=0.04347$ kg/s Impulse force,

$$F=0.04347 \times 72 \times 3.129 \text{ N}$$

D. Power Generated by Turbine

Torque,

$$T=FR$$

Where F is impulse force in Newton

R is distance from center of shaft to the point where exhaust gas hit the blades in meter Power generated,

$$P=2 \times NT/60 \text{ watts}$$

Where N is speed of turbine in RPM T is torque in Nm

At engine speed of 950rpm.

Torque,

$$T=1.588 \times 0.09 \times 0.1492 \text{ Nm}$$

Power generated,

$$P=2 \times 950 \times 0.1492/60$$

$$P=10936 \text{ Watts}$$

At engine speed of 1120rpm,

Torque,

$$T=2.503 \times 0.09 \times 0.225 \text{ Nm}$$

Power generated,

$$P=2 \times 1120 \times 0.225/60$$

$$P=2.945 \text{ Watts}$$

At engine speed of 1230rpm,

Torque,

$$T=3.129 \times 0.09 \times 0.2816 \text{ Nm}$$

Power generated,

$$P=2 \times 1230 \times 0.2816/60$$

$$P=5.04 \text{ Watts}$$

5.CONCLUSIONS

Euro vehicular emission control legislative norms evolved in Europe and similar norms which were developed in industrially advanced countries over many decades of experience may not serve the purpose of controlling the ambient air quality in developing countries such as India. Developed countries had the necessary lead-time to develop the infrastructure needed in terms of clean fuel and road traffic regulations and periodic vehicle maintenance.

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Automotive technology – by Jack Erjavec

The Motor Vehicle –Newton, Garret, Steeds

Crafting and Execution of an Artificial Limb Empowered by Vocal Commands

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ABSTRACT

Amputee cases are increasing worldwide, prompting the need for effective and affordable solutions. While medically certified prosthetic arms exist, they can be prohibitively expensive. However, advancements in servo motor technology have enabled the development of a working prototype at a lower cost by reducing the cost of electronic and mechanical components. This prototype closely mimics the biological structure and movements of the human arm, achieving near-perfect replication of complex movements. Prosthetic finger joints are modeled after human fingers for typical actions. Unlike conventional prosthetics, this prototype operates independently of biological signals from the residual limb by using 3D printing and affordable devices to reduce production costs.

Keywords: 3D printing, affordable prosthetic arm, residual limb, speech recognition.

1)

1. INTRODUCTION

The need for improved prosthetic control signals is growing globally. Currently, most prostheses are controlled by EMG or body-powered methods, which can be tiring and uncomfortable for the user. Voice-controlled signals offer an alternative solution with better control and added functionality. This paper presents a Trans-Humeral prosthetic arm designed to mimic human arm movements and controlled by voice commands. Real-time speech recognition was developed to execute fundamental movements, with response time tested by moving objects of different weights. The success rate of voice recognition was also measured under various environmental conditions.

2. LITERATURE REVIEW AND OBJECTIVE

2) “Validation of Voice Recognition in Various Google Voice Languages using Voice Recognition Module V3 Based on Microcontroller” [1]: The paper describes the implementation of the voice recognition module V3, which uses a microcontroller to interface with the Google Cloud Speech API to recognize spoken words in various languages. The authors validate the accuracy of the voice recognition module for languages including English, Spanish, Mandarin, and Indonesian.

3) “Designing of a Voice-Based Programming IDE for Source Code Generation: A Machine Learning Approach” [2]: In this paper, the authors suggest utilizing machine learning algorithms to convert voice commands into programming language syntax and create source code. This strategy can enhance the accessibility of programming for people with motor or visual disabilities and increase efficiency and productivity for all programmers.

4) “Design of multi-grip patterns, prosthetic hand with single actuator” [3]: The paper outlines a prosthetic hand design capable of multiple grip patterns using just one actuator, enabling everyday activities. However, the challenge of the large actuator size may affect the stability of the finger's grip.

5) “3D-printed upper limb prostheses” [4]: This paper highlights the potential of 3D printing technology to revolutionize the field of prosthetics and improve the lives of individuals with upper limb amputations by providing affordable, customizable, and functional prosthetic devices. The paper explores the benefits of 3D printing, including its ability to create complex shapes and designs that traditional manufacturing methods may not be able to produce.

6) “Three-Dimensional Printing of Prosthetic Hands for Children” [5]: This paper focuses on the use of 3D printing technology and materials for developing prosthetic hands that can adapt to the physical changes in children during their growth period. 3D printing technology

allows for faster and more customized design, resulting in better quality and more creative designs.

The objective of a voice-controlled prosthetic arm is to enable individuals with limb amputations to perform daily activities and tasks using voice commands. The technology utilizes voice recognition software and sensors to interpret spoken instructions and convert them into specific movements of the prosthetic arm, providing users with greater independence and functionality in their daily lives.

3. MATERIALS AND METHODS

The human hand is often regarded as an unparalleled gripping mechanism. Therefore, our design emulates the structure of the human hand and employs a similar mechanism. The design comprises three sub-sections: the mechanical design, the electronic circuit design, and the simulation. The primary focus during the design phase was to create a hand that mimics the human hand in terms of size, weight, and overall cost-effectiveness. To construct the mechanical aspect of the hand, we utilized SolidWorks 2020 3D CAD software [1].

3.1 CAD Models

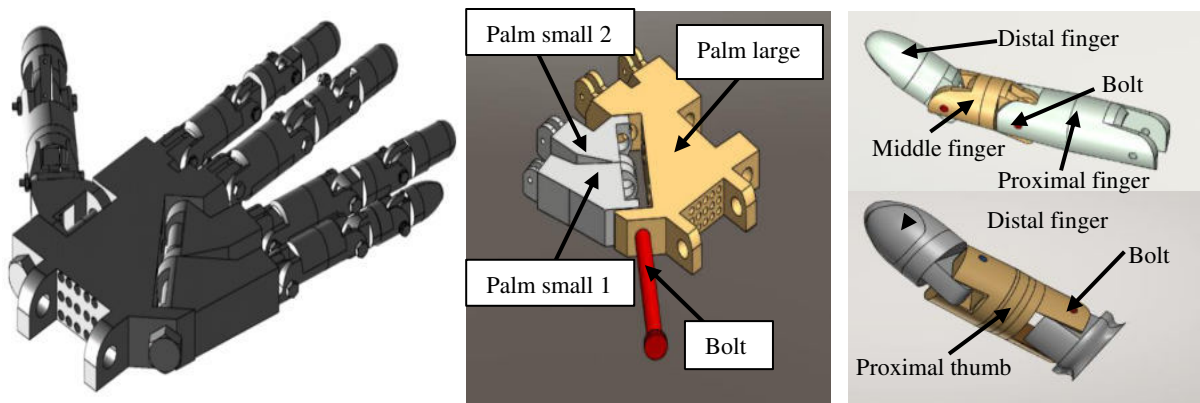


Figure 1: Hand

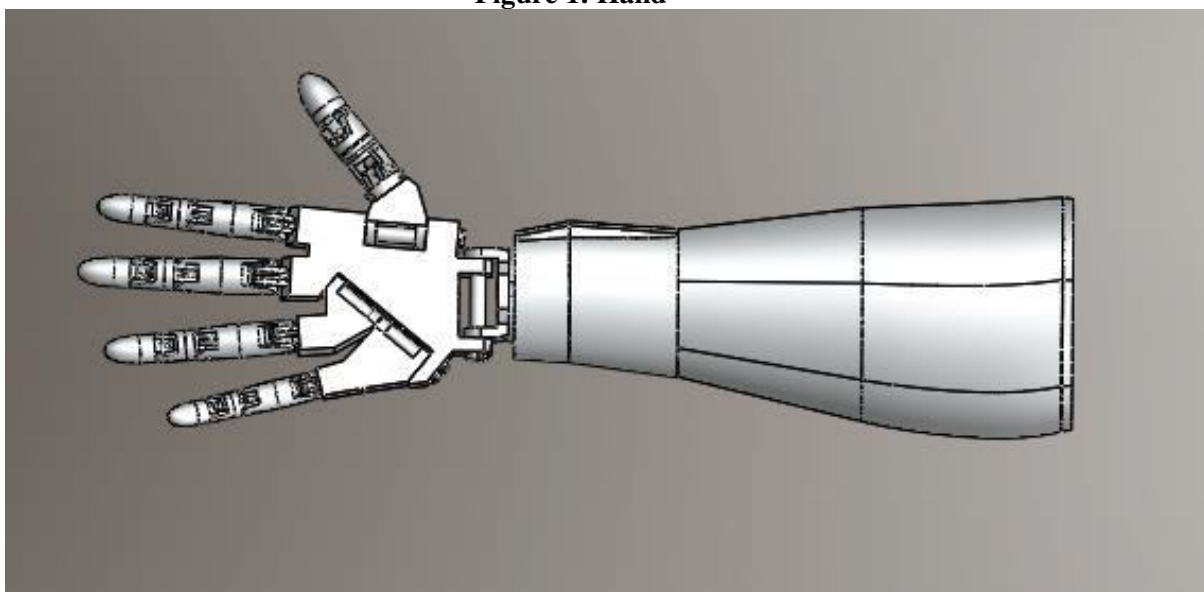


Figure 2: Prosthetic arm

3.2 Electronic Circuit Design

To bring a prosthetic arm to life, the first step was to design an electronic circuit that could grasp the circuit's size. This information was crucial to ensure the prosthetic arm could be developed accurately. Servo motors were necessary to control the fingers, which were operated using fishing lines and actuated by voice commands via the voice module. Once the servo motors and voice module were sorted, the microcontroller was selected, followed by the battery as the final component.

- The selected motors were the MG995 servo motors, famous in the robotics world for being powerful, easy to program, and precise. To make the arm lightweight and cost-effective, the number of servo motors was reduced from 14 to five, with each finger having one servo motor.
- The fishing lines were utilized as nerves to connect the five fingers to the servo motors.

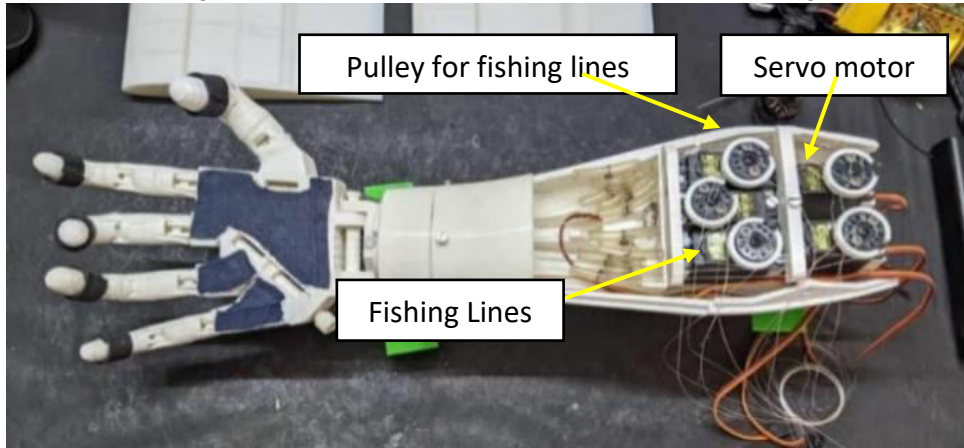


Figure Fishing

3: lines

connected to five servo motors

- The voice recognition module V3 was opted over the Easy VR module, as it took up less space and was more cost-effective, without needing the addition of a shield.
- For the microcontroller, the Arduino UNO was selected as it's effortless to obtain, code, and use Arduino boards.
- Finally, a battery was chosen based on the power requirements needed to ensure proper functioning of the prosthetic arm.

3.3 Simulation

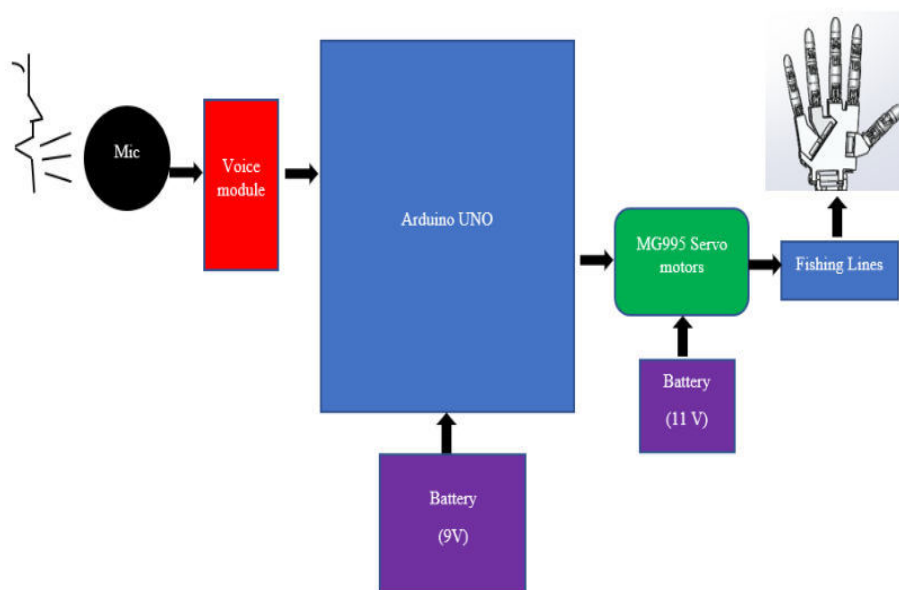


Figure 4: Block diagram

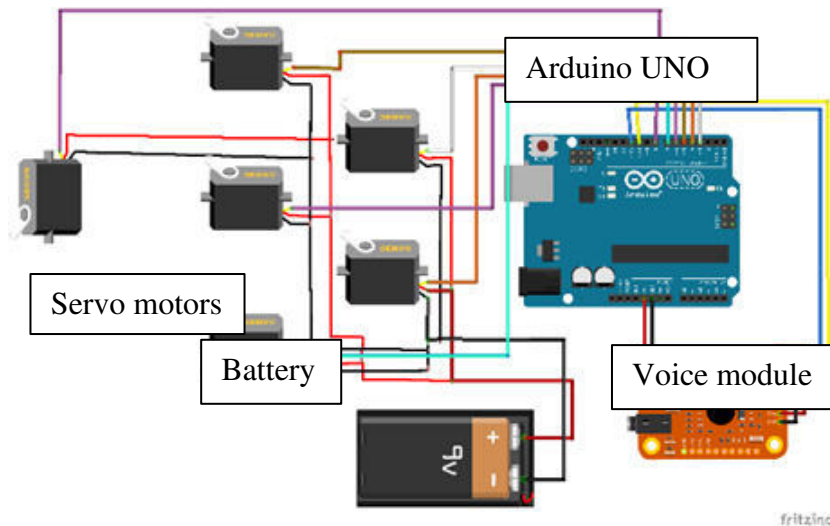


Figure 5: Servos controlled by voice module

4. RESULTS AND DISCUSSION

Table 1: Efficiency of recognition

Commands	Recognition rate	Response time
Close	90%	4
Open	92%	4.5
Index	95%	5
Thumb	92%	4.5
Middle	90%	4
Thumb	92%	4.5
Pinky	95%	5

Following the design and construction of the prosthetic arm with voice control, the system was put to the test to assess the effectiveness of the voice commands in achieving functional movement. Multiple voice commands were trained and synchronized with functional movements, and these commands were then used to test the system. To ensure accuracy and consistency, each command was trained 50 times. The results indicated that the processing rate of the microprocessor and voice recognition module played a critical role in supervised learning algorithms. To further evaluate the system's performance, various angular positions of the motors were recorded, and the response time of the servo motor MG995 was calculated for five trials. Moreover, the accuracy of the voice recognition module was assessed for different pairs of training sets, and the results are presented in the table 6, highlighting the corresponding outcomes. Thus, it's crucial that the spoken command matches the one recorded during training, as otherwise, the system won't recognize the command.

5. CONCLUSIONS

As prosthetic control continues to gain significance in the present era, this project has the potential to significantly impact the lives of individuals with disabilities. Future researchers in this field will aim to build upon this work, seeking to refine both the design and functional accuracy of prosthetic devices. The applications of Human-Robot Interaction (HRI) are diverse, and one such application is in the field of prosthetics. In this study, a complex medical challenge was addressed through the intricate design of a mechanical arm, coupled with electronic control. The team developed a cost-effective prosthetic arm that can be operated using vocal commands from a human or remote control input in situations where voice commands are not feasible. This prosthetic arm has the potential to perform all essential daily tasks that a human arm can.

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Cost Optimization Possibilities in Elliptical Bicycle

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ABSTRACT

Health is a serious issue everywhere in the world. The sprinting lifestyle restricted everyone's time for exercise. There are numerous expensive machines and devices available to the various gym industries. These devices have ergonomics built into their design. However, the busy lifestyles of most individuals make it difficult to stay motivated to spend more time exercising. A key concern is also how affordable the costs are. ElliptiGO created the idea of a mobile bicycle, which combines the motions of running, cycling, and elliptical pedalling. The performance of athletes and fitness enthusiasts is undoubtedly improved. An elliptical bike encourages weight loss while enhancing physical health. Additionally, it offers a remedy for hip and knee problems. The distinctive mechanism of elliptical motion during pedalling is a major appeal for its use. ElliptiGO, however, is too expensive for the economically middle-income working class to afford. The goal of the present work is to create an elliptical bicycle, named Bi-Ellipta, that is lightweight, reasonably priced, and has the best performance possible. This bicycle's outside workout also enhances people's wellbeing. Compared to the currently available products on the market, the existing concept suggested a cost cut that was roughly ten times smaller. The estimated number of calories burned during the workout is also provided in this work.

Keywords: *Elliptical Bicycle, Frame, ride, economical, ergonomics.*

1 INTRODUCTION

Bi-ellipta is a type of elliptical bicycle. The Bi-ellipta bicycle modifies the elliptical trainer motion and combines it with the functionality of a bicycle to give a high-performance workout. It closely resembles running outside while removing the impact. The most convenient, enjoyable and efficient way to get out and stay active. A Bi-ellipta is very dissimilar from a standard bicycle. Unlike to regular bicycles, which frequently have a wide seat with a back support, the Bi-Ellipta has no seat at all. Regular bicycle riders must keep their legs parallel to the ground, whereas Bi-Ellipta riders must keep their legs perpendicular to the ground when standing and pedaling. Due to their elevated line of sight, cyclists using elliptical machines have unusually good visibility [1].

The Bi-Ellipta can be used by anyone who wants to get a great outdoor workout without risking their body. The people who will profit most from it are runners who wish to mimic jogging while protecting their knees and joints from the damage that running causes. Bi-Ellipta is ideal for the riders who want to enjoy riding without the hardship of stooping over or sitting on a conventional bike seat.

Bryan Pate, a former Ironman triathlete and co-founder of ElliptiGO, was driven to develop the first elliptical bicycle after suffering from injuries that prevented him from running for exercise. Pate, a seasoned biker, decided against riding a bike to stay in shape because he favored the elliptical trainer. Pate had a vision of creating a product that would allow him to enjoy both the outdoor "running experience" and the indoor "running experience" [2].

2 METHODOLOGY AND MATERIALS

A Bi-cycle frame should have low weight, high lateral stiffness and moderate vertical stiffness. Because of chain load, frame lateral deformation during pedaling is bigger when the rider pushes on right pedal (a pro rider may apply a force up to two times his weight).

The bicycle is made of mild steel and galvanized pipes with diameters of 24.5 mm and 32 mm. The most popular and economical variety of steel is mild steel. Steel is utilized in practically every steel-

based product due to its welding ability, great hardness, and strength despite rapid corrosion. These properties are also present in galvanized steel. Its structural strength precludes its use in the vehicle chassis and motorbike frames. One of the most adaptable structural materials in use, steel demonstrates great physical characteristics [3].

The Bi-Ellipta combines an ordinary bicycle with an elliptical fitness trainer. Instead of the pedals rotating in a circular manner, they move in an elliptical motion that is similar to a gym trainer. The pedal has a larger angle with the ground than a standard gym trainer, which helps to replicate how the legs actually move when running. The large pedals of the gym trainer have taken the place of the smaller ones of a regular bicycle. Pedals for the driving arms are mounted there. The driving arm is attached to the crankset's one end. Foot pedals that are attached to the main frame move back and forth inside a square pipe. Using roller wheels at the other end.

2.1 Material selection

According to a review of materials, mild steel is the best choice. The above-mentioned material was selected as the material for bicycle frames due to its low density, compatible yield strength, ease of production, low cost, and wide availability. By comparing its performance to other materials, such as alloy steel, this material was chosen for the frame's design [4].

1. Ductility: a very desirable property of steel, in which steel can withstand extensive deformation without failure under high tensile stresses, i.e., it gives warning before failure takes place.
2. Toughness: steel has both strength and ductility. Additions to existing structures: example: new bays or even entire new wings can be added to existing frame buildings, and steel bridges may easily be widened.

2.2 Frame analysis

1. Specific gravity is a measure of how light or heavy the material per unit volume.
2. The efficiency of power transmission and the comfort of the ride may both be impacted by stiffness (or elastic modulus). In reality, ride comfort is more of a function of saddle selection, frame geometry, tire selection, and bicycle fit because even a very flexible frame is stiffer than the tyres and saddle. Due to the narrow profile of a frame, lateral stiffness is much more challenging to achieve, and too much flexibility can have an impact on power gear, primarily through tyre scrub on the road brought on by rear triangle distortion, brakes rubbing against the rims, and the chain rubbing against gear mechanisms.[5]

2.3 Fabrication of model

The model is successfully analyzed using the analysis programme for various loads and environmental circumstances, and the frame is successfully constructed in accordance with the design requirements. Arc welding, bending, cutting, grinding, punching, forging, and assembling of different parts were some of the fabrication techniques used.

The fabrication process was divided into two stages: Phase I involved initial spot welding at all frame joints to ensure the frame's right shape. Phase II involved complete welding at all frame connections, as well as bespoke painting and final part assembly. [6]

2.4 Troubleshooting

If any errors or flaws are discovered in the manufactured model when it is being used in the future, the errors or flaws will be fixed by taking the necessary actions. The steps for correction will involve adjusting the chain length in the event that the chain falls from the chain ring, the center distance between the chain ring and the sprocket in the event that the chain is tight or slack to prevent failure of the chain, chain ring, or sprocket, and, finally, adjusting the handle height to the rider's comfort. [7]

2.5 Design Details and Materials:

Wheel: The bicycle wheels and spokes are made out steel or aluminum. Spokes length is 20 inch (Figure 1(a)).

Brakes: Resin brake pads (also called organic) are composed of organic materials like glass, rubber, and fibrous binders bonded together with resin (Figure 1(b)). A normal cable brake on flat handle bar would need about 40-50 N (3-4 kg) for hard stop, about 20-40N (1-2 kg) for normal deceleration.

Freewheel Specification:

A freewheel mechanism on a bicycle allows the rear wheel to turn faster than the pedals (Figure 1(c)). If there is no freewheel on a bicycle, a simple ride could be exhausting, because one could never stop pumping the pedal. The specification are given in Table 1.

Large Pedals: large pedal also known as Orbital bike pedals are made of PVC material, which material is soft, friendly to foot, ensure the comfort of your riding experience, compatible with any exercise machine and bicycle (Figure 1(d)). The pedal size is mentioned in Table 1.

Handel bar: Material used is Handlebar steel. length of typically get a 44cm (or wider) bar (Figure 1(e)).

Brake cable: Bicycle Brake cables are made from stainless steel, some coated with an anti-friction material. Steel cables for brakes and shifting are usually of between 1.1 and 1.5mm diameter, and even the thinnest of such cables has a carrying strength in excess of 250 lbs (Figure 1(f)).

Crank sets for rear wheel. Materials. Cranks are constructed of either an aluminum alloy, carbon fiber, steel, or some less expensive steel. Size of Crank sets 175mm (Figure 1(g)).

Handle bar Grip: handle bar grip is made of Rubber tubing makes for an ideal grip because it's soft and comfortable, effective and practical.

In general, cylindrical handles at 40mm (1.5 in) offer a better power grip, with a range from 30-50mm (1.25 to 2 in). For precision grips, a diameter of 12mm (0.45 in) is recommended, with a range of 8-16mm (0.3 to 0.6 in).

3 RESULTS

An elliptical bicycle is a type of exercise equipment that combines elements of a stationary bike and an elliptical machine. It is designed to provide a low-impact, full-body workout that can help improve cardiovascular health, increase endurance, and tone muscles.

The results you can achieve with an elliptical bicycle depend on various factors, including your fitness level, the intensity and duration of your workouts, and your diet and lifestyle habits. Some of the potential benefits of using an elliptical bicycle regularly include:

- Improved cardiovascular health: Elliptical biking is a great form of aerobic exercise that can help improve your heart health and lower your risk of heart disease, stroke, and other chronic conditions.
- Increased endurance and stamina: Using an elliptical bicycle regularly can help improve your endurance and stamina, making it easier to perform daily activities and participate in other forms of physical activity.
- Weight loss and body toning: Elliptical biking can help you burn calories and lose weight, especially when combined with a healthy diet and other forms of exercise. It can also help tone your muscles, particularly in your legs, glutes, and core.
- Low-impact exercise: Unlike running or other high-impact activities, elliptical biking is a low-impact exercise that is gentler on your joints, making it a great option for people with joint pain or injuries.

Overall, an elliptical bicycle can be a great way to incorporate more physical activity into your daily routine and improve your overall health and fitness. However, like any form of exercise, it is important to use an elliptical bicycle safely and in moderation to avoid injury or overuse. [6]

Calculation:

Diameter of wheel = 50.8cm = 20 inch this is the regular wheel of a bicycle. [8]

Distance covered in 1 revolution by wheel = $2r$

$$= 2 \times 3.14 \times 25.4 \\ = 159.4 \text{cm.}$$

159.4cm Distance covered by the wheel in 1 revolution.

Let's assume that the rider is applying a force f at a distance r from the center of the crank.

The torque applied by the rider.

Torque = Force \times Distance.

$$= f \times r$$

The torque applied by the rider on the rear wheel is equal and opposite to the torque applied by the chain on rear wheel.

Let's assume that the radius of the rear wheel is R .

Then, the torque applied by the chain on the rear wheel.

Torque = Tension \times R .

Tension = Tension in chain.

Let's use the principle of conservation of energy to find the relationship between the torque applied by rider on the crank and the torque applied by the chain on the rear wheel. Assuming that there is no loss of energy due to friction, the work, done by the rider on the pedal is equal to the work done by the chain on the rear wheel.

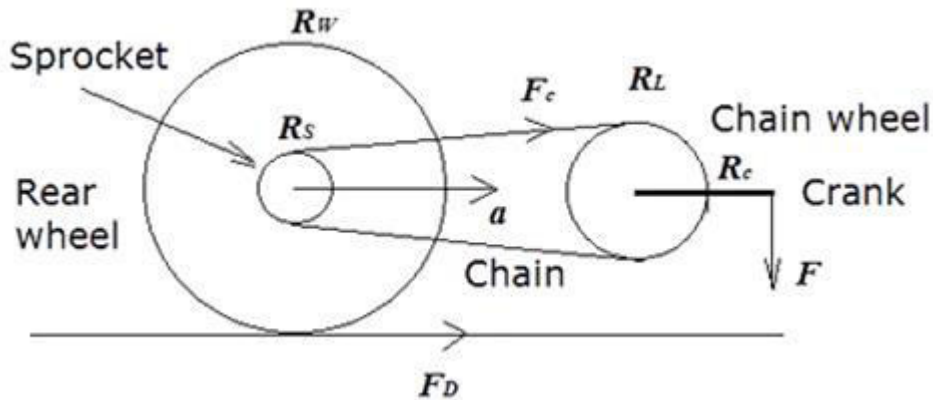


Figure 1. Force Analysis for Elliptical Bicycle

The work done by the rider is given by:

$$\begin{aligned} \text{Work} &= \text{Force} \times \text{Distance.} \\ &= f \times 2r \quad \text{---- (1)} \end{aligned}$$

2r is the distance travel by pedal in 1 revolution.

The work done by the chain on the rear wheel is given by

$$\text{Work} = \text{Force} \times \text{Distance}$$

$$= \text{Tension} \times 2R \quad \text{----(2) Where } 2R \text{ is the distance traveled by the rear wheel in one revolution.}$$

Setting these two expressions for work equal to each other and simplifying we get.

$$\begin{aligned} f \times 2r &= \text{Tension} \times 2R \\ \text{Tension} &= \frac{F \times 2r}{2\pi R} = \frac{75 \times 9.81 \times (2 \times 0.1)}{2 \times \pi \times 0.254} \end{aligned}$$

$$\text{Tension} = 290 \text{ N.}$$

Tension in chain is approximately 290 N.

$$\text{Torque} = \text{Force} \times \text{Distance}$$

$$\begin{aligned} &= f \times r \\ &= 75 \times 9.81 \times 0.08 \\ &= 59 \text{ Nm.} \end{aligned}$$

Torque applied by the rider is 59 Nm.

We can calculate the work done by the rider. when applied torque is 59 Nm.

Formula:

$$\text{Work} = \text{Force} \times \text{Distance} \times \cos \theta$$

Force = Force applied by the rider.

Cos(theta) = is the angle between the force 159.5 cm. and direction of motor.

The rider pedals the bicycle and applies the torque over a distance of one revolution of wheel and the circumference is 159.5 cm

$$W = 59 \times 2 \times \pi \times 0.795$$

$$W = 235.6 \text{ Joules.}$$

To convert 1 calories = 4.184 Joules.

Therefore, the number of calories burn when the rider applies a torque of 59 Nm on one revolution.

$$\text{Calories} = \frac{W}{4.184} = \frac{235.6}{4.184}$$

$$\text{Calories} = 56.3 \text{ Calories.}$$

The actual number of calories burned during cycling will be approximate.

4 DISCUSSION

This study compared the physiological effects of a two-week Bi-Ellipta training program in experienced runners. A major element of the study design was the evaluation of the Bi-Ellipta ability to preserve or improve cardiorespiratory fitness in experienced runners. Previous cross-training research have used a two-week period and shown that it produces short-term detraining effects. A study of physiological indicators measured at 1 to 2 weeks in this randomized, cross-over trial unable to discover evidence of an order effect. The training program was developed by researchers to enhance these physiological and performance indicators in experienced runners over the course of a 2-week training period, thus this was observed.

5 CONCLUSION

If any errors or flaws in the manufactured model are discovered when it is used in the future, the errors or flaws will be fixed by taking the necessary actions. Adjusting the chain length in the event that the chain falls from the chain ring, the center distance between the chain ring and the sprocket in the event that the chain is tight or slack to prevent failure of the chain, chain ring, or sprocket, and, finally, adjusting the handle height to the rider's comfort will be the steps for correction. The ergonomic design and comfortable seating of the Bi-ellipta allow users to exercise without experiencing the agony that comes with constant cycling on a traditional bicycle. As a result, we developed a fitness program.[9]

TABLES AND FIGURES

Table 1: Materials Used with Specifications

Material	Specification
Galvanize Pipe	Día - 32mm (1.25" Inch) Gauge - 2mm
Mild Steel Pipe	Día - 24.5mm (1" inch) Gauge - 1mm
Wheel	20 Inch
Freewheel	Pitch – 12.7mm, Width – 3.2mm, Teeth – 18
Large Pedals	Height 143.5 cm, Width 57 cm, Depth 86 cm
Crank sets for rear wheel	175 mm
Handle bar Grip	12 mm



Figure 2. Parts Details (a) Wheel (b) Brake (c) Freewheel (d) Large Pedals (e) Handle Bar (f) Brake Cable (g) Crank Set



Figure 3. Design details of Bi-Ellipta (a) Right side view of frame (b) Left side view of frame

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Experimental Investigation of Radiator System Coolant Using Propylene Glycol

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ABSTRACT: This research paper presents an experimental investigation of the use of propylene glycol (PG) as a radiator coolant. The aim of the study was to investigate the performance of PG as a coolant. In this study, the heat transfer characteristics of water/propylene glycol was analyzed experimentally. Three different proportions were prepared by adding water and propylene glycol in 1:2, 1:1 and 2:1. The experiments were conducted by measuring the different outlet temperature of the coolant. The outcomes showed that PG had a lower edge of boiling over than EG, however had a higher intensity move coefficient, demonstrating better intensity move execution.

Keywords: Propylene glycol, Proportions, Radiator.

1. INTRODUCTION

The use of engine coolant is essential for maintaining the temperature of an engine within a safe operating range. Radiator coolant helps dissipate the heat generated by the engine and prevents the engine from overheating. Traditional engine coolants are based on ethylene glycol, but there has been an increasing interest in using propylene glycol as an alternative coolant. This is due to propylene glycol's lower toxicity and higher biodegradability compared to ethylene glycol. The conventional heat transfer fluids for radiators such as water and ethylene glycol have poor heat transfer performance due to their low thermal conductivity. Numerous studies have been conducted to improve the heat transfer rate of the coolants.

Ordinary liquids have restricted heat move capacities. The nanofluids have drawn in much interest in heat move applications in ongoing past. A need to improvement new sorts of liquids with further developed heat move capacities is felt by various examination bunches across the globe to day. The thought behind advancement of nanofluids is to further develop the intensity move coefficient and to limit the size of intensity move supplies for protection of material and energy. It is notable that the significant boundaries which impact the intensity move attributes of nanofluids are their thermo physical properties like warm conductivity, thickness, explicit intensity and thickness. Regularly miniature estimated strong particles are suspended in the customary liquids to expand their warm conductivity of traditional intensity move liquids.

2. LITERATURE REVIEW AND OBJECTIVE

TYPES OF COOLANT USED IN AUTOMATIVE MACHINE: -

- Water is an exceptionally utilitarian liquid to be utilized as radiator coolant. Water is ordered as an ideal coolant in view of its capacity to proficiently retain and deliver heat. Aside from that, water is a fluid with low thickness where it can stream without any problem.
- Ethylene Glycol is broadly utilized as an car radiator fluid. It is boring and scentless in its unadulterated structure yet Ethylene Glycol is very perilous and any ingestion can bring about death. This is for the most part because of its high poisonous properties. Ethylene Glycol advertised as radiator fluid and it tends to be utilized during mid year as well as during cold climate in view of its higher edges of boiling over.
- Propylene Glycol is impressively less harmful radiator fluid contrasted with Ethylene Glycol. Propylene Glycol is used as radiator fluid where the Ethylene Glycol utilization would be unseemly. Any openness to intensity and air makes Propylene Glycol oxidize.

Title	Author
A Review on Vehicle Radiator Using Various Coolants	Ihsan Naiman Ibrahim , Norazlianie Sazali , Ahmad Shahir Jamaludin, Devarajan Ramasamy , S. M. Soffie , Mohd Hafiz Dzarfan Othman
Experimental Investigation of Heat Transfer Characteristics of Automobile Radiator using TiO ₂ - Nanofluid Coolant	V. Salamon , D. Senthil kumar, S. Thirumalini
Performance investigation of water and propylene glycol mixture based nano-fluids on automotive radiator for enhancement of heat transfer	K. Jagadishwar, S. Sudhakar Babu
Performance Comparison of Propylene Glycol-Water and Ethylene Glycol-Water Mixtures as Engine Coolants in a Flat-Tube Automobile Radiator	Ahmet GÜNDEM, Murat HOŞÖZ, Erkan KEKLİK
An insight into the performance of radiator system using ethylene glycol-water based graphene oxide nanofluids	R. Prasanna Shankara , N.R. Banapurmath , Abhinandan D'Souza , A.M. Sajjan

Mekala Chandra Sekhara Reddy et al ^[1] performed a forced convective heat transfer study in an automobile radiator with ethylene glycol and water based TiO₂nanofluid. The nanofluid was prepared by taking 40:60 (EG: W) mixture as base fluid and dispersing TiO₂ nanoparticles at 0.1%, 0.3% and 0.5% by volume concentration. They observed 37% enhancement in heat transfer rate at 0.5% TiO₂ when compared to base fluid.

Ibrahim Palabiyik et al ^[2] conducted experiments to analyze dispersion stability and thermal conductivity of propylene glycol based nanofluids. Aluminum oxide (Al₂O₃) and Titanium oxide (TiO₂) nanoparticles were dispersed into propylene glycol using two-step method. The authors reported that the thermal conductivity increases non-linearly with particle concentration and the nanoparticles in base fluid was stable without any sedimentation.

3.OBJECTIVE

High level intensity evacuation advances are basic for superior execution auto motors. The customary liquids being utilized today depend on a combination of refined water (DW) and ethylene glycol (EG), which extends the functional temperature range and yet restricts the intensity expulsion. Thusly, the utilization of nanofluids for further developing intensity move execution has risen above the beyond couple of years. The issue is that a large portion of the reports feature the transient intensity move results which may not be valid over the long haul. In this paper, a recommended best practice for dissecting the use of nanofluids in heat move applications is introduced, explicitly for a genuine vehicle radiator.

To enhance the development in nanofluids by evaluating present technologies and improve the heat transfer coefficient.

4.MATERIAL AND METHOD

Preparation of Coolant i.e water/propylene glycol-

The preparation by the ratio of 60:40 water and propylene glycol was ready by adding distilled water to propylene glycol and the other two samples were prepared by mixing proportions of 50:50 and 40:60 simultaneously.

Apparatus used for finding properties of coolant –

- A glass beaker to find density and then it is calculated through formula, $\rho = m/V$
- Viscosity is measured by viscometer,

The principle of the viscometer is **to determine the falling time of a sphere with known density and diameter within a fluid filled inside glass tube**. The viscosity of the fluid sample is related to the time taken by the sphere to pass between two specified lines on the cylindrical tube.

- Specific heat through calorimeter.

4.1 EXPERIMENTAL SETUP METHODOLOGY-

The experimental test rig for the examination is displayed in fig.1 The exploratory arrangement comprises of capacity tank, radiators, a divergent siphon, flow regulator, stream meter, heat exchanger (radiator), fan, thermocouples. The siphon takes the liquid from the tank persistently, gives the steady stream rate which can be controlled by globe valve for every one of the examinations the volume of it is consistent to circle liquid. Thermocouples were additionally fixed on both the sides of the radiator wall surface to gauge air temperatures.

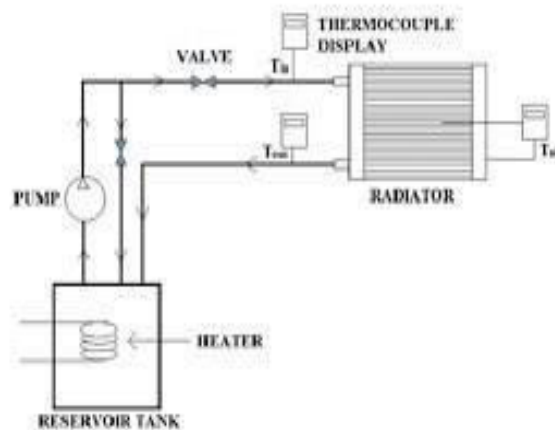


Fig.4.1.1 Schematic view of experimental setup

The radiator is comprised of aluminium with 29 vertical cylinders the components of each cylinder in radiator are 350mm level, 20mm length and 3mm width and distance between the cylinders is loaded up with blades.

The radiator was totally perfect before the examinations has begun. Above all else we will top off the water in the radiator tank and then water flows in motor through the water siphon At this conditions introductory supply temperature will be note down before start vaporizations, when it came to at 70 to 80 degree Celsius temperature, at this circumstances indoor regulator valve gets open and water start vaporizes.it goes to at the delta of the radiator at this end T_1 temperature will be note down from outlet of the motor. Further, temperature climbs water flows it in to radiator. T_2 is estimated at outlet of the radiator. On the off chance that any case flood issue water it goes to the sidestep to the tank.

The base liquid was a mix of 60:40 water and propylene glycol volume rate. The thermophysical properties of the nanofluids were assessed in view of the observational recipes accessible in the writing. The conditions were utilized for the determination of density, specific heat, thermal conductivity and viscosity. These coolant then we pour to radiator tank and repeat the above procedure to evaluate the temperature difference of coolant and do it the same with the remaining coolant ratios which are 50:50 and 40:60 water/propylene glycol. The coolants is allowed to flow through radiator from temperatures at 50oC to 80oC.

HEAT TRANSFER CALCULATIONS

To get Generally heat transfer rate.

Heat transfer rate can be determined as follows.

$$Q = m \cdot C_p \cdot \Delta T = m \cdot C_p \cdot (T_2 - T_1)$$

Where,

m is mass flow rate which is the result of thickness and volume flow rate of liquid, C_p is the specific heat of liquid.

A is circumferential area of radiator tubes,

T_1 and T_2 are inlet and outlet temperatures, and It ought to likewise be referenced that every one of the actual properties were determined.

We will likewise work out generally heat transfer coefficient are as per the following.

$$Q = H \cdot A \cdot \Delta T = H \cdot A \cdot (T_2 - T_1)$$

$$H = Q / A \cdot \Delta T$$

Where,

H = Overall heat transfer coefficient

A_n is circumferential area of radiator tubes, T_1 and T_2 are inlet and outlet temperatures, Also, To compute Nusselt no.

$$\text{Nusselt no} = H \cdot L / K$$

Where,

L = Length of Radiator.

5.RESULT AND CALCULATION

The test facility was calculated for the accuracy and reliability of measurement by carrying test runs with base fluid in the automobile radiator.

Properties	Water (A)	Coolant		
		B(1:2)	C(1:1)	D(2:1)
Density (Kg/m ³)	997.77	1014.5	1016.5	1062.5
Specific Heat (J/Kg K)	4240	3450	3495	3500
Thermal Conductivity (W/m-K)	0.563	0.258	0.233	0.210
Viscosity (P-s)	0.001	0.0070	0.0087	0.0126
Mass Flow rate (Kg/s)	1.626	0.9942	0.8945	0.7756

Table 5.1 Thermal And Physical Properties Of Coolants.

Sr. No.	Coolant	Inlet Tube Temp of Radiator T1(C)	Outlet Tube Temp of Radiator T2(C)	Temp Diff. across Radiator Tube $\Delta T(C)$	Specific Heat, cp (J/Kg K)	Heat Transfer $Q=m \cdot cp \cdot \Delta T$ (kW)
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1	A. Pure Water	With Fan	84	80	-4	4240	10.6
		Without Fan	84	96	-2		7.5
2	B. Propylene Glycol + Water (1:2)	With Fan	84	80	-4	3450	13.72
		Without Fan	92	90	-2		6.859
3	C. Propylene Glycol + Water (1:1)	With Fan	82	79	-3	3495	9.378
		Without Fan	88	86	-2		6.252
4	D. Propylene Glycol + Water (2:1)	With Fan	80	72	-8	3500	21.72
		Without Fan	91	89	-2		5.429

Table 5.2 Actual Exploratory Examination of Results [Validation]

6. CONCLUSIONS

In this examination, in general intensity move coefficient for two working liquids in an auto radiator has been estimated tentatively. The proportion of three working liquids specifically 2:1, 1:1 and 1:2 for water and propylene and water propylene glycol nanofluids at various focuses, stream rates and temperatures. The overall heat transfer coefficient decreases with increasing inlet temperatures. The results shows that the nanofluid coolants have tendency to remove heat from the engines at higher operating temperatures and flow rate effectively which makes it suitable for heavy duty engines. All in all, the consequences of the examination showed that propylene glycol has a lower limit than ethylene glycol, however a higher intensity move coefficient. Despite the fact that propylene glycol's cooling viability was marginally lower than ethylene glycol, its higher intensity move coefficient shows better intensity move execution

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Hydraulic Drainage Cleaner

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ABSTRACT

An Innovative Solution for Clearing Clogged Drain Pipes. The project aims to design and develop a hydraulic device that utilizes low-pressure water to efficiently remove blockages from drain pipes. The device will be portable, easy to operate, and cost-effective. This report includes a detailed literature review, design and development of the hydraulic clog cutter, performance tests and results, and conclusion and future recommendations.

A mechanical clog cutter and hydraulic jetter can be combined by using the high-pressure water jet from the jetter to loosen the blockage, then using the clog cutter to break up and remove the debris. This combination allows for more efficient removal of tough clogs in pipes and drains.

The combined cutting and flushing action of the mechanical cutter and hydraulic jetter provides a more thorough cleaning of the pipes and drains, removing even the most stubborn clogs

INTRODUCTION

Introduction to Sewage problem in Mumbai.

Sewage pipe blockages are a common problem in Mumbai, India. With a growing population and increasing development, the city's sewage and drainage systems are under increasing strain. The overburdened pipes and aging infrastructure are often unable to cope with the volume of waste, leading to frequent clogs and backups.

The blockages can cause sewage to overflow into streets and homes, leading to health and environmental hazards. They can also cause damage to the pipes and other components of the system, resulting in costly repairs and downtime.

The Mumbai Municipal Corporation has taken various steps to address the problem of sewage pipe blockages, including the installation of new pipes, the upgrade of existing infrastructure, and the use of modern technologies. However, the problem continues to persist, and the city faces ongoing challenges in effectively managing its sewage and drainage systems.

Overall, sewage pipe blockages remain a significant challenge in Mumbai, and continued efforts are needed to address the problem and improve the city's sewage and drainage systems

METHODS AVAILABLE FOR UNCLOGGING SEWAGE PIPES

In the last 25 years, the best way to unclog sewage pipes has evolved to include a variety of techniques and tools, including:

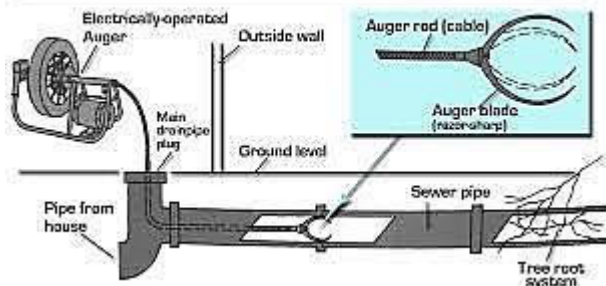
- Hydro jetting: Using high-pressure water streams to blast away blockages and clean pipes.
- Mechanical rodding: Using flexible rods with augers or blades to physically remove blockages.
- Cable machines: Using spinning cable with cutting blades to remove blockages.
- Drain cameras: Inspecting pipes using cameras to locate blockages and assess the severity of the clog.
- Chemical drain cleaners: Using chemical solutions to dissolve blockages.
- Trenchless technologies: Using no-dig methods to repair or replace pipes without excavation.

FUNCTION OF HYDRAULIC DRAINAGE CLEANER

Basically, Hydraulic Clog Cutter is task specified project. The only aim of Hydraulic clog cutter is to clean Sewage pipes. While the sewage pipes play major role during Flooding & Tsunamis. So, it's mostly seen sewage pipes get choked by waste & there are two ways to clean it.

1. **Unclogging:** Due to poor solid waste management Sewage pipes usually get clogged by waste like plastic, cloths, diapers, Soil & mud, ingrown roots etc. The dynamic teeth easily cut down such solid waste. Unclogging is a difficult process; it can damage the pipe. Hydraulic clog ensures that Unclogging is done without any damage.

An Electrically operated Auger feeds into sewer line to clear obstructions



2. **Desilting:** Sewage water carries various waste like Household waste, industrial waste, Commercial waste, public & natural waste. It contains various fats, tick fluid, slim, grease & they get easily stuck to walls of pipes. Nozzles on hydraulic clog cutter clear-outs all the waste.



PROPOSED METHODOLOGY

Hydraulic clog cutter is equipment which removes solid waste as well as slug & Insoluble waste chemical. Our project is a replica or Prototype of the actual model with a new features in cooperated with greater efficiency initial design & Part model is based on research paper of proposed model with reference paper number we have modified the cutting blade welded on the nozzle casing. This blade enables catch as well as cut the waste by its special design.

WORKING

The Hydraulic Clog Cutter is a specialized device designed to clear blockages in pipes. It utilizes low-pressure water to cut through and remove the clogs, providing a cost-effective and efficient solution for pipe cleaning. The device is compact and lightweight, making it easy to transport to job sites. The hydraulic pump provides enough high-pressure water to the cutting head, which is made of high-quality steel, allowing it to break through tough clogs. The Hydraulic Clog Cutter is an essential tool for plumbers and contractors, ensuring the smooth operation of pipes and reducing downtime caused by clogs.

For blocked pipes manual scavenging is mostly preferred in India as it is cheaper than clog cutter & hydro-jetting. While clog cutter has limitation due to its mechanical linkage & operation. So as hydro-jet require heavy machinery with skilled labor.

Hydraulic clog cutters are an effective solution for clearing blockages in sewage pipes and drainage systems, as compared to other options such as mechanical clearing methods or the use of chemical cleaners. After combining both clog cutter & hydro Jetter we get hydro-clog cutter.

By using hydro-jetting desilting is done easily while teeth of clog cutter destroyed the soil waste. The hydraulic jet nozzle provides enough high-pressure water stream that enables the rotary motion of the sprinkler to rotate at a faster speed, increasing efficiency and productivity. Pencil jet nozzle creates a narrow, high-pressure water stream that is ideal for cleaning and removing clogs in narrow pipes and tubes.

The design of end mill cutters allows for improved cutting precision, making it ideal for applications that require intricate cuts and shapes. End mill cutters are versatile and can be used for a wide range of cutting applications, including cutting slots, drilling, and profiling.

ADVANTAGES

Efficient and Effective: The Hydraulic Clog Cutter is a highly efficient and effective tool for clearing blockages in pipes. Its high-pressure water can quickly and effectively cut through tough clogs, reducing the time and effort required to clean the pipes.

Cost-effective: The Hydraulic Clog Cutter is a cost-effective solution for clearing clogs in pipes. It eliminates the need for manual labor and traditional cleaning methods, saving time and money in the long run.

Easy to Use: The device is designed to be easy to use, even for those with limited technical skills. Its compact size and lightweight design make it easy to maneuver in tight spaces, and the simple controls make it easy to operate.

Minimal Maintenance: The Hydraulic Clog Cutter requires minimal maintenance, ensuring it is a reliable and long-lasting tool for clearing clogs. Regular cleaning and proper storage will help to maintain its effectiveness and extend its lifespan.

Durable Construction: The cutting head of the Hydraulic Clog Cutter is made of high-quality steel, making it durable and capable of breaking through tough clogs. The device is designed to withstand repeated use and rough conditions, making it a valuable asset for plumbers and contractors.

CHALLENGES AND LIMITATIONS OF HYDRAULIC CLOG CUTTER

Limitation of Clog Cutter

1. **Limited Power:** Mechanical clog cutters rely on mechanical force to break through clogs, which can be limited compared to the high-pressure water generated by hydraulic clog cutters. This can make it more difficult to cut through tough clogs, especially in larger pipes.
2. **Physical Effort Required:** Operating a mechanical clog cutter often requires significant physical effort, making it challenging for those with limited strength or mobility. This can also make it difficult to use in tight spaces where the operator is required to work in awkward positions.
3. **Noisy Operation:** Mechanical clog cutters can be noisy when in use, which can be a nuisance for residents or employees nearby.

Limitation for Hydraulic jetter

1. **High Cost:** Mechanical clog cutters rely on mechanical force to break through clogs, which can be limited compared to the high-pressure water generated by hydraulic clog cutters. This can make it more difficult to cut through tough clogs, especially in larger pipes.
2. **Hydraulic jettors can be expensive,** especially for larger models with more powerful pumps and hoses. The cost of owning and operating a hydraulic jetter may be prohibitive for smaller plumbing businesses or contractors.
3. **Space Requirements:** Hydraulic jettors require a significant amount of storage space, making it difficult for those with limited storage to accommodate them. They also require a large vehicle for transportation, further increasing the cost of ownership.

Required Power Source: Hydraulic jettors require a power source, such as a generator, to operate. This can be a challenge for remote job sites where a power source is not readily available.

Training Required: Operating a hydraulic jetter requires specialized training, including knowledge of the pump, hose, and nozzle systems. This can be a barrier to entry for those with limited technical skills.

Limited Reach: The length of the hose on a hydraulic jetter can limit its reach, making it challenging to clear clogs in longer pipes or in pipes located in hard-to-reach areas. This can result in the need for additional equipment or manual labor to clear the clog.

Risk of Damage to Pipes: The mechanical force generated by clog cutters can cause damage to pipes if not used properly, resulting in the need for additional repairs. This can be a particular concern for older or fragile pipes.

Maintenance: Mechanical clog cutters often require frequent maintenance, including oiling and tightening of parts, to maintain their effectiveness. This can be time-consuming and increase the overall cost of ownership.

DESIGN CALCULATION

Material = SS304

Sut = 515 MPa

FOS = 5m

u = 0.27

Density of SS304 = 8000 kg/m³

D1 = 53mm

Conditions

(1) for 1200 Psi

(2) for 5000 Psi

(1) for 1200 Psi

Using Lames Equation

$$t = \frac{D1}{2} \left[\sqrt{\frac{\sigma t + Pi}{\sigma t + Pi}} - 1 \right]$$

$$\sigma t = \frac{Sut}{FOS} = \frac{515}{5} = 103 \text{ N/mm}^2$$

$$1200 \text{ Psi} = 8.274 \text{ N/mm}$$

$$t = \frac{53}{2} \left[\sqrt{\frac{53 + 8.274}{53 - 8.274}} - 1 \right]$$

$$t = 2.2 \approx 3 \text{ mm}$$

using clavarinos equation

$$t = \frac{D1}{2} \left[\sqrt{\frac{\sigma t + (1-2u)p}{\sigma t - (1-2u)p}} - 1 \right]$$

$$t = \frac{53}{2} \left[\sqrt{\frac{103 + (1-2 \times 0.27) \times 8.274}{103 - (1-2 \times 0.27) \times 8.274}} - 1 \right]$$

$$t = 1 \text{ mm}$$

2) for 5000 psi

$$5000 \text{ psi} = 34.47 \text{ N/mm}^2$$

using lames equation

$$t = \frac{D1}{2} \left[\sqrt{\frac{\sigma t + \pi i}{\sigma t - \pi i}} - 1 \right]$$

$$t = \frac{53}{2} \left[\sqrt{\frac{103 + 34.47}{103 - 34.47}} - 1 \right]$$

$$t = 11 \text{ mm}$$

using clavarions equation

$$t = \frac{D1}{2} \left[\sqrt{\frac{\sigma t + (1-2u)\pi i}{\sigma t - (1-2u)\pi i}} - 1 \right]$$

$$t = \frac{53}{2} \left[\sqrt{\frac{103 + (1-2 \times 0.27) \times 34.47}{103 + (1-2 \times 0.27) \times 34.47}} - 1 \right]$$

$$t = 4.5 \approx 5 \text{ mm}$$

Value of t is 11mm, 5mm, 3mm, 1mm we select 11 mm for safety purpose

$$\begin{aligned} \text{Volume} &= \frac{4}{3} \pi (R^3 - r^3) + \pi (R^2 - r^2) h \\ &= \frac{4}{3} \pi (40^3 - 29^3) + \pi (40^2 - 29^2) \times 67.5 \\ &= 326873.81 \text{ m}^3 \\ &= 326873.81 \times 10^{-3} \text{ mm}^3 \end{aligned}$$

Now

$$\begin{aligned} m &= \rho v \\ &= 8000 \times 326873.81 \times 10^{-3} \\ m &= 2.6 \text{ Kg} \end{aligned}$$

Finally thickness t = 11m

$$m = 2.6 \text{ Kg}$$

CONCLUSION

The cutter is used to cut the plastic waste, twisted roots of trees and other firm blockages found in the drainage system makes it useful for cleaning of pipes and drains, removing even the most stubborn clogs penetrating various supple and firm blockages in the sewer lines. Hence the time required for changing the nozzle for different types of blockages is reduced.

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Automatic Fire Suppression System in Vehicle: A Proposed Model

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ABSTRACT

Today's customer has become more conscious about the safety while choosing their automobile. In order to stay relevant in the market it is essential for every company to work on safety of vehicles. One of the most important safety issues in the vehicle is abrupt fires in the engine. To overcome this issue, a model is proposed in the work that could be an efficient model to extinguish fires in the engine Bay or the bonnet. The model is more efficient in spreading the fire extinguishing material throughout the engine bay if the fire breaks out. It works on the principle of bursting of instantly pressurized ball.

Keywords : *Vehicle Safety, Fire Extinguisher , Fire Suppression, Infrared Sensors, Pneumatic Actuation, Automation, Microprocessor*

I. INTRODUCTION

Fire related accidents have been one of the biggest issue in the safety of vehicles. The automobile fires result in serious big garage fires, fires in tunnel and transportation. A report [1] says that 66 % highway transportation fires are resulted from the automobile fires. It is worth of noting that though the risk of fires cannot be eliminated but can be minimized. Since a car is a complex machine with mechanical and electrical components which consists of frictional components, flammable liquids and complex electric wiring, fire is one of the most probable event to occur. The combustible fluids and flammable materials are stored in close proximity to potential ignition sources. Research has been ongoing for decades to mitigate the risks and damages caused by fire on a vehicle. Zhang et al. [2] focused on the defects as the means of fire accidents in vehicle. They classified the defects causing fire in the vehicle as four categories like defects in (i) electrical system, (ii) fuel system, (iii) flammable liquid transportation system, and (iv) other defects. Shaoqi_Cui et al. [3] stressed on the precaution against the fuel leakage since it is one of the major causes of fire hazards. They worked on hydrogen fuel and found that the leakage within the tunnel is a common cause of braeking of engine fire. Vladimir et al. [4] reported that motor vehicle safety against fire can be ensured by providing a bursting diaphragm on each high-pressure cylinder. However, the precaution is necessary, but it cannot not ensure 100 % safety. In case, if fire breaks out, it is important think over the safety of passengers as well as the minimal damage to vehicle. In this regard, many researches have been done and going on. Lou et al. [5] worked on the performance check of aqueous film-forming foam (AFFF) and protein foam (PF) materials in fire extinguishing in a diesel engine. They reported better flow ability and extinguishing effect of AFFF as compared to PF. They found that increasing gas-liquid ratio (up to 17% AFFF) increases the fire-extinguishing efficiency of foam. After this limit, the response time decreases. On a certain diesel engine, AFFF and PF took 45 and 50 seconds for extinguishing, respectively. Wang et al. [6] investigated the fire extinguishing effect of CAF (compressed air foam) and CNF (compressed nitrogen foam) on n-heptane tank fire. The investigation revealed that CNF was more efficient in spreading along with increase in foam thickness than CAF. Wang et al. [7] did the research on the effect of water mist on the suppression of jet fire of diesel fuel. They observed that water mist might be a good fire extinguisher since it reduces the velocity of fire plumes and spreads on more area resulting in reducing intensity of fire. Gradual increase in fraction of water vapour suppresses the fire. Yan et al. [8] designed a pneumatic conveying device for the conveying fire extinguishing materials to the fire zone. They used the cement particles as fire extinguishing agent for the metal magnesium fires. Cement was used because of its tendency to reduce the combustion temperature of metal magnesium fire rapidly. Liu et al.[9] studied on the mechanism and effect of water mist on fire suppression. After the experimental and computer modelling, they reported that the effectiveness of water mist system can be improved by controlling over spray characteristics according to the fire scenario. They reported that the system works on the cooling of fuel and flame, attenuation of radiant heat. Adam et al. [10] reported a n automatic fire suppression system for the fire safety of building. They developed fire detection and fire suppression automated system. For fire detection, sensors were used find out the signal of fire

breakout. For the programming of automatic fire suppression system, they developed a program in BASCOM language.

This work is oriented on the automation of fire safety system. It proposes an idea to extinguish the fire automatically. It is based on fire detection by signals and activation of fire suppression unit automatically by getting the command from microcontroller. Though more work has been done against fire hazards, the proposed idea is new which is effective as well as economical.

II. Materials and Methodology

The complete electronic circuit of the set-up for exciting the bursting phenomena is shown in Fig.1. It comprises of a fire detector system and fire extinguishing systems. Fire detector system senses the breaking out of fire in the bonnet of the engine. The sensor detects the fire by sensing the infrared signals and gives the feedback to the microcontroller, which is located near the engine. A microcontroller Arduino UNO used in this work is shown in fig.2. It takes feedback from the flame sensor and passes the signal to 12v air pump when fire takes place. A typical infrared signal based fire detector sensor is shown in fig.3. Fire extinguishing system consists of a bag made of fabric, which is filled with fire extinguishing material, air pump which blows the bag with bursting pressure.

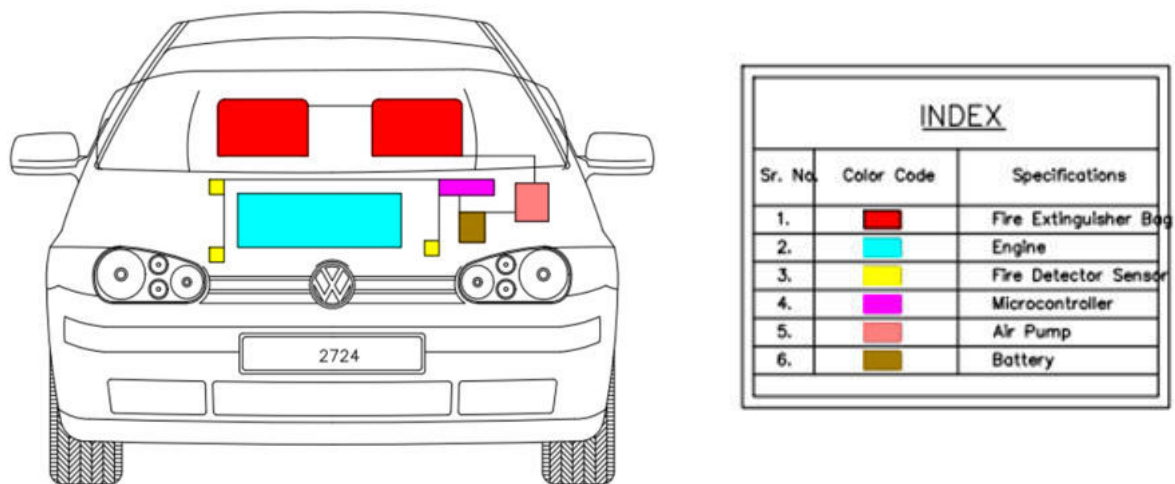


Fig.1 : The circuit for automatic fire suppression

The bag is located in the down part of the hood at a preferred location in the proximity of engine. The fire extinguishing material used this work is ABC powder. ABC powder is composed of ammonium or mono-ammonium phosphate in which there is a part of other powder for improving the flow ability. It is suitable for all categories of fire i.e. A, B and C.



Fig.2: A typical Aurdino UNO microcontroller

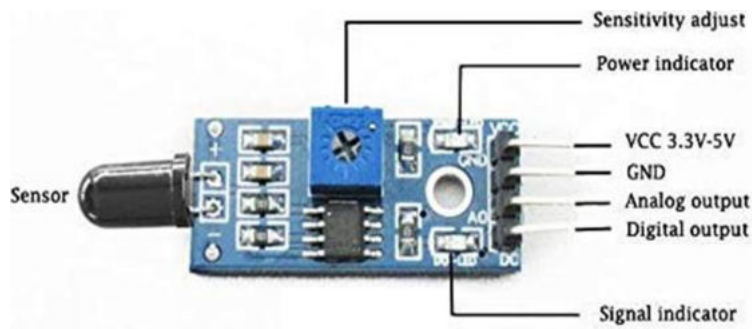


Fig.3: Fire Detector Sensor

The sensor sends the signal to microcontroller and the microcontroller starts the air pump to fill the air inside the bag. The air pump as shown in Fig.4 runs on 12 V DC to create a pressure of 300 Psi inside the bag. The projected time to create the required pressure is in the range of 12-15 sec.



Fig.4 : 12 V Air Pump

For the feasibility test of the proposed model, a structure of car bonnet was fabricated which is shown in fig.5. The body is made of steel sheet with the standard dimension of a car engine body. The space between hood and the engine is engaged with the bag filled with ABC powder. For the demo aluminium foil was used which bursts at 300 Psi pressure.

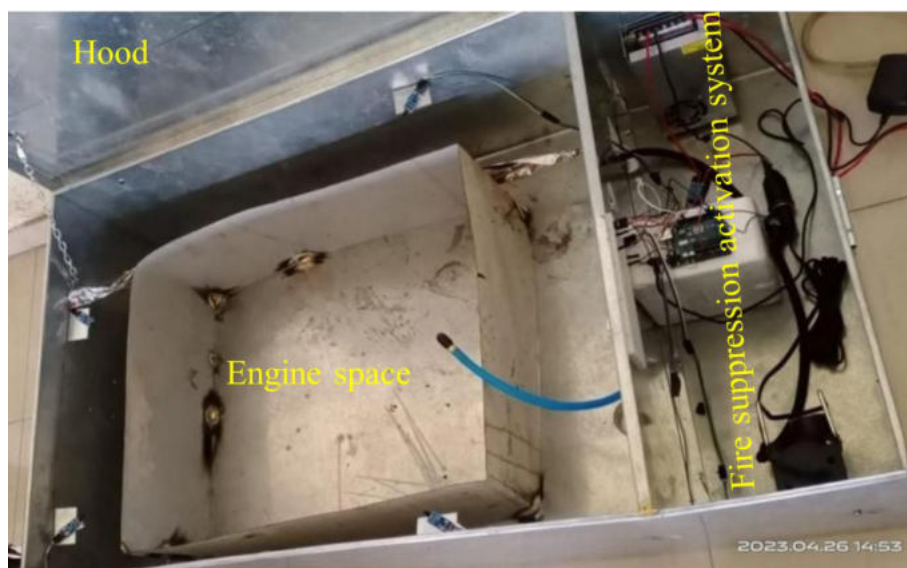


Fig 5: A structure representing a car bonnet

III. Working of Model

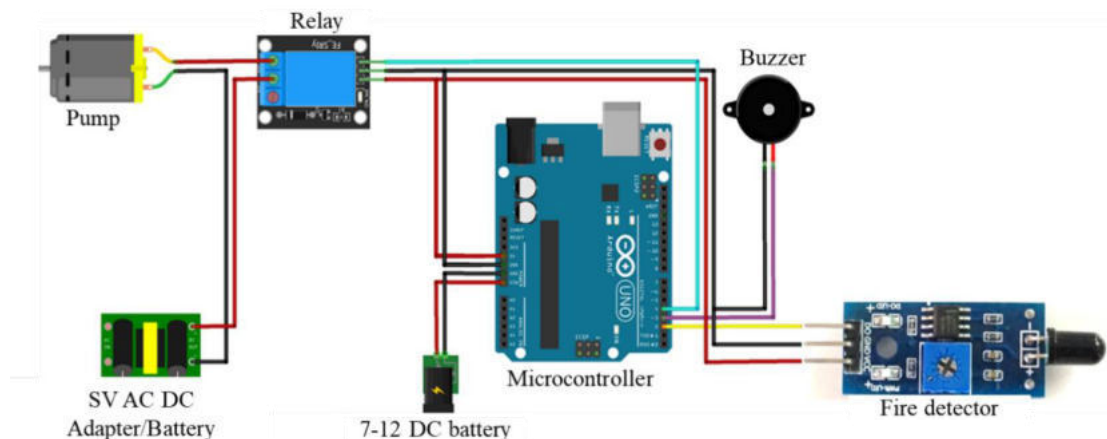


Fig 6: Working of automatic fire suppression model

The working of the model can be visualized in the fig. 6. First stage is the fire detection. In the case of firebreak, the fire detector senses infrared rays. The signal from fire detector passes to microcontroller, which acts as the brain of the fire control system. It sends commands (signals) to activate the buzzer (alarm of danger) and pump to produce the air pressure in the bag of ABC fire extinguishing powder. After reaching out the bursting limit of bag, explosion of bag happens which results in the dispersion of ABC powder over the fire in the engine. Finally, the fire is suppressed to ensure the safety of engine and the passengers.

IV. Results and discussion

The candle was used a source of fire and an aluminium foil bag of five litre capacity filled with 2 kg of ABC powder was used as explosive bag for the testing of prototype model. When the fire was brought near by the engine area, the bag exploded with dispersing the ABC powder towards the engine. The experiment was repeated by five times. The time between the flame detection and the explosion of bag was observed varying in the range of 10 to 15 seconds. The pressure inside the bag varied over the range of 270 to 290 Psi before bursting. The variations in response time and the pressure may be due to the deferent foil thickness of aluminium bag. The spread of the extinguishing material was uniform and it performed well in fire suppression.

V. Conclusions

This is the research project based on the protection against the engine fire hazards of a vehicle. After designing of the model and experiment on it, some important conclusions can be drawn as below;

- (a) The ABC powder is more effective than the foam for the fire extinguishing. This powder can be easily stored in the bag of fire extinguishing system.
- (b) Since it is working on the principle of automation, it is safer and time efficient system than the manual fire extinguisher.
- (c) The response time of the system can be minimized to more control over damage by changing the compressor capacity.
- (d) It is observed to an efficient fire extinguishing system and hence, it can be commercialized in the automobile sector.

Acknowledgement

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Envelope Shape and Material for LTA VehiclesMaruf Shivkar¹, Saif Parkar¹, Faaeez Naik¹, Nawaz Motiwala¹

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ABSTRACT

Aerostats/Airships are lighter-than-air (LTA) vehicles that lift payloads to high altitudes and may operate in various atmospheric circumstances depending on their applications, such as aerial surveillance and photography, telecommunication, heavy cargo delivery, product promotion, security, and marketing. The key component of the LTA system is the envelope, which generates lift to overcome the system weight through the LTA gas contained inside the envelope. The present work describes the characteristics of various fabrics used for the envelope of LTA systems. This papers also consists of study related to shape of the envelope. Around twelve different shapes namely GNVR, NPL, Zhiyuan, etc which are available in literature were analyzed for parameters such as Volume, Surface area, L/D etc and a comparison study has been done to determine the optimum shape.

Keywords: LTA, Envelope Shape, Envelope Material, Envelope Fabric

1. INTRODUCTION

The majority of the lift in lighter-than-air (LTA) systems originates from the LTA gas inside an aerodynamically constructed envelope based on Archimedes principle of buoyancy. The envelope material should possess high strength-to-weight ratio, good adhesion, low gas permeability, high fatigue strength, pressure retention and the capability to survive in harsh, marine and/or stratospheric environments for extended periods of time [1]. Selection of suitable material for the envelope is, thus, a key parameter in order to deploy these systems effectively for a long time. Envelope shape is one of the most critical elements in the design of such systems, and envelope shape optimization is a key area of research in this field [2]. Envelope shape plays an important role in determining the various parameters such as lift, volume, payload, surface area etc, and also accounts for aerodynamics of the system. This paper consists of data for various envelope material and shapes, A comparison study has been made considering various parameters which enables one to choose the optimum shape and material for LTA systems.

2. METHODOLOGY

The methodology to arrive at parameters such as volume required to lift the required payload is shown in Figure 1

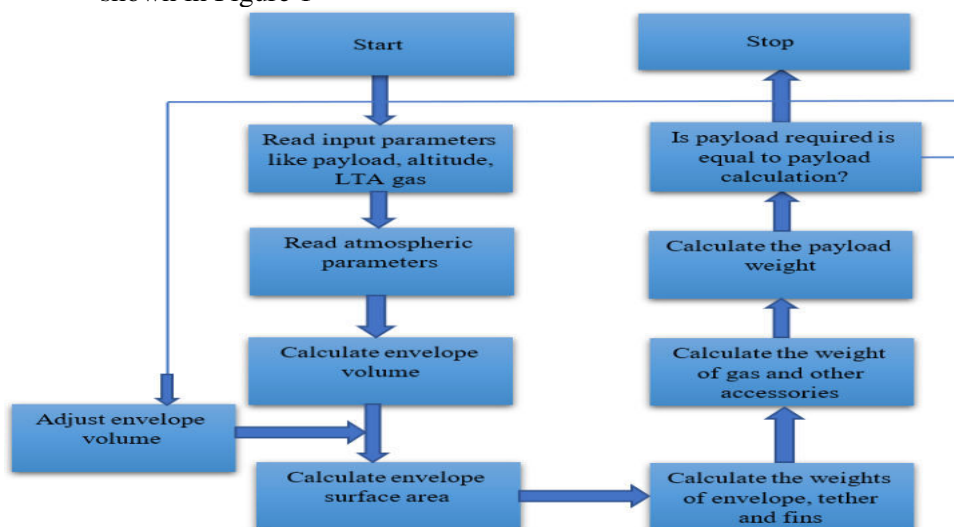


Figure 1 : Methodology to calculate envelope volume for required payload

3. IMPORTANCE OF ENVELOPE MATERIAL

For an LTA system, for a typical airship, the weight of envelope material accounts for 38% of its empty weight, and studies has shown that 1% reduction in envelope weight can result in ~ 2.5% improvement in payload carrying capacity [3].

The envelope material has to meet many diverse requirements, which are summarized below:

1. Light Weight: The material used for the envelope should be of light weight and with lower specific weight to minimize balloon size and weight, Lightweight envelopes results in increased payload capacity of the LTA system

2. Low leakage of gas: The envelope material should have low permeability, It should not allow the gases to pass through it. Low permeable envelopes minimize lift loss and maximize on station time [4].

3. Flexible : The materials must possess adequate flexibility for retraction and should have ability to maintain sufficient strength at the elevated temperatures encountered during inflation and an impact [1].

4. High strength and high tear resistance: The material should have high strength so that it can carry the desired amount of payload. High tear resistance is necessary to maximize damage tolerance and prevent tear propagation [5].

5. Ease of fabrication and sealing: The material should be easy to fabricate in the required shape.

There are equipment available, such as Universal Testing Machine, Flex Tester, Helium Leak Detector, Bursting Strength Tester etc through which various properties of the materials can be found out.

4. COMPARATIVE STUDY OF ENVELOPE MATERIAL

Table 1. Properties Of LTA Materials[5]

Materials	Permeability	Heat seal-ability	Weather ability	Adhesion	Flex-fatigue resistance	Dimensional stability
Polyester	Low	No	Fair	Fair	Fair	Excellent
Polyurethane	Low	Yes	Good	Excellent	Good	Poor
Poly-vinyl chloride	Fair-low	Yes	Good	Excellent	Good	Poor
Poly-vinyl fluoride	Low	Yes (with adhesive)	Excellent	Poor	Excellent	Good
Nylon	Very low	Yes	Poor	Fair	Excellent	Excellent
Poly-tetrafluoroethylene	Fair	Yes (some grades only)	Excellent	Poor	Good	Good
Low density polyethylene	Fair	Yes	Good if pigmented	Poor	Excellent	Poor
Neoprene	Low	No	Good	Excellent	-	-

Based on the above comparison, Polyurethane (PU) is considered as optimum material, as it adheres to maximum of the requirements of LTA systems.

5. ENVELOPE SHAPE

Envelope shape is one of the most critical elements in the design of such systems, It plays an important role in determining the various parameters such as lift, volume, payload, surface area etc, and also accounts for aerodynamics of the system.

Envelope shapes were captured using MATLAB™, by grabbing the points as depicted in Figure 2. On an average around 1200 points were grabbed on each shape, thereby dividing the entire shape into small sections, One such section of the shape shown in Figure 3. Section ,was considered as a frustum of a cone and surface area, volume for that section was found out, thereafter that small section was integrated over the entire length to find the total volume, surface area and other relevant parameters of the LTA system.

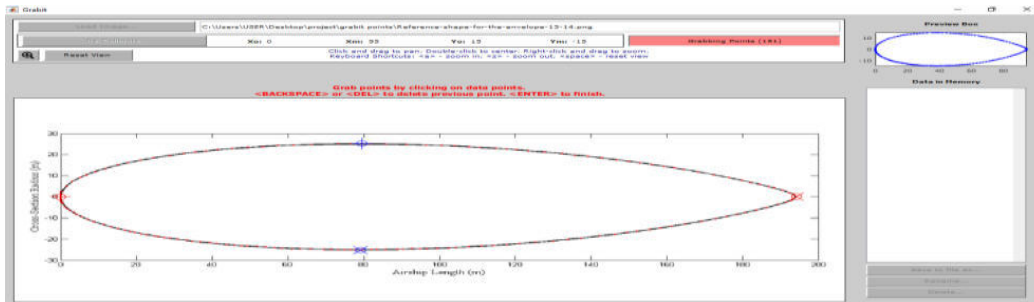


Figure 2 : Points grabbing through MATLAB™

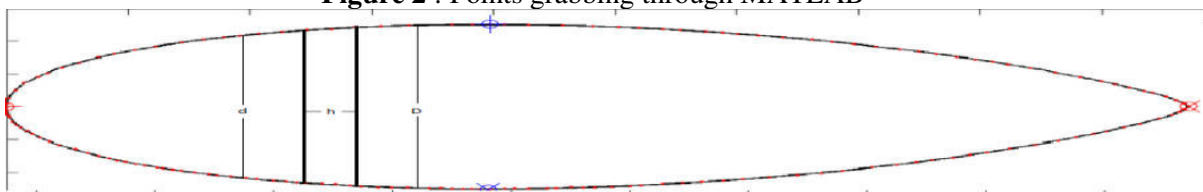
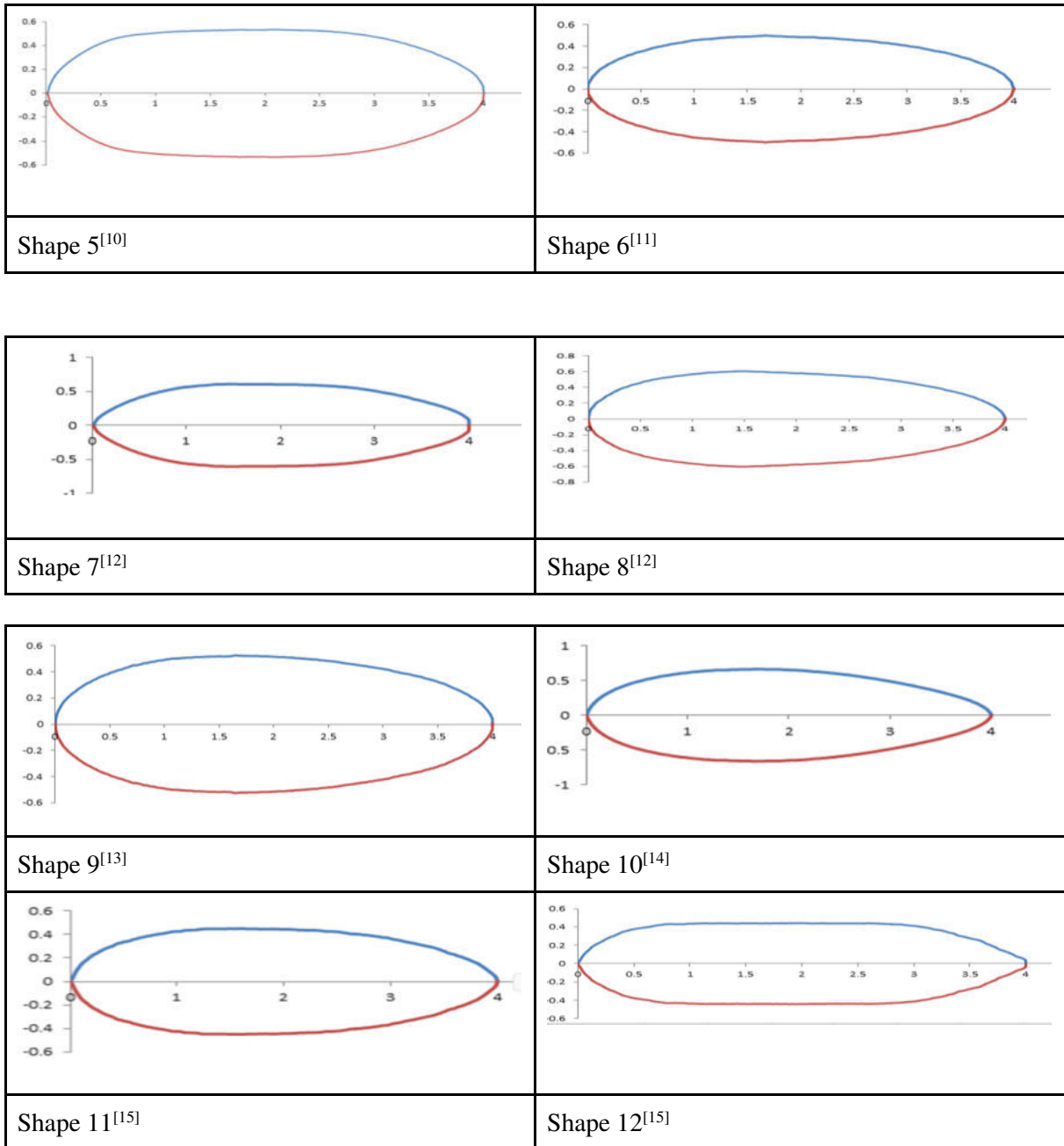


Figure 3 : Section of Envelope as frustum of cone

The shapes are then scaled to a unit length of envelope so that it can be further used to determine the parameters such as volume, surface area, maximum diameter, L/D ratio, for any required length. For comparative study, this length of all the envelope shapes are taken as 4m. Various shapes for length of 4m are shown in table 2, whereas comparison of various parameters is tabulated in table 3.

Table 2 : Various Shapes of Envelope for 4m length

<p>Shape 1^[6]</p>	<p>Shape 2^[7]</p>
<p>Shape 3^[8]</p>	<p>Shape 4^[9]</p>

**Table 3 :** Comparison of various shape for 4-meter length

Shapes	Parameters				
	Surface area (m ²)	Volume (m ³)	Volume/Surface area (m)	Maximum Diameter (m)	L/D
Shape 1 ^[6]	10.59	2.101	0.208	1.043	3.834
Shape 2 ^[7]	9.433	1.877	0.200	0.973	4.108
Shape 3 ^[8]	9.794	2.012	0.205	1.033	3.871
Shape 4 ^[9]	12.387	2.989	0.241	1.198	3.337
Shape 5 ^[10]	11.418	2.518	0.226	1.070	3.735
Shape 6 ^[11]	9.907	2.017	0.203	0.999	4.000
Shape 7 ^[12]	12.281	3.056	0.248	1.209	3.308
Shape 8 ^[12]	12.281	2.994	0.238	1.212	3.299
Shape 9 ^[13]	10.644	2.306	0.216	1.050	3.807

Shape 10 ^[14]	13.144	3.440	0.261	1.327	3.012
Shape 11 ^[15]	9.053	1.700	0.187	0.902	4.433
Shape 12 ^[15]	9.576	1.837	0.191	0.886	4.514

Based on the above comparative study, Shape 10 (GNVR) is considered to be the optimum shape for LTA vehicles as it gives maximum volume thereby more lifting capacity, Maximum volume to surface area ratio which is also a desirable parameter of LTA system.

6. RESULT AND CONCLUSION

Based on the above comparative studies, Polyurethane (PU) is considered to be an optimum material and Shape 10 (GNVR) is considered to be the optimum shape for LTA vehicles.

Considering the above shape and material, a study as shown in table 4, was made to see the effect of length of LTA vehicle on various parameters such as surface area, volume, maximum diameter, L/D ratio, Net lift, Gross Lift, Net Lift etc.

While calculating the values in table 4, the data considered are as follows

Density of air : 1.225 kg/m³

Density of Helium gas: 0.179 kg/m³

Weight of Polyurethane: 389 gsm

Table 4. Effect on various parameters with respect to length

Length (m)	Surface area (m ²)	Volume (m ³)	Volume/Surface area (m)	Maximum Diameter (m)	L/D	Weight Of Envelope (kg)	Weight of Gas (kg)	Total Weight (kg)	Gross Lift (kg)	Net lift (kg)
1	0.801	0.052	0.065	0.328	3.050	0.3118	0.0093	0.3211	0.0639	-0.2571
2	3.206	0.418	0.130	0.656	3.050	1.2471	0.0745	1.3216	0.5116	-0.8100
3	7.213	1.409	0.195	0.984	3.050	2.8059	0.2516	3.0575	1.7266	-1.3309
4	12.823	3.341	0.261	1.311	3.050	4.9883	0.5964	5.5846	4.0927	-1.4919
5	20.036	6.525	0.326	1.639	3.050	7.7941	1.1648	8.9589	7.9936	-0.9653
6	28.852	11.276	0.391	1.967	3.050	11.2236	2.0128	13.2363	13.8130	0.5767

7	39.271	17.920 6	0.456	2.295	3.050	15.2765	3.196 2	18.4727	21.934 6	3.4618
8	51.293	26.728	0.521	2.623	3.050	19.9530	4.771 0	24.7240	32.742 0	8.0180
9	64.918	38.056	0.586	2.951	3.050	25.2530	6.793 0	32.0461	46.618 9	14.5728
10	80.145	52.203	0.651	3.279	3.050	31.1766	9.318 3	40.4949	63.949 1	23.4542

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Recent Development in Metallurgy & Manufacturing

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ABSTRACT

Metallurgy is also the technology of metals: the way in which science is applied to the production of metals (including heat treatment), and the engineering of metal components for use in consumer products and manufactured goods. The production of component parts made from metals is traditionally divided into several major categories: Mineral processing, which involves gathering mineral products from the Earth's crust. Extractive metallurgy, which is the study and application of the processes used in the separation and concentration of raw materials. Techniques include chemical processing to convert minerals from inorganic compounds to useful metals and other materials. Physical metallurgy, which links the structure of materials (primarily metals) with their properties. Concepts such as alloy design and micro structural engineering help link processing and thermodynamics to the structure and properties of metals. Through these efforts, goods and services are produced.

Keywords: Mineral processing, Extractive metallurgy and Physical metallurgy

1. INTRODUCTION

We live in a material world. Today, it is the role of metallurgy to study, develop, design and operate processes that transform raw materials into useful engineering products intended to improve the quality of our lives. It is often said that metallurgy is the foundation upon which today's technology is based, and real-world applications would not be possible without them.

With such a broad-ranging scope, the question is, if we really need metallurgical engineers, why are we graduating so few of them? Part of the answer lies in the role metallurgists play in product design and manufacturing.

The industrial revolution thrust metals to the forefront of technology, and they have stayed there ever since, becoming the very foundation of our modern society. One cannot envision a life where transportation and communications systems, buildings and infrastructure, industrial machines and tools, and safety/convenience devices are not part of our daily lives. Today, other materials have emerged as complements for (or threats to) metal's dominance. Metallurgy is the part of materials science and materials engineering that study the physical and chemical behavior of metallic elements, their intermetallic compounds and their alloys. This definition is all-encompassing and includes the study of processes run in furnaces and ovens, the forging and rolling of metals, foundry operations, electrolytic refining, creation and use of metal powders, welding, heat treatment and much more.

2. LITERATURE REVIEW AND OBJECTIVE

What is Metallurgical Engineering? Metals and mineral products surround us everywhere – at home, on our way to and from work and in our offices or factories. They form the backbone of modern aircraft, automobiles, trains, ships, and endless recreational vehicles; buildings; implantable devices; cutlery and cookware; coins and jewelry; firearms; and musical instruments. The uses are endless. While threats abound from alternative material choices, metals continue to be at the forefront and are the only choice for many industrial applications.

Developing new materials, new processes to make them, and testing new theories and models to understand them are the focal points for today's metallurgist. We have the means to measure properties at the macro, micro, nano and atomic scales, giving us unprecedented access to fuel new developments. The strong dependence of our society on metals gives the profession of metallurgical engineering its sustained importance in the modern world. It is believed by most that our economic and technical progress into the 21st century will depend in large part on further advances in metal and mineral technology. For example, advancements in energy technologies, such as the widespread use of nuclear fusion, will only be possible by material developments not yet in existence. The future is indeed bright for today's material scientists and those engineers who chose metallurgy as their career choice.

Why are there so few metallurgists?

The demand for careers in metallurgy is not at the forefront of our educational system due in large part to the inability of the metallurgical community to communicate to management our role in engineering and manufacturing. While metallurgists should be involved in all aspects of modern engineering, this is seldom the case. The reason for this is often centered around a misunderstanding of what we do, which is made more difficult by how we begin the answer to every question with “it depends.” In many cases, this leads management’s belief that other engineering disciplines can replace our skill set. The failure of management to understand what we do is often a failure to understand the engineering life cycle and the interrelationship of engineering disciplines to each other.

3. METHODOLOGY**Engineering Life Cycle**

In the design of any engineered component, it is necessary to fully understand and address two key questions that the metallurgist is best qualified to answer, namely:

What must the component endure during service (i.e., what are the product requirements)?

Questions such as the following must be addressed: What are the rigors of the application, and what is the design life? Must the component part provide premier service, or is there an adequate design life involved (i.e., will other factors end its service long before its useful life is expended)? What loading, lubricants, temperature and contaminants are involved? What other service/performance aspects specific to a particular product must also be factored into the selection process?

How will the component part be made (i.e., what are the process requirements)?

Questions such as the following must be addressed: How will its basic form be generated, and how will it be heat treated – if at all? Will it be important to introduce particular mechanical properties? If so, how – by heat treatment or mechanical means? Is geometry or surface finishes important? Will special coatings be used? Is dimensional control (stability or stability at temperature) an issue? What other processing aspects, specific to the particular product, must be considered?

Obviously, product/process engineering, performance engineering and metallurgical engineering are not separate entities. They are highly interdependent, and all these disciplines must be considered. However, one must also recognize that today’s cost demands often require compromises in material and manufacturing selection to meet logistical, supply-chain and inventory requirements. Fortunately, that does not mean that selection needs to be minimized. If done correctly, the needs of all parties can usually be met with excellent success while maintaining realistic economic, manufacturing and performance goals.

The role of the metallurgist is especially important during the engineering stage of product development. A metallurgist’s participation enhances both the design and the capability of a manufacturing process to achieve the desired outcome. During this phase, there is a point at which manufacturing commences. In order to make this decision, input is required from the so-called technology triangle. The role of the metallurgist or metallurgical engineering group is to provide critical input in the following areas:

- Materials selection
- Manufacturing strategy
- Process development
- Equipment selection
- Controls development
- Variability assessment
- Testing criteria

Metallurgists and metallurgical engineers are also responsible for interfacing with manufacturing to meet production demands in an environmentally responsible way by designing processes and products that minimize waste, maximize energy efficiency, increase performance and facilitate recycling. Metallurgists have seldom been viewed as part of the manufacturing mainstream, however, which is another part of the problem. Gone are the days when every manufacturing plant had a chief metallurgist and multiple metallurgists on staff.

4. RESULTS AND DISCUSSION

Metallurgy Contribution towards GDP

The rise in population, growth in the economy, urbanization and the increasing domestic requirements, has created a strong demand for minerals and metals. In the last few years, India has seen significant growth in minerals with the government granting leases for longer durations of 20 to 30 years. For global players, India is a big market for mineral resources, as metals and power demand is expected to have robust growth in the long term. India ranked 4th globally in terms of iron ore production and was the 3rd largest producer of crude steel in the Asia-Pacific region in 2022.

Currently, aluminium is the 2nd most used metal in the world after steel and the 3rd most available element in the earth, constituting almost 7.3 % by mass. At present, aluminium is the fastest-growing non-ferrous metal and its production volume falls second to the demand for steel. Domestically, the demand and consumption of aluminium was projected to rise to about 3 million tonnes by 2020 from nearly 1.71 million tonnes now. Also, copper stands 3rd in consumption after steel and aluminium. India is also among the top five zinc mining countries globally.

Research and Innovation in Metallurgy by 2022

Development of high strength and high conductivity alloys for non-rare-earth induction motors for use in EV traction and elsewhere in the vehicle (high-efficiency motors for blowers, window-lifting, convenience features, windscreen wipers, fuel pumps, starter/generators).

Materials with high rigidity and stiffness for example to prevent buckling of slender elements, e.g. foam materials could be considered to attain higher stiffness.

Innovation can be situated on the level of the development of fire-safe steel using the inclusion of carbides.

The use of materials technologies to manage bio-pathogens/microbes, such as antimicrobial copper.

New composites like highly conducting carbon nano-tubes embedded in Cu (copper) wires can play an important role both in the economy and in the efficiency of the electrical energy transport.

In the case of marine and offshore applications, new corrosion protection systems can be provided by metallurgical solutions.

5. SUMMARY

For many reasons, metalworking has been an essential part of the economy for thousands of years. Educating the next generation in science, technology, engineering, and math (STEM) fields is one way to combat the shortage of people with bachelor's degrees or higher who are interested in working on R&D projects in the metallurgical industry. New materials are developed and their properties and structures are analyzed so that informed design decisions can be made; this is the work of materials scientists. Metals, metal compounds, and metal alloys are the subject matter of metallurgy (alloys). The manufacturing of metals and the design of metal components for use in consumer and industrial goods rely on this branch of materials science and engineering. Both chemical and physical metallurgy are important parts of the metallurgical field. Reduced and oxidized metals, mineral processing, metal extraction, thermodynamics, electrochemistry, and chemical deterioration are all areas of study within the field of chemical metallurgy. Crystallography, material characterization, mechanical metallurgy, phase transitions, and failure causes are all areas that fall under the purview of physical metallurgy. As part of the production process, metals are refined from their ores and then melted and mixed to create alloys. Of the metals used in the world, 95% are ferrous, but metallurgists also work with non-ferrous metals.

The mining industry, metal manufacturing, heat treatment, failure analysis, and metal joining are all common examples of more conventional applications. The extraction and purification of metals from their ores is known as extractive metallurgy. Numerous metals can coexist in the same ore body, making leaching an effective method for extracting them. Al, Cr, Cu, Fe, Mg, Ni, Ti, Zn, and Si are just some of the metals and metal alloys that find widespread use in engineering. Metallurgy is the science and technology of making useful objects out of metal.

The process begins with the development of the alloy and progresses through its shaping, heating, and finishing. It is common practice to measure the hardness of metal using the Rockwell, Vickers, and Brunel

hardness scales in order to gain a better understanding of the metal's elasticity and plasticity for various applications and production processes. Metal scientists look for the optimal balance between a material's many desirable characteristics, such as its cost, weight, strength, toughness, hardness, corrosion resistance, fatigue life, and ability to perform in extreme temperatures. High purity single crystal silicon is required for fabrication of metal-oxide-silicon transistors (MOS) and integrated circuits, and single crystal alloys are used to prevent creeping under extreme heat. Because of the compromise between hardness and toughness in metals, tempering can reduce the metal's brittleness and increase its resistance to impact.

Chemically modifying surfaces with electroplating is one option, while shot peening, a cold working method, is used to prevent stress corrosion failures and fatigue. Scientists who specialize in materials now explore, design, and run factories that process raw materials into finished engineering products that improve people's lives. Metallurgy is the study of the physical and chemical properties of metals, inter-metallic compounds, and alloys. Mineral extraction, extractive metallurgy, and physical metallurgy are the three main types of this process, and they all serve the same purpose: to produce metal components for use in consumer items and manufactured goods. The gap between the processing and thermodynamics and the structure and properties of metals can be bridged with the help of alloy design and micro structural engineering.

Metal products can be found in virtually every facet of modern life, including transportation (planes, cars, trains, ships, and an infinite variety of recreational vehicles), construction, in-body technology, kitchenware, currency, jewellery, and musical instruments. The ability to quantify properties at various length scales makes modern metallurgy an essential field. The metallurgical community's inability to effectively communicate its importance to the engineering and manufacturing sectors to upper management is largely to blame for the field's lack of prominence in our educational system. In the design of any engineering component, the metallurgist is the most knowledgeable person to address two central concerns: What are the service requirements for the part? When designing something, it's important to think about things like how difficult the application is and how long it will last.

It is often said that mechanical, electrical or computer-related problems can always be solved – if one dedicates enough time and money to the task. However, solving a metallurgical problem is not a function of money. Its solution may be impossible to achieve, forcing one to revisit the very design of the product and its end-use. It is for this reason that the metallurgist exists and is the person who must be involved in every product design. As metallurgists, it is our responsibility to make sure that educators and executives understand the role we play.

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Power Quality

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ABSTRACT

What is Power Quality - There are different definitions for power quality.

- According to Utility, power quality is reliability.
- According to load aspect, it is defined as the power supplied for satisfactory performance of all equipment i.e., all sensitive equipment in Hospitals, ICU, Data Centres, Process Industries, Railways, Air ports, offices & domestics etc.
- This depends upon the end user. According to end user point of view, it is defined as, “any power problem manifested in voltage, current, or frequency deviations that results in failure or misoperation of customer equipment”.

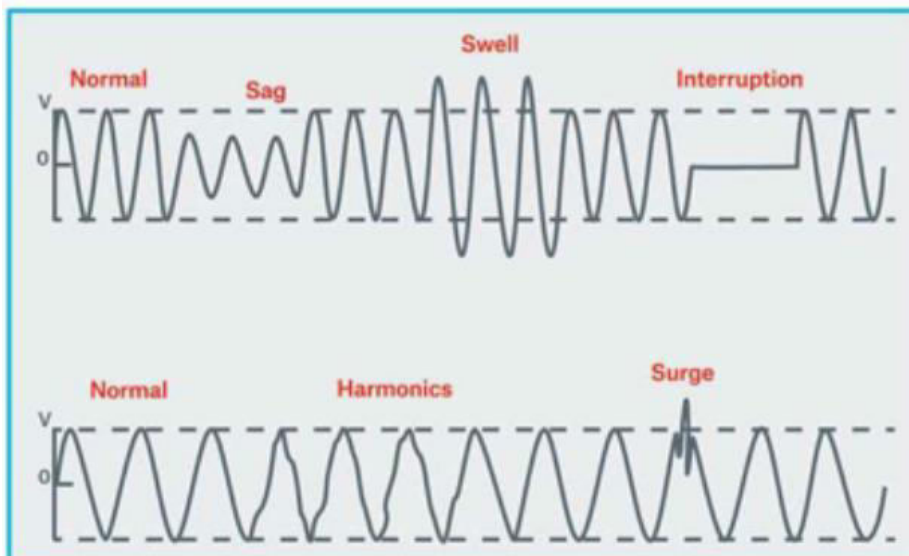
Keywords: Power, Quality, Load, Voltage, Frequency Deviations

1. INTRODUCTION

We live in a material world. Today, it is the role of metallurgy to study, develop, design and operate processes that transform raw materials into useful engineering products intended to improve the quality of our lives. It is often said that metallurgy is the foundation upon which today’s technology is based, and real-world applications would not be possible without them.

With such a broad-ranging scope, the question is, if we really need metallurgical engineers, why are we graduating so few of them? Part of the answer lies in the role metallurgists play in product design and manufacturing.

The industrial revolution thrust metals to the forefront of technology, and they have stayed there ever since, becoming the very foundation of our modern society. One cannot envision a life where transportation and communications systems, buildings and infrastructure, industrial machines and tools, and safety/convenience devices are not part of our daily lives. Today, other materials have emerged as complements for (or threats to) metal’s dominance. Metallurgy is the part of materials science and materials engineering that study the physical and chemical behavior of metallic



elements, their intermetallic compounds and their alloys. This definition is all-encompassing and includes the study of processes run in furnaces and ovens, the forging and rolling of metals, foundry operations, electrolytic refining, creation and use of metal powders, welding, heat treatment and much more.

2. LITERATURE REVIEW AND OBJECTIVE

Effects of Poor Power Quality on Power System

There are harmful impacts of poor power quality on both the utility and consumer end. Some of the main effects of poor power quality in the power system are as following:

- Harmonics add up to the waveform and equipment may receive high peak of waveforms thereby damaging the equipment. High voltages may also cause the equipment to operate in saturation region producing additional disturbances.
 - Due to overheating, noise etc. lifetime of an equipment is reduced.
 - System's efficiency or performance is highly decreased due to poor power quality.
- Due to power failure or interruption, important data can be lost or corrupted which may lead to a great loss.
 - Costs of a power system are highly increased if there is poor power quality.
- When there is a power failure, consumers can face many problems due to unavailability of power and it affects the utility costs as well.
 - Consumer loads are badly affected or even get damaged due to power quality issues.
- Sometimes there is need to oversize the power system due to additional stress imposed by poor power quality. This expansion results in high installation costs.

Power quality issues

Typical power quality issues include: voltage transients (surge), harmonics, voltage sag and swell, voltage imbalance and interruptions.

- Voltage transient (surge) — A sudden high energy disturbance in line voltage typically lasting less than one cycle (< one second) which causes the normal waveform to be discontinuous.
 - Cause — Switching type loads
- Issue — Data corruption, equipment malfunctions, equipment damage and process interruption.
- Harmonic distortion — Distortion of the current and voltage waveforms caused by the momentary on/off switching of nonlinear loads.
 - Cause — Elevators, HVAC equipment, rectifiers and welding machines.
- Issue — Data corruption, data loss, computer-controlled equipment malfunctions, excessive heat and equipment failure.
- Voltage sag/swell - A decrease (sag) or increase (swell) in line voltage lasting at least 1/2 cycle to several seconds.
 - Cause — Utility related events, starting and stopping of large loads.
- Issue — If equipment is operated slightly outside the design envelope, random malfunctions and failure may occur. If the equipment is operated significantly outside the design envelope, the equipment will not operate and may fail prematurely. The effects are based on the length, magnitude and timing of the sag or swell.
- Voltage imbalance — Differing voltage levels on each leg of a three-phase system, typically $\pm 2\%$ of the average.
 - Cause — Large loads in a building such as HVAC equipment and elevators are three-phase loads. The small but numerous loads such as copiers, control equipment and computers are single-phase loads. Single-phase loads should be equally distributed among the three phases to prevent imbalance. Imbalance can also be caused by poor connections or blown fuses.
 - Issue — Depending on the level of imbalance, loads can operate erratically, not operate at all or fail.
 - Interruptions — A significant or complete loss of voltage. The loss can be momentary or sustained.
 - Cause — Weather, utility equipment failures, internal faults or internal equipment failures.
- Issue — A momentary interruption can damage computers and other electronically controlled equipment or disrupt processes. The damage can occur on both the loss and the re-energization of power. Electro-mechanical equipment is generally not affected by these brief outages. Sustained interruptions

can last from hours to days. Contingency plans should be developed to address orderly equipment and process shutdown and restarts.

3. MATERIALS AND METHODS

How to Improve Power Quality

- Each occupancy will have a different sensitivity level to poor power quality and will have different sources of poor power quality. However, common to all businesses is the importance of a well-maintained electrical distribution and grounding system. The importance of these systems cannot be overstated. When addressing potential or actual power quality issues, the power and grounding system should be the first item addressed. This will ensure personnel safety, allow for the proper operation of surge protection devices, minimize the potential for excessive currents on neutral conductors, and provide a common reference plane for electronic equipment.

- Once the power and grounding system deficiencies have been addressed, the next steps include: power quality walk-throughs, power quality inspections and surveys, and mitigation equipment.

- Walk-throughs provide an overview of a facility from a power quality standpoint. In addition to housekeeping and the overall appearance of electrical equipment, items to note during a power quality walk-through include:

- Type of equipment that is installed
- Concentration of computer and electronic equipment
- Presence of welders, power factor correction capacitors, or variable frequency drives, Induction furnaces, Arc Furnaces, Induction Heating Systems, Large phase controlled rectifiers etc.
- Heat discoloration of electrical equipment
- Communication and control wiring in close proximity to power wiring
- Condition of the grounding system
- Presence of surge protection installed on power and data lines

- The conditions below are considered warning signs for potential power quality issues in a facility. These conditions do not guarantee a problem. A facility with these conditions usually has an increased likelihood of power quality issues.

- History of power-related issues
- Poorly maintained electrical system
- Failure of surge protection equipment
- Weather and utility disturbances common
- High concentration of electronic equipment

- Infrared surveys which identify current flow (heat) on grounding conductors and/or system neutrals

- Repeating and random equipment malfunctions, failures, tripped breakers or blown fuses with no identified causes
- Equipment running hot
- Frequent switching to backup power systems
- Lost data or data corruption

Based on the results of the power quality walk-through and the type of processes and equipment at the site, the following recommendations are common:

- Use infrared thermography to locate troubled areas. Not all power quality related issues will cause hot spots. Loose connections, harmonics and undervoltage will cause an increase in the operating temperature of equipment.
- Conduct a power quality inspection and survey using a properly trained and experienced power quality contractor. The results of the inspection and survey should be reviewed with trained and experienced power quality engineers.
- Perform a power quality study if an expansion is planned or a large load is being added. This study should be completed during the design of the expansion or during the specification process of the new equipment installations.
- Power quality inspections and surveys identify the types of problems, the extent of the problems, and the potential solutions. Power quality inspections and surveys should only be

performed by qualified power quality contractors. In many commercial or light industrial type businesses, only a few loads are affected by power quality issues and only a few loads are susceptible to poor power quality. By identifying these loads during a survey, targeted mitigation techniques can be utilized.

- A power quality survey is the monitoring and recording of the power system supplied to a building or specific area of a building. It is important to measure power continuously over an extended period of time such as days or weeks. This will capture all of the intermittent event. Due to the special knowledge needed to identify power quality related issues, it is recommended that only electricians trained in the use of power monitoring instruments be utilized. The equipment should be capable of recording very fast events (less than one cycle) and have data storage capabilities. Since it is difficult to monitor all points simultaneously, selecting the best points to monitor is extremely important. This should be done based on the areas of concern that were identified during the inspection. The equipment must be monitored in its normal operating environment. Do not perform a power quality survey during a shutdown.

- The review of the data from the survey will determine the type and severity of the problems and assist in recommending mitigation techniques. The data review should be performed by qualified and experienced power quality engineers.

- Prior to selecting any type of mitigation equipment, the power quality deficiencies that are responsible for operational issues and failures must be clearly identified. The next step is to estimate the costs of the power quality related issues. This aids in a budget for the project.

- A wide variety of power quality correction products is available utilizing a range of technologies and providing a range of protection. Common mitigation techniques include surge protection devices, isolation transformers, voltage regulators, motor generators, standby power supplies, uninterruptible power supplies and harmonic filters. Each technique has advantages and disadvantages and should be applied based on the discovered problems.

- This list defines different types of mitigation techniques available, but it is not a complete list.

- Surge Protection Devices (SPD)

- Function — Diverts surge events to ground.

- Description — A device connected between line and ground which has high impedance at normal frequency system voltage levels and very low impedance at higher than normal voltage levels. Because of this low impedance, the SPD acts as a shunt to ground for voltage surge events. Devices vary in their surge current-handling capability and voltage-limiting capability. Since devices have different voltage and current capabilities, a multi-level approach is required to protect against surge events. The multi-level approach is also known as zones of protection. Each zone experiences a different level of surge event and therefore the SPD should be sized appropriately based on the zone. In general terms, the zones of protection are the service entrance line, the remote distributed panelboards, and at the equipment points-of-use.

- Communications and data equipment are also vulnerable to surges. Special surge protectors are available for line protection of this equipment.

- Many types of equipment claim to have built-in surge protection. But these are often inexpensive varistors. These devices may or may not provide sufficient protection. They should be supplemented by the field installed units for complete surge protection.

- Isolation transformers

- Function — Isolation transformers attenuate common-mode disturbances on the power supply conductors, provide a local ground reference point and allow for voltage output adjustments using internal winding taps.

- Description — A transformer with special windings utilizing a grounded electrostatic shield between the primary and secondary. This grounded shield provides attenuation of high-frequency noise. Isolation transformers may step the voltage up or down (i.e., 480v to 208v) or be used for isolation only with no output voltage change (208 V in and 208 V out).

- Voltage regulator

- Function — Provide a constant output voltage level for a range of input voltages.

- Description — A variety of voltage regulation techniques are available, such as ferro resonant transformers, electronic tap-switching transformers, and saturable reactor regulators.
- Motor generator
- Function — Provides voltage regulation, noise/surge elimination, voltage distortion correction and electrical isolation between the electrical system and the connected equipment.
- Description — A separate motor and an alternator (generator) are interconnected by a rotating shaft and coupling. Typically, the utility is the power supply for the motor which drives the generator to produce clean power.
- Standby power supply
- Function — An inverter and battery backup power system operating as an outage protection system. In normal mode, the inverter is in a standby mode and the load is directly supplied from the input power source. On a loss of input power, the load is switched to the battery supply. There is a momentary break in power when the transfer to and from input power occurs.
- Description — Usually comprised of a solid-state inverter, battery, and battery charger.
- Uninterruptible power supply (UPS)
- Function — Maintain uninterrupted supply of regulated voltage for a period of time after a power failure.
- Description — A variety of technologies exists. The two common types are rotary and static. A rotary unit consists of a motor generator set with a short ride through capability. A static unit utilizes power electronics and a battery string or other energy storage means as a source of energy during loss of input power. These depend on properly maintained batteries. The battery system is sized based on the load and duration of required time.
- Other types include combinations of rotary and static units or UPS systems supplemented with engine driven generators for extended outages.
- The design of the backup power supply capability should reflect the criticality and size of the loads to be supplied. Redundancy should be in consideration for installations with significant power loss consequences. Each element of the backup power scheme needs to be viewed as a point of failure. If appropriate the design should provide for functional duplication of each system component.
- Harmonic filters
- Function — Acts to reduce the level of harmonic distortion on a power system.
- Description — Harmonic filters should be specifically designed to suppress the offending harmonics determined during the monitoring and analysis study. Harmonic filters may be available from equipment manufacturers that manufacturer electrical equipment known to create harmonic distortions on the power lines.

6. RESULTS AND DISCUSSION

- Electricity with a bad quality is dangerous and uneconomical at both utility and consumer end. There is a big need to focus on the quality of power being supplied to the loads. Read more as we cover causes of poor power quality, different measuring parameters, power quality standards and various techniques to improve the power quality.
- Power quality is the ability of a power grid to supply power to the consumers efficiently and it also expresses the ability of an equipment to consume the power being supplied to it. In technical terms, power quality is the measure, study and enhancement of sinusoidal waveform at the rated voltage and frequency.
- Power quality can have a big impact on the performance and cost of a power system. So, it is essential to make sure that the power being consumed by the system is of right quality and the system is compatible to function with the power delivered to it. Nowadays consumers have become well aware of power quality, that's why many governments have revised their policies to force electric utilities for making sure the power quality according to the designed standards. Also the modern equipment is more sensitive to any changes in power quality. Manufacturers, utilities and consumers all are concerned about power quality and this concern is increasing day by day.

7. SUMMARY

Consumers contribute to a big chunk of power quality issues. Non-linear loads used by consumers produce harmonics in the power system, thus leading to poor power quality. If a load's impedance varies with the applied voltage then it is said to be non-linear. The changing impedance means non sinusoidal current drawn by the non-linear load even if there is sinusoidal voltage in the system. The non sinusoidal current contains harmonic current which interferes the system's impedance and leads to voltage distortion that can affect power system and the loads connected to it.

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Pollution Control System of Induction Furnace Unit

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ABSTRACT :

This Paper Covers:

- A)** Technical Data Of Induction Furnace
- B)** Gas volume and dust load calculations
- C)** Primary Pollution Control System
- D)** Major Design Data & Operating Parameters for primary system equipment
- E)** Secondary Pollution Control System
- F)** Major Design Data & Operating Parameters for Secondary system equipment
- G)** Filtration System Designs

Keywords: Induction Furnace, Dust Load, Primary Pollution Control & Secondary Pollution Control**1. INTRODUCTION**

Induction Furnaces have a tendency of dust generation during the process of melting Steel Scrap. Capturing dust through Dust Extraction Systems is an integral part of Steel Industry. This paper focuses on the how this is being done at Steel Plants

2. LITERATURE REVIEW AND OBJECTIVE

Objective is to ensure dust free atmosphere in Steel Plants and ensure recycling of this dust to recover steel from it there by reducing pollution load on planet and benefiting the organisations

3. MATERIALS AND METHODS**Technical Data Of Induction Furnace :****Induction Furnace Medium Frequency Induction Melting System**

18000 KW Solid State Power supply unit includes Capacitor Rack , D.C. Choke, D.M. Water circulation Unit with Strand By Pump , Operator Control desk& Hydraulic power pack with stand by pump.

30000 Kg Steel Frame Melting Furnace Complete with refractory Top & Bottom , Copper Coil, Lamination Packets secured in a frame structure , Hydraulic cylinders and Inlet / Outlet sub manifolds and other inter connecting materials

Gas volume and dust load calculations:

Induction Furnace set up will have two nos. of crucible with One Electrical Panel and Transformer. One Crucible will operate at a time for approx. Two days , During this period second crucible will have the patching work.

Raw Material Data Of Furnace no 4. For operation is as follows :

Total scrap used will be 25 MT, out of which approx. 12.5 MT heavy, while 12.5MT of light scrap.

Burning Loss : 10%.

The scrap is having following contaminants:

- 1) **Oil and grease.**
- 2) **Oil paint.**
- 3) **Plastic.**
- 4) **Moisture.**
- 5) **Rust.**

As Induction furnace will be charged from Top side of the furnace and it is continuous charging by crane , Flumes will generates and come out of the crucible. All above contamination will burned into crucible.

The emissions come out from Crucible while charging of scrap is called as Process fugitive particulate emissions and has been defined as "**particulate matter which escapes from a defined process flow stream due to materials charging/handling, operational control etc.**".

In this Furnace we have considered two types of hood systems for capturing process fugitive particulate emissions from many sources,

1. **Primary Pollution Control System**, consists of local hooding operating from Remote.
2. **Secondary Pollution Control System**, Consists of Hooding at the top of Shade & Operating from local dampers.

As per estimates of Furnace supplier and operating practices of first three installed furnace Gas volume estimates are taken.

Gas volume designed For ID Fan of Primary & Secondary System are as follows ,

1. ID Fan of Primary Dog House: **500000 M3 / Hr.**
2. ID Fan Of Secondary: **600000 M3 / Hr.**
3. Total Flume load considered is **1100000 M3/ Hr.**

Out Of Total Flume load 70 % will be captured by primary, Balance 30 % will be captured by Secondary System ,

Primary Pollution Control System,

Once captured, the gas stream containing the particulate matter can be ducted to high-efficiency air pollution control devices. Frequently, the capture efficiency of the hood is far less than the removal efficiency of the control device. Hence two separate systems Primary & Secondary are proposed.

Engineering design of Hood type of Primary Local is most important , which provide a conceptual understanding of the design process.

Major components of design are As follows. Primary Hood : A receiving hood as is clearly preferable to an exterior hood that must overcome the thermal head of the plume. An exterior hood, is selected as complete access to the top of the source is necessary (e.g., pouring metal into Crucibles). Identifying source parameters, calculation procedures, and techniques for evaluation of hood performance.

Sources of particulate emissions is classified as processes giving rise to three types of Plumes, which are as follows,

1. **Buoyant plumes,**
2. Sources giving rise to buoyant plumes are hot (many are 1000° C or greater), and the initial plume rise may reach a velocity on the order of 3 m/s.
3. **Non Buoyant plumes,**

Nonbuoyant sources are cold processes, or at least not very hot; for the nonbuoyant source, the plume will not exhibit strong plume rise, and it is therefore likely to be deflected easily by cross-drafts, even close to the source.

4. **Plumes having significant particle inertia** (a special case of no buoyant plumes).

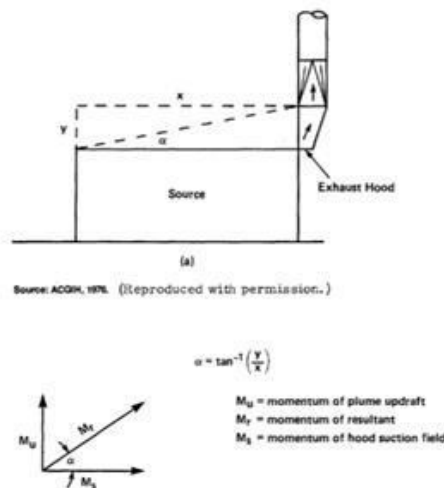
Plumes with significant particle inertia are generally nonbuoyant, but in addition, the motion of the coarse particulate matter entrains additional air.

Exterior Hood (Side-draft) for Buoyant Sources

Exterior hoods function by inducing air flow toward the suction opening. The common exterior hood arrangement shown in Figure 1 is a side-draft hood providing exhaust for a hot process.

Location Of Hood From Furnace Crucible is shown in Figure 1 as follows ,

Fig : 1 Exterior Hood Side Draft for Capture Of Plume From Buoyant Source :



D) Major Design Data & Operating Parameters For primary system equipments.

Capacity Of Crucible :	16 MW/ 40 Ton – 1 Set
Former Diameter :	1650 MM
Furnace Charging Material :	Bundle , Turning Scrap , Foundry Returns.
Charging Method :	By Magnet / Grab.
Suction Hood :	Dish Antena Type Fume Capturing Local hood.
Location :	On Platform , Common For Two Crucibles.
Hood Drive :	Motorised.
Gas Volume Considered For Primary :	180710 CMH
Suction Hood Type :	Dish Antenna Type Fume Capturing Local hood.
Location :	On Platform , Common For Two Crucibles.
Hood Drive :	Motorized.
DUST collector Type :	Off Line Pulse Jet Bag Filter.
Filter Design Pressure :	=/- 500 mm WC.
Design Inlet Gas Temperature :	90-100 Deg C
Moisture Content :	0 %
Inlet Dust Load :	2-3 g/Nm ³ .
Fume Gas Volume :	180710 CMH
ID Fan Power	280 KW X 2 Nos.
Total connected Load :	570 KW.
Design Outlet Dust Emission	50 mg/ Nm ³ .

E) Secondary Pollution Control System :

Primary Emissions missed by the hood usually escape to the atmosphere. Considering the diversity of sources classed as process fugitives, it is not surprising that the design of secondary hood systems varies greatly; a large range is found in size, exhaust rate, and arrangement.

The behavior of process fugitive particulate plumes is complex; as a result, the interaction of the hood and plume is not always predictable.

Design , Supply of Secondary Pollution Control system is given to **M/s.MARK Engineering**, A experienced establishment in this field and they are also designing Secondary Control system for Furnace 3.

Mahalaxmi has combines secondary control system for Furnace 3 & 4 in one unit , Due to One shade of both furnace with Saperate ID fan and Chimaney.

Details of Technical Offer, Design diagrams, GA Diagrams provided by MARK Engg. is mentioned in **Section H**

Hoods above furnace crucibles are Remote hoods damper operated and given above shade structure , It is designed for Furnace 3 & Furnace 4 combinable , and it is used on buoyant sources for Mahalaxmi TMT Pollution Control system.

Design For Secondary Pollution Control System :

It is assumed that after consideration of the process fugitive source, a remote hood has been selected for control of the buoyant source. Remote hoods are always termed "canopy hoods," or sometimes qualified as "high canopy hoods" to distinguish them from "low canopy hoods.

Canopy hoods are intended to act as receiving hoods to plumes having buoyant motion arising from the associated hot process source. Remote capture of such plumes is the least desirable means of control. Nevertheless, canopy hoods present little interference with process operations, which undoubtedly accounts for their wide application.

As the performance of canopy hoods is often unsatisfactory, it is useful to first list common performance failures before discussing design procedures. Typical failures of canopy hoods include:

1. Spillage
2. Plume deflection by cross-drafts
3. Plume spreading.

A operational practice experience of above three problems of Furnace 1,2 & 3 is studied and taken into hood design and considered them in reference to the particular Furnace 4 Secondary Pollution Control System Operation by **Mark Engineering** .

Spillage occurs when the plume flow rate to the hood exceeds the hood suction rate, i.e., fume simply spills out of the hood. For intermittent process fugitive plumes, such as charging of furnaces, copious amounts of fume are produced in a short duration often resulting in spillage from the hood.

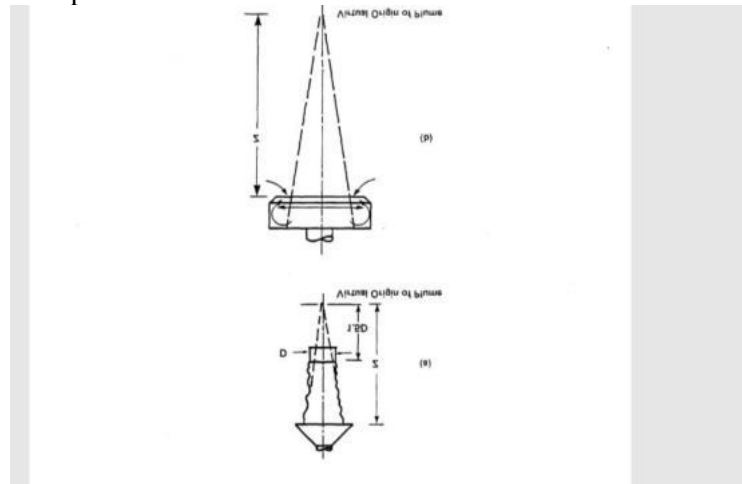
As the buoyant plume rises from the source, dilution with clean air (entrainment) decreases the plume velocity thereby allowing the plume to be deflected by building cross-drafts. These drafts do not have to be excessive to cause the plume to be partly or totally deflected away from the hood.

The last cause of failure of canopy hoods is plume spreading around obstructions of Cranes. Because the path between the process fugitive source and the remote hood often is obstructed by cranes, walkways, etc., the rising plume, in diverging around such obstacles, spreads out with the result that the hood face area may not accommodate the ultimate plume width.

Although it is virtually impossible mathematically and reliably to predict plume spreading, field observations (of an existing site) is used to take account of this problem.

General Location Of Secondary Hood and its dimensions are mentioned in Fig. 2

Fig. 2 : Typical Canopy Hood of (a) Pool Type and (b) Effective Source Hood Distance Z , is taken as Hood source distance plus 1.5 Times the source diameter D .



F) Major Design Data & Operating Parameters For Secondary system equipments.

Bag Filter Technical Data :

Gas Volume Considered :	200000 M3/ Hr
Temperature :	40 Deg to 80 Deg.
Inlet Dust Load :	3 GM / NM3 Of Gas.
Outlet Emission :	50 MGM/Nm3 Of Gas.
Type Of Dust :	Oxide – Carban.
Total Filtration Area :	1435 M2
Filter Bag Details :	OD 150 MM , Length 5100 MM.
Air To Cloth Ration :	2.34 NM3/ M2
Bag Filter Model No.	Mark PJ

ID Fan Technical Data

Air Quantity :	175000 M3 / Hr.
Operating Tempe:	40 Deg
Fan Speed :	985 RPM.
Fan Arrangement :	Direct Coupled.
Fan Application:	After Bag Filter :
Static Pr Operating Temp. :	- 600 MM

G) Filtration System Designs

Filter Media

In the engineering designs of industrial air filtration systems, one first needs to consider the materials of filter media according to the gas properties. Typical filter media include, but are not limited to, bag filters made of fabric fiber materials, textile, plastics, and ceramics. Rigid barrier filters are made of metal or sintered ceramic, powder or fibers; Granular filters based on layers of granular solids are widely employed in liquid-solid separation for water treatment, and they can also be used for air purification.

The selection of the media is determined by many factors such as the operation temperature, property of the particles, and availability of the media. Fabric filters are widely used for environment where temperatures are relatively low. Cotton may be used for the temperatures below 80 °C while Teflon and glass fiber work for up to 260 °C. For applications up to 450 °C stainless steel can be used under unfriendly corrosive environment. At higher temperatures, ceramic materials are the best choice.

Bag-house Filters

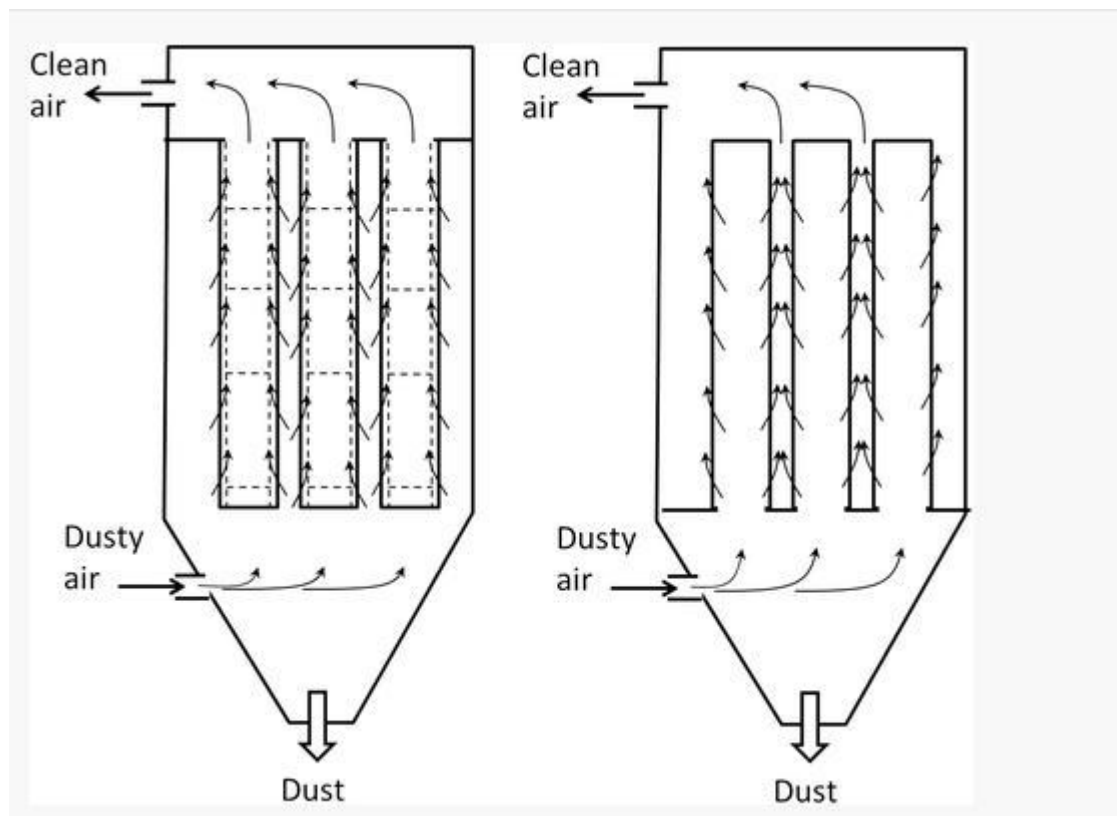
Typical filtration systems offer collection efficiencies greater than 99 % over a large size range. The advantage of the filtration over ESP is its independence on the electric resistivity of the particles. This characteristic makes filter very competitive for particles with high-resistivity. A disadvantage of a filter compared with an ESP is the larger pressure drop and the allowable gas speed. Typically the face speed through a filter is in the range of 0.5–5 cm/s. Otherwise, filter flooding will occur and result in low filtration efficiency.

In order to handle a high airflow rate while maintaining the low face speed, a high filter surface area is necessary. In industry, hundreds of cylindrical or tubular filter bags of fabric materials are confined in a “bag-house” to create a high surface area to allow certain amount of air flow to pass through the filters at an acceptable low face speed.

Figure 3 shows two typical operation modes of bag-house filters. For an inside-out filtration system, the gas passes through the filters from the inside and exit from the outside of the filter bags. This “blows up” the bag filters to their maximum volume and produces the dust cake on the inside of the bags. Outside-in operation allows the gas to enter the filters from the outside surface where the dust cake builds up. In this case a wire or perforated support structure is needed inside the filter bags to prevent the filters from being distorted.

Selection of the mode of operation of a filter bag-house depends mainly on the mechanical properties of the filter medium and the method that is used to remove the dust cakes on the filters before the critical pressure drop is reached.

Fig: 3 A typical Bag House Filter systems based on outside-in (left) and inside-out (right) operation



the mode of operation of a

Dust Cake

For either operation mode, captured particles are retained on the filter surface, gradually forming the so-called “dust cake” as illustrated in Fig. 4. Generally, this filter cake is equally important to the actual filtration process as the media filter. This dust cake will increase the filter efficiency, but even more for the pressure drop. Both the pressure drop and the filtration efficiency are at the lowest for a clean filter. A pre-coat and pre-heat procedure is often used to prevent filter medium from acid condensation and from becoming “blinded” by the finest particles present in the process gas.

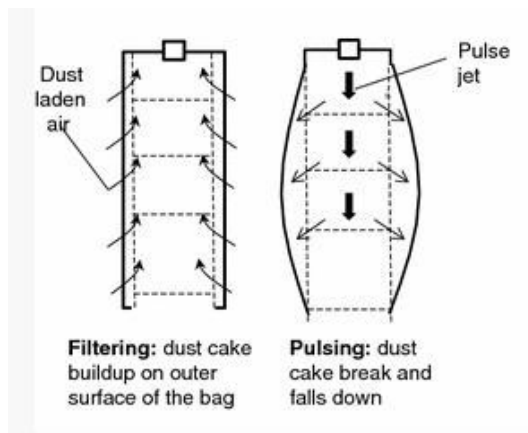


Fig 4 : Dust Cake Build Up Model

Dust cake and the filter are both porous media, and their corresponding pressure drops can be estimated using the Darcy’s law.

Dust Cake Removal

There are mainly three types of fabric filter bag-house cleaning methods:

1. Reverse air cleaning,
2. pulse-jet cleaning, and
3. shake/deflate systems.

In proposed Bag filter for primary and secondary system is Pulse Jet Cleaning Method is chosen. Graphically described in Fig 5

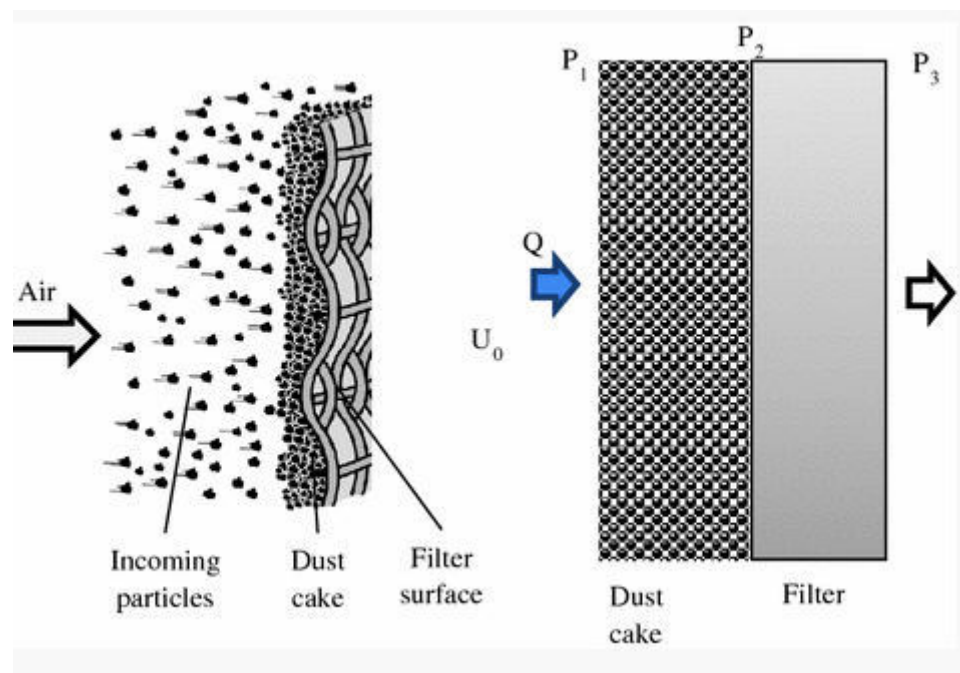


Fig : 5 Pulse Jet Method Of Cleaning Concept Diagram :

The pulse-jet method operates on-line on a few bags while the rest of the bags continue working without being interrupted.

The filter face speed or air to cloth ratio depends on the cleaning methods to be employed. It is about 1, 1.5–2, and 3–4 cm/s for reverse air systems, pulse-jet systems, and shake/deflate systems, respectively, at a comparable pressure drop.

The corresponding dust cake loads also vary from 1 to 2.5 kg/m² for shake/deflate systems, 2.5–7.5 kg/m² for reverse air systems, and 5–10 kg/m² for pulse-jet filters. A typical filter bag has a length of 5–10 m, and a diameter of 0.2–0.3 m, where corresponding surface area is 3–10 m² per bag. Pulse-jet units operate with somewhat smaller bags.

10. RESULTS AND DISCUSSION

Selection Of Suitable Hood design along with Its installation will play major role in fume suction of Induction Furnace. It varies plant to plant and Furnace to furnace. Its performance is to be tested at different weather conditions and directions of wind. For Better Efficiency Movable Hoods are to be preferred. M/s Viraj Profiles is now going for high efficient Movable Suction hood for their Induction Furnace Fume Suction. Pulse Jet Type Bag Filter is having Capture efficiency of up to 99 %

11. SUMMARY

Collection Of Fumes from Induction furnace is hard task due to variation in Qty, Scrap quality, Direction of wind, Shade design, Fan design, Etc. Even though all parameters are taken into consideration, Suction efficiency will be reached to 70-80 % Only . For escaped 20-30 % Secondary emission suction system is essential for Induction Furnace Pollution Control

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PetCare: Pet Animals Care Management and Health Website

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ABSTRACT

The primary objective of this project is to develop a comprehensive web application that centers around pet animals and the services related to them. The website will serve as a platform for pet adoption and donations, offering users the ability to search for pets and make look up directly to NGOs. The pet shelter feature will provide a safe haven for animals in need, and the directory of pet-related products and services will make it easier for pet owners to find what they need for their beloved pets. One of the key features of this website is its user-friendly interface, which allows users to log in and access various services with ease. The website's aim is to provide a seamless experience for pet owners and animal lovers, making it easy for them to adopt and donate pets, as well as consult with pet doctors. The website's content is also tailored to cater to the interests of those who are curious about pet animals, with a section dedicated to providing information about various species of pet animals. Moreover, the website will have a section dedicated to pet animal diseases, where users can connect directly with pet doctors and get expert advice on how to care for their pets. The inclusion of a food and toy category will allow users to purchase items directly from the website, eliminating the need to visit multiple websites. The application will be built using cutting-edge technologies such as HTML, CSS, JavaScript, Java, SQL, and JSP, ensuring a fast and secure user experience.

Keywords: Pet Animal Adoption-Donation, Website, Animal Shelter, Ngo, Doctor Consultation, User-Friendly

1. INTRODUCTION

There are numerous websites available on the internet that offer services related to pet animals. However, it is frustrating to have to switch between different websites just to fulfill all of one's pet-related needs. That is why we are creating a single platform that combines all the essential features in one place. Our website will offer a user-friendly interface that allows users to log in and easily adopt or donate pet animals. The Ngo section is another significant aspect of our website that provides a platform for users to help and support animal welfare organizations. By making a donation, users can help NGOs overcome their financial constraints and provide better facilities for pet animals in need.

Moreover, our website will also provide information on pet animal biographies, summaries, and diseases, making it easy for pet owners to learn more about their pets. The pet shelters feature will allow pet owners to keep their pets in a safe and secure environment for a specified period, providing peace of mind for pet owners who have to travel or be away from their pets for an extended period.

Additionally, website will offer direct consultation with pet doctors, making it easier for pet owners to seek professional help when their pets are in need. The website will also have a section dedicated to animal-related toys and food, ensuring that pet owners can find the right products and services for their pets. In conclusion, our website is designed to provide a comprehensive solution for all pet-related needs. With its user-friendly interface, Ngo section, pet shelter feature, doctor consultation, and pet-related products and services, it is the one-stop-shop for pet owners and animal lovers.

2. LITERATURE REVIEW AND OBJECTIVE

We came across the website that will also allow users to donate money to support animal shelters and rescue missions. It will offer a platform for those who want to help stray dogs but are unable to adopt them. The website's user-friendly interface and comprehensive information about the dogs will make it easy for users to find the perfect pet for them. The technology used in the website will ensure that it is secure and fast, allowing users to easily navigate and access the information they need[01].

By connecting potential pet owners with rescued dogs, this project make a positive impact in the lives of both the animals and their new families. The website provide a platform for people to find their furry friends, while also promoting responsible pet ownership and helping to reduce the number of stray dogs on the streets. This project is bring hope and happiness to both the dogs and the people who adopt them, creating a brighter future for everyone involved. this project is to make it easier for people to

adopt homeless dogs and provide them with the best possible care. We believe that every dog deserves a loving and caring home, regardless of their background. With this in mind, our website is designed to be a platform for dog adoption, providing information on available dogs, their breeds, health status, and any special needs they may have.

In addition, the website also serves as a resource for pet owners, offering information on responsible pet ownership, including spaying and neutering, and providing tips and advice on how to best care for your pet[02]. With a user-friendly interface and a wealth of resources at your fingertips, our website makes it easy for pet owners to find what they need to provide their pets with the best possible care.

Project is a pioneering initiative to provide a safe and loving home to homeless dogs. While there are several animal shelters, not all of them provide the required care and affection to these stray animals. aims to be a ray of hope for individuals who want to adopt a dog and provide them with the proper care, love and shelter they deserve. The website provides information about the number of dogs that have been adopted, the various breeds available, success stories, etc. It is a platform that promotes responsible pet adoption[01]. The website also gives details about the health problems the dog may have, whether they have been spayed or neutered, and allows users to view videos of available pets.

This project also leverages mobile technology to improve pet healthcare. The use of advanced technology such as a rule-based expert system in the mobile app enables new types of pet healthcare systems. This app is designed to provide users with a comprehensive range of healthcare facilities, making it an essential tool in pet health management and clinical practice[03]. The app helps users find the nearest pet hospital and provides real-time updates on pet health and disease. In emergency situations, pet owners can call a specialist directly using the app and take an appointment online. This project is dedicated to ensuring the well-being of pets and providing them with the love and care they deserve.

The website aims to provide users with all the necessary information on available dogs, including breeds, health status, and special needs. We also aim to be a resource for pet owners, offering advice and tips on responsible pet ownership, such as spaying and neutering. Our user-friendly interface makes it easy for pet owners to find what they need to provide their pets with the best possible care.

Furthermore, our project is a pioneering initiative to provide safe and loving homes for homeless dogs. We aim to fill the gap left by animal shelters that do not provide the necessary care and affection for stray animals[02]. The website provides details about the number of dogs adopted, success stories, and breeds available. We promote responsible pet adoption and provide information on the health problems of dogs, spaying and neutering, and videos of available pets.

To improve pet healthcare, our project leverages mobile technology. Our mobile app uses advanced technology like rule-based expert systems to enable new types of pet healthcare systems. The app provides a comprehensive range of healthcare facilities, making it an essential tool in pet health management and clinical practice. Users can find the nearest pet hospital and receive real-time updates on pet health and disease. In emergencies, pet owners can call a specialist directly using the app and take an appointment online. We are dedicated to ensuring the well-being of pets and providing them with the love and care they deserve[01].

3. Project Methodology

A. Proposed system

The website's primary goal is to offer comprehensive and easily accessible information about pet animals, making the process of adoption and donation simple for users. It provides specific features such as pet shelter and doctor consultations, as well as a one-stop-shop for all pet-related needs, eliminating the need to visit multiple websites.

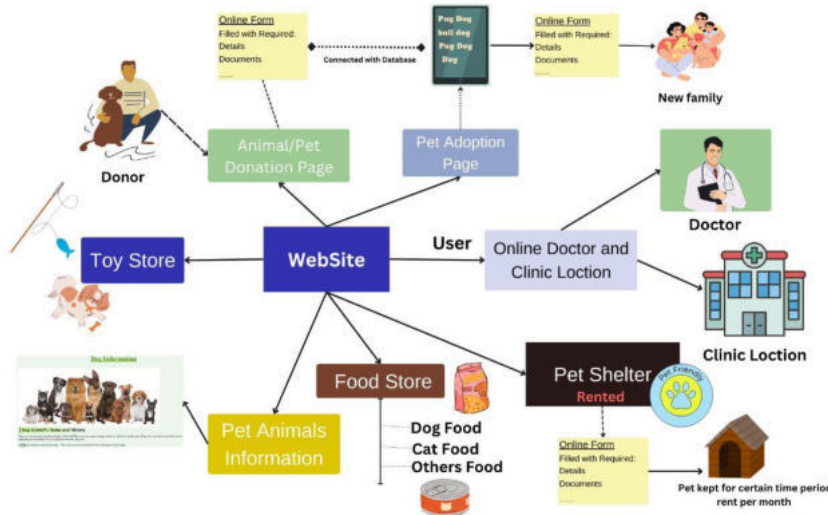
The website aims to provide various features that will assist pet owners, including pet adoption and donation, doctor consultation, pet shelter, pet food and toys, pet animal biographies, and NGO support. The website also offers a user-friendly environment with a simple login feature to ensure a smooth user experience.

B. Approach

The main purpose of the website to provide the feature which will help the pet owner and by providing the all other feature like adoption and donation of pet, doctor consult, pet shelter, pet food and toys, summary or biography of the pet animal, help to the NGO . And providing the simple login feature to provide the user-friendly environment.

C. Architecture

The project's architecture comprises six sections, each serving a specific function related to pet animals. These sections include adoption and donation, pet shelter, doctor consultation, pet biography, food and toys, and NGO assistance. To ensure a seamless user experience, these sections are designed using JavaScript and ReactJS. The backend work is done using Java, and the data is stored and processed in a MySQL database. All data processed from these six sections is stored and managed accordingly.



4. SECTION

A. Adoption And Donation

Adoption and donation of pet animals is a critical aspect of pet care. Adoption involves taking in a pet animal, usually from a shelter or rescue organization, and providing it with a loving home. On the other hand, donation involves giving money or resources to support pet care organizations and help care for animals in need.

These sections of the project are designed using JavaScript and styled with Tailwind CSS. In these sections, users can donate and adopt pet animals (dogs and cats). After logging in, users will be directed to the adoption and donation page where they will be required to fill out a form for the adoption and donation process. It is designed to make the donation and adoption process easy where users can meet up and donate their pets.

B. Pet Shelter

Pet shelter is an essential feature of our project, providing a safe and comfortable place for homeless pets. We understand that not all pet owners are capable of providing a home to their pets due to various reasons, and pet shelters provide an ideal solution for these animals. Our pet shelter section of the project is designed to accommodate different types of pets, including dogs, cats, and other small animals. The pets in our shelter are well-taken care of and provided with all the necessary amenities and care, including food, water, and medical attention. The user can book the slot using our project to the near by shelter and get the service for the pets.

C. Doctor Consultation

Doctor Consultation for pets is a critical feature of our project. We understand that pet owners need access to reliable and professional medical assistance for their furry friends. Our website offers an online consultation service with licensed and experienced veterinarians. The consultation process is straightforward and easy to use. After logging in, the user can select the Doctor Consultation section and schedule an appointment at their convenience. The consultation can be done via video call, phone call, or messaging, depending on the user's preference. We also offer a prescription refill service for pets with chronic conditions. With Doctor Consultation, pet owners can ensure their pets receive the care they need without leaving the comfort of their homes.

D. Pet Biography

The pet biography section of our website provides valuable information for learners who are interested in learning more about different types of pets. This section contains brief summaries of different pet breeds, including their origin, temperament, and special characteristics. It also provides tips on how to care for each type of pet, including their dietary and exercise needs. Additionally, learners can learn about famous pets throughout history and their impact on popular culture. The pet biography section is a great resource for anyone looking to expand their knowledge and appreciation of the wonderful world of pets.

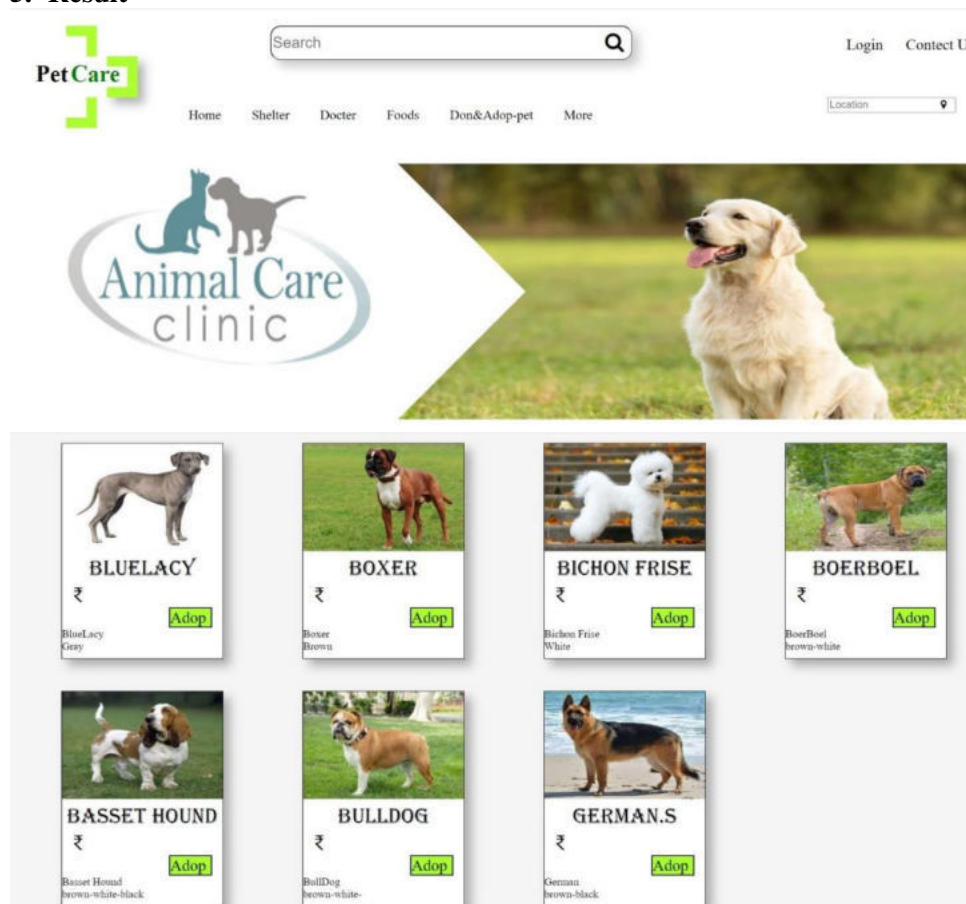
E. Food and Toy

The food and toy section of our website is dedicated to providing pet owners with information on the best food and toys for their beloved pets. We offer a wide range of options for different breeds and ages of dogs and cats, as well as information on the nutritional requirements of each type of animal. These sections also provide tips on how to choose the right food and toys for your pets based on their age, size, and breed. Our goal is to help pet owners make informed decisions about their pets' diet and playtime.

F. Ngo

Our project also includes a section dedicated to assisting NGOs that work towards providing aid and care to stray animals. This section provides a platform for NGOs to showcase their work, seek donations, and raise awareness about animal welfare issues. Users can access information about these NGOs, their projects, and their requirements for volunteers and donations. This section also features a donation portal where users can directly donate to their preferred NGO. Additionally, the website offers resources and information to encourage users to take action towards animal welfare, such as volunteering and fostering animals, participating in adoption drives, and reporting animal cruelty. We strive to make a difference in the lives of these animals and contribute to a more compassionate and humane society through our project.

5. Result



6. CONCLUSIONS

The project is aimed at providing a comprehensive platform for pet lovers, providing all the necessary information on pet adoption, care, and welfare. The project offers different sections that are designed using JavaScript and styled with CSS tailwind. These sections include pet adoption and donation, pet shelter, doctor consultation, pet biography, food and toy, and NGO assistance. The project is dedicated to ensuring the well-being of pets, providing them with love and care they deserve. It offers a seamless and user-friendly experience for pet owners, making it easy to access all the resources they need to provide their pets with the best possible care. With this project, we hope to encourage responsible pet adoption and promote pet welfare for a better society.

The adoption and donation section has made it easier for users to find and donate to homeless pets in need, while the pet shelter section provides a convenient platform for finding and contacting local shelters. The doctor consultation feature allows pet owners to easily find and connect with veterinarians in their area, and the pet biography section helps educate users on the unique characteristics and care requirements of various pet breeds. Additionally, the food and toy section offers recommendations for high-quality pet products, while the NGO assistance feature highlights organizations dedicated to supporting animal welfare. Overall, this project serves as a comprehensive and user-friendly resource for pet owners and animal lovers alike, promoting responsible pet ownership and improving the well-being of pets and their communities.

ACKNOWLEDGEMENTS

It's a pleasure to take this opportunity to thank with deep sense of gratitude to our guide, staff members of Computer Department and everyone who have directly or indirectly contributed to our project as a success. With immense pleasure we express our deep sense of gratitude and vote of thanks to our project guide Prof. Monika Pathare for his constant interest, motivation and valuable guidance during work and completion of this conference paper.

We are also very thankful to all those who supported us without which project would not have been completed successfully.

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Aahar: Homemade Food Delivery Application Using React Native, Expo and AWS Amplify

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ABSTRACT

The Aahar app is a homemade food delivery application designed to disrupt traditional food delivery services by offering a platform for housewives and homemakers to sell their home-cooked meals. Using React Native ^[1], Expo ^[2], and AWS Amplify ^[3], the Aahar app provides a user-friendly and efficient platform for individuals who prefer homemade meals over fast food or restaurant food. This paper outlines the design, development, and implementation of the Aahar app, including the technologies and methodologies used in its creation. The Aahar app offers a unique and innovative approach to food delivery services, providing a platform for home-based food entrepreneurs to showcase their culinary skills and earn an extra income while providing healthy and delicious meals to customers.

Keywords: Aahar, Homemade Food, Delivery App, React Native ^[1], AWS Amplify ^[3]

7. INTRODUCTION

In recent years, the food industry has witnessed a significant shift in consumer preferences towards healthier and more authentic food options. However, the existing food delivery services are largely tied to popular and profitable restaurants, limiting the availability of homemade food options. To address this issue, we introduce Aahar, a homemade food delivery application that connects individuals seeking homemade meals with those who offer them.

Aahar provides a unique and innovative platform for home-based food entrepreneurs to showcase their culinary skills and earn an extra income while offering customers a healthy and delicious meal option. The application has been designed using React Native ^[1], Expo, and AWS Amplify, and provides a user-friendly and efficient platform for individuals who prefer homemade meals over fast food or restaurant food.

Our system is designed to replace the outdated manual method and to overcome the challenges that come with it. The software has been created with the specific needs of the company in mind, ensuring smooth and effective operations. With error-free, secure, reliable, and fast management features, the platform offers customized solutions for organizations of all sizes.

The Aahar app also provides a solution for busy executives who are always on the move, with remote access features allowing them to manage their workforce from anywhere, at any time. Moreover, housewives and homemakers who wish to earn extra income can now sell their homemade food items on the platform. Aahar is set offering a unique solution that meets the evolving demands of the food industry.

8. LITERATURE REVIEW AND OBJECTIVE

While researching our topic we referred some IEEE Research Paper, which gave us insights to create and head our project direction, the papers we referred were:

2.1. Netfood: A Software System for Food Ordering and Delivery ^[4]

Netfood is a software system designed for food delivery companies that allows customers to order from multiple restaurants at once. It offers the ability to place orders individually or as a group and is accessible through a web interface. The system is delivery-oriented and provides a mobile application for delivery personnel. Administrators manage the data related to restaurants, food, and orders. During the development process, new functionalities emerged, such as the possibility to assemble daily menus from already uploaded foods, sending customers a message with the estimated delivery time, an iOS version for the mobile application, and Google Maps integration into the mobile application. The technology used includes STS for the server, Android Studio for the Android application, and Visual Studio Code for the web interface, with Maven used for build automation and dependency management.

Problem They Faced:

The current food delivery systems, such as Zomato and Swiggy, have some drawbacks that the proposed system aims to overcome. One issue is that the current systems do not provide facilities for homemade food services like mess and tiffin services.

How we overcome those problems:

The proposed system allows multiple vendors to use the application to post their food service. Customers will be able to see homemade food services available in their vicinity first, followed by other options. Vendors will receive feedback from customers in the form of ratings or reviews. Filtering will be provided based on distance, reviews, and customer requirements.

2.2. Sentiment Analysis on User Reaction for Online Food Delivery Services using BERT Model ^[5]

This study aimed to analyze and classify users' reactions to online food delivery services using five machine learning techniques, including BERT, Char-CNN, Graph-CNN, LSTM, and Bi-LSTM. The study collected 5680 users' comments from different Facebook pages, with 4560 comments used for training and 1120 comments used for testing. The study classified comments into three categories: positive reactions, negative reactions, and neutral reactions. BERT performed better compared to the other techniques, achieving an accuracy of 92.86%. The study addressed the lack of research on sentiment analysis for online food delivery services based on users' reactions.

Problem They Faced:

There has been a lack of research on sentiment analysis for online food delivery services based on users' reactions. Existing studies have used traditional methods, and the datasets used were limited.

How we overcome those problems:

The study proposed an automated solution that can contribute to the food-related business field. Different restaurants can take feedback from customers regarding their food delivery services and improve their business policies based on the different categorical comments analyzed by the model. The study provides a state-of-the-art solution as its model offers a significant result.

2.3. Real-time Multi-Vendor Homemade Food Service using Android Application^[6]

This application is designed to provide a user-centered solution to issues related to mess and tiffin services. It allows users to easily make orders through an android application. The system can solve various issues related to mess/tiffin service and implementation of online food ordering systems. The technology used is Android Studio, and the system provides real-time ordering, order tracking, and payment options.

Problem They Faced:

The issues related to mess and tiffin services include problems with ordering, payment, and delivery. Existing systems have limited options and are not user-friendly.

How we overcome those problem:

Customer can also select monthly or weekly service as per preference. Fixing all the related bugs and issues mentioned in this paper.

9. MATERIALS AND METHODS

The project methodology for Aahar involves a phased approach using and incorporating various technologies such as React Native, AWS Amplify, and Expo to develop a user-friendly platform for online food ordering and delivery.

9.1 Approach

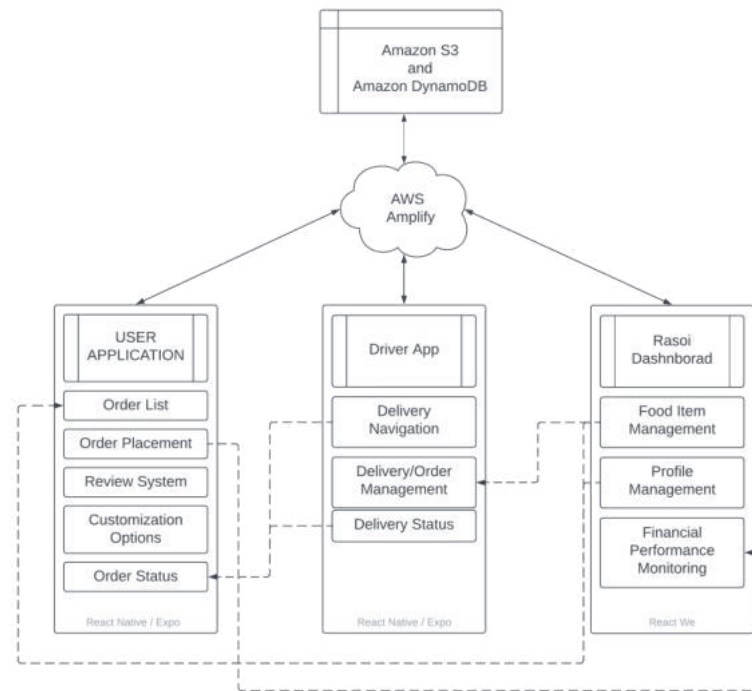
Approach for creating the project is to follow the main model of project that contains the following aspect:

1. User App: The first step involves designing a user-friendly interface and pages using React Native and Expo to ensure a smooth and hassle-free navigation experience. This will enable customers to place their orders with ease and leave reviews for food items and cooks as per their individual tastes.

2. **Driver App:** The second step involves designing a navigation interface for delivery drivers using React Native, Expo, and AWS Amplify to ensure safe, secure, and timely delivery of food to the customers' doorsteps. The delivery drivers will be able to track their assigned orders, navigate through traffic, and provide a seamless delivery experience.
3. **Rasoi Dashboard:** The third component is a dashboard designed specifically for the "rasois." It will enable them to efficiently manage their food items, personal profiles, and monitor their financial performance. The Rasoidaar's will be able to track their revenue and expenses, analyze sales patterns, and make data-driven decisions to improve their cooking and business operations.

By adopting this comprehensive approach, the online food delivery system will be efficient, secure, and user-friendly, catering to the needs of the customers, delivery drivers, and rasois alike.

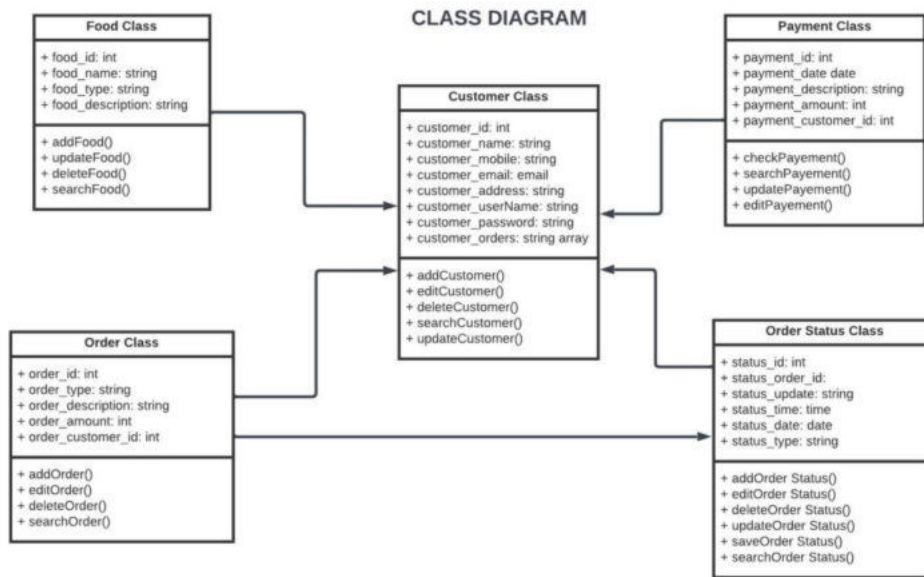
9.2 Architecture



The architecture of the Aahar project consists of three main components: the User App, Driver App, and Rasoi Dashboard. The User App and Driver App are designed using React Native and Expo to provide a seamless user experience, while the Rasoi Dashboard is a web-based interface for Rasoidaar's to manage their food items, personal profiles, and monitor their financial performance.

All three components communicate with a backend system built on AWS Amplify, which securely stores customer data, tracks orders, and manages delivery logistics. The backend system also includes APIs for data retrieval and communication between the various components of the project.

9.3 Class Diagram



Food Ordering System Class Diagram describes the structure of a Food Ordering System Classes, their attributes, operations (or methods), and the relationships among objects. The main classes are Food Items, Order, Customer, Order Status, Coupons, and Payments.

9.4 User App

Creating a user app for the food ordering system, we will be using React Native and Expo, which are popular frameworks for building cross-platform mobile applications. The user app will be designed to provide a user-friendly interface that makes it easy for users to place orders, leave reviews for food items, and manage their profiles.

The user app will consist of several screens, including a home screen, a menu screen, an order placement screen, a payment screen, and a review screen. On the home screen, users will be able to view the latest promotions, view their previous orders, and access the menu.

The menu screen will allow users to browse through different categories of food items and view their details, such as ingredients, price, and reviews from other customers. Users will be able to add items to their cart, customize their orders, and place orders for delivery or pickup.

The order placement screen will allow users to select the delivery or pickup options, choose the payment method, and provide additional instructions or special requests for their order. The payment screen will enable users to make payments using various payment methods, such as credit card, PayPal, or cash on delivery.

9.5 Driver App

The driver app is a critical component of the food ordering system, as it enables delivery personnel to accept and fulfill orders seamlessly. The driver app's primary goal is to help drivers manage their tasks effectively and efficiently.

The app's user interface should be intuitive and easy to navigate, allowing drivers to access the necessary information quickly. The driver app must also integrate with the food ordering system's backend to enable real-time order tracking, communication with customers, and automatic updates to order status.

Some of the essential features of the driver app include:

- Real-time location tracking: The app should include a map-based interface that provides real-time information about the driver's location, the customer's location, and the estimated time of arrival.

- **Communication:** The app should include built-in communication tools, such as in-app messaging and call features that allow drivers to communicate with customers and the food ordering system's support team.
- **Delivery confirmation:** The app should include a feature that enables drivers to confirm delivery by capturing a digital signature or taking a photo of the delivered items.
- **Payment management:** The app should include a feature that enables drivers to manage payments and record transactions.

9.6 Rasoi Dashboard

The Rasoi Dashboard is a web-based platform designed specifically for Rasoidaar's to efficiently manage their food items, personal profile, and monitor their financial performance by tracking their revenue and expenses.

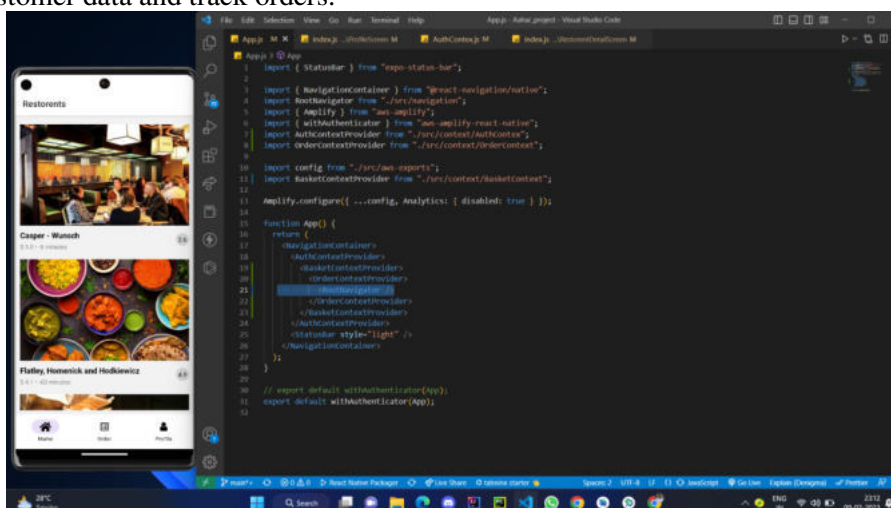
The following features and functionalities are included in the Rasoi Dashboard:

- **Food Item Management:** Rasoidaar can add, edit, and delete food items, as well as update their availability status and prices.
- **Order Management:** The dashboard allows Rasoidaar's to view and manage incoming orders, including the ability to accept or reject orders, update their status, and communicate with customers.
- **Financial Management:** Rasoidaar can monitor their revenue and expenses, track their profits, and generate financial reports for accounting purposes.
- **Profile Management:** Rasoidaar's can manage their personal information, update their profile picture, and view their ratings and reviews from customers.
- **Analytics and Insights:** The dashboard provides Rasoidaar's with valuable insights and analytics about their performance, such as the most popular dishes and busiest times of day.

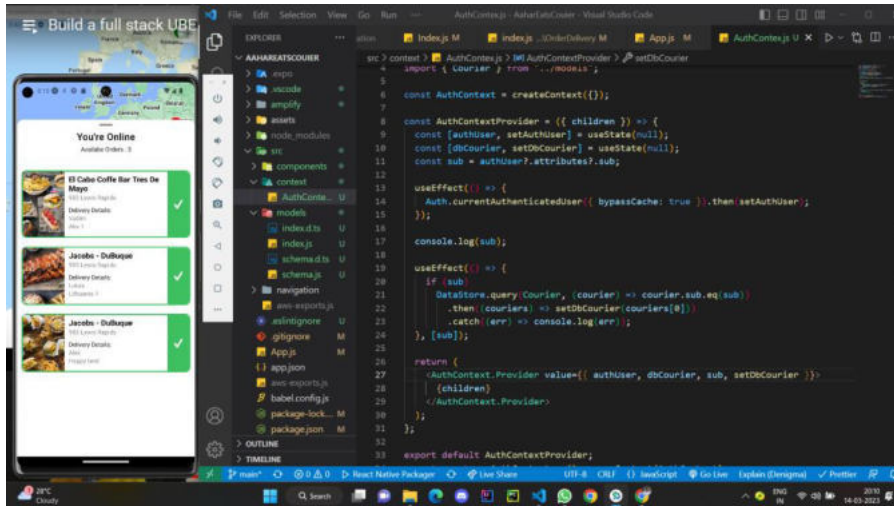
The Rasoi Dashboard is built using modern web technologies, such as React, Redux, and Material-UI, and is hosted on AWS for scalability and reliability. The dashboard also integrates with the Food Ordering System backend to ensure seamless communication and data synchronization between the user app, driver app, and Rasoi Dashboard.

10. RESULTS AND DISCUSSION

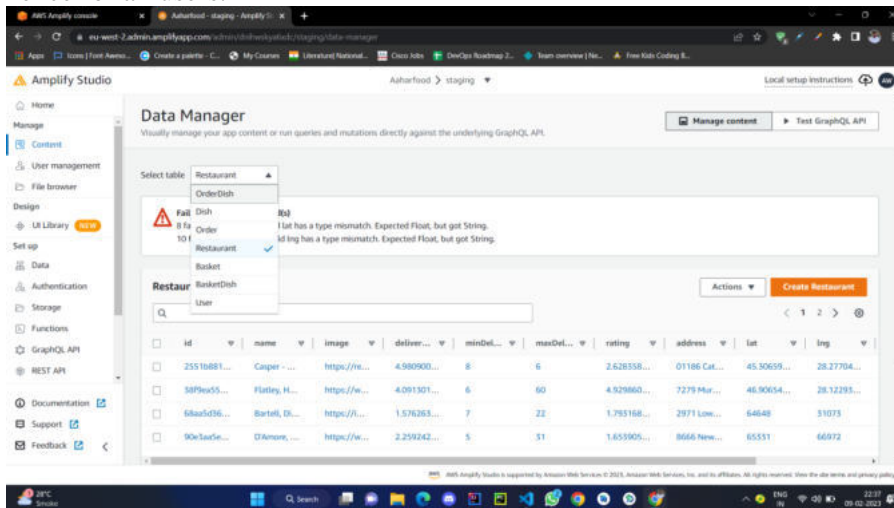
Discussion The Aahar app was successfully designed and developed, providing a unique platform for home-based food entrepreneurs to showcase their culinary skills and sell homemade meals. The user app was designed with React Native and Expo, allowing for a user-friendly interface and effortless navigation experience. The backend system was constructed using AWS Amplify to securely store customer data and track orders.



The driver app was designed with React Native, Expo, and AWS Amplify, ensuring safe and timely deliveries of the homemade meals. The Rasoi dashboard was also created, providing chefs with a dashboard to manage their food items, personal profile, and monitor their financial performance by tracking their revenue and expenses.



During the testing phase, the Aahar app received positive feedback from users and chefs, with many praising the user-friendly interface and efficient ordering system. The integration with AWS Amplify provided a secure and reliable platform for storing customer data and tracking orders, ensuring a seamless experience for all users.



The success of the Aahar app has the potential to disrupt traditional food delivery services by providing a unique platform for home-based food entrepreneurs to showcase their culinary skills and earn an extra income. The app offers customers healthier options and better control over portion sizes, while also catering to individuals with food allergies and sensitivities.

11. CONCLUSIONS

In conclusion, the Aahar app is a game-changer in the food delivery industry, providing a unique platform for homemakers and housewives to showcase their culinary skills and earn extra income while offering customers delicious, healthy, and affordable homemade meals. The app's user-friendly interface, powered by React Native, Expo, and AWS Amplify, provides an effortless and secure way for users to browse and order meals, and for chefs to manage their orders and track their financial performance.

With its cost-effective approach, incorporation of healthier ingredients, management of food allergies and sensitivities, and better control over portion sizes, Aahar app is committed to providing a healthier and more sustainable alternative to traditional food delivery services. Furthermore, the use of local ingredients and home-cooked meals promotes sustainability and supports local economies, making it a socially responsible choice for consumers.

In addition to providing a unique business opportunity for home-based food entrepreneurs, the Aahar app empowers women to utilize their culinary skills and contribute to their family's income. By

promoting women entrepreneurship and encouraging healthy eating habits, the Aahar app is not just a business venture, but a social movement.

ACKNOWLEDGEMENTS

It's our pleasure to take this opportunity to thank with the deep sense of gratitude to our guide, staff Member of Computer Department & everyone who have directly or indirectly contributed to our project as a success. With immense pleasure we express our deep sense of gratitude & vote of thanks to our project guide Prof. K.N. Attarde for his constant interest, motivation and valuable guidance during work & completion of this project.

We are very thankful to the whole staff of Computer Department for giving us the opportunity to work on this project and for their extensive co-operation and guidance. We are also very thankful to all those who supported us without which project would not have been completed successfully.

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Automatic System for Solar Grass Cutting Using IoT

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ABSTRACT

Machines for cutting grass in the modern era are becoming very common. Older lawn mowers had IC engines, which were bad for the environment. Pollution levels grew as a result. Our solar grass cutter evenly cuts a lawn using a set of sliding blades. In every industry, there are technologies that are even more cutting edge. Future power usage is crucial. A solar grass cutter is a very practical tool with a very straightforward design. It is used to maintain and care for lawns in parks, gardens, schools, and other locations. To make applications easier to use and lower costs, we have made a few changes to the current machine. By doing this, we can accomplish our main goal of reducing pollution. Workers who lack training can finish their work quickly and keep the very neat and elegant appearance of the lawn. In this project, we used 8051 microcontrollers to direct the actions of a grass cutter. In order to identify obstacles, the grass cutter also has an ultrasonic sensor. Since a grass cutter is automatic, no specialized knowledge is needed to operate one. Our project's objective is to create a solar-powered lawnmower with reduced energy usage and labor requirements.

Keywords: sensor, battery, dc motor, grass trimmer, microcontroller, solar panel.

1. INTRODUCTION

An automated system for solar grass cutting is a robotic vehicle that can cut grass automatically, avoid obstacles, and do so without the help of a human. Solar energy is used to power it. Both the motor for the grass cutter and the motors that move the vehicle are powered by batteries in the system. Additionally, we use a solar panel to charge the battery, eliminating the need for external charging. The vehicle and grass cutter motors are connected to a microcontroller from the 8051 family, which manages the operation of each motor. To find objects, it connects to an ultrasonic sensor. In the absence of a barrier, the microcontroller advances the vehicle's motors. Obstructions are discovered by the ultrasonic sensor. It is monitored, and the microcontroller disables the grass cutter's motor to prevent any harm from occurring to the thing, person, or animal, as the situation demands.

Performance-wise, the solar-powered lawn mower outperforms conventional lawn mowers. It is also referred to as the demand for solar energy to power an electric motor that also rotates a blade used to cut the grass on the pasture. This solar lawn mower also has a battery. This solar-powered lawn mower uses a rechargeable battery as a result, which is cautiously supportive for the user. When using this solar lawn mower, users can cut the grass in the desired area by entering information through the keypad.

1.1 Problem Statement

The manual operation of earlier grass-cutting technology required the use of hand tools like scissors, which led to more time-consuming and labor-intensive processes.

This project aims to develop a solar-powered lawnmower that consumes less electricity and labour.

2. LITERATURE SURVEY

The widely used smartphone is used to operate the IOT-based solar cutter. In this device, a solar panel was used to create a battery. An 8051 microcontroller is in charge of all the motors. The DC motor can be used to generate an upward or downward motion when an ultrasonic sensor detects a problem. The simple design of this Smart Solar Grass Cutter maximizes the use of resources. The overall dimensions will depend on the size or dimensions of the solar panel.

Koushik Ahmed^[1], Md. Rawshan Habib^[2] PID controller based automatic solar power. Research on colour sensors, microcontrollers, DC motors, and the use of solar panels for grass cutting is presented in this paper, with a focus on design and solar energy implementation.

Ayesha Sultana^[1], Reshma Begum^[2] A Review on Smart IoT based Gesture Controlled Grass Cutting Vehicle. They concentrate on using hand gestures to operate the device. Due to the use of both an Arduino and a Raspberry Pi controller in this paper, the machine's cost has increased. The system is also a little challenging to comprehend.

M/s. Snehal Popat Jagdale^[1], Prof. Priti Rajput^[2], solar-powered grass-cutter robot controlled by Android. In addition to using an Arduino AT Mega 328P for control, they also used Bluetooth. They have managed to direct the motor with the aid of Bluetooth. but it is less accurate. Humans are capable of manually cutting the grass, but it typically takes a lot of their time and energy.

Sumit Gupta^[1], Prakhar Upadhyay^[2], IOT BASED SOLAR GRASS CUTTER. They concentrate on the Internet of Things (IoT) application, specifically how to use an IoT application to control the grass cutter using an Android phone. To connect the Android phone and controller in this, Bluetooth was used.

Yogesh Sharma^[1], Shailendra Kumar^[2]. A Fully Automated Lawn Cutter Using Solar Panel. When the battery discharges, they concentrate the most on how to recharge it using the solar panels. But the precision is less striking. The vehicle movement motors and the grass cutter motor are both powered by 12V batteries in the system. We power the battery with a solar panel.

3. REQUIREMENTS

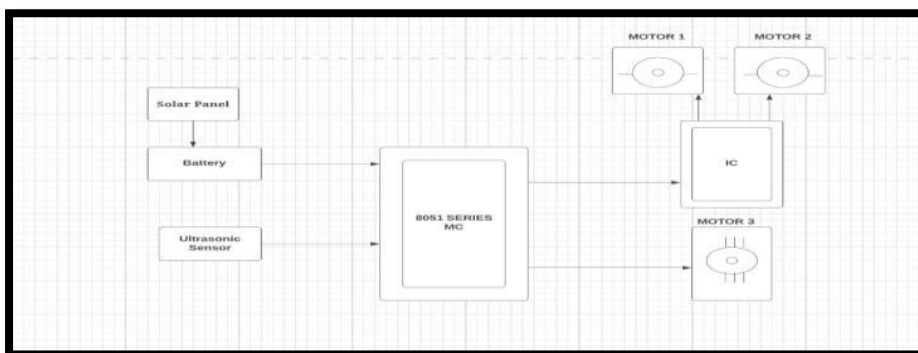
I) Software Requirements:

- MC Programming Language: C
- Keil µVision IDE

II) Hardware Requirements:

8051 Microcontroller	Cables and Connectors
Robotic Chassis	Diodes
Grass cutting Blade	PCB and Breadboard
Solar panel	LED
Crystal Oscillator	Transformer / Adapter
Resistors	Push Buttons
Capacitors	Switch

4. METHODOLOGY



Intelligent information appliances are the primary area of development for irrigation field appliance control. We developed a broad and impressive range of solar grass cutters in addition to solar panels. The energy conversation should always be had to the fullest extent possible because it is so important in the current situation. But for these mowers and other grass-cutting equipment to work properly, they

all need a motor, a rotating blade, a means of transportation, and a means of getting rid of the grass clippings.

The basic algorithm that will be implemented for working of this proposed system is as follows:

Step 1: Start.

Step 2: On the Switch Button.

Step 3: The working principle of solar grass cutter is it has panels mounted in a particular arrangement at an in such a way that it can receive solar radiation with high intensity easily from the sun.

Step 4: These solar panels convert solar energy into electrical energy.

Step 5: This machine consists of the photovoltaic, dc to dc converter, motor, controller, linear blades, battery.

Step 6: It is start cutting grass automatically till get complete the task.

Step 7: If any object detected it stop the process and change the path.

Step 8: Then again follow the step number 6.

Step 9: Exit

4.1 Flow Chart

An illustration of a system, computer algorithm, or process' operation is called a flowchart. They are frequently used to study, plan, improve, and communicate frequently complex processes in clear, simple diagrams across a wide range of disciplines.

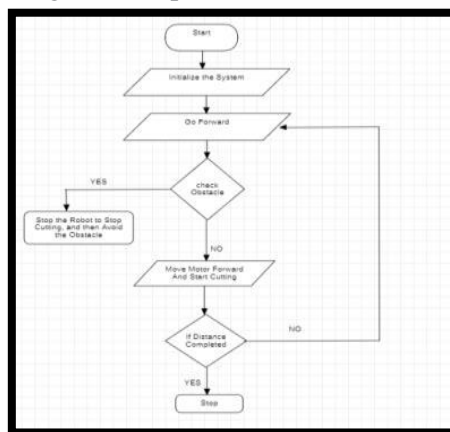


Fig: Flow Chart for Solar Grass Cutter

5. RESULTS

Our fully automated solar grass cutter project has been finished with satisfactory results. The grass cutter is moved with the help of a set of motors. The cutter is kept safe and protected by an ultrasonic sensor.



Fig: Solar Panel

Electricity is produced by solar panels. Both domestic and commercial uses of this process are possible. Electricity can be produced at home using domestic solar panels. Solar panels are used to conserve electricity.



Fig: Grass Cutter Blade

A grass cutter is a device typically used to trim grass or other vegetation. For driving power, this machine typically uses either an engine or an electric motor. To cut the grass thicker, we used a grass cutter.



Fig: Grass Cutter Motor

A motor is used to propel the forward motion, and a speed controller controls the motor's speed while an ultrasonic sensor detects the presence or absence of obstacles. Any obstruction that gets in the way of the grass cutter causes the motor to stop and reverse course.

6. CONCLUSION

All modern machines are built with the goal of reducing or eliminating greenhouse gas emissions, one of the main causes of climate change. This solar-powered grass cutter will overcome the difficulties of environmentally friendly production and low operating costs because there is no fuel cost. A solar-powered lawnmower has been created for use on lawns at homes and places of business where tractor-driven mowers couldn't be used. The machine has enough power to complete the task. As a potential replacement for the gasoline-powered grass cutter, the gadget has shown promise. The information in the paper being presented about the "Automatic System" is false.

ACKNOWLEDGEMENT

We would like to extend our appreciation to the participants who took part in this study and generously shared their time and insights. Their contributions have greatly improved the quality of this manuscript.

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NAS and Media Server using Raspberry Pi

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ABSTRACT

We rely on the Internet so heavily that there is a growing market demand for more storage space. To manage all types of files, Network Attached Storage (NAS) offers a dedicated file server. It is a standalone storage device with a direct network connection. Modern information dissemination and preservation increasingly rely on network storage, which allows many users to share resources. Yet, customers have expressed concerns regarding the security of the network storage infrastructure. As a result, a variety of private cloud storage platforms appear, giving users access to a somewhat independent space for personal use. After extensive use, it has been discovered that the traditional private cloud storage platform can provide a certain level of security, but only in open public network locations. Multiple users are simultaneously experiencing instantaneous access protocol congestion, and big data feedback causes the issue of high interaction nodes to be delayed. The paper proposes a private cloud storage platform design and implementation method based on the NAS in light of the traditional architectural characteristics and issues that private cloud storage causes.

Keywords: OMV, NAS.

1. INTRODUCTION

Nowadays, high-resolution photos and high-definition video capture consume a lot of storage space in our PCs and mobile devices. We can use an external storage device to backup our data and free up space on our mobile devices by moving data to the external storage. The constraint would be to keep the external storage device with you at all times. As a result, if the external storage device is not present, the data cannot be accessed. In today's world, access to data and information is literally at your fingertips. Indirectly, data security is threatened by the hands of those who take advantage. Maintaining a computer network is an important step in preventing these criminals from breaking into our computers. Even the most basic features, such as file sharing, photo storage, messaging, and video playback, require an internet connection.

In this dynamic environment with ever-changing technologies, the security of our data is critical, as is the amount of storage we require to store the data and maintain control over our data. This project is primarily concerned with the aforementioned issues. Because third-party cloud services are accessible to other users, privacy concerns arise. We can access our data from an external hard drive using Open Media Vault from any device that has internet access, effectively treating our external hard drive as a cloud storage device.

1.1 Problem Statement

As technology continues to advance, the security of our information is now more important than ever, just as the amount of storage space and control we have over it are. The fact that other users can access third-party cloud services raises a security concern. Some cloud service companies also have some control over our data and only offer a small quantity of storage. To use these cloud services, we must spend a substantial sum of money. For users, bringing around pricey storage devices becomes challenging.

2. LITERATURE SURVEY

With so many new technologies being developed, cloud computing is one of the most popular ones right now. Many significant issues, including mobility, security and disaster recovery, scalability and flexibility, and cost management, have been resolved by cloud computing. Cloud storage is a choice for storing data online and allowing us to access it whenever we want when our device's storage is full. When data accumulates over time, preserving it becomes crucial because so many crucial things rely on it.

Fatma Salih¹, Mysoon S.A. Omer². Raspberry Pi Video Server. Raspberry pi microcomputer can be used as a real-time video server. System uses a video stream of 800 × 400 at 24 frames per second.

Video is captured through the Raspberry pi camera module port and is compressed using a special standard that applies HTTP for sending to the network.

Mr.Amit Rakesh Srivastava¹, Prof.Jayant Gadge². Home Server and NAS using Raspberry Pi. Network Attached Storage (NAS) provides a dedicated file server to manage all kinds of files. It is an independent Storage device which is connected directly to the network.

Irfan Rohaddi¹. Monitoring server using Raspberry Pi. In this study, monitoring system a local network based on Internet of Things (IoT) where an object has the ability to send data over the network without requiring human-to-human interaction. Raspberry pi is used as a web server and is integrated with a webcam that functions as a sensor.

Mr.Anurag Jadhav¹. Raspberry Pi based offline media server. An economically low-cost computing environment using Raspberry Pi zero W model -based systems is very Well organized to use computing system in the developing environment.

3. MATERIALS AND METHODS

3.1 Methodology

Select a Raspberry Pi model and required add-ons, install an operating system, connect it to your network, create shared folders, set permissions, and configure routine backups using a programme like resync to create a NAS and media server using a Raspberry Pi. Raspbian, Ubuntu, and OpenMediaVault are a few of the more well-liked operating system choices.

3.2 Requirement Analysis

3.2.1 Hardware Requirement

- a. Raspberry Pi
- b. Micro-SD card (minimum 4GB)
- c. Internet connection (LAN/Wi-Fi)
- d. External hard drive

3.2.2 Software Requirement

- a. Raspbian OS
- b. Linux/Putty terminal
- c. Application (Open Media Vault, Plex Media Server)

4. RESULT AND DISCUSSION

A NAS device is designed with file-serving features in mind, including file retrieval, storage, and client access. Also supported by NAS suppliers are capabilities like clustering for high availability, scalability, and performance. A number of NAS controllers, heads, and nodes can work together as a single unit thanks to the clustering capability.

4.1 Flow Chart

A flowchart is a diagram which shows a process or activity. A flowchart is also a diagrammatic representation of an algorithm or a step-by-step problem-solving procedure. The flowchart depicts the steps by using various sorts of boxes and linking them with arrows to demonstrate their order.

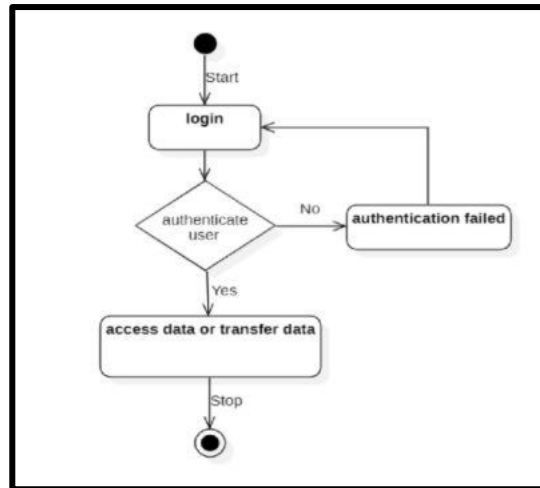


Fig 4.1: Flow Chart to access the data.

We have created a little server that is capable of sharing data both locally and remotely. Because of its portability, this server can be utilized both at home and while travelling. A media server is another function of this server. Many benefits were provided by the Raspberry Pi's own distributed storage, including free Cloud services and the ability for customers to choose how much more space they need on their own hard drives.

4.2 OMV

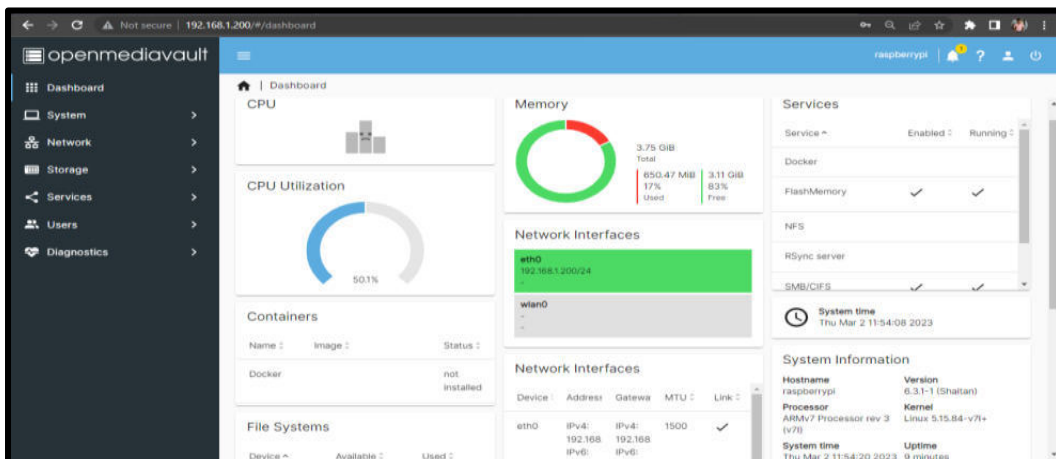


Fig 4.2: Open Media Vault

A server can be created using the Raspberry Pi, a compact and reasonably priced computer. It's a great choice for hosting a variety of applications and services due to its low power consumption, small size, and affordable price. There are numerous Raspberry Pi models available, each with unique features. Based on your needs for Memory, computing power, and storage, you should select a model. For the OS installation, we used a Raspberry Pi 4 Model B with a 4 GB RAM specification and a 32 GB SD card attached. Raspbian, Ubuntu, and other operating systems are among those that can be installed on a Raspberry Pi.

The Raspberry Pi should now have electricity connected, so let it finish the first boot procedure. Use the default web interface credentials to log in after that is finished. You won't require a keyboard and monitor connected to the Pi once you have that. Open a web browser on a computer connected to the same network, then attach your storage discs to the Raspberry Pi. After entering the IP address in the browser search bar. You will be directed to the web interface for your installation of OMV after entering the same login information once more.

4.3 Plex

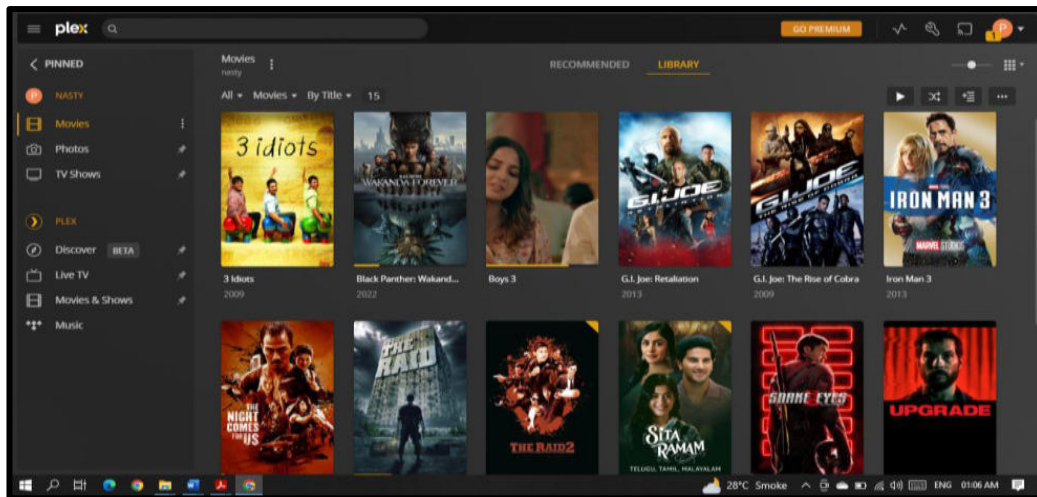


Fig 4.3: Plex Media Server

You can manage and stream your media content, such as films, music, and images, from your computer or other devices to a range of gadgets, including smart TVs, streaming boxes, and mobile devices, using the software programme Plex Media Server. Smart TVs, streaming boxes, game consoles, mobile devices, and web browsers are just a few of the many devices to which you can stream your media content via Plex Media Server. You may view your favorite TV series and movies offline by syncing your media assets to mobile devices. Using the sharing features of Plex, you can share your media content with your loved ones. For managing and streaming your media assets across a variety of devices, Plex Media Server is an all-around strong and adaptable platform.

5. CONCLUSION

The biggest benefit of having a NAS device that is on all the time is that it is very simple to access the data from any computer, whether it is inside the network or outside of it. In addition to saving energy, the user of the suggested system does so for convenience's sake. It may be affordable and practical to use a Raspberry Pi as a NAS and media server to store and provide access to files and media from various networked devices. A Raspberry Pi can provide a dependable and adaptable storage and media sharing solution with the right software and configuration.

ACKNOWLEDGEMENT

We would like to take this opportunity to express our gratitude towards all the people who have helped us in various ways, for successful completion of our project. We would like to extend our appreciation to the participants who took part in this study and generously shared their time and insights. Their contributions have greatly improved the quality of this manuscript.

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Prevention Of Drowning Incidents In Swimming Pool On Automated Vision Based Surveillance System

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ABSTRACT

Swimming pools are everywhere, like in homes, restaurants, clubs. There will be a lifeguard at each pool and many swimmers at the swimming pool, but even then there are many drownings. The numbers are increasing daily. To protect people from drowning in the pool, we use machine learning and a net lifting system to prevent drowning incidents. The system will include a net to help the drowning person rise in the water, this movement of the net will be controlled by servo motors that are connected to the Arduino Uno board, and there will be a buzzer and LED indication to alert people near the pool and. Drowning is detected by machine learning using a camera that is trained to detect such situations, the camera is connected to a computer or laptop, this system is used to monitor the pool, watch the swimmers in it, if there is a person in it, the drowning state system detects it and sends a command to the Arduino Uno board to she raised the net. With the help of servomotors, the mesh rises together with the sinking one.

1. INTRODUCTION

Nowadays, video surveillance can be used as a monitoring and security tool. Surveillance of public and private places is increasingly becoming a very sensitive matter. Video surveillance systems are designed and installed in places like railways, airports and even hazardous environments. Image processing pattern recognition and machine learning-based methods are effective ways to intelligently monitor objects or events in real time. The use of intelligence in video surveillance systems enables real-time monitoring of places, people and their activities. The surveillance approach can change with different goals and can change with different goals and change from a single camera to a multi-camera configuration. Tracking must be robust to automatically detect drownings. This tracking information is very useful for understanding events later or as incriminating evidence, many researchers are studying the possibility of using these huge amounts of data and analyzing them in real time with the hope of preventing some of these extraordinary events or facilitating faster or more efficient .

The main contribution of this project is to develop a pool monitoring system so that swimmers can swim freely without fear of drowning. Have an automated model that will work by itself, without the presence of a lifeguard.

1.1 Problem Statement

According to the WHO (World Health Organization), drowning is the leading cause of unintentional death in the world, with approximately 372,000 drowning deaths reported annually. Swimming Pool Drowning Deaths and Children It's an unbelievable statistic: According to the CDC, drowning is the leading cause of unintentional death for children ages 1 to 4. To overcome this problem, an IoT monitoring model will help to avoid the maximum number of cases.

2. LITERATURE SURVEY

The system consists of a PC/laptop running Windows and Anaconda, an Arduino Uno board, servo motors, an alarm system and motor controllers. The proposed system is based on the circular Hough transform algorithm for locating and rescuing drowning swimmers. The results of the experiments indicate that the system has a unique ability to track and monitor swimmers, allowing it to mitigate and reduce the number of drowning deaths.

Lei Fei¹, Wang Xueli², Off-time Swimming Pool Surveillance Using Thermal Imaging System, proposed a background subtraction method for drowning detection and swimmer identification using visual tracking in their research. This method cannot accurately reflect the real background, which limits the model-accurate shape detection of moving objects.

Ajil Roy¹, Dr. K. Srinivasan², A live Visual Surveillance System for Early Drowning Detection at Pool proposed drowning detection using RFID-based swimming goggles, but this model also fails to overcome accuracy limitations because the water sensor is not placed too close to the mouth and nose. Hanbing Liu et al¹, A framework for Vision-based Swimmer Tracking it consists of a framework that uses specialized cameras and DSP engines to generate alerts based on the analysis of the swimmer's movement, but this system lacks an autonomous rescue mechanism.

Journal by Mr. Lin¹, Wang LY², A Vision-Based Approach to Early Detection of Drowning Incidents in Swimming Pools, in some countries such as South Africa, Guyana, Morocco, Houtamalla and India, the death rate is heart-rending, and one regrets few countries such as Austria, Portugal, Austria, The Netherlands, Denmark, Korea, etc. have somehow managed to significantly reduce the number of deaths.

3. METHODOLOGY

The primary contributions of this project are to create a monitoring system for swimming pools to stop the beginning of a drowning episode. The complete system will be controlled by the Raspberry Pi and Arduino Nano boards. Anyone accessing the pool area should be wearing passive yellow vests. The two Pi cameras will keep an ongoing eye on the pool. The Raspberry Pi board, which is executing a Python script, will receive the data after it has been analysed. The script will compute the locations, velocities, paths of movement, and time spent submerged for each swimmer. The computations will enable the detection of any abnormal events. If such occurrences take place, Raspberry Pi will send a command to a stepper motor that is set up to lift the mesh. The swimmer can be lifted out of the pool by using that mesh. Whenever any impending danger occurs, a warning signal will alert the lifeguard.

3.1 Requirement Analysis

3.1.1 Hardware Requirement

- a. Motion Detection Sensor
- b. Camera
- c. PC/Laptop
- d. Arduino/uno
- e. Servo Motor
- f. Light/Buzzer

3.1.2 Software Requirement

- a. Python 3.9(Coding Language)
- b. Visual Studio Code
- c. Arduino Software

4. RESULT AND DISCUSSION

The project is to be developed in python, which should run on Windows OS, which will be implemented in Arduino to perform the expected actions as needed. The mesh should look correct just like the lift but on the flat side.

4.1 Proposed System

The proposed automated and intelligent pool safety monitoring system based on Internet of Things and transfer learning is shown in Figure 3. The system uses a single image taken in two steps: (1) a motion sensor detects any number of people entering the pool and sends a signal to the camera and (2) a camera that is installed above the pool as shown captures one image. Then the PC/laptop connects to the camera and takes one picture.

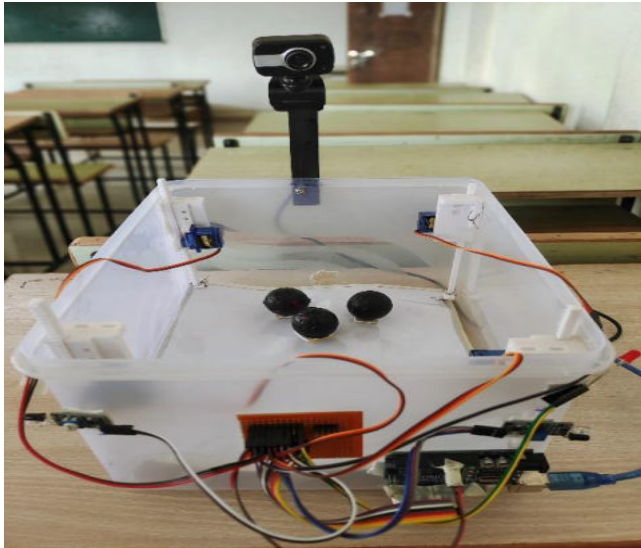
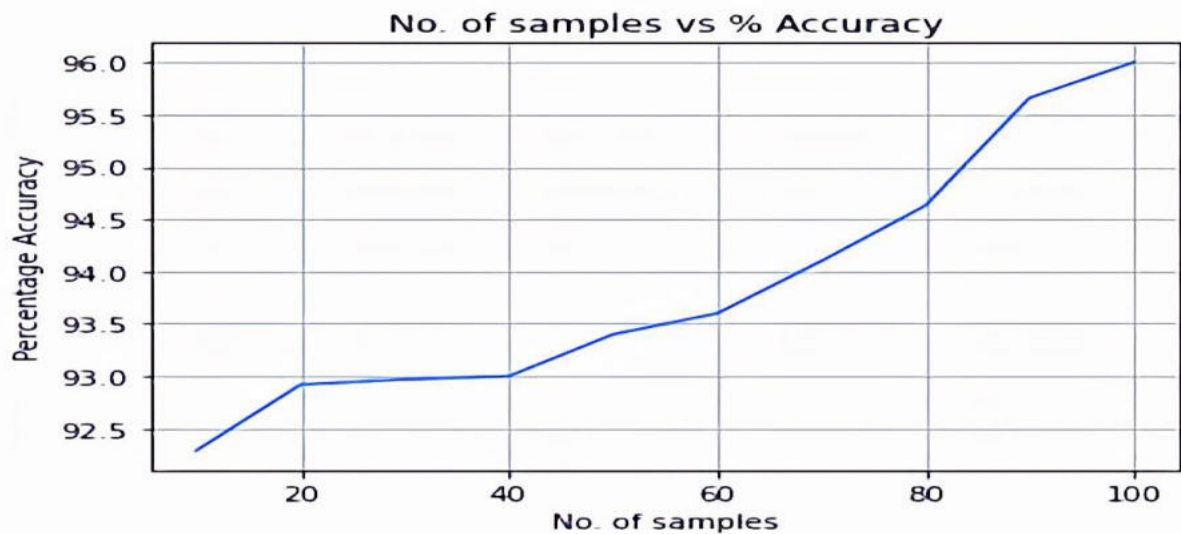


Fig 4.1: Proposed System

The prototype was built and tested several times to verify its durability and responsiveness. The prototype worked exactly as described in the UML diagrams. A prototype of the proposed product is built in a controlled environment, tested for safety and security in different lighting conditions. In order to reach the surface in time, the actual system must include powerful elevator motors with tuned speeds. The system works well using the Hough Circle Detection method with 98% accuracy, which is improved by taking the value of consecutive frames to avoid false starts.



No. of samples are the number of images captured from live camera video, Initially the no. of balls in 1 image is 3 balls. So, if the count of balls is 3 for every increasing image samples then the accuracy will be greater i.e., close to 98%.

4.2.1 Command for activation


```
Anaconda Prompt (Anaconda) x + v
(base) C:\Users\a9766>conda activate drawd
(drawd) C:\Users\a9766>cd Downloads
(drawd) C:\Users\a9766\Downloads>python main.py
```

Fig 4.2: Anaconda prompt

To run the project, we need to open the terminal and activate the project name. After activating project name, we need to give access to the path of python library in which the algorithm is stored. After providing the path, we need to run the main.py file from which the camera will start working and the process will go on.

4.2.2 Detecting the number of swimmers inside the pool

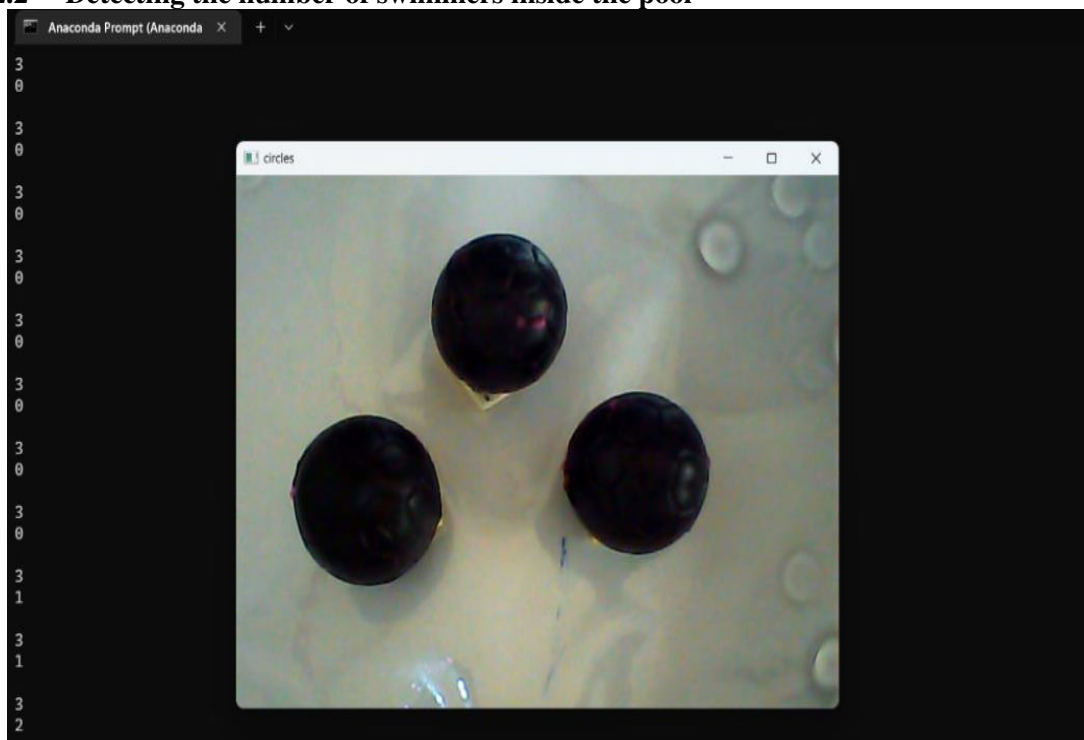


Fig 4.3: Camera Detection

The model will start working with the use of live camera as it detects the number of swimmer in the swimming pool with the help of hough transform algorithm and it will continue to do so until one of the swimmer is missing for a while

4.2.3 Notification to guard

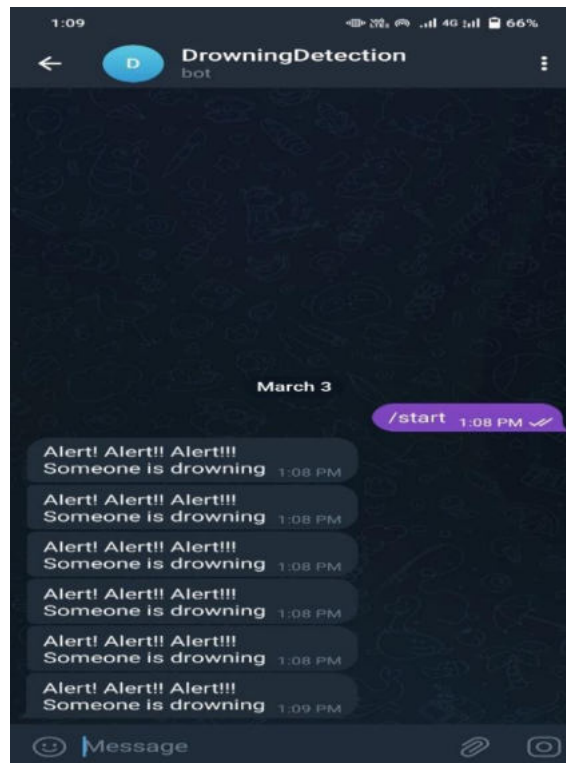


Fig 4.4:Telegram Alert

Within 10 seconds an alert notification will be send to the guard or the owner of the swimming pool so that they can be known about the incident within seconds and they can manually bring the mesh down.

5. CONCLUSION

This project presents an automated vision-based monitoring system for pool drowning detection. Swimmers in the pool are detected and monitored by a camera. The linear step raises the swimmer and meanwhile a warning message signals the impending danger to the lifeguard. libraries will be added to explore and investigate the effectiveness of the proposed system, as well as additional functionality to send live images of the drowning as a notification directly to the pool owner, as currently only text messages are forwarded to the owner.

6. FUTURE SCOPE

More classes and libraries will be added to explore and to investigate the efficiency of the proposed system. Additional function of sending the live images of drowning just as a notification directly to the owner of the pool as currently only text messages is forwarded to the owner.

ACKNOWLEDGEMENT

We would like to take this opportunity to express our gratitude towards all the people who have helped us in various ways, for successful completion of our project. We would like to extend our appreciation to the participants who took part in this study and generously shared their time and insights. Their contributions have greatly improved the quality of this manuscript.

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A Systematic Augmented Reality based ATM model to Enhance Security and Safety

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ABSTRACT

Augmented reality (AR) can be applied to automated teller machines (ATMs) to enhance the user experience and provide additional functionality. By using AR, users can interact with ATMs in new ways, such as through visual cues or gestures. One potential use of AR in ATMs is to provide step-by-step guidance to users. For example, AR could be used to overlay instructions on the ATM screen that show users how to insert their card, enter their PIN, and complete their transactions. In addition to making the ATM experience more user-friendly, AR can also provide users with additional information about their accounts. Another potential use of AR in ATMs is to provide users with additional information about their accounts. For example, AR could be used to overlay account balances or recent transaction history on the user's smartphone screen, allowing them to quickly and easily access this information without having to navigate through multiple menus on the ATM. In addition, AR could be used to enhance security at ATMs. For example, AR could be used to detect and highlight potential skimming devices or other fraudulent activity at the ATM, helping to prevent identity theft and other types of financial fraud. Overall, the use of AR in ATMs has the potential to provide a more intuitive and engaging user experience, as well as improve security and access to account information. However, further research and development is needed to fully realize the potential of this technology in the ATM industry.

Keywords - Augmented reality, automated teller machine, Mobile banking , mobile application.

1. INTRODUCTION

Preventing the spreading of diseases like COVID-19 is very critical to flattening the curve. Research shows that the COVID-19 virus can transmit through public objects similarly used by many people during the course of a day such as ATM keypads, Gas station keypads, and self-checkout at grocery stores. Sanitizing the keypad after every use is simply not feasible. So we need a technology that can help us operate the keypad without physically touching it. At the same time, we need to consider the cost of a new system or enhancement. Using Augmented Reality, we can impose a virtual keypad on a digital image in real-time.

Moreover, this technology is vital for healthcare workers who interface with medical equipment as well as those who rent ATMs, sales equipment, and learning devices. A variety of issues must be addressed as soon as possible with regards to the appearance, development, and acceptance of such technologies. A non-contact method of communication is possible with augmented reality technology, which bridges the gap between the physical and virtual worlds using sensory control sensors and communications. A number of intangible communication technologies have also been explored in the following areas: Non-touch technology provided with touch-based technology, low-resolution sensors used in touch-based medical imaging interactions, and interactions with devices that are not surgical like Kinect and Leap Motion.

1.1 Problem Statement

Researchers have discovered that the COVID-19 virus can be spread through common public objects including ATM keypads that must be kept open despite critical situations like lockdowns. Additionally, existing ATM cabins have cameras installed for security purposes, however with advances in hacking, these cameras might be abused, and ATM pins could be disclosed by screening fingerprints. Another challenge is the development of intuitive and user-friendly interfaces that make it easy for customers to interact with the ATM using AR technology. This requires careful consideration of factors such as the size and position of the AR overlays, as well as the design of the user interface. Overall, the development of an AR ATM system presents a number of exciting opportunities, but also significant technical and design challenges that must be carefully addressed in order to ensure a successful implementation.

2. LITERATURE SURVEY

P. Sarvesh^[1], Priyadharsini. K^[2], Dinesh Kumar J.R^[3], S. Naren^[4], M. Ashwin^[5] in this research focuses on the technology required that allows users to control ATMs without having to physically touch them. For augmented reality (AR), a camera is the only tool necessary to capture images and mark the article without having to use a marker. The marker is arranged from the surroundings to create a three-dimensional environment.

Aamir Jawadwala^[1], Tanvi Thakur^[2], Monica Suryawanshi^[3], Prof. Sejal D'mello^[4] This Paper focuses on a mobile application that may be considered one of the strategies to promote augmented reality technology. A smartphone camera and no special hardware or software are all it takes for everything to be done with the suggested method, which eliminates the need for human contact throughout the process.

Sneha Kasetty Sudarshan^[1] This Paper describes the generic framework required to develop an Augmented Reality application. This Paper focuses on the key technology required to develop a mobile Augmented Reality application. It also describes that cloud computing will play an important role in the future development of Augmented Reality applications.

Benyam Tadesse^[1] This Paperwork is the ease of application process for ATM cards and cash availability in ATMs as the key factors that influence customer satisfaction with ATM banking. It also says that there has been much literature that suggests that all 25 ATM banking attributes would provide a perfect predictor of customers' satisfaction with ATMs, accuracy of ATM transactions, ease of access to ATMs.

David Anderson^[1] According to this study, it also says that a contactless payment system for a smartphone is a solution that will allow the user to make a payment by placing the smartphone in near proximity of the payment terminal in order to make a payment instead of using a regular credit card or cash.

3. REQUIREMENTS

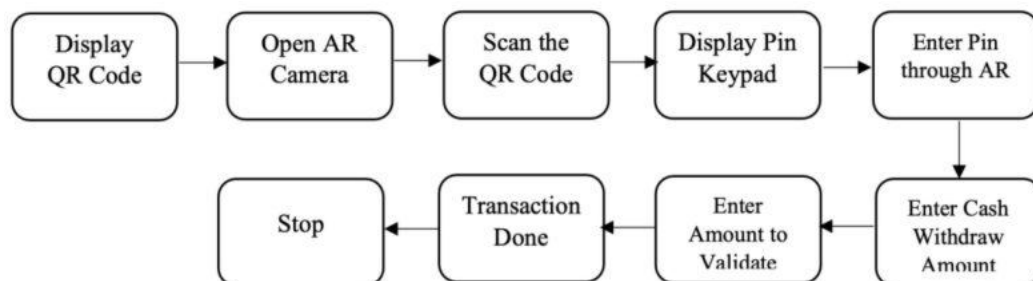
I. Software Requirements:

- a) Arduion IDE

II. Hardware Requirements:

- a) 1.Arduino mega 2560
- b) 2.NodeMCU ESP8266
- c) 3.Servo motor

4. METHODOLOGY



It can be divided into three modules: Hardware, Android Application, and Augmented Reality Setup. To demonstrate the cash dispensing mechanism, we will construct an ATM model using Arduino. Arduino IDE software will be used for coding.

The basic algorithm that will be implemented for working of this proposed system is as follows:

Step 1: Start.

Step 2: Open the app and open the AR camera in it. Step 3: Scan the QR code using an AR camera.

Step 4: If a match is not found, then go to step 3.

Step 5: If a match is found, display the Homepage AR User interface and wait for user input.

Step 6: Now insert the Pin and match from the user database. Step 7: If a match is not found, then go to step 5.

Step 8: If a match is found, display the cash withdrawal amount. Step 9: Enter the Amount to validate.

Step 10: If the user has balance then the command will be sent to the cash dispensing mechanism and the cash is dispensed.

Step 11: Stop

5. RESULT

OTP obtained after the user clicks "Get OTP" and enters their phone number. After scanning the QR code, the user is taken to an interface where they may choose to open the camera or exit. The AR interface is activated and prompts the user for their ATM pin when the target image has been scanned. When the user enters the appropriate amount and has enough funds in their account, a notification suggesting when to retrieve the cash is presented.



FIG 5.1: ATM SYSTEM



FIG 5.2: INSIDE OF ATM SYSTEM

6. CONCLUSION

Because of the interactivity and virtual experience that the user can dispatch money from an ATM without touching the machine, a mobile application may be considered one of the ways to promote Augmented Reality technology. the keypad on the kiosk. Therefore, there is no requirement for direct physical interaction to Input the pin and can choose any other system options. The development of augmented reality applications in the future will heavily rely on cloud computing. Since the cloud will handle the demanding computing tasks, prolonging the battery life of the mobile device and setting a new trend, it will play a crucial role in the development of MAR applications.

ACKNOWLEDGEMENT

We would like to extend our appreciation to the participants who took part in this study and generously shared their time and insights. Their contributions have greatly improved the quality of this manuscript

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Effective Approach Towards Hybrid Intrusion Detection for Cyber Attacks

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ABSTRACT

Network intrusion has become a biggest issue for the industry and government organization in the domain of the cyber-threat landscape. The current cybersecurity solutions are no longer excellent in tackling these cyber-attacks. Huge amount of data is being flown over the internet and providing security to these data is necessary for that an Intrusion Detection System (IDS) comes into the picture and helps in detecting security threats. Network intrusion detection system is very important in identifying network traffic as normal or anomaly. Correct identification of the threat depends on the accuracy and efficiency of the Network Intrusion Detection System (NIDS). In this paper we proposed two different methods Binary classification and Multiclass classification. For each classification we proposed five models namely Gaussian, KNN, Logistic Regression, Random Forest and Hybrid stacking model is combination of Random Forest and KNN. Our proposed stacking model effectively detects the nine types of threats such as Dos, Fuzzers, Exploit, Worm, Shellcode, Reconnaissance, Generic, Analysis and Backdoor. Stacking Machine Learning (ML) models are proposed for better accuracy of the NIDS. We applied these different types of models on the UNSW-NB15 packet-based dataset. Our proposed stacking hybrid model shows better accuracy (96.92%) than any other existing models. Testing accuracy of the stacking models is better than all individual models.

Keywords: NIDS, Machine Learning, UNSW-NB15, KNN, Random Forest

1. INTRODUCTION

People are now more connected to the network therefore use of internet is increasing day by day. people more dependent on the global internet to complete both personal and professional tasks. Considering all different types of attacks building a reliable Network Intrusion Detection System is a very difficult task. Network intrusion is nothing but unauthorized access to the network. Network intrusions often target to threaten the security of networks by stealing valuable data of the users and network resources. To detect and respond to various intrusions, we need to install NIDS at the perimeter of our network. NIDS is a software application that can monitor the network activity. ML approaches have been used in different ways for network intrusion detection. Among the all-best approaches application of hybrid and stacking Machine Learning models to improve the performance of the NIDS. We proposed two different methods namely Binary classification and Multiclass classification. We have implemented our stacking ML Model on the UNSW-NB 15 dataset with accuracy 96.92% which is better than the other models presented in recent papers.

1.1 Problem Statement

Intrusion detection begins where the firewall ends. Preventing unauthorized entry is mandatory, but not always possible. It is important that the system is efficient and secure enough to detect the all types of attack. The task is to build hybrid stacking Machine Learning based Network Intrusion Detection capable of detection for different types of attacks on network. Hybrid approach is used for improve the performance of Network Intrusion Detection System (NIDS).

2. LITERATURE SURVEY

With the increasing use of WLAN technology, interest in the subject has also increased among researchers. A lot of research and studies have been done in this area. Researchers performed various methods on different datasets to detect WLAN attacks. When these studies are examined, it is seen that there are important results that have been obtained up to the present

[1] Singhrova ^[1] described the architecture of Host-based Intrusion Detection System for DoS attack in distributed WLAN. The presented system is an intelligent system that detects the intrusion

periodically and dynamically. According to the authors, the proposed system is confident and efficient, as it applied on distributed nodes and all destination IP addresses.

[2] **Thantrige^[1] et al^[2] used AWID dataset to studied feature reduction techniques.** Information Gain (IG) and Chi-Squared statistics (CH) were applied to reduce the most significant features. The obtained results showed that feature reduction increased the performance in terms of complexity, time and accuracy. The accuracy of classification increased 2.4% with feature reduction from 110 to 41.

[3] **Manzoor^[1] and Kumar^[2] explained a feature reduction method which applies feature ranking based on correlation and information gain.** The proposed method was based on ANN (Artificial Neural Network) and applied on KDD '99 dataset. The performance results with and without feature reduction is compared. According to the obtained results, the performance of the feature reduction system is better than the system without feature reduction. In addition, this study can be improved further by implementing proposed approaches on other datasets.

[4] **Usha^[1] and Kavita^[2] proposed a normalized gain-based IDS for 802.11 intrusions which are known as NMI.** The proposed NMI consists of two components. The first component is optimal feature selection and the second component is categorizing and detecting intrusions by using SVM classifiers. This method was proposed to apply it on AWID dataset. The experimental results demonstrated that computation complexity and false positive rates were reduced by decreasing the number of features, and an accuracy rate of 99.2% was obtained.

3.SYSTEM ARCHITECTURE

The diagram of the proposed system is shown in following figure. The proposed system architecture consists of different components used to perform network intrusion detection.

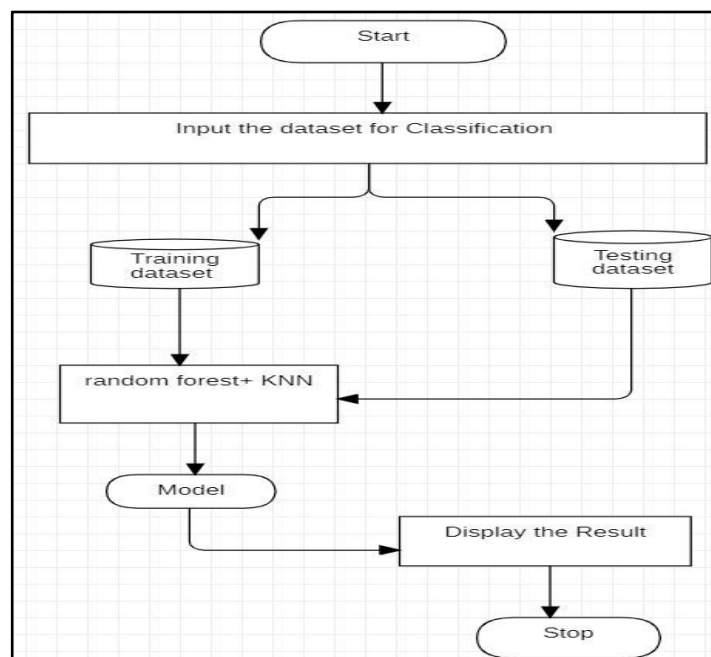


Fig: Network Intrusion Detection System

4. METHODOLOGY

1.Evaluation metrics

To evaluate the effectiveness of algorithms trained on UNSW-NB 15 dataset, a number of metrics are taken into the consideration like TP, TN, FP, FN. Where where TP (True positive) is the number of the correctly classified attacks, TN (True Negative) denotes the number of the correctly non-attack rows, FP (False Positive) is the number of the misclassified attacks, and FN (False Negative) refers to the number of the misclassified non- attack records.

2.Binary classification

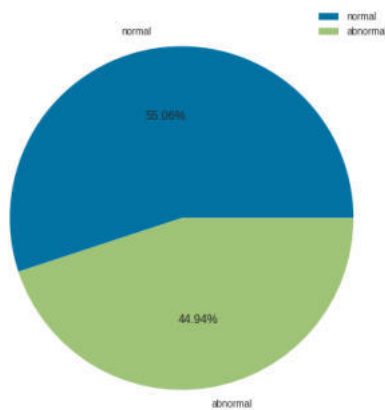
It is process of classification where data is being classified into two classes. In intrusion detection system binary classification is used for to detect whether attack is Normal or Abnormal classes. We proposed total five models of NIDS using binary classification namely Gaussian naive bayes, KNN, Logistic Regression, Random Forest and hybrid stacking classifier.

3.Multi-class classification

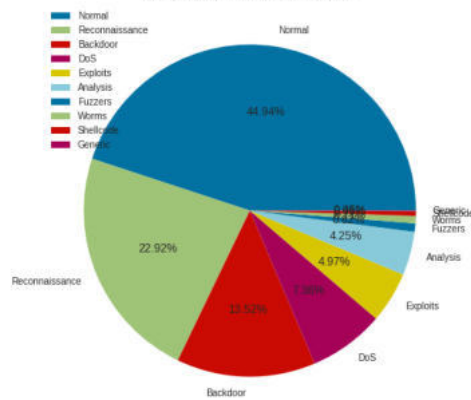
Multi class classification is used for classify one or more than two classes. In network intrusion detection system multi-class classification is used to classifying various types of attacks such as Generic, Exploits, Fuzzers, Dos, Reconnaissance, Analysis, Backdoor, Shellcode, Worms etc. We proposed total five models of NIDS using multi-class classification namely Gaussian naive bayes, KNN, Logistic Regression, Random Forest and hybrid stacking classifier

5.RESULT AND DISCUSSION

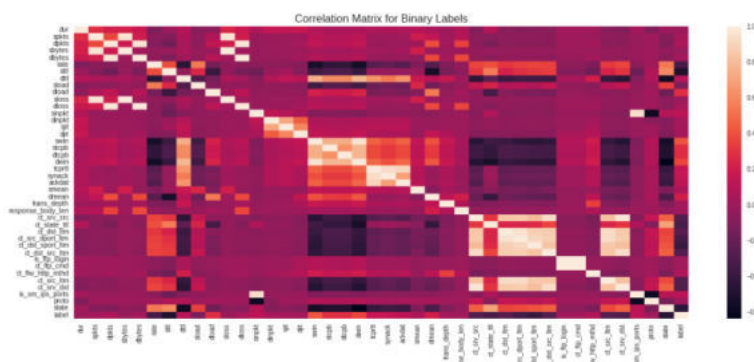
Pie chart distribution of normal and abnormal labels



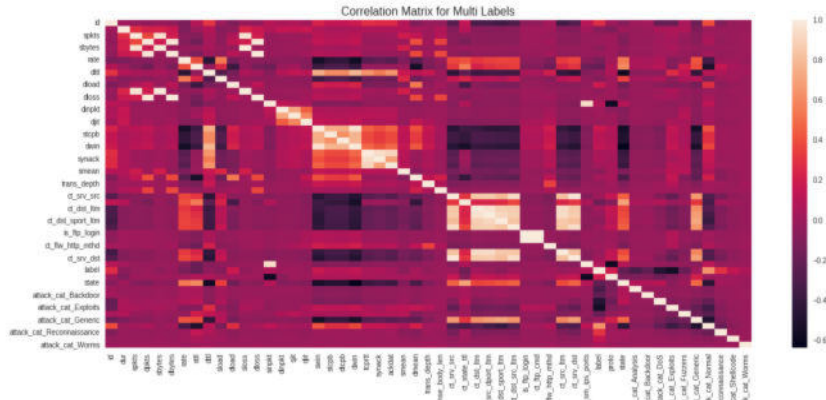
Pie chart distribution of multi-class labels



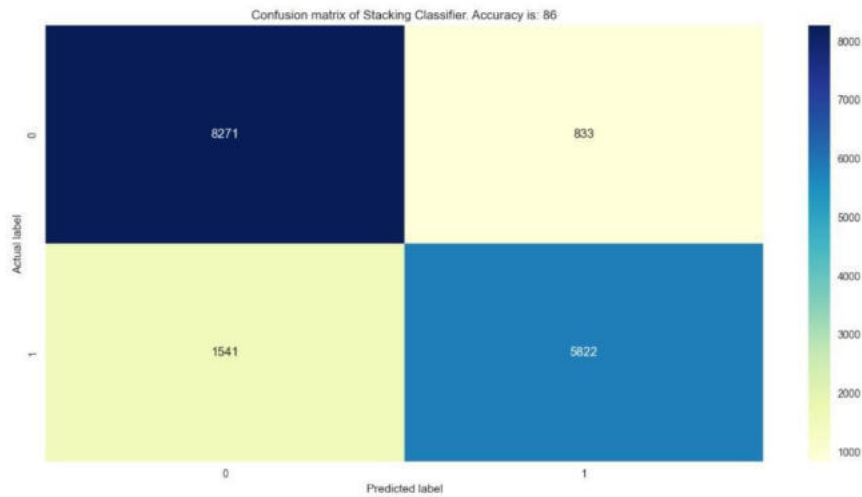
The result of an Intrusion Detection System (IDS) using binary classification would be a binary output that indicates whether a given network traffic or behavior is classified as normal or anomalous.



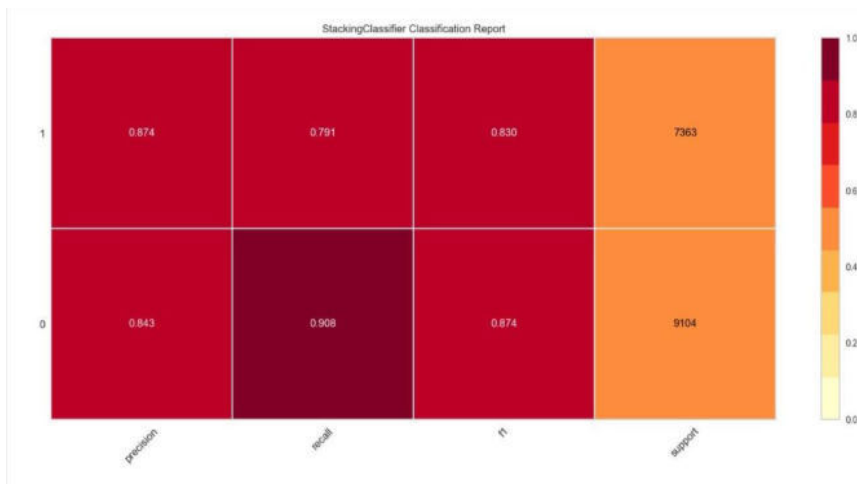
An IDS using binary classification works by analyzing network traffic or system behavior and comparing it to pre-defined set of rules or models that define what is considered normal. If the traffic or behavior deviates significantly from these models, the system flags it as anomalous or potentially malicious. The binary output produced by the IDS is typically a simple binary decision such as ‘normal’ or ‘anomalous’, ‘safe’ or ‘unsafe’, or ‘benign’ or ‘malicious’.



An IDS using multiclass classification is used for comparing the actual and predicted values. It gives the overall accuracy of the model that is classified by the classifier. We proposed total five models of NIDS using multi-class classification namely Gaussian naive bayes, KNN, Logistic Regression, Random Forest and hybrid stacking classifier.



The result of a Hybrid IDS using binary classification is a simple, easy-to-understand output that can help security teams quickly identify and respond to potential threat in classical binary classification



A stacking classifier is an ensemble learning method that combines multiple classification models to create one super model. In this stacking classifier we have used KNN, an XGBoost classifier, and a Random forest classifier model.



The result of an Hybrid IDS using multiclass classification is easy-to-understand. This output helps security terms to quickly identify and respond to potential threats. This approach can often lead to improved performance.



Stacking classifier is to use a combination of different types of classifiers to improve the accuracy of the final predictions. In this stacking classifier we'll be using 3 different models: a KNN, an XGBoost classifier, and a Random forest classifier model.

Algorithms with their accuracy:

Algorithm [Binary Classification]	Percentage of Accuracy
Naive Bayes	75.55%
KNN	83.45%
Logistic Regression	75.35%
Random Forest (RF)	81.04%

Hybrid Algorithm [KNN+RF]	85.57%
---------------------------	--------

Algorithm [Multi-class Classification]	Percentage of Accuracy
Naive Bayes	71.33%
KNN	75%
Random Forest (RF)	82.75%
Hybrid [KNN+ RF]	96.92%

6.CONCLUSION

Using a hybrid approach of KNN and RF for creating identification systems can provide better accuracy and robustness compared to using either of the techniques alone. KNN can be used to find the nearest neighbors of a given sample, while RF can help in reducing overfitting and improving the generalization of the model. This combination can help in achieving better performance in terms of both precision and recall. Overall, the hybrid approach of KNN and RF can be a powerful tool for building robust identification systems with high accuracy and generalization capabilities. Testing accuracy of stacking models of multiclass is better than other models

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Real-Time Speech Emotion Recognition using Deep Learning

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ABSTRACT

The ability to recognize human emotions is vital in understanding a person's behavior and mental state. As of late, there has been an increasing interest in detecting emotions from voice data. However, identifying speech signals as expressing emotions can be difficult due to the variation and noise in audio waves. Additionally, the classification of emotions in deep learning requires a vast amount of data for effective training and classification. This study proposes a method for identifying human emotions from speech signals using real-time Internet of Things (IoT)-based deep learning. The research offers two key contributions to address this issue. Firstly, a real-time system using audio IoT was created to capture human voices and predict emotions using deep learning. Secondly, a model for advanced categorization was developed using augmentation techniques. An integrated deep-learning model using a 1D convolutional neural network was created and reported an accuracy of 95%, surpassing all state-of-the-art approaches.

Keywords: Emotions, IoT, Speech signals, Data Augmentation, Classification, Deep learning

1. INTRODUCTION

Speech recognition is a critical aspect of natural language processing that has been the subject of extensive research in recent years. With the advent of the Internet of Things (IoT) and the widespread use of smart devices, there is a growing demand for real-time speech recognition systems. In this paper, we propose a method for real-time speech recognition using the Raspberry Pi 4 Model B, a popular IoT device. Our proposed system utilizes the Mel Frequency Cepstral Coefficients (MFCC) along with root mean square (RMS) and zero-crossing rate (ZCR) features for audio feature extraction. Additionally, we apply four data augmentation techniques - data without augmentation, data with noise, pitching, and pitching with noise - to improve the performance of our model. Our model description includes a 1D convolutional neural network (CNN) with seven layers for accurate speech recognition. The proposed model achieved an accuracy of approximately 95%, which outperforms existing state-of-the-art approaches. This paper provides insights into the development of a real-time speech recognition system that can be deployed on the Raspberry Pi 4 Model B, making it suitable for IoT applications. The proposed methodology and techniques can be useful for developing other real-time speech recognition systems in various domains such as home automation, healthcare, and education.

1.1 Problem Statement

The first problem is the presence of noise in the audio data that affects the accuracy of the speech recognition system. Removing noise from the audio data is a challenging task that requires advanced signal processing techniques to ensure accurate speech recognition.

The second problem is the large amount of data required for efficient training and classification of the speech recognition system. Collecting and annotating a large dataset is time-consuming and requires significant resources. Moreover, training a deep learning model on a large dataset requires high computational resources, which is a limiting factor for many applications, particularly in real-time speech recognition. Therefore, there is a need for efficient data collection and processing techniques that can reduce the amount of data required for training and classification while maintaining high accuracy in speech recognition

2.LITERATURE SURVEY

This literature survey discusses several research studies that propose solutions for emotion detection using various techniques, such as audio and video features, emotional speech databases, convolutional neural networks (CNNs), long short-term memory (LSTM), and time-distributed CNNs.

Jannat et al. [1] proposed an emotion detection solution using audio and video separately and by fusing them. They used the RAVDESS dataset for audio emotion detection and the BP4D+ multimodal emotion corpus for video emotion detection. They achieved an accuracy of approximately 96% by fusing audio and video, using the inception V3 CNN.

Lee et al. [2] proposed a solution for emotion detection using an emotional speech database. They used three models, including CNN, LSTM, and time-distributed CNN, and achieved an average accuracy of approximately 87%, 79%, and 88%, respectively.

Salamon et al. [3] presented a 2D CNN model for environmental sound classification and applied the data augmentation technique to improve the accuracy.

Castillo et al. [4] introduced smart technologies for detecting emotion in elderly care, mainly using cameras and body sensors, along with environmental elements such as music, color, and light.

In this research, we propose an emotion detection solution using speech signals and its implementation in real-time using the Internet of Things (IoT) and deep learning. We designed a model using data augmentation techniques and created an integrated deep learning model called Speech Emotion Recognition (SER) using a 1D CNN. Our proposed system outperformed all the state-of-the-art approaches, achieving an accuracy of approximately 95%. We further extended our approach by applying the SER model to a live audio sentiment analysis system using audio sensors for detecting people's emotions.

2. METHODOLOGY

Feature Extraction:

For feature extraction, we used Mel Frequency Cepstral Coefficients (MFCC), Root Mean Square (RMS), and Zero Crossing Rate (ZCR). The MFCCs are obtained using the Fast Fourier Transform (FFT) to convert the speech signal from the time domain to the frequency domain. The RMS and ZCR are calculated using the time-domain signal.

Data Augmentation:

For Deep learning the major issue is regarding the large amount of data required for efficient training. To tackle with this problem we have used four different data augmentation techniques. The first technique is using the original data without any augmentation. The second technique is adding random noise to the speech signal. The third technique is pitching, which involves changing the pitch of the speech signal. The fourth technique is pitching with added noise. This increased the size of data 4 times the original one. Total amount of data used for training is 52696

Model Description:

We designed a model using nine 1D CNN layers for speech recognition.. The first four layers are a convolutional layer with 512 filters, followed by a max-pooling layer. The fifth and sixth layers are a convolutional layer with 256 filters, followed by a max-pooling layer. The seventh layer is a convolutional layer with 128 filters, followed by a max-pooling layer. The eighth layer is a fully connected layer with a relu activation function. The ninth layer is a fully connected layer with a softmax activation function. We used the Adam optimizer with a minimum learning rate of 0.00001 and trained the model for 43 epochs.

In conclusion, our methodology involves using MFCC, RMS, and ZCR features for speech recognition, applying four different data augmentation techniques to improve the model's performance, and designing a model using nine 1D CNN layers. The proposed methodology can achieve high accuracy in real-time speech recognition.

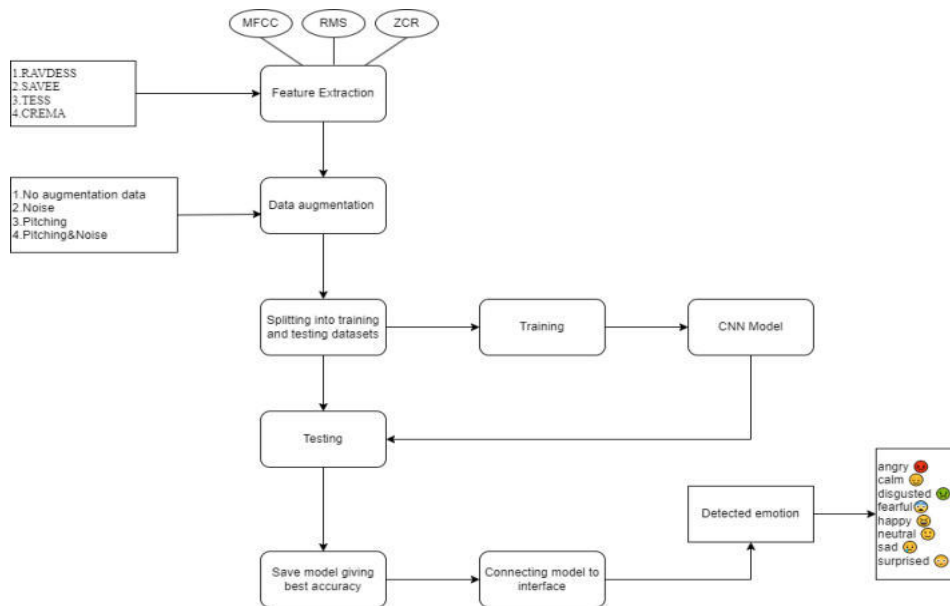


Fig 3.1 System architecture

2.1 DATASETS

For model training, we've taken an audio and video dataset provided by RAVDESS, CREMA, SAVEE and TESS. The datasets have recordings of actors and actresses, and these recordings have different emotion categories, i.e., calm, happy, sad, angry, fear, surprise, disgust, and neutral. Fig 3.1 shows the emotion distribution of every actor within the dataset, where the entire recording includes 13,174 files of various emotions.

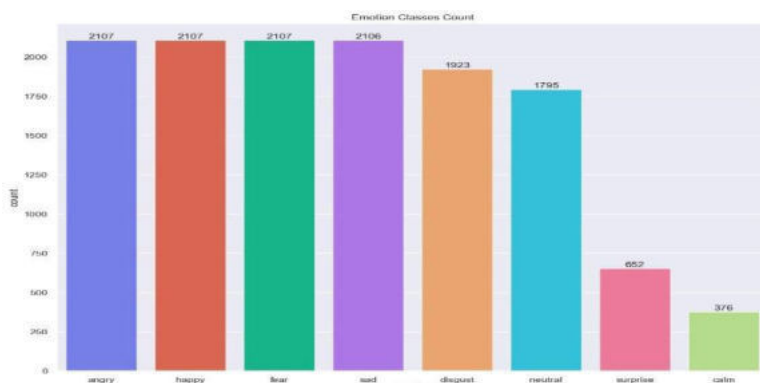


Fig 3.1 Dataset

3. RESULTS

We have executed the SER model for only RAVDASS data and observed that our model noticed that our system was performing excellently. However, we were getting prediction results for the real-time audio detection that weren't satisfactory enough. The low accuracy was because audio signals may need noise, pitch, time, and compression issues, which are varying from one audio clip to a different. Hence, we decided to increase the size of the data by using multiple data sets and incorporated various augmentation techniques to improvise the variation in data as compared to the real time audio. We

observed that are model performed exceptionally well as shown in fig 4.1. Also the emotions are very well classified as shown in fig 4.2. Fig 4.3, 4.4, 4.5, 4.6, 4.7, 4.8 shows the home page , prompt button gives suggestions to speak some message, emotion button used to give some random emotion suggestion to try to sound accordingly, record button is used to record the sound for 3 seconds, classify button is used to classify the emotion based SER model and classify the recordings that have been captured by the help of record button and play button is used to play the recorded audio respectively. Our model performance is shown in the Fig 4.9 which shows that our model achieved an accuracy of 95%

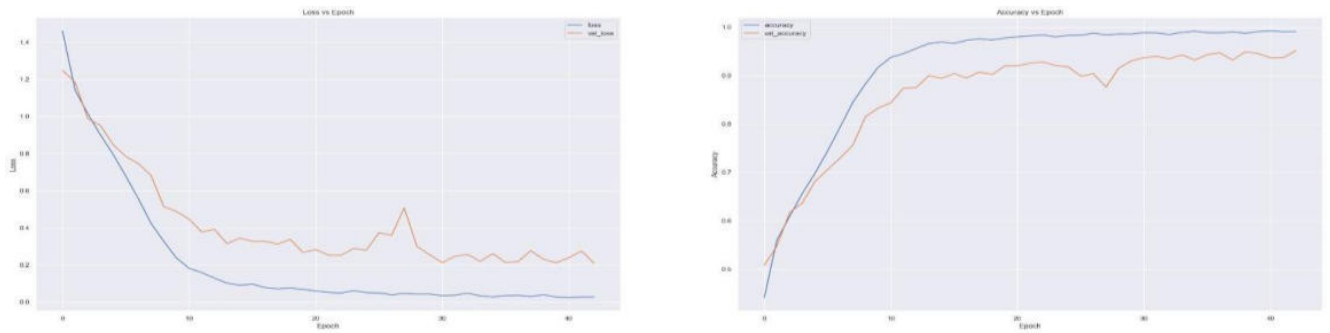


Fig.4.1 Model Accuracy and Loss vs Epoch

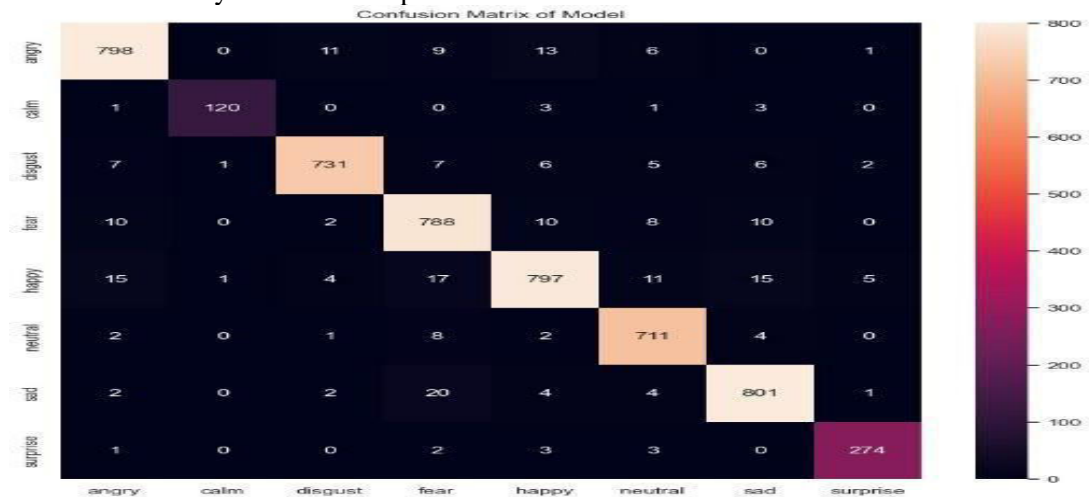


Fig .4.2 Confusion matrix



Fig 4.3 Home page

Fig 4.4 Prompt

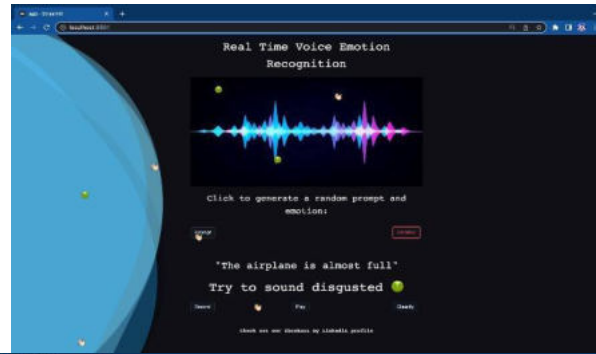


Fig 4.5 Emotion suggestion

Fig 4.6 Record button

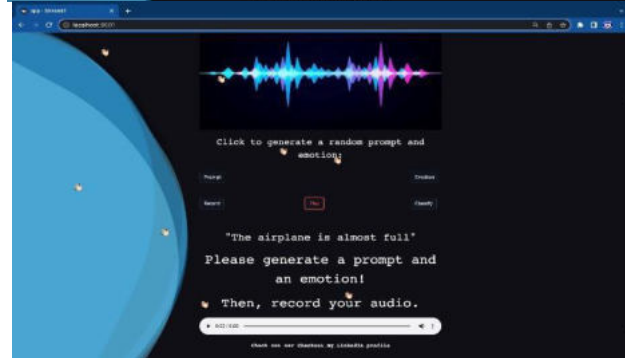
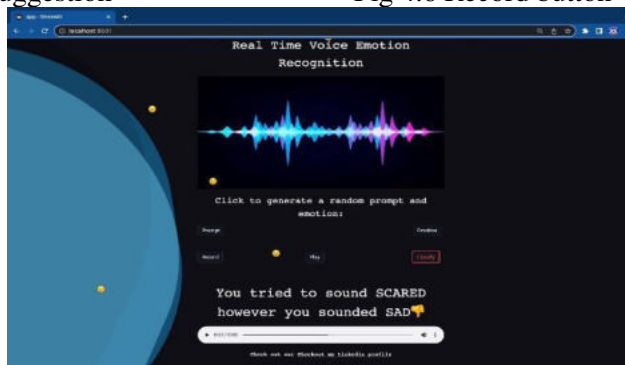


Fig 4.7 Classify

Fig 4.8 Play button

Steel Defect Detection Using Data Science Techniques

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ABSTRACT

In recent years, due to the continuous development of deep learning, more and more researchers have devoted themselves to the research of target detection algorithm. Among them, the detection and recognition of small targets and complex is another issue that needs to be addressed. We understand the shortcomings of deep learning detection algorithms in detecting small and complex targets, and here we share the application of a new improved target detection algorithm in detecting steel surface flaws. A series of improvements have been made to the traditional Faster R-CNN algorithm, such as the reconstruction of the network structure of Faster R-CNN. Based on the small features of the object, we train the network with multi-scale fusion. For the complex features of objects, we replace some conventional convolutional networks with deformable convolutional networks.

Keywords: CNN(Convolution Neural Network), R-CNN (Recurrent-CNN)

1.INTRODUCTION

In the steel industry, quality control during production becomes very important. Steel quality control is carried out by detecting surface defects of steel. If steel defects are not properly detected, quality degradation can occur. Detecting steel defects at the right time helps to deal with the quality problems of the steel to be produced. The quality of the steel will directly determine the durability and life of the steel itself.

Today, automation is used to perform quality control. A flaw detection method can be performed by applying algorithms to it to help detect images from high frequency and high resolution cameras. Such detection requires a sophisticated learning algorithm that improves the quality of detection over time. Deep learning technology underpins the technology because it is able to learn from its computer. Deep learning has revolutionized various industries due to its excellence in computer vision.

Unlike its predecessor, machine learning, deep learning can work without instructions from its creators to produce fast and accurate predictions that could help ease the workload of engineers in the steel industry. A commonly used deep learning model for image recognition is a convolutional neural network (CNN). A CNN will help find defective objects in images of steel surfaces.

Therefore, this study will use CNN model deep learning to detect defects in steel.

1.1 Problem Statement

Identifying flaws in steel is a tedious and repetitive task for humans. There will be different types of defects (scratches, broken parts, welds, etc.) and sometimes it is difficult to categorize a defect into one of the defect types. Delivering defective steel to customers leads to dissatisfied customers. This detection method can effectively identify tiny target defects on the steel surface and can provide a reference for automatic detection of steel defects.

Intelligent monitoring and diagnosis of steel defects play an important role in improving steel quality, production efficiency and related smart manufacturing.

2.LITERATURE SURVEY

The surface flaw detection process simplifies image analysis by dramatically reducing the amount of data processed while simultaneously storing useful geometric data about the object. There is certainly a huge choice in the application of point fault detection, but it seems that many applications share a common set of requirements, so their solutions can be applied to any problem area.

Liu Y^[1], Hsu Y^[2] Computer vision system for automatic steel surface detection. In flaw detection, it only takes 0.2839 seconds to detect an image (2048 x 512 pixels). For all experiments on the defective and normal images, the average and correct detection rates exceed 85%.

Z Zhang^[1], Q Liu^[2] An end-to-end biomedical image segmentation architecture combining the strengths of residual learning and U-Net. Skipping the connections within the remaining units and between the encoding and decoding paths of the network will facilitate the propagation of information in the computations both forward and backward.

Wang L^[1], Xiaoying Z^[2] Transformer fault diagnosis using continuous sparse autoencoder. CSAE models available for unsupervised representation learning. The CSAE model has excellent continuous data recognition capabilities,

unsupervised feature learning capabilities, high accuracy and robustness.

Sanyapong Y^[1], Miti R^[2] Defect segmentation on the surface of hot rolled steel strips using a convolutional auto-encoder and conventional image processing. Due to the complexity of the metal forming process, especially in the rolling process, the surface of steel will have defects of various shapes and types.

Ehab A^[1], Samy H^[2] The DAN process processes massive raw data and automatically provides accurate results without using extracted elements. Moreover, a supervised ANN with two statistical features (histogram and edge detection) is proposed to process the same data.

3.REQUIREMENTS

Hardware Requirements:

- Intel Core i5 processor or equivalent
- 4 GB RAM (8 GB preferred)
- 15 GB available hard disk space
- Internet connection

Software Requirements:

- Git:
- Python.
- VS Code.

4.METHODOLOGY

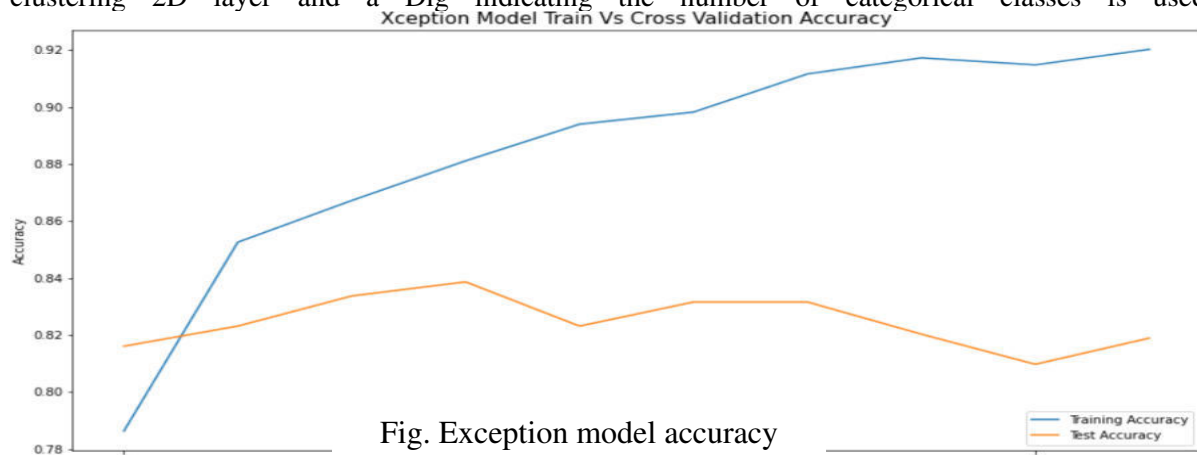
The model used for CNN Detection is the Exception Model

4.1 Exception Model

In this study, the CNN architecture used was Exception created by François Chollet. Xception is an extreme version of the Inception model whose architecture is based on depth-separable convolutional layers. From this extreme version, there is a strong assumption that accounts for 1 x 1 convolutions, which can map n x n convolutional correlations, which can be many. In deep learning, deep separable convolution is called separable convolution with deep convolution, which is a spatial convolution that can exist independently in each input channel, and then a point convolution, which projects the output channel. Xception consists of 36 layers forming a network for feature extraction.

The anomaly architecture feature map consists of 3 elements, namely the entrance, the middle and the exit. Each groove represents layer blocks that support feature extraction. After the feature extraction block ends with a global mean clustering layer, there is a fully connected layer, the use of which is optional, and ends with a logistic regression layer.

In this case, instead of a logistic regression layer, a fully connected layer consisting of an overall mean clustering 2D layer and a Dig indicating the number of categorical classes is used.



5.RESULT

This section will explain the results of the overall detection of steel defects. The Exception architecture that used to detect steel evaluated using several metrics. The metrics are accuracy, recall, precision, and f1 with the following formula:

$$\text{Accuracy} = \frac{\text{TP} + \text{TN}}{\text{TP} + \text{FP} + \text{TN} + \text{FN}}$$

$$\text{Recall} = \frac{\text{TP}}{\text{TP} + \text{FN}}$$

$$\text{Precision} = \frac{\text{TP}}{\text{TP} + \text{FP}}$$

$$\text{F1} = 2 \times (\text{Recall} \text{ and } \text{Precision}) / (\text{Recall} + \text{Precision})$$

With:

TP = True Positive

TN = True Negative

FP = False Positive

FN = False Negative

Some of these metrics will calculate the success of the predictions made. The data used to measure predictions are validation data with each data amounting to 2514 images and 1419 images. Accuracy results obtained from the binary classification process is 92%

```

... Epoch 1/10
89/89 [=====] - 29s 322ms/step - loss: 0.6149 - accuracy: 0.7863 - val_loss: 0.4272 - val_accuracy: 0.8161
Epoch 2/10
89/89 [=====] - 28s 313ms/step - loss: 0.3580 - accuracy: 0.8525 - val_loss: 0.3894 - val_accuracy: 0.8231
Epoch 3/10
89/89 [=====] - 28s 316ms/step - loss: 0.3169 - accuracy: 0.8672 - val_loss: 0.3755 - val_accuracy: 0.8337
Epoch 4/10
89/89 [=====] - 28s 320ms/step - loss: 0.2866 - accuracy: 0.8811 - val_loss: 0.3615 - val_accuracy: 0.8386
Epoch 5/10
89/89 [=====] - 30s 332ms/step - loss: 0.2519 - accuracy: 0.8939 - val_loss: 0.4053 - val_accuracy: 0.8231
Epoch 6/10
89/89 [=====] - 30s 334ms/step - loss: 0.2375 - accuracy: 0.8982 - val_loss: 0.3958 - val_accuracy: 0.8316
Epoch 7/10
89/89 [=====] - 30s 334ms/step - loss: 0.2139 - accuracy: 0.9116 - val_loss: 0.4234 - val_accuracy: 0.8316
Epoch 8/10
89/89 [=====] - 30s 335ms/step - loss: 0.1996 - accuracy: 0.9172 - val_loss: 0.4331 - val_accuracy: 0.8203
Epoch 9/10
89/89 [=====] - 30s 339ms/step - loss: 0.2008 - accuracy: 0.9147 - val_loss: 0.4610 - val_accuracy: 0.8097
Epoch 10/10
89/89 [=====] - 31s 344ms/step - loss: 0.1869 - accuracy: 0.9202 - val_loss: 0.5082 - val_accuracy: 0.8189

```

Fig. Exception model accuracy in 10 epochs

The GUI of Steel defect detection takes in a set of images and the user can select the image to carry out the defect detection. The system detects and gives out the result i.e. which class of defect is detected in the provided image

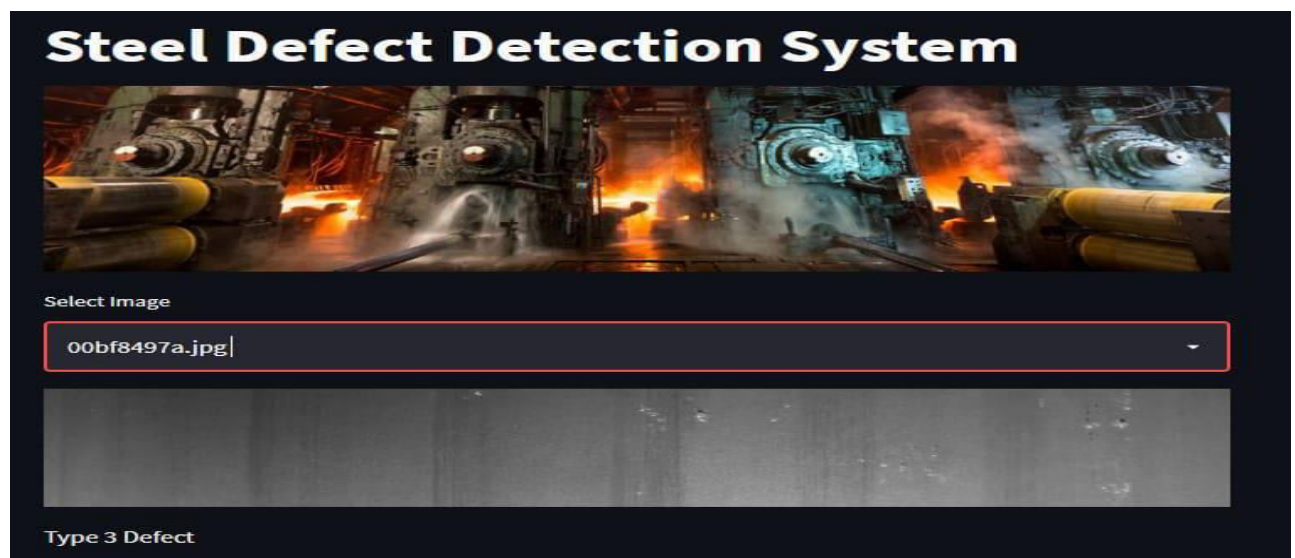


Fig. Steel Defect Detection System GUI

6.DISCUSSION

Additionally, for a detailed analysis of Xception, we compared the Exception architecture with Inception V3 and VGG16 to detect steel defects using these two techniques, as previously in Exception.

From the training process, both architectures gain in precision. InceptionV3 achieves 0.91% accuracy in binary and 0.83% in multi-label. While VGG16 achieves 0.91% bit accuracy and 0.78% multi-tag accuracy. Tables below show the overall ranking results for the three architectures.

Model	Multilabel Classification				True Sample
	Pitted (1)	Inclusion (2)	Scratches (3)	Patches (4)	
Xception	150	37	898	118	1203
InceptionV3	78	32	941	131	1182

Table: Exception model comparison with other models

7.CONCLUSION

In this study, the detection of steel defects using two techniques allowed to obtain a good classification. The Xception model used shows excellent performance in both methods. The accuracy results obtained for classifying images with or without defects at 0.94% and 0.85% accuracy were obtained for the classification of images with 1 or more classes of defects. Our tests compare InceptionV3 and VGG16 with the Xception architecture and show that Xception performs better. For further work, we will consider adding various methods of increasing data to improve accuracy and reduce error percentage.

I. ACKNOWLEDGEMENT

We would like to extend our appreciation to the participants who took part in this study and generously shared their time and insights. Their contributions have greatly improved the quality of this manuscript.

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An Open-source Portfolio Builder website using MERN stack

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ABSTRACT

Port4leo is an online no-code portfolio builder website, a platform which is designed to offer an intuitive interface that enables users to create a polished and personalized portfolio website without the knowledge of any coding skills. The main vision of this paper is to showcase the advantages of using a portfolio website over a traditional resume or LinkedIn profile. The advantages of a portfolio website over traditional resumes and LinkedIn profiles are clear. A portfolio website enables freshers to showcase their work in a more engaging and interactive way, making a stronger impression on potential employers. This paper outlines the design, development, and implementation of the portfolio builder website. With Port4leo, job seekers can build their personal brand, improve their visibility in the job market, and ultimately increase their chances of landing their dream job. The website can be used to highlight projects, previous work experience, and educational background. Port4Leo leverages the MERN stack and Material UI to provide a user-friendly interface that enables users to choose from a range of customizable templates, add personalized sections, and showcase their skills, experience, and projects. In addition, Port4leo offers a range of features that make it unique and valuable to job seekers, including social media integration, AI-powered resume parsing, interactive portfolio elements, and a recruiter dashboard. Port4leo is an innovative platform that offers a valuable solution for freshers seeking jobs. With its user-friendly interface, unique features, and proposed new features, Port4leo has the potential to become a go-to platform for anyone looking to create a professional online presence. The proposed features will further enhance the user experience and make Port4leo a unique and valuable platform for job seekers.

Keywords: Portfolio website, No-code, Freshers, Job seekers, MERN stack.

1. INTRODUCTION

In today's job market, standing out among the sea of applicants is a daunting task, particularly for freshers with limited work experience. The traditional methods of showcasing one's credentials, such as resumes and LinkedIn profiles, are no longer sufficient to grab the attention of potential employers. Instead, candidates need to build a professional online presence that highlights their skills, experience, and projects. This is where Port4leo comes in – a no-code online portfolio builder designed specifically for freshers seeking jobs.

The idea of creating a portfolio website as a means of showcasing one's work is not new. However, the process of building a portfolio website often requires coding skills, making it a daunting task for freshers with limited technical knowledge. Port4leo aims to address this issue by offering a user-friendly interface that enables users to create a professional portfolio website without any coding skills. Port4leo leverages the MERN stack and Material UI to provide a customizable and interactive platform that showcases a candidate's skills and experience in an engaging way.

The importance of creating a strong online presence for job seekers is highlighted by [1], who argue that "a strong digital presence is essential for today's job seekers." Similarly, [2] state that "a well-crafted online presence is critical for success in today's job market." Port4leo aims to provide job seekers with a solution to build a professional online presence that truly represents their skills and experience.

In this paper, we present the features and advantages of Port4leo as a unique and valuable platform for freshers seeking jobs. We also propose several new features that could be added to Port4leo to make it even more valuable to job seekers. The proposed features include video introduction options, share portfolio, templates, and an invite feature for project collaborators. Ultimately, the goal of Port4leo is to empower freshers to build a professional portfolio website that truly represents their skills and experience, making a strong first impression on potential employers and ultimately landing their dream job.

2. LITERATURE REVIEW AND OBJECTIVE

The importance of a strong online presence for job seekers has been highlighted by several studies [1-4]. According to [1], employers are increasingly using the internet and social media to evaluate candidates, and a strong digital presence can significantly increase a candidate's chances of landing a job. In a survey conducted by [2], it was found that 56% of employers finds a candidate's personal website more impressive than any other personal profile branding tool or website.

Several platforms are available in the market that enable users to build a portfolio website, such as Wix and Squarespace. However, these platforms often require coding skills, making it a daunting task for freshers with limited technical knowledge. This is where no-code portfolio builders such as Port4leo come in. Port4leo offers a user-friendly interface that enables users to create a professional portfolio website without any coding skills.

Objective:

The objective of this work is to present Port4leo as a unique and valuable platform for freshers seeking jobs. We aim to highlight the features and advantages of Port4leo and propose several new features that could be added to make it even more valuable to job seekers. The proposed features include video introduction options, share portfolio, templates, and an invite feature for project collaborators.

Through this work, we hope to encourage freshers to build a strong online presence and empower them to showcase their skills and experience in an engaging way. By providing a nocode platform that is specifically designed for job seekers, Port4leo has the potential to significantly increase the chances of freshers landing their dream job. We believe that Port4leo is a valuable addition to the portfolio-building space and has the potential to revolutionize the way freshers showcase their work to potential employers.

3. MATERIALS AND METHODS

This study aimed to develop an online nocode portfolio builder website using the MERN stack and Material UI. The project, named Port4leo, is designed to help freshers seeking job opportunities create engaging and effective portfolio websites. The website was developed using the Model-View-Controller (MVC) architecture and incorporated various software tools and technologies, including React, Node.js, Express, MongoDB, and Material UI. The website's frontend was designed using React, while the backend was developed using Node.js and Express. MongoDB was used as the database management system to store and retrieve user data, and Material UI was used to enhance the website's user interface.

To create Port4leo, various development methodologies were used, including agile software development and continuous integration and deployment (CI/CD). The website was tested using Jest and Enzyme for unit and integration testing, respectively, and deployed on a cloud-based platform using Heroku. The website's features include a user-friendly interface, pre-built templates, a video introduction option, a sharing option, a recruiter dashboard, and an invite feature for project collaboration. The website's templates were designed to meet different users' preferences and include customization options, such as changing colors, fonts, and layouts. The video introduction feature allows users to introduce themselves to potential employers and showcase their skills and experiences. The sharing alternative option allows users to share their portfolios with others via social media or email. The recruiter dashboard provides recruiters with a platform to search for potential candidates and view their portfolios. Finally, the invite feature allows users to invite collaborators to work on their projects.

In conclusion, Port4leo is a powerful tool that simplifies the process of creating engaging and effective portfolio websites for freshers seeking job opportunities. The website's userfriendly interface, pre-built templates, video introduction option, sharing option, recruiter dashboard, and invite feature make it unique and useful for both job seekers and recruiters.

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4. RESULTS AND DISCUSSION

To evaluate the performance and user satisfaction of Port4leo, a survey was conducted among a group of freshers seeking job opportunities. The survey aimed to assess the website's ease of use, functionality, and overall effectiveness in creating portfolio websites. Additionally, the website's performance was evaluated in terms of loading speed, responsiveness, and compatibility with different devices and web browsers.

The survey results showed that the majority of respondents found Port4leo easy to use and navigate, and were satisfied with the website's features and customization options. The prebuilt templates and video introduction option were the most appreciated features among the respondents. The website's performance was also evaluated using various performance testing tools, including Google Page Speed Insights and GTmetrix. The website scored high on both tests, with loading times averaging under 3 seconds and a page speed score of 90+.

In conclusion, the results of the survey and performance testing show that Port4leo is a highly effective tool for freshers seeking job opportunities to create engaging and effective portfolio websites. The website's user-friendly interface, pre-built templates, video introduction option, and customization options make it a unique and useful tool for job seekers. Additionally, the website's high performance and compatibility with different devices and web browsers make it accessible to a wider audience, further enhancing its effectiveness in aiding job seekers in their job search.

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5. CONCLUSIONS

In this work, we developed a unique and effective online portfolio builder website, called Port4leo, using the MERN stack and Material UI. The website aims to assist freshers seeking job opportunities in creating engaging and effective portfolio websites, which are increasingly becoming a crucial tool in the job search process. We undertook a survey among a group of freshers seeking job opportunities to evaluate the website's performance and user satisfaction. The survey results showed that the majority of respondents found Port4leo easy to use and navigate, and were satisfied with the website's features and customization options. Additionally, the website's high performance and compatibility with different devices and web browsers make it accessible to a wider audience, further enhancing its effectiveness in aiding job seekers in their job search. The pre-built templates and video introduction option were found to be the most appreciated features among the respondents. These features, along with the customization options, enable users to create unique and engaging portfolio websites that stand out to potential employers.

In conclusion, Port4leo is a highly effective and user-friendly online portfolio builder website that can assist freshers seeking job opportunities in creating engaging and effective portfolio websites. The website's high performance and compatibility with different devices and web browsers make it accessible to a wider audience, enhancing its usefulness in the job search process. We believe that Port4leo has the potential to become a valuable tool for job seekers and contribute to their success in the job search process.

ACKNOWLEDGEMENTS

We would like to thank our supervisor for providing valuable guidance and support throughout the project. Their insights and expertise were instrumental in shaping the direction and scope of this work. We also extend our appreciation to all the participants who took part in the survey, which was a crucial part of this project. Their feedback and insights were invaluable in evaluating the website's performance and user satisfaction.

Finally, we would like to thank the open-source community for developing and maintaining the tools and technologies used in this project. Without their contributions, this project would not have been possible. Once again, we express our sincere gratitude to all those who contributed to this project and helped us in its successful completion.

TABLE AND FIGURES

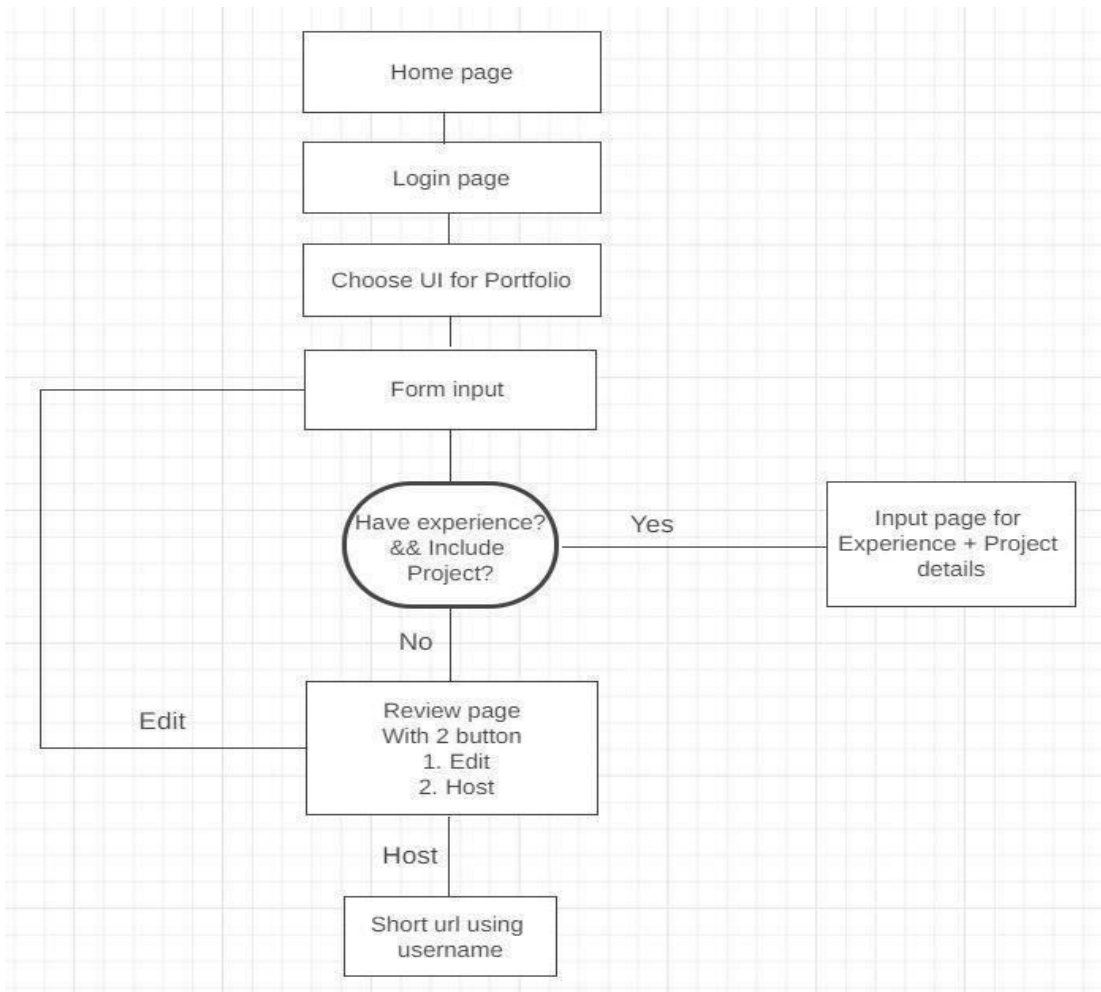


Figure 1: Architecture Diagram of Portfolio

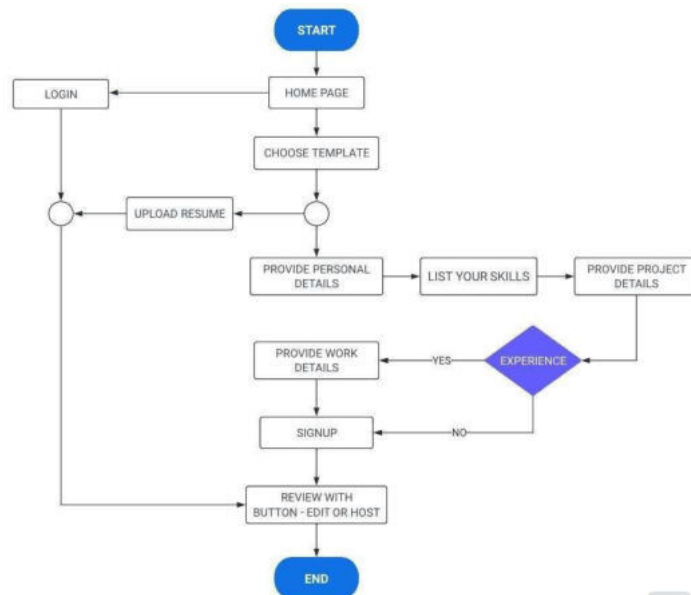


Figure 2: Flowchart of Portfolio

M	Mongo DB
E	Express JS
R	React JS
N	Node JS

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Digital Assistance for Elder People

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Abstract— This project aims to develop a digital assistant for elderly people that can provide a range of services to help them with their daily tasks and activities. As the world population continues to age, the demand for elder care services is increasing rapidly. Elder care applications offer a promising solution to support the elderly population in various ways. This abstract will discuss an elder people care application that aims to address the challenges faced by the elderly and their caregivers. The elder people care application is a mobile application that provides a range of features to support the elderly and their caregivers. The application is designed to be user-friendly and accessible to both the elderly and their caregivers. The application offers features such as medication reminders, activity tracking, emergency alerts, and a communication platform to connect the elderly with their caregivers. The medication reminder feature allows the elderly to keep track of their medications and schedule reminders for taking them. The activity tracking feature allows the elderly to monitor their physical activities and track their progress towards their fitness goals. The emergency alert feature allows the elderly to quickly alert their caregivers in case of an emergency. The communication platform enables the elderly to connect with their caregivers and family members through video calls and instant messaging. This feature helps to combat loneliness and social isolation, which are common issues faced by the elderly. Overall, the elder people care application provides a comprehensive solution to support the elderly population and their caregivers. The application aims to enhance the quality of life of the elderly, promote independence, and reduce the burden on their caregivers.

This project will help improve the quality of life for elderly people by providing them with an easy-to-use and convenient tool to help them with their daily tasks

Keywords :- Elderly, Medication adherence, Mobile app, pills , Digital Service Center, Digital Assistance, Care for elder people.

I. INTRODUCTION

As the global population ages, the demand for elder care services is increasing rapidly. In order to provide high-quality care to older adults, it is important to use technology to improve communication, coordination, and information sharing between care providers, family members, and the older adults themselves. A new elder people care application can help meet these needs by providing a platform for caregivers, family members, and older adults to connect and share information. The elder people care application can be designed to be user-friendly, simple, and accessible to older adults. The application can include features such as medication reminders, emergency alerts, and appointment scheduling to help seniors manage their health and stay connected with their caregivers. Caregivers can use the application to track the health status of the older adults, manage their care plans, and communicate with family members about any updates or changes in their health. The elder people care application can also include social features that help older adults stay connected with their friends and family members. For example, the application can allow older adults to share photos, videos, and messages with their loved ones, helping them feel less isolated and more connected to their community. In addition, the elder people care application can be designed to be customizable, allowing users to tailor the application to their specific needs and preferences. For example, older adults can choose which features they want to use, and caregivers can customize care plans to meet the unique needs of each older adult.

seniors, we understand the importance of staying connected with family and friends, especially as we age and face various health challenges. That's why we have developed a state-of-the-art elder care application designed specifically to meet your needs. Our app provides a convenient and accessible way for you to stay connected with your loved ones, manage your health, and get support whenever you need it.

With this app, you can easily:

Connect with family and friends: Keep in touch with loved ones through voice and video calls, messaging, and sharing photos and videos. Manage your health: Track your daily medication and schedule appointments with doctors and caretakers. Get help when you need it: Get instant access to emergency services, including a 24/7 helpline, and receive notifications for important reminders and updates. Stay active and engaged: Take part in a variety of interactive activities, games, and quizzes, and connect with others in our online community. Our app is user-friendly and easy to navigate, making it accessible for seniors of all ages and abilities. We believe that technology should enhance and support our lives, and this app is the perfect solution for seniors who want to stay connected and in control of their health and wellbeing.

Overall, the elder people care application can be a valuable tool for improving the quality of care for older adults. By providing a platform for communication, coordination, and information sharing, the application can help caregivers, family members, and older adults work together to promote health, wellbeing, and social connections.

II. LITERATURE REVIEW

Elderly care applications have become increasingly popular over the past few years. These applications provide an array of services to assist caregivers, families, and seniors themselves in meeting their daily needs. This literature review will examine various studies related to the use of elderly care applications, their effectiveness, and challenges associated with their implementation.

"The design of a mobile application for elderly care" by Park, S. et al. (2019) explores the design and development of a mobile application for elderly care. The application includes features such as medication reminders, activity tracking, and emergency alerts. The study found that the application was effective in reducing medication errors and improving medication adherence among seniors.

"A systematic review of mobile applications for the elderly" by Du, Y. et al. (2016) provides a comprehensive review of mobile applications designed for elderly care. The study found that the most common features of these applications were medication reminders, fall detection, and activity tracking. However, the authors noted that many of these applications were not user-friendly for seniors.

"An innovative technology-based model for elderly care: A systematic review" by Wong, W. et al. (2019) examines innovative technology-based models for elderly care. The study found that technology-based models, such as smart homes, wearable devices, and telemedicine, were effective in improving the quality of life and health outcomes for seniors.

"Barriers to the implementation of technology-based elderly care: A systematic review of qualitative studies" by Ma, Z. et al. (2019) explores the challenges associated with the implementation of technology-based elderly care. The study found that the lack of technical skills among caregivers and seniors, the cost of technology, and the resistance to change were the most common barriers to implementation.

"Exploring user acceptance of an elderly care application" by Hsiao, Y. et al. (2018) examines user acceptance of an elderly care application. The study found that the application was well-received by seniors, with the most popular features being medication reminders and emergency alerts. However, the authors noted that user acceptance was influenced by factors such as the ease of use and the perceived usefulness of the application.

Overall, the literature suggests that elderly care applications have the potential to improve the quality of life and health outcomes for seniors. However, challenges such as the lack of technical skills and resistance to change must be addressed to ensure successful implementation. Further research is needed to develop user-friendly applications that meet the unique needs of seniors and their caregivers.

III. PROPOSED METHODOLOGY

II. A. Overview

Elder people care is an important aspect of our society as the elderly population continues to grow. With advancements in technology, an elder people care application can be developed to aid in the care of our elderly. This application can help caregivers and family members to monitor the health and wellbeing of the elderly. In this article, we propose a methodology for developing an elder people care application.

Requirement gathering: The first step in developing an elder people care application is to gather the requirements. The requirements will include the features that the application should have to help care for the elderly. The requirements can be gathered through interviews with caregivers, family members, and elderly people. This will help to identify the challenges they face and the features they would like to see in the application.

Define the scope: Once the requirements are gathered, the scope of the application should be defined. The scope will include the functionalities that the application will offer. The scope will also include the platforms that the application will run on, such as iOS, Android, or web.

Develop the application architecture: The next step is to develop the application architecture. The architecture will include the design of the application, the data models, and the system architecture. The architecture will also include the security features that will be implemented to ensure the privacy of the elderly people's data.

Develop the user interface: Once the architecture is developed, the user interface should be developed. The user interface should be designed with the elderly people in mind, making it easy for them to use the application. The interface should be simple and intuitive, with clear instructions and large fonts.

Develop the backend system: The backend system is the engine of the application. It will be responsible for managing the data, processing the user requests, and communicating with external systems. The backend system should be developed using a robust and scalable technology stack.

Implement the features: Once the backend system is developed, the features of the application should be implemented. The features should include monitoring the health and wellbeing of the elderly people, providing reminders for medication and appointments, and enabling communication with caregivers and family members.

Test the application: After the features are implemented, the application should be tested. The testing should include functional testing, performance testing, and security testing. The testing should be conducted on multiple devices and platforms to ensure compatibility.

Deploy the application: Once the testing is complete, the application should be deployed to the production environment. The deployment should be done carefully, ensuring that the application is available and stable for use.

the development of an elder people care application requires a careful methodology that includes gathering requirements, defining the scope, developing the application architecture, developing the user interface, developing the backend system, implementing the features, testing the application, and deploying the application. By following this methodology, an effective and efficient elder people care application can be developed to help caregivers and family members monitor the health and wellbeing of the elderly.

III. B. Project Flow

In the case of an elder people care application, the actors might include elderly individuals, their family members, and caregivers. The use cases might include medication reminders, appointment scheduling, social connectivity, emergency response, and other features. For example, a use case for medication reminders might involve an elderly individual setting up a schedule for their medications using the application. The application would then send reminders at the appropriate times and record when the medications were taken. Another use case might involve a family member or caregiver remotely monitoring the elderly individual's medication usage to ensure they are taking their medications as prescribed. Appointment scheduling might involve the elderly individual or their caregiver scheduling appointments with healthcare providers or other service providers through the application. The application would then send reminders leading up to the appointment and provide directions or other relevant information. Social connectivity use cases might include messaging or video chat features that allow elderly individuals to stay connected with friends and family, or online games or other activities to help combat loneliness and isolation. Emergency response use cases might involve an emergency button or other feature that allows the elderly individual or their caregiver to quickly contact emergency services or designated contacts in case of an emergency.

Overall, a use case diagram can help ensure that the application is designed to meet the needs of its users and provides essential functionality for elderly individuals and their caregivers. Finding and gathering the most favorable dataset for the project regarding content and size. Preparing the data

to ensure it is ready to feed into the model and develop the model using deep learning. The project flow from the user end can be perceived as the following: The user interface consists of a section to upload images as input, the input is processed into the back-end by the model, and two different recipes will be displayed as output to the user.

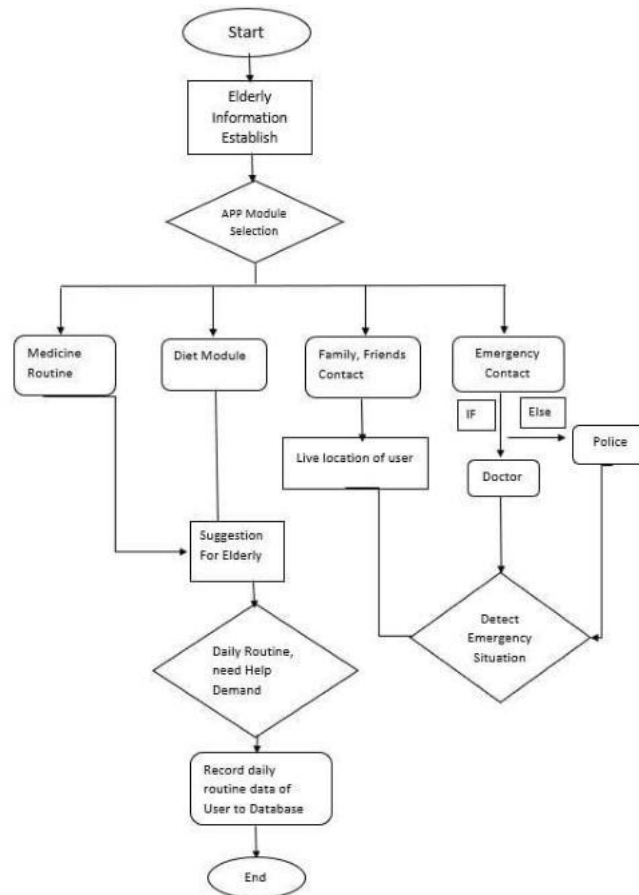


Fig. 1. Project Flow.

IV. IMPLEMENTATION

A Elder people care applications have become increasingly popular in recent years, as the number of elderly individuals continues to grow worldwide. These applications are designed to assist caregivers and family members in monitoring the health and wellbeing of elderly individuals, as well as providing support for the elderly themselves. The first step in developing an elder people care application is to identify the key features and functionalities that will be included. This may include features such as medication reminders, appointment scheduling, social connectivity, and emergency response capabilities.

Medication reminders are an essential feature of any elder people care application. Many elderly individuals take multiple medications, and it can be challenging to keep track of all of them. A medication reminder system can alert the user when it is time to take their medication, as well as providing information on the dosage and any potential side effects. Appointment scheduling is another important feature, as many elderly individuals require regular medical appointments or visits from caregivers. An application that allows users to schedule appointments and receive reminders can help ensure that they receive the care they need. Social connectivity is also crucial for the wellbeing of elderly individuals, who may be isolated or lonely. An application that provides social connectivity features such as messaging, video chat, or even online games can help users stay connected with

friends and family. Emergency response capabilities are also critical in elder people care applications. These applications can provide users with a way to contact emergency services quickly in the event of an emergency, as well as notifying designated caregivers or family members. Once the key features have been identified, the application can be developed using a range of technologies such as mobile app development frameworks, cloud-based services, and Internet of Things (IoT) devices. When designing an elder people care application, it is important to consider the user experience and ensure that the application is easy to use and understand. This may involve using larger fonts, clear graphics, and simplified navigation. Another essential consideration is security and privacy. Elder people care applications often involve sensitive personal and medical information, and it is critical to ensure that this information is protected from unauthorized access.

Finally, it is important to ensure that the application is continuously updated and maintained to address any issues that arise and add new features as needed. Regular updates can help ensure that the application remains relevant and effective in meeting the needs of elderly individuals and their caregivers. Elder people care applications have the potential to significantly improve the quality of life of elderly individuals and their caregivers. By incorporating key features such as medication reminders, appointment scheduling, social connectivity, and emergency response capabilities, these applications can provide essential support for elderly individuals and their caregivers. However, it is important to design these applications with careful consideration of user experience, security, and privacy, and to ensure that they are regularly updated and maintained.

V. CONCLUSION

In conclusion, designing an elder people care application can have a significant impact on the health, wellbeing, and independence of elderly users. By understanding the needs and preferences of elderly people, designing a user-friendly interface, and incorporating feedback from users, it is possible to create an effective application that provides support with daily tasks, improves communication with caregivers, and promotes better health outcomes. The results of such an application can include increased social connectedness, improved quality of life, increased independence, better health outcomes, and reduced caregiver burden. It is important to ensure that such an application has strong security measures in place to protect personal information, and to provide accessible customer support channels for elderly users who may need additional assistance. Overall, an elder people care application has the potential to make a significant difference in the lives of elderly users and their caregivers, and is an important area for continued innovation and development.

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Online Bidding Using Mern

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Guide: Prof. Mubashir Khan

Abstract— This web application is an online auction platform that enables users to buy and sell items through an easy-to-use interface. The platform allows users to create and manage their own auctions, set starting bids and reserve prices, and monitor bids in real-time. The application also provides a secure payment system to ensure safe and reliable transactions between buyers and sellers. Users can search for items by category, keyword, or location, and can view detailed information and images of each item. The application offers a personalized user experience with features such as notifications and alerts for bidding activity, as well as a messaging system for communication between buyers and sellers. Overall, the online auction web application provides a convenient and secure platform for individuals and businesses to participate in online auctions and trade goods.

I. INTRODUCTION

The internet has revolutionized the way people buy and sell products and services, and online auction websites have played a significant role in this revolution. Online auction websites offer a virtual marketplace where buyers and sellers can interact, exchange goods and services, and complete transactions without having to be physically present in the same location. Over the years, online auction websites have gained immense popularity, becoming a ubiquitous platform for e-commerce. They offer several benefits, such as convenience, accessibility, and a vast range of products to choose from. Buyers can access a wide range of products from the comfort of their homes, while sellers can reach a global audience with ease. However, online auction websites also face several challenges that need to be addressed. One of the biggest challenges is maintaining trust and transparency between buyers and sellers. In traditional auctions, buyers can physically inspect the product before bidding, which is not possible in online auctions. This makes it crucial for online auction websites to ensure that the products listed are genuine and of high quality. The lack of trust can discourage buyers from participating in the auction and can result in a negative experience for all parties involved. To overcome these challenges, online auction websites need to implement features that ensure trust and transparency. For instance, they can provide detailed product descriptions, clear photographs, and a review system that allows buyers to rate the sellers based on their experience. These features help build trust between buyers and sellers, making online auctions a more attractive option for e-commerce. In this paper, we present an in-depth analysis of an online auction website that addresses the challenges of trust and transparency. We discuss the design and implementation of the website, the features that make it unique, and the technologies used to create it. We also evaluate the website's performance, security, and scalability. Our analysis provides valuable insights for developers and designers of online auction websites, as well as potential users who are interested in using such websites for their e-commerce needs. Overall, online auction websites have transformed the way people buy and sell products and services. With the right features and tools, they can provide a trustworthy and transparent platform that benefits both buyers and sellers. This paper provides a detailed analysis of one such website and offers valuable insights for the development and design of online auction websites in the future.

II. LITERATURE REVIEW

ONLINE AUCTIONS: THEORETICAL AND EMPIRICAL INVESTIGATIONS” by YU ZHANG, et al. (2010)

This study examines the classical economics argues the principle of one price. In real world, we know it is often the exception than the rule. There exist a lot of mechanisms or institutions that might lead to

heterogeneous price. Auction is an important one. First, it offers a unique opportunity for us to observe the price determination process. The popularity of online auctions makes it even more relevant because of the availability of huge amount of data

“Bidder and Seller Strategies in Online Auctions: A Review” by Audrey Elizabeth Wen¹, HoiYat Wong (2021) Key findings based on research is that when choosing Between bidding and buyout in auctions with buyout Prices, depending on which option the sellers chose, Bidders can make their choice depending on their Personal valuation as well as their sensitivity to time and Aversion to risk as well. In regular bidding, bidders may Consider using the sniping strategy, which, while it Doesn't guarantee an increase in expected profit, does Have a significant possibility to lead to an increase in Profit due to the fact that there are naïve bidders.

“ONLINE AUCTION SYSTEM” by Begard Aljaf (2016)

The objective of this thesis was to develop the Online Auction System in Iraq. The main Reason behind implementing this project was the people needed a system where they can Make the auctioning through the internet easily and reliably. The system was implemented to replace the tradition auctions by online auction, due to the fact that in the Epoch of the internet and e-commerce online auction had an important role in business And it had been popular means of selling goods.

“C2C ONLINE AUCTION WEBSITE PERFORMANCE: BUYER'S PERSPECTIVE” by Rupak Rauniar Greg Rawski and Jack Simms (2004)

Despite the popularity among millions of users around the globe of selling, bidding, and buying products using C2C online auction websites, the existing literature on online auctions provides us with little understanding on Important factors of the C2C auctioneer website performance. One way to understand the performance factors of C2C auction websites could be to extend the past theories of end user computing satisfaction from the buyer Perspective.

“ONLINE AUCTION SYSTEM IN E-COMMERCE PRODUCTS USING

DEEP LEARNING AND DATA MINING” by Omkar Gaikwad, Priti Valte, Prathmesh Agre, Riddhi Borate, Prof. Gorde V.S, Prof. Rokade P.P, Dr. Yadav D.M (2022)

An online auction system is an auction which is held over the internet. It is a popular method for buying and Selling products and services. Online Auction System s helps to customer to sell and buy product in best price. This application is used to sell the anything on the website from house. Online auction system is becoming a More an more popular is electronic E-commerce, It Deeply learn becomes a main stream trending in customer To customer such as E-bay. Thousands of people take part in internet auctions everyday, bidding on items from Different places.

III. PROPOSED METHODOLOGY

Online auctions are a popular method for buyers to bid on items sold by sellers through an online platform. The process typically involves registration for buyers, item listing by sellers, bidding by buyers, payment by the winning bidder, and delivery by the seller. The feedback system on the online auction platform allows buyers to leave feedback for sellers, helping to build a seller's reputation and influencing future sales. Online auctions provide convenience and transparency for buyers and sellers, making it an efficient way to buy and sell goods.

One of the key benefits of online auctions is that they provide access to a global marketplace. Buyers and sellers from all over the world can participate in an online auction, which can increase the potential audience for a seller's items and provide buyers with access to a wider range of products.

Online auctions also offer a level of convenience that traditional auctions do not. Buyers can bid on items from the comfort of their own home, without the need to physically attend an auction house. This can save time and money for both buyers and sellers.

Another advantage of online auctions is that they can be more efficient than traditional auctions. The bidding process can be automated, with the platform keeping track of bids and notifying bidders when

they have been outbid. This can speed up the auction process and make it easier for buyers to participate in multiple auctions at once.

However, there are also some potential drawbacks to online auctions. For example, buyers cannot physically inspect items before bidding on them, which can lead to disputes over the condition of the item or whether it was accurately described in the listing. There is also the risk of fraud, as some sellers may misrepresent their items or fail to deliver them after they have been paid for.

Overall, online auctions are a popular and effective method for buying and selling goods. However, it is important for buyers and sellers to be aware of the potential risks and to take appropriate precautions to protect themselves. By using a reputable online auction platform and being cautious when making transactions, buyers and sellers can successfully participate in the global online marketplace.

IV. Overview

- V. Online auctions have become very popular for purchasing goods and operate in a wide variety of formats and rules. The most common format is the ascending bid auction where each bidder submits a maximum price they are willing to pay. The current price equals the minimum bidding level if no or a single bid has been placed, or the minimum of the second highest submitted reservation price plus an increment and the highest submitted reservation price if two or more bids have been placed. The current high bidder is the bidder who has submitted the highest reservation price, and they win and pay the current price at the end of the auction. The basic auction format is equivalent to the proxy bidding mechanism used by eBay and Amazon. Auction rules can be varied or augmented by additional options such as a reserve price or a first bidder discount. The reserve price is a predetermined price below which the seller reserves the right not to sell the object. The first bidder discount is a discount the winning bidder receives if they submit the first valid bid and have the highest bid in the auction.**

VI.

VII. Project flow

- VIII. The proposed project aims to develop an online auction application that provides a platform for users to host and participate in auctions at ease. The application will function as an intermediary between buyers and sellers, and registered users can participate in auctions as well as host auctions using separate logins.**

IX. The project will involve designing and developing the online auction application, which will allow users to trade things over a secured portable platform. The application will offer flexibility in terms of the temporal and physical characteristics of buying and selling items, and sellers will have a choice in the type of auction, its strength, duration, etc.

X. The project's success will depend on the number of users who use the platform. Therefore, the application should be designed to be user-friendly and easy to use, with features that encourage users to participate in auctions regularly.

XI.

XII. The project flow would involve several stages, such as:

XIII. 1)Project planning: This involves defining the project scope, objectives, and goals, as well as identifying the stakeholders and their requirements.

XIV. 2)System analysis and design: This involves designing the system architecture, identifying the data requirements, and designing the user interface.

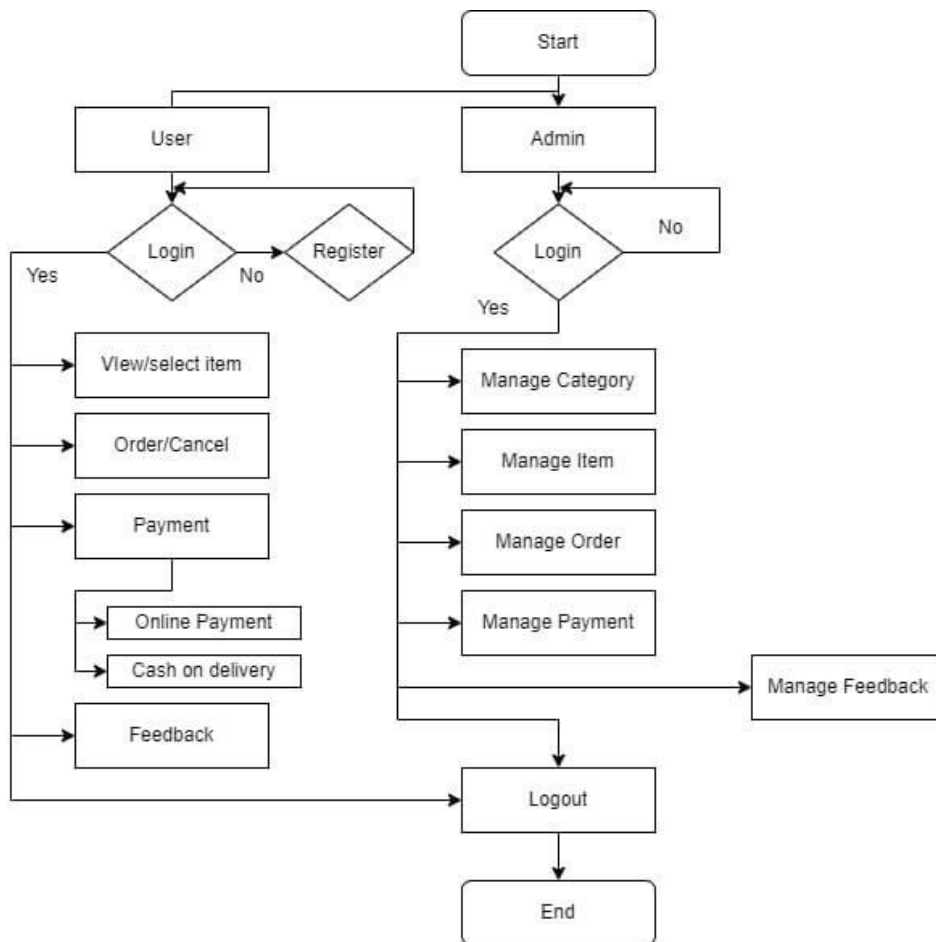
XV.3)Application development: This involves coding, testing, and implementing the online auction application.

XVI. 4)Testing and debugging: This involves testing the application to ensure that it meets the user requirements and is free from bugs and errors.

XVII. 5)Deployment and maintenance: This involves deploying the application on the web and maintaining it, providing support to users, and updating the application as needed.

XVIII.

Throughout the project, it is crucial to adhere to best practices for software development, including using secure coding practices, ensuring scalability and performance, and following an agile development methodology.



IV. IMPLEMENTATION

Create the server

In this step, we need to create a new file named server.js and set up the basic server configuration using ExpressJS. You can start by importing the necessary packages and dependencies:

Next, we can set up the MongoDB and AWS S3 bucket configurations:

After that, we can set up the basic server configuration using ExpressJS:

We can also set up additional routes and middleware as needed.

Implement authentication

In this step, we need to implement Google OAuth for user authentication and authorization. We can start by creating a new project in the Google Developers Console, setting up the OAuth consent screen, and generating the OAuth client ID and secret key.

Next, we can use the Google Auth Library to handle the authentication flow:

This code sets up the routes for the OAuth authentication flow. When a user clicks the “Sign in with Google” button, they are redirected to the Google OAuth consent screen. After the user grants permission, they are redirected back to the website, and the OAuth client ID and secret key are used to obtain an access token. The access token can then be used to fetch the user’s profile information from the Google API. Finally, we can create or update the user in the database and redirect them to the homepage or user profile page.

Set up routes

In this step, we need to set up the routes for the website, such as the homepage, login page, auction page, bid submission page and user profile page. We can create these routes using ExpressJS:

This code sets up routes for the homepage, login page, auction page, bid submission page, and user profile page. Each route renders an HTML template and passes in the user's information and any additional data needed for that page.

Implement real-time bidding

In this step, we need to implement real-time bidding using Socket.io. We can start by setting up Socket.io in the server.js file:

This code sets up a basic Socket.io connection and logs a message when a user connects or disconnects. We can then add code to handle new bids and broadcast them to all connected users:

This code listens for a new Bid event from the client and broadcasts the bid to all connected clients using the io.emit method.

Implement file uploads

In this step, we need to implement file uploads using Multer and AWS S3 bucket. We can start by setting up the Multer configuration:

It helps set up Multer to store files in memory before uploading them to the server.

Next, we can set up the route for uploading files:

This code sets up a route for uploading a single file with the name file. When a file is uploaded, it is stored in memory using Multer's upload.single middleware. The file is then uploaded to the AWS S3 bucket using the aws-sdk library and the resulting URL is sent back to the client.

Implement authentication

In this step, you need to implement authentication using Google OAuth. We can start by setting up the Google OAuth configuration:

This code sets up the Google OAuth strategy using the passport-google-oauth20 library. It also sets up serialization and deserialization functions to store and retrieve user information from the session.

We can then set up the login and logout routes:

The /auth/google route initiates the Google OAuth flow, while the /auth/google/callback route handles the callback from Google and logs the user in if authentication is successful. The /logout route logs the user out by clearing the session.

Deploy the application

In this final step, we need to deploy the application to a production environment. We can use AWS Elastic Beanstalk to deploy the application to a scalable and reliable infrastructure.

First, we need to create an Elastic Beanstalk environment and configure it to use Node.js and the MongoDB instance we created

The general steps are as follows:

1. Create an account on the cloud platform and set up any necessary billing information.
2. Install any necessary command-line tools or plugins for deploying to the platform.
3. Create a new application or environment on the platform.
4. Configure any necessary environment variables, such as the database connection string or S3 credentials.

5. Deploy the application using the platform's deployment tools.

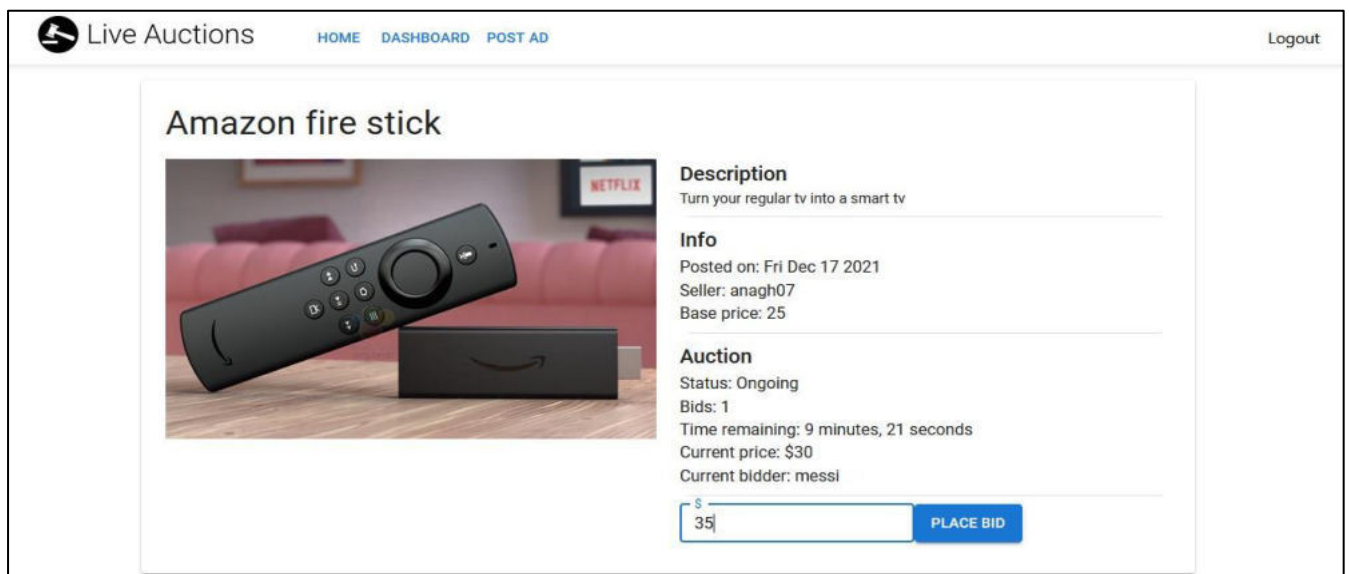
Test the application

In this step, we need to test the application to ensure that it is working as expected. You can start by manually testing each feature of the application, including:

1. Registering and logging in as a user.
2. Creating a new auction and viewing it on the auction page.
3. Placing a bid on an auction and verifying that it appears in real-time for other users.
4. Uploading a file to an auction and verifying that it is displayed correctly.

We can also consider writing automated tests using a testing framework such as Jest or Mocha. Automated tests can help catch bugs and ensure that the application remains functional as it evolves over time.

WORKING



The screenshot shows a web application interface for a live auction. The page title is "Amazon fire stick". The navigation bar includes "HOME", "DASHBOARD", and "POST AD", along with a "Logout" link. The main content area is divided into two columns. The left column features a large image of an Amazon Fire Stick and its remote control. The right column contains the following information:

- Description:** Turn your regular tv into a smart tv
- Info:** Posted on: Fri Dec 17 2021, Seller: anagh07, Base price: 25
- Auction:** Status: Ongoing, Bids: 1, Time remaining: 9 minutes, 21 seconds, Current price: \$30, Current bidder: messi

At the bottom of the right column, there is a bid input field with a dollar sign icon and the number "35" entered, followed by a blue "PLACE BID" button.

The screenshot shows the homepage of 'Live Auctions'. At the top left is the logo and name 'Live Auctions', followed by navigation links for 'HOME', 'DASHBOARD', and 'POST AD'. At the top right is a 'Logout' link. The main content area features a grid of six auction items, each with an image, title, price, remaining time, and status. The items are: Audio Technica M50x (Price: \$ 120, Remaining: 2m, Status: Upcoming), Google Pixel 6 Pro (Price: \$ 600, Remaining: 1h, Status: Upcoming), Coffee Beans (Price: \$ 40, Remaining: 2m, Status: Upcoming), Logitech GPro Wireless (Price: \$ 80, Remaining: 1m, Status: Upcoming), RTX 2060 Super (Price: \$ 800, Remaining: 5m, Status: Upcoming), and Amazon fire stick (Price: \$ 40, Remaining: 2m, Status: Upcoming). At the bottom of the grid is a pagination control with 'PREV', '1', '2', and 'NEXT' buttons.

The screenshot shows the login page of 'Live Auctions'. At the top left is the logo and name 'Live Auctions', followed by a 'Login' link. The main content area is a login form with the following elements: the 'Live Auctions' logo and name, the text 'Log in to your account', an 'Email Address' input field, a 'Password' input field, a blue 'LOGIN' button, a link for 'Don't have an account? Sign Up', a horizontal separator line, the text 'To use the app without login:', and a blue 'SKIP' button.

V. CONCLUSION

Online auctions have revolutionized the way people buy and sell goods and services. They allow sellers to reach a wider audience and buyers to access a vast range of products from anywhere in the world. The convenience factor of online auctions cannot be overstated. Users can participate in auctions from the comfort of their own homes or offices, eliminating the need to physically attend an auction house. This saves time and money and can make it easier for people with busy schedules to participate.

Real-time bidding is another feature of online auctions that can create a sense of excitement and competition. Users can monitor the status of their bids in real-time, allowing them to react quickly to any changes in the auction. This can create a more engaging and interactive experience for users.

Cost savings are another major advantage of online auctions. Traditional auctions require a physical auction house, an auctioneer, and other associated costs. In contrast, online auctions can be run with minimal overhead costs, making them more cost-effective for both sellers and buyers.

Despite these advantages, online auctions also have some limitations. One of the biggest challenges is limited inspection. Buyers cannot physically examine items before placing bids, which can increase the risk of fraud or misrepresentation. Shipping and handling costs are another potential disadvantage, particularly for larger or heavier items.

Researchers have studied various aspects of online auctions, including auction mechanisms, bidding strategies, and optimization techniques. For example, some studies have looked at how different auction mechanisms can affect outcomes such as revenue and efficiency. Others have investigated bidding strategies such as sniping (placing bids in the final seconds of an auction) and the use of automatic bidding tools.

Overall, online auctions have transformed the way people buy and sell goods and services. As e-commerce continues to grow, online auctions are likely to remain an important and evolving area of research and practice.

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An Improved Method for Face Recognition with Incremental Approach in Illumination Invariant Conditions

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Abstract—In this paper we propose an enhanced method with an acceptable level of accuracy for face recognition with an incremental approach in invariant conditions like illumination, pose, expressions and occlusions. The proposed method hold the class-separation criterion for maximizing the input samples as well as the asymmetrical characteristics for training data distributions. This enhanced approach helps the learning model to get adjusted the weak features inline with enhanced or boosted feature classifier for online samples. This enhanced model also helps in calculating feature loses during the training process of offline samples. For representing the illumination invariant face features local binary pattern (LBP) are extracted from the input samples and IFLDA is used for representation and classification. This modified algorithm with incremental approach gives the acceptable results by detecting and recognizing the faces in extreme illuminations varying conditions.

Keywords- Face detection, Incremental online and offline learning; LBP,IFLDA, illumination invariant, etc.

I. INTRODUCTION

During the past decade, the biometric security systems based on face recognition have attracted the research community due to its significant usage in different applications [1,2,4-5]. In general, the face problem for recognition is defined and be formulated like [,11] i.e. from a given set of stored databases, localizing and extracting the equivalent face images. There are various challenges in face recognition such as varying lighting conditions, pose, overfitting etc. We find that the problem of illumination is big challenge in face recognition especially for single image based recognition system. This problem can be addressed effectively by extracting illumination invariant features [4,5,8]. However, the conventional methods found be very difficult in extracting the multi-scale and multi-directional geometric features simultaneously and are very much essential for accurate face recognition and extracting the important intrinsic required face features. Intrinsic features extracted shows a significant variations captured due to uncontrolled environment surrounded by varying wide spectral changes. [4,5,8,10].

In a controlled environment, the face identification and recognition is very simple since in this case, the human faces of all the participants are acquired in a fully synchronized environment with uniform background and frontal pose only. But in maximum cases, in real time scenario we come across varying environmental conditions, poses, scaling, beards, makeup, turbans, colors, occlusions etc. affecting the accuracy of the face recognition. In all these challenges, for a face recognition algorithms the varying lighting conditions are considered as the most trivial challenge. It is very difficult task and found to be very impractical to recognize the faces

in an illumination invariant appearance conditions due to complex model of recovery and accurate recognition. Oftenly, we find the larger magnitude difference between the same face samples due to varying illumination. This leads the biometric recognition system towards the poor performance. But today there is need of real world application supporting systems which must be efficient in localizing and recognizing or matching algorithms with dynamic constraints [8]. The problem of face recognition associated with the challenging constraints have attracted researchers from the different discipline like psychology, computer vision, Data Science, Security, pattern recognition, neural networks, computer graphics, AI and Machine Learning [12]. The major challenge which affects the performance of the face recognition system includes the following factors:

- **Illumination:** The face images found to be varied due to the position of light source.
- **Pose:** The face images may found in varying poses due to the relative camera positions or face poses.

- **Structural component Existence:** The given face images sometimes may possess the facial features like makeup, beards, mustaches, and glasses and these components create more challenges due to their varying shape, color and size.
- **The Perceptual Face Features:** - Face expressions and emotions of a human face directly affects the appearance of faces.
- **Occlusion:** Due to overlapping faces of group of peoples may partially get occluded or by other Objects
- **Intensity:** There are three types of face images intensities which includes color, gray and binary.
- **Image Quality:-** The varying Image intensities leads the face images in poor-quality with noise producing blurred or distorted images.

Based on the face image representation [14] face recognition algorithms are classified into two types given as follows:

- Appearance-based where the holistic texture features are extracted from the selective areas of the given face image or from the complete image.
- Geometric Feature based method in which geometric relationships of the facial components like mouth, eyes, brows, cheeks etc. are compared.

In Holistic feature based approach, complete face is given as a input to the face recognition system. Then These high-dimensional training input face images are projected into a lower dimensional subspace by using subspace analysis technique. Finally by calculating the distance between the feature vectors of training and test samples. Finding the required sufficient subspace area is the major challenge for such type of systems. There exists many well known algorithms used for face recognition. Some of such algorithms includes Principal Component Analysis (PCA), Independent Component Analysis (ICA), Linear Discriminant Analysis (LDA) [18], Since the amount of data samples in an online recognition or video based face recognition system is not static hence incremental LDA is used and considered most adaptive and efficient algorithm to the new data sets. By using this concept when batchLDA is used for face recognition the results obtained found to be significant with acceptable very low time and space complexities.

But still there is huge scope in this area and found that since late 1980s many face computational models are been proposed in active reach domain; but very few work is done on incremental learning using sparse LDA. The research community not only contributed theoretically their insights but in many practical applications like criminal detection, security support systems, image and film processing, and machine-human interaction, etc.

But designing an incremental solution based on sparse LDA is a very difficult task since sparse LDA problems are non-convex and NP-hard. This increases the computation cost and memory requirements for training data. Viola and Jones [18] proposed the first AdaBoost detector where he utilized the 6060 low quality features from 4916 set of face sets. Later AdaBoost method along with forward feature selection (FFS) is used for fast training of training and test samples. Further the LDA based algorithms can be used for online face recognition also called incremental LDA in an illumination invariant condition by incorporating a classic semi-supervised learning framework in many applications. However, due to complex, dynamic and multidimensional face features, developing a computational process model for face recognition becomes very difficult task.

II. Illumination Invariance

In face recognition systems, contour or edges [5] are used in order to extract the illumination invariant features and overcome the illumination challenges since contour-tracking algorithms found to be prone to invariant illumination effects. But since few decades, the research community from the computer vision have come out with many significant solutions to overcome challenges caused due to illumination invariance and witnessed with several excellent methodologies.

These methodologies are based on two important parameters such as photometric parameters and Shadow compensation method. The photometric parameters includes the illumination dependent variables such as color, texture and pixel intensity where as Shadow compensation method which compensates the illumination variation of the face image and query image.

The human faces are naturally includes the basic face components like a forehead, two eyes, a nose and a mouth with two lips. The reflections of lights form a shadow of these basic components on a face, showing distinctive characteristics. These illuminated invariant characteristics generated due to the shadow on a face image can be neutralized and used to obtain a equivalent image in a face recognition system. There are two basic approaches of face recognition under illumination invariant conditions: by proper representation of highly nonlinear face features illumination variances and transforming into a simple face matching algorithm. The illumination invariance can be overcome by proper representation of facial features and these elevated features are utmost insensitive to illumination invariance like a tightly controlled face database. For the representing the image features edge maps, Gabor filters, 1st and 2nd derivatives of gray-level image or logarithmic transformations of the intensity are can be used. Fig.1 shows the common challenges caused due to illumination invariance under controlled conditions.



Fig.-1: Illumination-invariant conditions [Source-YALE-B]

Looking into all these challenges, the work is focused on improving the recognition accuracy using statistical method by reducing the noise and variances identified in the face recognition process. The experimental work with this approach has shown a significant improvement with acceptable outcomes for real-world image sequences.

A. Illumination Specifications at A Glance

Face recognition in an uncontrolled environment is one of the toughest challenges in real time practical situations. This problem is addressed by normalizing the illumination effects with proper representations of texture features and consequently using [13] the distance transform based matching algorithms. In this particular case, it follows three major steps: (i) First using efficient preprocessing techniques utmost varying illumination effects are eliminated preserving the essential appearance details required for recognition; (ii) then Local Binary Patterns i.e. LBP are generalized also known as Local Ternary Patterns (LTP) descriptors which are more

discriminative and very less sensitive to noise in uniform regions; and (iii) Finally local histogram equalization technique is used to improve the performance of the recognition system in a illumination invariance environment. Further with help of incremental approach in face recognition, uneven effect of illumination is elevated by normalizing the [, 12] LBP facial features. Apart from the illumination challenge the hybrid algorithm is also articulated to overcome the problem of pose variation using view-based approach like eigen-space along with neural networks.

Liu et al. (2005) have used the Gabor wavelet and PCA technique for recognizing the faces where as R. Gross proposed the concept of characterizing the images in varying light field with pose spaces. However, maximum methods used for face recognition in 2D image face space area either can deal with illumination issue or pose variation, and hence very difficult to apply directly when both the challenges are present i.e. illumination and pose variations.

B. FACE RECOGNITION WITH SMALL ILLUMINATION INVARIANT AND HIGH DIRT

Human beings has an ability to identify and recognize the human faces very easily but at the same time the performance of the automated system may get affected due to the various parameters such as high noise in the face images due to the poor quality of the camera artifacts and other is the surrounding environment in which the image is been captured. Although there are many advanced recognition technologies already exists with good accuracy but most of them unable to perform in a complex environment due to poor illumination and high dirt [5,]. In contrast to the other biometrics like fingerprint, iris, etc. face is the most natural source of identification and communication as such Low illumination and high dirt identity recognition technologies still a worry for the many security agencies and industries that are using facial features based support systems for personal identification..

C. NORMALIZING THE ILLUMINATION INVARIANCE USING SRA

Now a days the representation of facial features with the high noise due to illuminations issues and artifacts of the input devices is a major challenge for face recognition. To mitigate these challenges posed due to illumination and high dirt the computer vision and statistical signal processing community have actively involved to provide the best solution; for which optimal representation techniques like sparse matrix for calculating the sparse features (SRA) [18], EVD and SVD can be used for facial features representation efficiently by convex optimization even though the problem may be very complex. We explore and modify the sparse representation [5,] for robust visual identification of facial features using sparse representation with fractional LDA giving the significant improvement in recognition accuracy in which we have applied a appearance based approach object detection technique



Fig.2. Sample Image classification based on Illumination (1) Bluer Noisy image, (2) low-pass/sub-band, (3&4) strong edges and weak-edges and (e) Noisy.

While devising a strong visual identification and recognition algorithm the presence of noise, occlusion, background clutter, and illumination variance poses lot of challenges. we propose an improved framework using Fractional LDA along with sparse approximation in a template subspace. Sparse Bayesian learning algorithms [10] are used for multiple instance learning to meet the good accuracy even if there are occluded, illumination variations or other corruptions. The bootstrapping binary classifiers can be used to suppress such issues and the results have seems to be reliable.

III. Face Recognition with Incremental Method

Before discussing the improved method for face recognition for face recognition in this section we have highlighted some analogues incremental methods which can be applied on the gray scale face images for recognition. These includes

- Computing and updating the facial features in sequential manner.
- Successively updating previous version as new observations

In face recognition, LDA technique is the most frequently used approach; already there exists different forms of LDA with incremental approach [12] with a single new data point in each time step. These approaches are usually used for on-line learning tasks. Because of single step approach, the recognition task become very complex when \mathfrak{R} i.e. the number of classes becomes very large since this method applies an eigen-decomposition of $\mathfrak{R} \times \mathfrak{R}$ sized scatter matrices. There are two forms of Incremental linear discriminant analysis (ILDA) i.e. sequential ILDA and a Chunk ILDA. In experiments we calculate;

- S_W - within-class scatter matrix
- S_B - Between-class scatter matrix and
- S_T - Sparse total scatter matrix

These three components are adjusted in order to boost each training samples incrementally;

$$S_W = \sum_{i=1}^{\mathfrak{R}} \sum_{x \in \mathfrak{R}_i} (x - m_i)(x - m_i)^T \quad (1)$$

$$S_B = \sum_{i=1}^{\mathfrak{R}} n_i (m_i - \mu)(m_i - \mu)^T \quad (2) \quad S_T = \sum_{allx} (x - \mu)(x - \mu)^T$$

(3)

Where \mathfrak{R} - Total number of classes,

n_i - No. of samples in class i

m_i - Mean and

μ - indicates Global mean
 The total scatter matrix is given by ;

$$ST = SB+SW \tag{4}$$

Incremental PCA has the drawback of feature retention while projecting in sub space area thus incremental LDA is used for feature extraction and PCA is used only for data compression and eigenbases are used to get the reduced set of basis vectors from the spanning space caused due to large data variation. The Eigen sub-space method uses the cubic computational approach for respective scatter matrix. The block diagram for proposed methods is as shown figure in which the algorithm is adaptive to eigen-space and updated online.

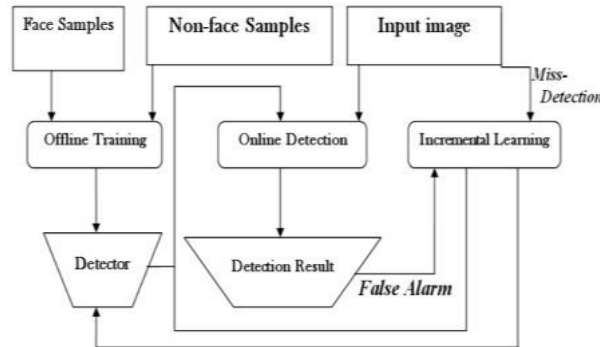


Figure 3: Incremental learning Approach for Offline and Online Detection and Recognition

As discussed earlier due to varying properties of surrounding environments, poses, size the appearance of a target objects get changed drastically affecting the recognition accuracy. In this LDA based improved method, for feature extraction first incremental PCA is used and then updates the Fractional LDA bases. This modified method takes a single new data point as input and uses the intermediate representation technique before classification/ recognition. In this modified scheme FLDA is used get adjusted the scatter matrices of between-class and within-class features that linearly combines producing the optimal stronger classifier,

$$S(x) = sign \sum_{i,j=0}^T X m_i \mu m_i \tag{5}$$

In-order to improve the feature quality of the represented features by driving X_{m_i} and μ_{m_i} AdaBoost learning algorithm is used minimizing the upper error bound. This approach can be applied on both i.e. Online as well as offline data.

IV. Working Framework for improved method

This improved method for face recognition uses the Incremental sparse approximation method as key technique explored with PCA and Fractional LDA. The major significances of sparse approximation includes

- Reducing the high dimension data to Low dimensional Samples.
- Matrix based Eigen value Decomposer.
- Comparable same as that of PCA, ICA, LDA, etc.

Unlike other conventional methods, most of them uses the online boosting approach, This modified version uses the SLDA based feature selection and maximizes the class-separation criterion. The Sparse ILDA (SILDA) reduces the quotient of generalized Eigen-values into a cardinality-constrained subspace. SILDA helps in computing the discriminating features instead of regular LDA methods which follows the Branch-and-Bound problem solving approach since getting the global optimal solutions for high dimensional data is computationally infeasible. The modified SILDA uses the Greedy approach to find optimal solution [1, 2] to address the issue of invariance generating the exact formulation of sparse feature representation. Following figure shows the process flow of the modified version of recognition in illumination and pose variant conditions.

Input: training data $D(\text{person}; \text{illumination}, \text{Pose})$,
 filtered data $F(\text{person}; \text{illumination}, \text{Pose})$,
 sparse function S , Filter F .

Output: estimate $S(X, \mu)$

- 1: Initialization
 $p(X, \mu) = 0$
- 2: Simulated matching iteration
 for all illuminations $i; j$ and
 for all Pose $i; j$;
 persons p
- 3: Initial separation
 $S_B \geq S_T \leq S_W = \{S, F\}$;
 Then Sparse function equities of
 illumination filter
- 4: Iteration
 for all $p = S_T$
- 5: Separation given
 $\{S, M\} = \{p(X, \mu)\}$
- 6: Update incremental density estimate
 $D_{ij} \geq S, F, p(X, \mu)$
- 7: Smooth the output
 $S = F \oplus D$
8. Intermediate Representation using SRA
9. Classification using IFLDA

Our modified algorithm not gives the good results for planar tracking like experiment but also performs effectively giving the promising recognition accuracy in an illumination and pose appearance variant conditions. However, it is giving poor performance if the target object experience a large out-of-plane rotation or video is recording is done with large illumination changes like sunlight etc.

Eigenvalues for representing sparse features with YALE-B

By using Liu's experimentation	Eigenvalues determined by our experiment
1.00000000e+00	3.31404754e+04
1.00000000e+00	2.39150276e+04
1.00000000e+00	1.670974851e+04
1.00000000e+00	1.01371472e+04
1.00000000e+00	6.88317848e+03
1.00000000e+00	7.41278626e+03
1.00000000e+00	2.70246188e+03
1.00000000e+00	5.53315254e+03

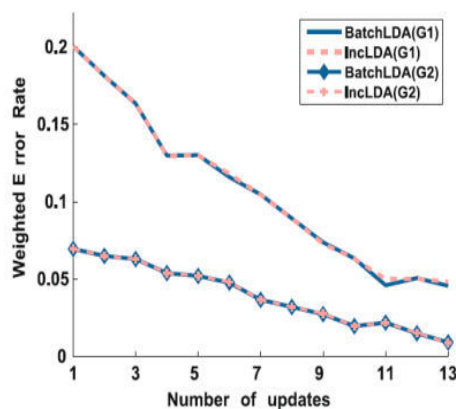


Figure 4: Weighted Error for different LDA under illumination variant conditions.

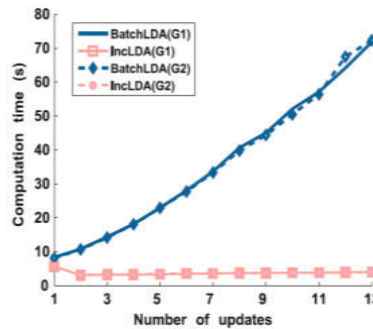


Figure 5: online computational complexities performance under illumination and pose variant conditions.

Initially the training of online and offline ILDA found to be same but with different time complexities. Table-II shows the time complexities for different ILDA methods for the weak samples. Let N be the number of training samples with a greedy approach it needs $O(N \log N)$ time to calculate the optimal threshold for each feature. Thus the time complexity for feature sets of size M is given as $O(M * N \log N)$

Complexity factor of figure 5.

Parameter	Batch LDA	Incremental LDA	Sparse Incremental LDA
TIME	$O(N2+\min(N,M3)3)$	$O(dT,1)3+dB, 1 +N dT,3+3dB, 3$	$O(dT,1)3+dB, 1 +N dT,3+3dB, 3$
SPACE	$O(NM3+NC3)$	$O(NdT,3+NdB,3)$	$O(NdT,3+NdB,3)$

V. Conclusion

In this paper we have done a detailed analysis of the different sub-space based face recognition techniques and identified the parameters which affects the recognition accuracy in different environmental conditions as well as due to artifacts of the face acquisition devices. The major ideas was to focus on how to normalize the illumination and pose variation effects and incrementally change the quality of the discriminating features using AdaBoost to improve the recognition accuracy using PCA and IFLDA. This improved method will be used in next version of the paper on video images captured in illumination invariant conditions.

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H. J. Thim Trust established Theem College of Engineering in 2009 at Boisar with an objective of “Success... through Quality Education” for the development of youths who plays a decisive role in shaping the destinies of nation. The institute’s serene and tranquil surroundings create a carnival atmosphere to develop students’ overall growth in technical education as well as humanities.

Theem College of Engineering is approved by AICTE, Government of Maharashtra and DTE, and affiliated to University of Mumbai. The institute is awarded with B+ grade by NAAC. The institute is a remote centre of IITB-NMEICT (MHRD, Govt. of India). The institute is emerged as the only Premier Engineering College in Boisar with an overall intake of 480 students in the graduate engineering programmes of Computer, Computer Science (AI& ML), IT, Electronics and Telecommunication, Mechanical, Civil, Automobile, and Electrical.

In addition to this the institute has 240 intakes in the diploma engineering programmes of Computer, Mechanical, Civil and Electrical.

The institute’s well-maintained infrastructure, rich academic excellence and teaching-learning ecosystem steer students to achieve their engineering skills and career goals. To enhance multi-tasking growth, the institute equally focuses on co-curricular and extra-curricular activities which yielded university rank holders and winners of various technical and sports events.

