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A STUDY ON BLOCK CHAIN IMPLEMENTATION IN HEALTHCARE SYSTEM

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ABSTRACT
Bitcoin was introduced as an application of block chain by Satoshi Nakamoto in 2008.Blockchain focused on recording the transactions thus maintaining the integrity of transactions without an intermediary. It is a decentralization process .As it can be seen patients are increasing day by day in today's world of modernization. Therefore health records are to be maintained efficiently so that both the doctors and patients will find it easy to access the data. Health care industry can have adverse effect if block chain technique is introduced in the same. The concept is new but growing day by day. This paper presents a systematic review of health care industry in terms of block chain. The process of systematic review process must contain the necessary protocol which is very important component. Before the review starts, the protocol ensures that the what is planned is well documented so that conduct team can promote consistent conduct and also maintain transparency. Four scientific databases, to identify, extract and analyze all relevant publications will be used. The method is based on Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. Different use cases such as identity management, financial and health care records, clinical research data, healthcares supplies are focused. However these protocols lack some implementations and also effectiveness of these proposed use cases. The state-of-the-art in the development of blockchain applications for healthcare, their limitations and the areas for future research are highlighted. To this end, therefore, there is still the necessity for more additional analysis to better understand, characterize the appraise the utility of block chain in health care.

Keywords: blockchain; healthcare; systematic review, bitcoin, decentralization

INTRODUCTION
The disconnected electronic systems and paperwork of health records are a cons in health care industry. Doctors are unable to provide proper care to their patients due to improper interoperability of health records of patients. Also incorrect information results in errors in the health care records. According to British medical association about 50000 women did not receive the information related to cervical cancer due to an error caused in the system. A majority of women did not receive the letters for further tests and majority missed letters which could include warnings of abnormal smear results that may need further investigation. Block chain could solve the problem faced by National Health Service in which there is a shortage of doctors and nurses. Though the NHS computerized all the records but the process delayed. Blockchain could solve the problem of interoperability by allowing doctors to gather information about a patient from multiple independent systems. A blockchain-based system would allow for data to be added and tracked through a ledger, thereby providing a live feed of multiple agencies' relief efforts. It can have the potential to save lives and money. As the underlying technology for Bitcoin, the main utility of blockchain is that it makes possible the exchange of electronic coins among participants in a distributed network without the need for a centralized, trusted third party. Some of the limitations can be overcome if block chain technology is used in healthcare industry. Some of the limitations addressed are transactions that take place between patients and third parties. Some times the trusted third party may malfunction or fail. A very good example is Punjab National Bank hit by another fraud, this time of Rs 3,800 crore. The third parties also charges fees for delay.So this can be overcome if block chain technology is used.

Block chain is a decentralized system in which the role of middleman does not exist. The third party signatories are replaced with a computational proof to validate transactions. The confirmation process is carried out by network of users who stick to rules which are agreed previously and these rules are implemented by software. The method saves the cost of mediation ,as no mediator is involved and the cost associated with reversing the transactions is also saved cause block chain transactions are irreversible. The transaction records are grouped into blocks and then every block is locked to next block takes an arbitrary amount of data input—a credential—and produces a fixed-size output of enciphered text called a hash value. Once recorded the data cannot be altered as data in each and every block has to be changed. Block chain is found now as an general purpose source of application as earlier it was only limited to finance. The system is also flexible enough to allow the addition of arbitrary logic to process, validate, and access the data. This is implemented via components of business logic known as smart contracts, which reside on the blockchain and are synchronized across all nodes. A smart contract is a string of computer code that executes whenever certain conditions are

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met, ensuring security and authorized access[1].Smart properties and smart contracts were introduced in second generation of blockchain technology[2].The third generation of block chain is concerned with non financial applications of block chain. As block chain is a new technology there are lot of misconceptions such as incorrect information, uncertainties etc. about the technology. Members of research community and practitioners want to understand the specific areas of block chain applications in health care.

OVERVIEW OF BLOCKCHAIN

The most obvious and outstanding benefit of blockchain is the fact that it removes the need for a centralized trusted third party in distributed applications. By making it possible for two or more parties to carry out transactions in a distributed environment without a centralized authority, block chain over comes the problem of single poin to failure whicha central authority would otherwise introduce. It also improves transaction speed, by removing the delay introduced by the central authority, and at the same time, it makes transactions cheaper since the transaction fees charged by the central authority is removed. In place of a central authority, block chain uses a consensus mechanism to reconcile discrepancies between nodes in a distributed application. The difference between centralized and decentralized systems is illustrated in Figure 1.

Block chain technology in healthcare

(a). At hospital level: In the industrialized nations block chain plays important role in EMR(Electronic Medical Records) in hospital environment. Several features including disintegration, data origin, and validity have made blockchain technology suitable for repository storing, managing, and sharing protected health information in EMR [1]. For example, health chain is a blockchain-based EMR system which used hyperledger fabric by IBM [2]. This technology helps to achieve scalable data security and optimize the performance of the EMR system. Arguably, blockchain is considered to improve transactions in billing section, insurance claims, and surveillance measures like nosocomial infection surveillance [3]. The advantage of this technology is that a lot of data can be stored, processed and shared with the stakeholders, very swiftly, without any link failure/delay [4].According toPeterson et al., it can reform health database interoperability within-built authentication controls,whichlowers the risk of data theft[5].

(b). Resource management in health systems: Blockchain can facilitate managing logistic and human resources in healthcare systems. For example, counterfeit medications and instruments below standard can be supplied to healthcare systems from external vendors. Use of blockchain can validate the quality standards at different nodes of supply chain management and inform the respective authorities about suspected discrepancies [6]. Moreover, human resource management in the digital age requires storing and using employee data for attendance, leaves, performance appraisal, and security measures with complex authentication processes. Use of blockchain can make such processes efficient and contribute to the development of smarter health services organizations.

(c). Patient-level applications: Due to its decentralized features protecting data safety concerns, blockchain is increasingly being used to share the health data with patients and their caregivers. Such patient empowerment initiatives are also fostering meaningful use of health information technology and improving patient-provider communication in the digital platforms [7]. Furthermore, blockchain-based m-Health interventions are enabling remote patient monitoring through use of biosensors, thus bridging the access gaps inpatient-level health services[8].

(d). Disease Surveillance at community level: Surveillance is defined as “systematic, ongoing collection, collation, and analysis of data and the timely dissemination of information to those who need to know so that the action can be taken [9]”. It is done for both communicable diseases and non-communicable diseases by all the national health systems according to the national priorities as per WHO’s International Health Regulations (IHR). For example, deadly virus like Nipah can travel across the globe within 36 hours and can cause pandemic by compromising health security due to rapid and uncontrolled urbanization and globalization [10]. Communicable disease surveillance is an ongoing, complex and inefficient process, because a huge number of self-regulating organizations report to a centralized information system. So, it is a challenging task to keep the information flow seamlessly in a timely manner. Moreover, there is no incentives are allotted for the routine staffs. The sequence of events after the reporting of a case by a health worker until the timely action is depicted in Figure 3.1.

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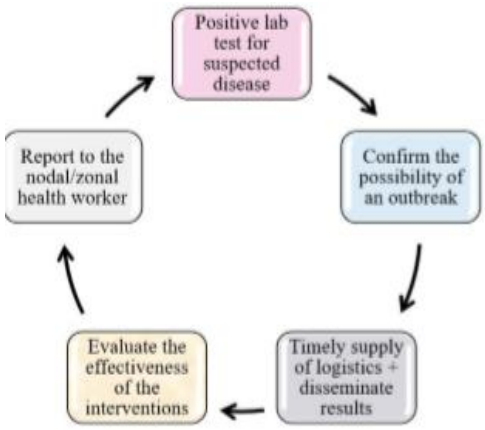

Fig-3.1: Sequence of Events after the reporting of a case by a health worker

Blockchain could help these independent organizations to manage data more efficiently during the pandemics [11]. It could also help track information for ongoing public health emergencies, like road traffic accidents, illicit drug use, opioid misuse, and so on [12]. When the block chain technology is used in a public health domain, these networks might be able to automate secure data sharing and storage at different levels of healthcare organizations. This technology has a potential to give real time data/information by sensing potential outbreaks or bioterrorism. Hence, if vaccinations, antibiotics, and other disease control measures are instituted promptly, massive casualties can be prevented. For example, fake news on social media against vaccination have critically impacted public health in recent years [13]. Huckle et al. reported a blockchain based approach to identify the origins of such harmful contents and identify the population at risk in digital communication [14]. This highlights the potential of blockchain to improve public health surveillance in the era of digitalization. Nowadays, most of the countries use machine learning techniques in surveillance. There are certain unique and added advantages of blockchain technology over machine learning techniques. The blockchain predominantly blocks malicious activities, like data hacking and duplication [15]. Additionally, the combination of blockchain technology with Artificial Intelligence (AI) is like addition of"cherry on the cake"to medical research and health sector[16].There is also tremendous scope for integration with geographical information system (GIS) to expedite the routine epidemic investigations, drug and vaccine supply chain management. The other critical aspect is that by ensuring transparency and correct reporting, as in the case of reporting deaths from the particular outbreak, the blockchain overcomes the limitations of already-present in the district health information systems. The following schematic illustration (Figure 3.2) shows how the block chain application in surveillance systems enhances the activities for ensuring health security.

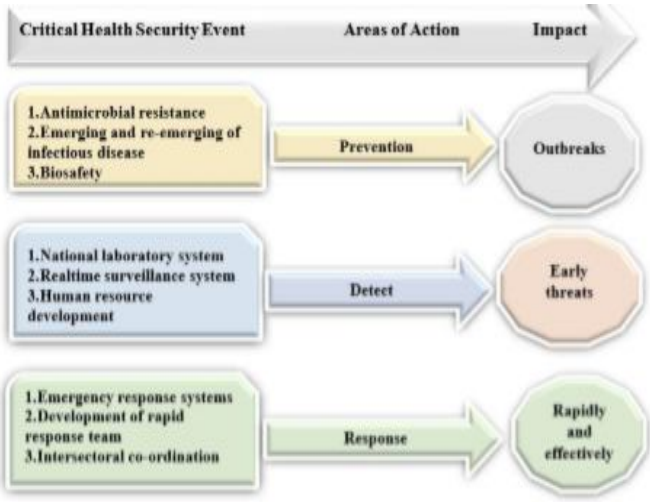

Fig-3.2: Schematic of Block Chain Application In Surveillance Systems

Under these three broad categories of disease control action points namely prevent, detect and respond as shown in Figure 3.2, there is a great scope for real-time surveillance for detection of Non-Communicable Diseases (NCD). This also comes under the Global Health Security Agenda (GHSA)action packages. By applying real-time surveillance, early risk factors detection for NCDs can be ensured. In addition, by capacity building of medical and health staff, the emergency response can be overcome through effective supply chain systems [17]. The summary of the NCD activities and GHSA action package activities are shown in Table1.

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GHSA category	GHSA action package	NCD RELATED activity
Detect	Real time surveillance	1. Strengthen cancer registries
		2. Support tobacco use surveillance
		3. Birth defects surveillance due to zika virus
		4. Include NCD indicators in current surveillance systems
		5. Support inclusion of Electronic Medical Records
		6. Implement for health data

Table-1: Real Time Surveillance for NCDs

5. LIMITATIONS

Blockchain technology has several limitations which include use of the technology without adequate security and privacy measures, lack of frameworks for implementation and regulation, concerns for cost-effectiveness and interoperability [18]. These challenges can be overcome by gradual scalability and upgradeability.

DISCUSSIONS AND CONCLUSIONS

The case of Taiwan is an excellent example of the application of this revolutionary blockchain technology [19]. In Estonia, the complete public health infrastructure is being operated using blockchain [20]. Other examples include countries such as the UK, USA, and Canada, where such real-time surveillance systems have been implemented in many of their departments. In England, at the national level, they have implemented it in their Emergency Department Syndromic Surveillance System. Emergency Department Syndromic Surveillance has been implemented by Canada at the regional level. Another excellent example of this application is the European Antimicrobial Resistance Surveillance Network [21]. Hence, we may conclude that, blockchain applications can retain the prime characteristics of ideal disease surveillance. It can be more effective and prompter than the traditional surveillance in terms of coverage, durability, consensus, selective privacy, uniqueness and timing. Blockchain technology holds great promise in over populated and low-income countries like India, Pakistan, Africa (where the health systems are prone to epidemic and pandemic) by strengthening the capacity of the countries with simplified early warning surveillance for diseases of epidemic potential by reducing the mortality, morbidity and economic costs. It is high time to incorporate blockchain technology for the low-income countries within the existing surveillance systems forhealthsystem strengthening.

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A STUDY ON CARBON, CAPTURE & STORAGE IN CEMENT INDUSTRY

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ABSTRACT
Concrete is the third most used substance on earth after air, water and cement is the secret to its success. Sustainable cement production today takes place in the modern dry process facilities incorporating the best available technologies. CCS is an essential technology for most the only way to decarbonize the cement industry. The cement value chain is unique in its structure and could lend itself to a lower cost of implementation for CSS than any other sectors. Furthermore, when combined with bioenergy, CCS holds the potential for producing negative emissions, which is the only well developed technology to achieve negative emissions. This exploratory study focuses on an important case study of the complexity of implementing CCS in an industrial context.

INTRODUCTION
The special ingredient or glue which makes all this possible is a rather ordinary-looking grey powder called cement. Globally, cement production accounts for around 5% of man-made CO2 emissions. The industry recognizes this responsibility and embraces its commitment to reduce this markedly, especially by contributing to the circular economy. In the roadmap, we focused on what can be done to reduce CO2 in cement production using today's technology, and will speculate on what could be achieved by 2050. However, the cement production process is unique due to the fact that the 60% of the carbon dioxide produced is as a result of chemical reactions when processing the raw material, not just from the combustion of fuel. Out of the total emissions CO2 emissions generated through the production of cement, 40% comes from the use of energy whilst the remaining 60% is produced as a by-product of the thermal decomposition of limestone. This means that even if energy efficiency and renewable energy measures were technically feasible and cement production was upgraded accordingly, the maximum CO2 abatement that could be achieved is 40%. The CCS association believes that the challenges of delivering a modern energy system that is environmentally sustainable, affordable for consumers and guarantees secure energy supply requires CCS to be widely deployed alongside other low-carbon technologies such as renewable energy, nuclear energy, and energy efficiency measures.

OBJECTIVES OF STUDY
- Ensure that CCS is recognized and accepted as an essential technology that underpins energy security objectives and cost-competitively reduces CO2 emissions from power, energy-intensive industry and other energy uses.
- Facilitate a supportive environment for the successful delivery of early commercial-scale CCS projects and maximize the lessons learned from those projects for subsequent projects.
- Focus on the development of a political, regulatory, technical and economic landscape that underpins sustainable CCS business models and supports the deployment of CCS at scale.

TECHNOLOGY
According to the Carbon Capture & Storage Association, CCS is "a technology that can capture up to 90% of the CO2 emissions generated from the use of fossil fuels in electricity generation and industrial processes, preventing the CO2 from entering the atmosphere." (The Carbon Capture & Storage Association, 2017).

There are two key concepts involved in CCS: separation of carbon dioxide (CO2) from other gases, and its storage or confinement. CCS is a way of taking the CO2 produced from energy-intensive processes, separating it from the rest of the exhaust gases, and transporting and storing it underground so that it cannot enter the atmosphere. CCS has the potential to capture a significant proportion of the CO2 produced in a cement kiln from both the combustion of fossil fuels and the calcination of limestone.1 there are several basic approaches to the separation of CO2, but only two of them—post-combustion and oxy-fuel combustion—have been identified as potentially feasible in the cement industry.

Separation: Post-combustion technology means the separation of the CO2 from the exhaust gas after, or at the end of, the cement kiln; it would apply to existing cement plants without significant modifications to the production process. Oxy-fuel combustion technology means operating the cement kiln with a mixture of pure

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oxygen and recycled CO2, instead of the normal ambient air, resulting in a pure CO2 exhaust gas. This may be a long-term solution, and will be more applicable to new cement plants, since a new generation of burners, cement kiln lines, and plant configurations will be required.

Storage: CO2 can be stored in a number of ways: in depleted gas and oil fields, in deep saline aquifer formations, in coal seams that can no longer be mined, or injected into declining oil fields to increase the amount of oil recovered (more commonly known as Enhanced Oil Recovery, EOR). These structures have stored natural gas, crude oil, brine, and CO2 over millions of years.

ENVIRONMENTAL IMPACT

CCS technologies constrict the emission of CO2 in the atmosphere, thereby reducing the contribution of that source of CO2 to anthropogenically-forced global warming. However, it does not work to reduce the emissions of sulphur dioxide, nitrogen oxides and particulate matter that are associated with the combustion of fossil fuels and other traditional fuels. Moreover, the application of CCS has been found to increase the energy consumption of power plants by 10-40% to account for the energy-intensive process of post-combustion carbon capture (IPCC, 2005). CCS is the only option for the full decarbonization of the cement industry. CCS is the currently the most mature commercial technology with the potential to offer negative carbon emissions and has the ability to create negative emissions in a fully carbon-neutral society.

CONCLUSION

CCS as a potential mid-term solution to limit carbon emissions, and will continue to pursue opportunities for the advancement of this technology. Industry is the basis for prospering societies and central to economic development. As the source of almost one-quarter of CO2 emissions, it must also be a central part of the clean energy transition. Emissions from industry can be among the hardest to abate in the energy system due to process emissions that result from chemical or physical reactions and the need for high-temperature heat. A portfolio of technologies and approaches is needed to address the decarbonization challenge while supporting sustainable and competitive industries. Carbon capture, utilization and storage (CCS) can play a critical role in this sustainable transformation. For some industrial and fuel transformation processes, CCS is one of the most cost-effective solutions available for large-scale emissions reductions. The development of CO2 transport and storage networks for industrial CCS hubs can reduce unit costs through economies of scale and facilitate investment in CO2 capture facilities. Establishing markets for premium lower-carbon materials through public and private procurement can also accelerate the adoption of CCS and other lower-carbon industrial processes.

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A SURVEY ON HACKING METHODOLOGY

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ABSTRACT
Internet security is defined as a process to create procedures and whereabouts to take to protect against attacks over the Internet. Its objective is to establish rules and measures to use against attacks over the Internet. Internet security is getting worse day by day and it has become a foremost area of concern, as many types of hacking methods are experienced increasingly and new hacking techniques are being presented. Therefore cyber security is highlighted the most in many of the administrations. ***Hacking is recognizing flaws in computer systems or networks to exploit its weaknesses to gain and achieve access*** *also using computers to obligate fraudulent acts such as fraud, privacy incursion, stealing corporate/personal data, etc. In this study main objective is to cover core elements of security, security challenges, frequently occurring hacking techniques and its prevention for the improvement of the cyber security.*

Keywords: Ethical Hacking, Hacking, Hacker, Information Security, methods of hacking, security.

1. INTRODUCTION

Security is a state of wellbeing of data and organisations in which the possibility of successful yet hidden theft, tempering and disruption of information and services are kept to low tolerable. Network security refers to protecting a network and data, computer program, other computer system assets from unwanted intruders, and unauthorized user. [3] Whereas protecting information and information systems from unauthorized access, use, disclosure, interruption, alteration or damage.

Many organisations and associations are being targeted in cyber-attacks, and they must get to know their enemy if they are to safeguard vital networks. Computer hacking means someone alters computer hardware or software such that it can change the original content.[3] If someone hacks an organization, then he can steal sensitive data such as documentation of business and trade secret information for employees and customers. Hackers can also do mutilation of data by erasing or altering the data, or by damaging the real hardware. The impact of hacking can also include legal liability. A **Hacker** is an individual who catches and exploits the weakness in computer systems or networks to gain access. Hackers are usually skilled computer programmers with knowledge of computer security.

2. HACKING

Hacking involves activities that seek to compromise digital devices, such as computers, smartphones, tablets, and even entire networks. Hacking is an attempt to exploit a computer system or a private network inside a computer. Simply put, it is the unauthorised access to or control over computer network security systems for some illegitimate purpose.

Generally hackers gain access to a computer or to a similar device by exploiting a weakness in the computer's software or configuration, or by using stolen usernames and passwords. Once hackers have access, they can mimic legitimate users for accessing data, as well as alter the files and configurations, they can also manipulate other devices connected to the compromised computer. Consequences of hacking can be serious, depending on which machines hackers have accessed and what level of access they have achieved. [8] while hacking might not always be for malicious purposes, nowadays most references to hacking, and hackers, characterize them as unlawful activity by cybercriminals—motivated by financial gain, protest, information gathering , and even just for the "fun" of the challenge. [9]

Further proceeding with the market survey, I tried to find out what type of data is generally stolen. And result was payment card information stealth was at the top. To complete the queue, non-payment card information, intellectual information and sensitive information are after payment card information.

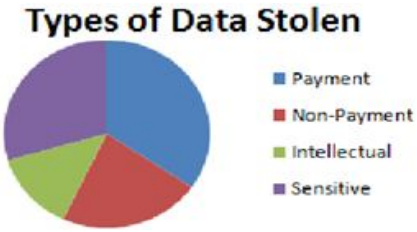

Fig 1: Types of Data Stolen [7]

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To better describe hacking, we needs to first understand hackers. One can easily assume them to be intelligent and highly skilled in computers. The basic definition of a hacker is someone who uses a computer system to gain unauthorized access to another system for data or who makes another system unavailable. Their clever strategies and detailed technical knowledge help them access the material you really don't want them to have. These hackers will use their skills for a specific goal, such as stealing money, gaining fame by bringing down a computer system, or making a network unavailable or even sometimes destroying them.

3. WHO THE HACKER IS

An individual who uses his computer skills to overcome a technical problem is generally known as hacker. The term hacker may refer to anyone having technical skills, but with intensions of using his or her abilities to gain unauthorized access to systems or networks or unethical purposes in order to commit crimes. A **Hacker** is a person who finds and exploits the weakness in computer systems and/or networks to gain access. [10] Hackers are referred as expert computer programmers with knowledge of computer security.

To better understand them, they are further classified into four categories. Every type of hacker hacks information for a not the same reason, a cause, or both. All have the required skills needed to accomplish their task. The black hat hackers hacks for criminal and malicious purpose and without permission. Whereas the white hat hackers hacks in contradiction of a black hat in order to protect computer and network access and has the enterprise's permission to do so. In the middle is the grey hat hackers who hacks not for illegal and not for good; they are neutral in their cause and usually try to sell their skills for financial gain.

- **White hat hacker**

These are professional hackers who uses their skills for defensive intent in purely an ethical way as known as ethical hackers. White hat hackers are the people who test existing internet infrastructures to search loopholes in the system, gains access to systems by creating algorithms and performing multiple methodologies to break into system, with a vision to fix the identified flaws and may also perform penetration Testing and vulnerability assessments. White hat hackers are the good guys of the hacker world.

- **Black hat hacker**

Black hat hackers also known as crackers, purposely gain unauthorized entree to networks and systems with malicious intent, they break into systems purely with damaging intentions. From stealing credit card information, to altering public databases, a black hat hacker looks to gain fame or monetary benefits from exploiting the loopholes in internet frameworks.

- **Gray hat hackers**

Gray hat Hackers are Mixture between Black hat Hackers and White hat hackers. Grey hats usually has mixed intentions, they exploit networks and computer systems in the way that black hats do, but do this without any malicious intent. These hackers can hack any system even if they don't have authorisation to test the security of the system but they will never steal money or damage the system, instead they tell the administrator of that system.

- **Suicide Hacker**

They are such notorious individuals who aim to bring down critical structure and even do not care about facing punishment. [7]

4. HACKING PHASES

Hacking can be divided into many phases:

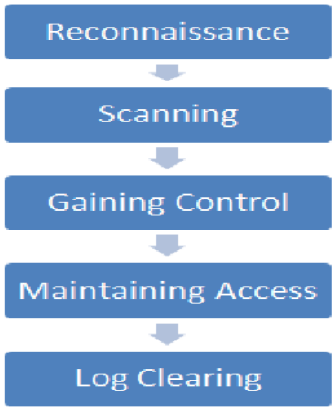

Fig-2: Hacking process [7]

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Reconnaissance: It refers to gathering initial data on the target and learning as much as possible about how it works. Reconnaissance can be performed actively or passively and sets the basis for further planning the attack. This involves information gathering with direct interaction like social engineering and the even without any direct communication by searching news release or public records.

Scanning: the information gathered during the reconnaissance phase is used to scan for all the open as well as closed ports and even for the known vulnerabilities on the target machine. This phase requires the use of technical tools to collect further intelligence on the target and about the systems that they have in place.

Gaining Control: This phase involves taking control of one or more network devices to abstract data from the target or use that device to perform attacks on other targets. It can be gained at OS level, system level or even network level. From normal access hacker can even proceed with privilege escalation. It often includes password cracking, buffer overflows, DoS attack etc. [7]

Maintaining Access: After having gained access, hacker strives to retain its control over target long enough to gather as much data as possible or to enable himself to return at a next time with backdoors, root kits or Trojans. To maintain access for a longer time, the attacker must remain sly to not get trapped using the host environment.

Log clearing: It is also known as Daisy Chaining [7], hackers hide the intrusion and any controls he may have left behind for future visits. To avoid being exposed, a good hacker will leave no symptoms of his presence, hacker overwrite/ Remove logging the system and application logs.

5. HOW TO REDUCE THE IMPACT OF HACKING

Hackers can use exploits, or flaws in computing technology, to gain admission that they shouldn't be able to entree. To avoid this happening to you, make sure you make sure you disable Wi-Fi when you're not using it, keep your software up to date, and pay special attention to the various security fixes that software creators roll out, **Look after your passwords,** use firewall software to restrict hackers' facilities to access your computer across the internet and install antivirus software, which identifies and restricts robotic malicious software.

6. CONCLUSION

Previously hackers were considered to be mastermind because they used to help in many ways in the growth of computers and internet technology, but in this modern world where personal profit has taken a major significance in individual's life, people are often attracted to things they can do and achieve through illegal access of people privacy and using for their own welfares. A full-disclosure policy is required and individual must be able to see the underlying flaws and vulnerabilities in the systems they employ if they are to perfect them.

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A SYSTEMATIC REVIEW ON WORK STUDY & COMPLETE JOB ANALYSIS ALONG WITH CNC MACHINING & ITS ASSOCIATED TOOLING

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ABSTRACT

This paper focuses on crucial side of productivity improvement with proper use of work study technique combined with motion & time study. The systematic application of method study & time study to improve the productivity, reduce costs & improve profits.

Job analysis is focused on the collection of work-related information for the job as it's currently exists and/or existed in the past

Research methodology: Observations, personal interviews, mail surveys, data collection and analysis performed at a local manufacturing plant.

Keywords: Work study, time study, motion study, plant layout, productivity process improvement, soft skills training, planning, manufacturing process, Machining, CNC, tooling accuracy, job making, CNC tooling

INTRODUCTION [1]

Work study is the systematic examination of the method of carrying out activities so as to improve the effective use of resources & to set-up standards to performance for the activities being carried out.

There are number work study techniques such as ergonomics, operations research work study time & motion study. The good performance indices of each work study technique should yield improved productivity improved quality improved efficiency reduced downtime improved employee morale reduced turnover & absenteeism.

The term work study embraces method study. Method study being the systematic recording &critical examination of way of doing things in order to make improvements whereas work measurement involves application of techniques designed to establish the time for a qualified worker to carry out a task at a defined rate of working.

Method study enables the industrial engineer to subject each operation to systematic analysis. the main purpose of method study is to eliminate the unnecessary operations and to achieve the best method of performing the operation.

Basic procedure for method study

There are eight steps involved in performing a complete method study:

1. Select the job or process to be studied
2. Record or collect all relevant data about the job or process, using the most suitable data collection techniques so that the data will be in the most convenient form to be analysed.
3. Examine the recorded facts critically and challenge everything that is done, considering in turn, the purpose of the activity; the place where it is performed; the sequence in which it is done; the person who is doing it; the means by which it is done.
4. Develop the most economic method, taking into account all the circumstances and drawing as appropriate on various production management techniques as well as on the contributions of managers, supervisors, workers and other specialists with whom new approaches should be explored and discussed.
5. Evaluate the results attained by improved method compared with the quantity of work involved and calculate a standard time for it
6. Define new method and related time and present it to all those concerned, either verbally or in writing, using demonstrations.
7. Install the new method, training those involved, as an agreed practice with the allotted time of operation.
8. Maintain the new standard practice by monitoring the results and comparing them with the original targets Going through these eight simple steps should be able to yield improved productivity, improved quality,

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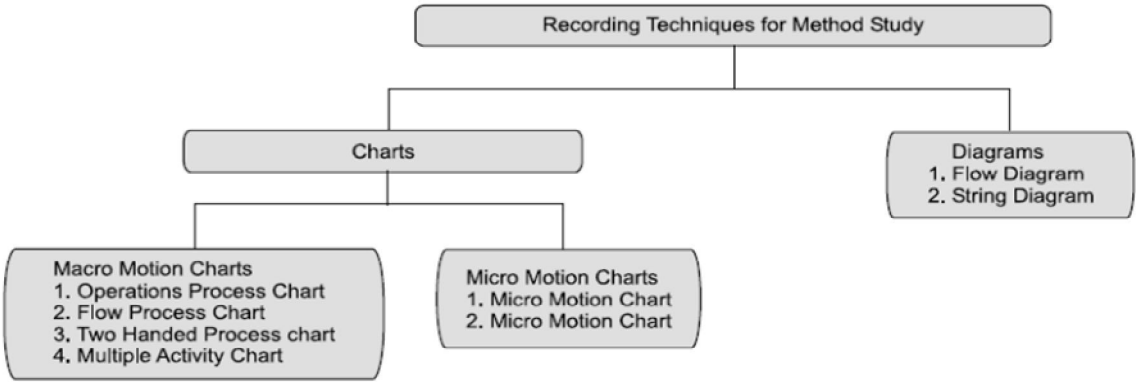
improved efficiency, reduced downtime, improved employee morale, reduced turnover and absenteeism produce of method study (ISSN 2319-7064)

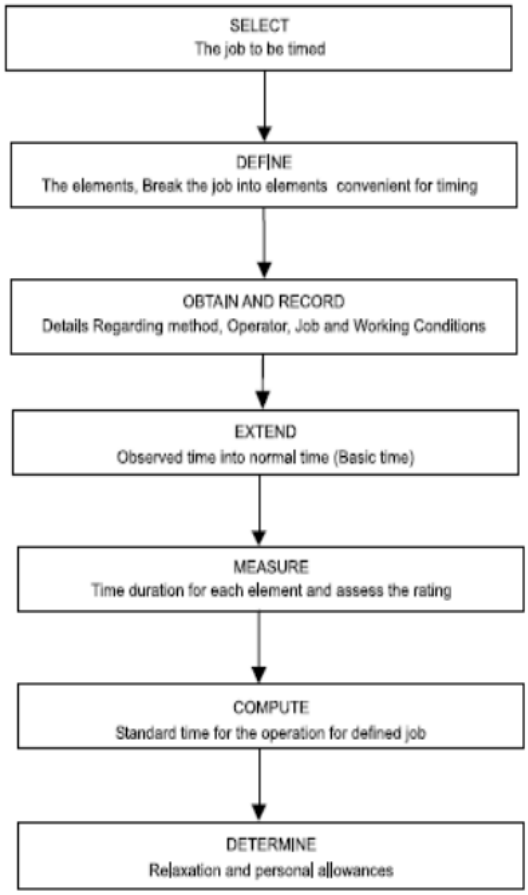
RECORDING TECHNIQUES FOR METHOD STUDY



WORK MEASUREMENT

Work measurement is also called as time study Work measurement is absolutely essential for both the planning and control of operations without measurement data. We also cannot determine the capacity of facilities or it is not possible to quote delivery dates or costs. we are not in a position to determine the rate of production, labour utilisation & efficiency it may not be possible to introduce incentive schemes & standard costs for budget control

Procedure of making time study



CNC or "computer numerical controlled" machines are sophisticated metalworking tools that can create complicated parts required by modern technology. Growing rapidly with the advances in computers, CNCs can be found performing work as lathes, milling machines, laser cutters, abrasive jet cutters, punch presses, press brakes, and other industrial tools. The CNC term refers to a large group of these machines that utilize computer logic to control movements and perform the metalworking. This article will discuss the most common types: lathes and milling machines.

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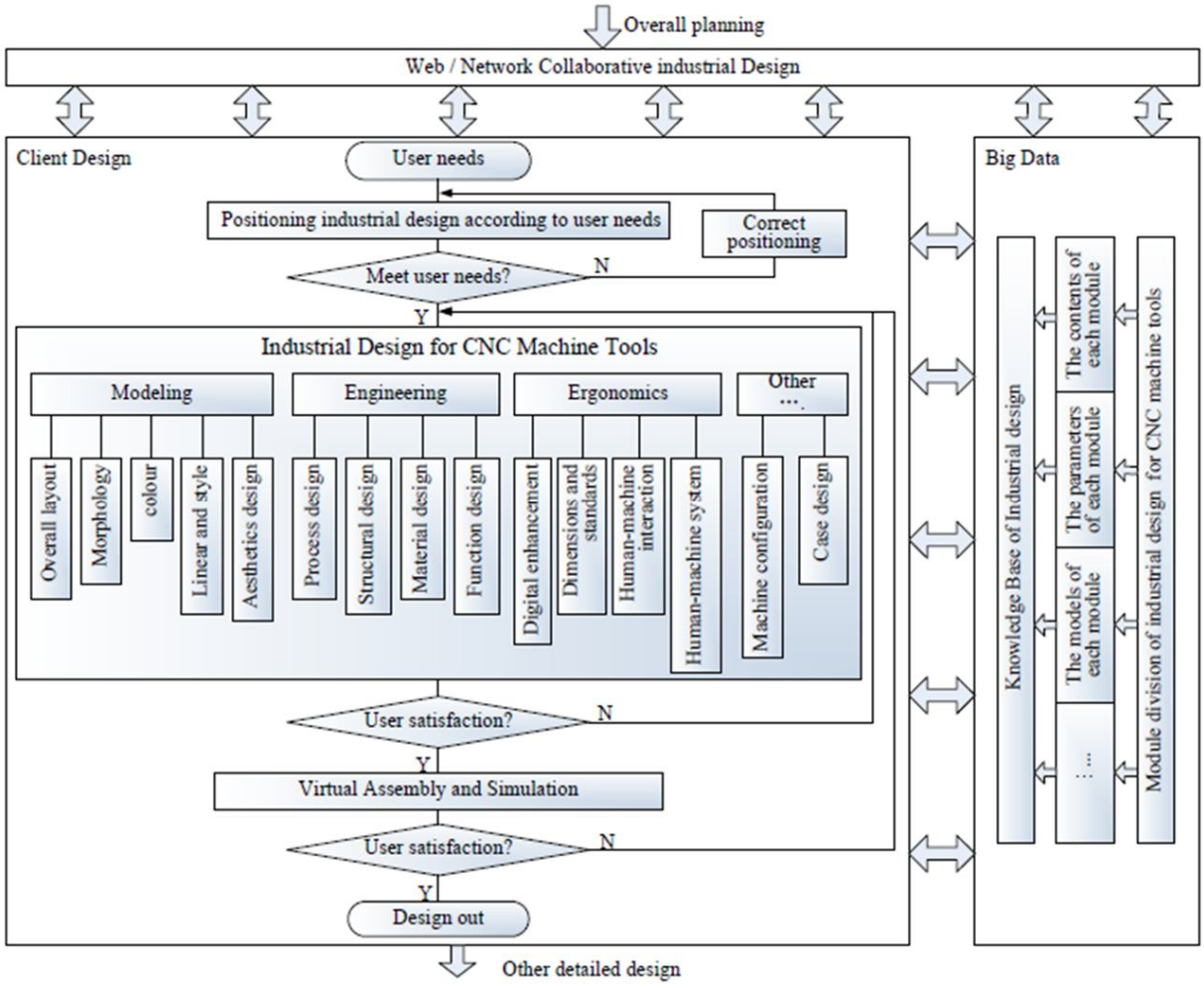
Industrial design process for CNC machine tools

The industry design process for CNC machine tools is formulated in a design-process flow chart as illustrated in Fig.2. Scientific understanding of the design process morphology is essential for establishing the industrial design knowledge-base for CNC machine tools and its architecture. The industrial design for a CNC machine is carried out based on the architecture. The modelling module is composed of overall layout, morphology, colour, linear and aesthetics design; the engineering module consists of the process design, structural design, material selection and function design; and the ergonomics module mainly covers the digital enhancement, dimensions and standards, human-machine interaction and human-machine system.

The entire virtual assembly and simulation of the CNC machine tool will be carried out after completing the design modelling and analysis, and the detail design of the machine system. The final design of the CNC machine is determined after the final evaluation by all relevant members of the engineering team including the feedback from marketing side. Under Big-data and Industry 4.0, the client design is the most basic design unit, as a future exemplar, industrial design for CNC machine tools would be extended to the network collaborative design platform.

Ultimately, this research aims to develop and build the knowledge-base of industrial design for CNC machine tools using Big-data analysis on hyper-market data, which will enable more timely and dynamic industrial design for CNC machines.



Job analysis is focused on the collection of work-related information for the job as it's currently exists and/or existed in the past.

Yet, as competition and technological innovation increase, jobs are becoming less individually based. Consequently, the tasks to (perform, knowledge, skills, and abilities) required for effective job performance and becoming more volatile, and more team-based. Organizations may perceive the creation of jobs that do not currently exist, the analysis of which is beyond the scope of traditional job analysis. This has led to calls for a more practice and strategic approach to job analysis, so that the procedures will continue to be relevant in today's workplace.

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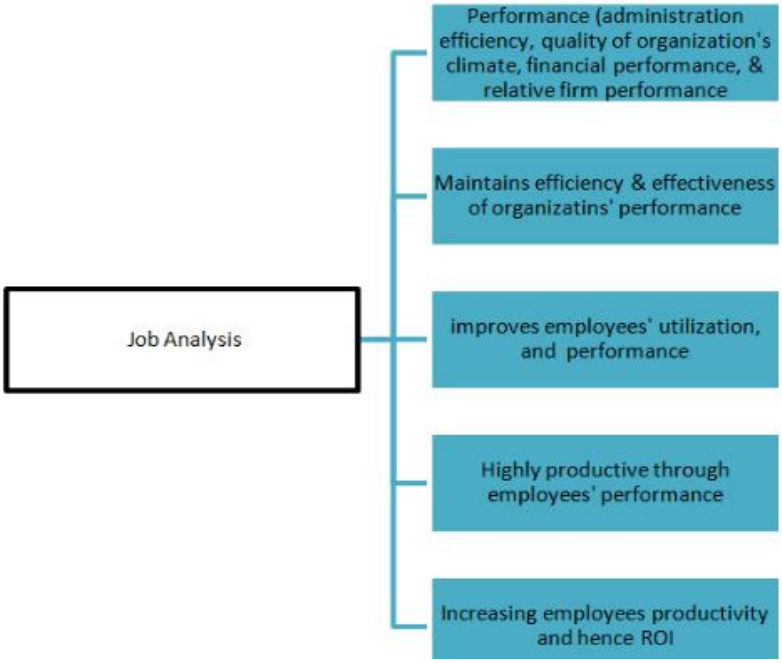

Job Analysis Impact and Outcomes: Wikipedia defined job analysis as "the formal process of identifying the content of a job in terms activities involved and attributes needed to perform the work and identifies major job requirements". As defined by Armstrong (2009) "job analysis is the process of collecting, analysing, and setting out information about the contents of jobs in order to provide the basic of job description". Jackson & Musselman (1987) Defined job analysis as: “the process of determining, by observation and study, pertinent information about the nature of a specific job". Job analysis is a vital step taken before creating any position and the discussion stated in the literature review will show further the vital impact of it.

Purpose of Conducting a Job Analysis: Job analysis produces the following information about job analysis (Armstrong, 1995): *Overall purpose*: why the job exists and, in essence, what the job holder is expected to contribute *Content*: the nature and scope of the job in terms of the tasks and operations to be performed and duties to be carried out. *Accountabilities*: the result or outputs for which the job holder is accountable. *Performance criteria*: the criteria, measures or indicators which the job is being performed satisfactorily. *Responsibilities*: the level of responsibility the job holder has to exercise by reference to the scope and input of the job; the amount of discretion allowed to make decisions; the difficulty, scale, variety and complexity of the problems to be solved; the quantity and value of the resources controlled, and the type and importance of interpersonal relations. *Organizational factors*: the reporting relationships of the job holder. *Motivating factors*: the particular features of the job that are likely to motivate or demotivate job holders in, in the latter case, nothing is done about them. *Developmental factors*: promotions and career prospects and the opportunity to acquire new skills or expertise. *Environmental factors*: working conditions, health and safety considerations, unsocial hours, mobility, and ergonomic factors relating to the design and the use of equipment or work stations.

[7] The study has found that Job Analysis plays significant role toward effective decisions leading to the employee's growth of the organization. It's revealed from the study that performing job analysis encourages service re-engineering; provide definite objectives improves efficiency of service; improves employees' performance; helps to evaluate costs and benefits of projects; help in planning and encourages prudent management of resources in organizations. Accurate job analysis can facilitate important group practice, including budgeting, strategic planning, quality improvement, and managed care contracting. The cost data captured through job analysis can be used to develop an overall practice budget. A practice job analysis allows the manager or worker to:

1. Plan for each work schedule and plan for each cost centre to meet those estimated figures.
2. Measure whether the estimates were met at the end of the accounting period and provide the necessary tools and information to investigate and explain variances;
3. Monitor the overall performance of the organization; and
4. Control expenditure and identify cost-cutting opportunities.

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These positions have been substantially corroborated by the works of Drucker (2002), and Gdelade& Ivery (2003). They submit that a strategic employee and cost management process of the job analysis is:

1. Price-led
2. Customer-focus
3. Design-centred
4. Cross functional
5. Life cycle oriented
6. Value chain based

CNC CUTTING TOOLS

Since ancient times, cutting tools have existed. They're one of the oldest inventions in human history and there has been a dramatic change in the type of cutting tools we use. Initially, we built them with stones, so these metallic tools are of much value in the manufacturing world.

Although all cutting tools serve one purpose, to cut through a material, there is a huge difference in their purpose. Normally, for a cutting tool to be effective, it has to be **30% to 50%** harder than the material it will work on.

Cutting tool must have following characteristic: -

1. Be easily fabricated.
2. Have high thermal conductivity.
3. Have low coefficient of friction.
4. Be very resistance to wear.
5. Be chemically inert and stable.

In practice, different CNC cutting tools perform cutting operations. Before considering which CNC cutting tools to use for a specific operation, you've got to understand the material that manufacturers used when producing the tool Based on that material.

1) Carbon Steel Tool

These cutting tools are inexpensive and are mainly for low-speed operations. They have a carbon composition of 0.6 – 1.5% with a little amount of manganese and silicon.

Uses of carbon steel tools they're mainly in twist drills, forming tools, milling cutters, and turning.

2) High-Speed Steel (HSS)

It's composed of high carbon steel with a reasonable amount of element alloys like chromium, tungsten, and molybdenum. With this combination, it improves hardness, wear resistance, and toughness. It also offers higher removal rate for metals and other materials.

3) Ceramics

These chemically inert tools are corrosion-resistant and 10x faster than high-speed steel. Usually, aluminum oxide and silicon nitride make up ceramics' materials. Projects that require top-notch finish operations normally use ceramics.

4) Cemented Carbide

Designed for high-speed operations, these carbide tools are extraordinarily hard and can withstand temperatures of up to 1000^{o}C. Normally, tantalum, titanium, and tungsten make them up. Operations that require a high-quality surface finish also use them.

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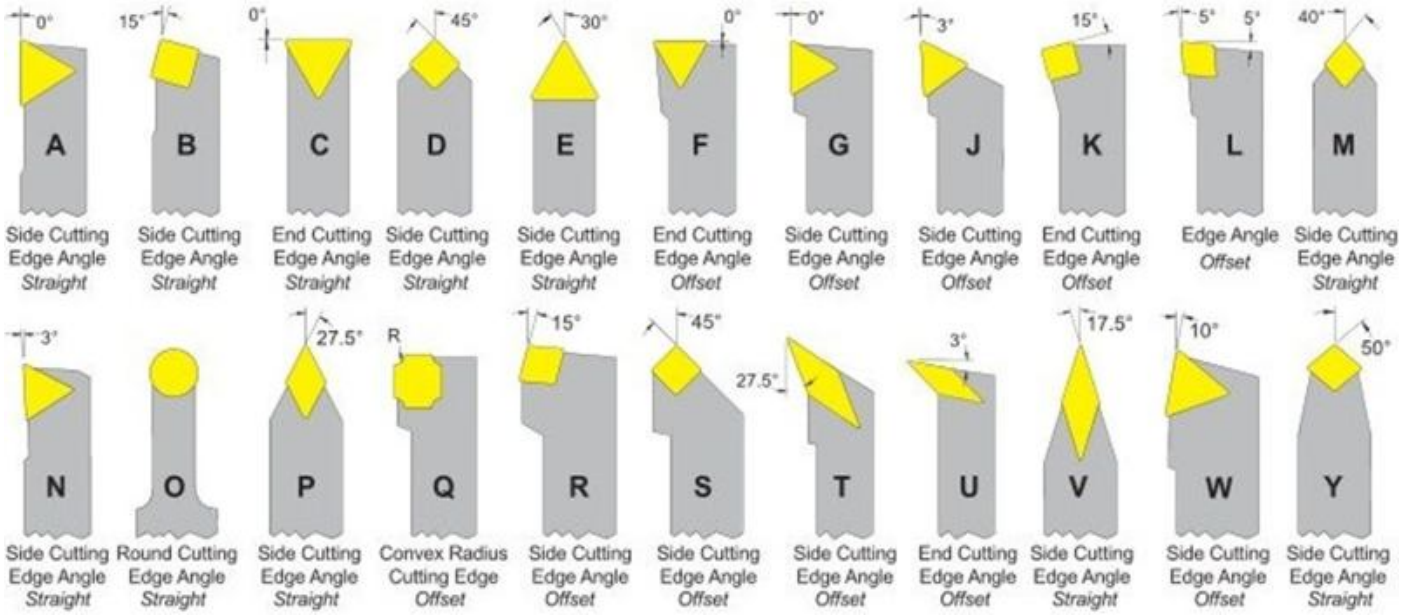

CONCLUSION

(1) After reviewing above paper we can say that, cnc machine tools must be better designed and constructed, and must be more accurate than conventional machine tools.

(2) It is necessary to minimize all non-cutting machine time, by fast tool changing methods, and minimize idle motions by increasing the rapid traverse velocities to make the use of the machine tool more efficient.

(3) it should be noted that it's the combined characteristics of the electric control as well as the mechanical design of the machine tool itself that determine the final accuracy and productivity of the CNC machine tool system.

(4) In addition, better accuracy is obtained in CNC machines by using low friction moving parts, avoiding lost motions and isolating thermal sources.

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APPLICATIONS OF CLOUD COMPUTING FOR LIBRARY MANAGEMENT SYSTEM

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ABSTRACT
Cloud computing present an advantage for libraries, it is providing several opportunities to link their services to the cloud. Cloud computing is the new type of service providing on the Internet, which has entirely changed the way computers are used regardless of geographical barriers. The paper focused on cloud computing and its probable applications that can be clubbed with library services on the web based era. This study may be useful in recognizing and producing cloud based services for libraries.

Keywords: Cloud Computing, Software as a Service, Platform as a Service, Infrastructure as a Service, Models of Cloud Computing, Applications of cloud Computing.

1. INTRODUCTION

In the current scenario, web based technologies developed on virtual platforms and created huge opportunities and virtual avenues for different users to use their services. Currently, cloud computing services appear as the trendiest virtual technology for libraries to serve effectively. Cloud computing features various technologies like grid computing, utility computing, unified computing, Web 2.0, service oriented architecture and more. Cloud computing technology is giving advantages for libraries an innovative way to connect their services not only instantly, but also in new formats with the flexibility to pay, access anywhere, as you use the model.

2. MEANING AND CONCEPT OF CLOUD COMPUTING

The word cloud refers to a network present at remote area. Cloud can provide services on public or private networks i.e. wide area network, local area network. Cloud computing refers to operating, accessing, and configuring the application online. It provides online data storage infra and function. Cloud computing denotes that rather than all the hardware and software you are utilizing sitting on your desktop or anywhere indoors your local network. It refers to the various types of services and results that can be presented in the Internet cloud and in many cases the tools used to access these services and applications do not require any special applications. With cloud computing you are able to employ the software conveying by the internet on the browser without any fitting, host applications on the Internet set up your individual database system and remote file storage and more.

The National Institute of Technology and Standards (NIST) provide the simplest definition of Cloud computing is a model for enabling, convenient, on-demand network access to a shared pool of configurable computing resources e.g. Server, Networks, services, Storage and Applications, that can be fastly maintained and associated with negligible management effort or service provider interface

According to Gartner cloud computing as: "A style of computing where massively scalable IT- related capabilities are provided 'as a service' using internet technologies to multiple external customers"

Buyya said that 'Cloud computing is a parallel and distributed computing system consisting of a collection of virtualized and interconnected computers that are energetically provisioned and presented as one or more unified computing resources based on service level agreements recognized throughout compromise between the service provider and costumers.

3. FEATURES OF CLOUD COMPUTING

Main attributes of clouds computing are given below

- Self-healing: A self diagnosis and self healing system must be created against various failures or downgrades.
- Self-service interface: With the self-service cloud, users retrieve a web based portal, where they can demand or construct a server and launch applications.
- Pay Per Usage: Cloud providers usually use the "pay-as-use" model, which can escort to unpredicted operating costs if administrators are not familiar with the cloud-pricing model.
- Service-oriented: It is a way is to modularize key business services and improve service interfaces designed to ensure that the service business operates in a variety of services.

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- It can access from around the world through an Internet connection because the infrastructure is provided by a third party.
- These applications are easier to maintain as contrasted to individual applications, as they are installed on a common platform and can be retrieved from different locations.
- The infrastructure is less likely to fail, so the servers are more reliable and highly available
- Cloud computing allows all employees to be more flexible. Employees can retrieve files using web-enabled devices such as laptops, smart phones and notebooks.

4. MODELS OF CLOUD COMPUTING

There are two models are working for the cloud computing b) Service Models.

4.1) Deployment Models: NIST defines cloud deployment model is according to where the infrastructure for the deployment resides and who has control over that infrastructure. NIST classified four types of deployment model:

a) Private Cloud: Private cloud is usually infra and services to be accessible within an organization. Such services may be managed by the organization itself to support various user groups, or third party. This cloud offers more security as it is implemented within the internal firewall

b) Community Cloud: This cloud system and service allows access by a group of organizations. The third party or member organization may be responsible for managing the cloud. It shares the infrastructure between many organizations.

c) Public Cloud: It allows systems and services to be simply reachable to common public. The whole cloud computing infra is fully controlled by the third party providers. E.g. Amazon, Google, Microsoft offers cloud services via Internet.

d) Hybrid Cloud: This cloud is a mixture of public and private model. In a hybrid cloud, an organization uses interconnected private and public cloud infrastructure. Many organizations use this model when they need to rapidly expand their IT infrastructure, such as leveraging public cloud to complement the capabilities available in a private cloud.

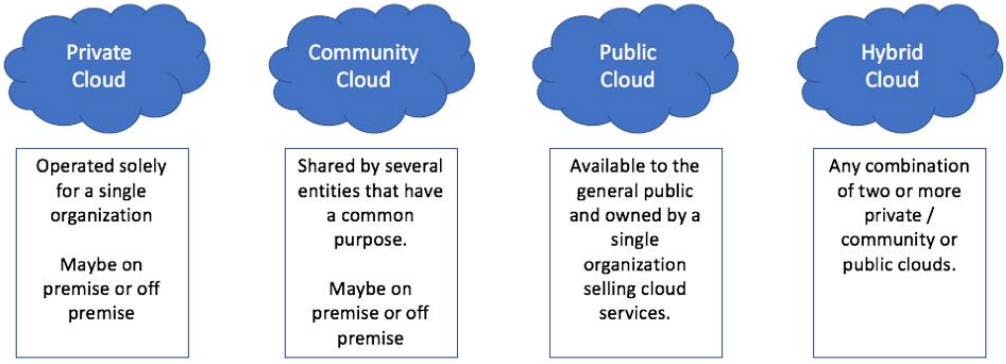

Figure-1: Types Deployment Models

Source: https://chrislazari.com/what-is-cloud-computing/

4.2) Service Models: A cloud service is any service provided to users on request via net from a cloud computing provider's servers as resisted to being supplied within own premises servers of organization. Service models are categorized in four types as per given below:

Figure 2: Types Service Models

Source: https://www.edureka.co/blog/cloud-computing-services-types/

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a) Software as a Service (SaaS): This service model permits end users to provide software applications as a service. It submits to software deployed on a hosted service and available through the Internet. It uses the cloud computing infra to convey an application to several users, rather than the traditional model of one application per desktop. It allows managing activities from central locations within a single one to several model including architecture, pricing, partnerships and management features. **There are many SaaS applications**-

A) Billing invoicing system

B) Customer relationship management application

C) Help application

D) Human Resource Solutions. SaaS is the fastest growing market in which a recent report mentions that current double growth is forecast.

SaaS cloud service providers: Google Apps, SQL Azure, SalesForce.com, Twitter, Microsoft 365 and Oracle on Demand. Unauthorized access to data is a lack of SaaS as user's data is accumulated on the Cloud provider's server.

b) Platform as a Service (PaaS): Platform as a Service model assists to create computing platforms for running software and other tools on a computer without having to manage the software and hardware at the end of the user. PaaS offers virtual machines, applications operating systems, development frame works, services, transactions and control structures. The client can organize its applications on the cloud infra or use applications programmed using languages and tools sustained by the PaaS service provider. PaaS model is providing platforms to costumers for maintain and support their IT infrastructure without using a large amount of money to buy hardware, software and related technologies for example Amazon Elastic Cloud, EMC Atmos, Aptana and GoGrid .

c) Infrastructure as a Service (IaaS): This service model offers contact to basic resources such as virtual and physical machines, virtual storage etc. These resources are made accessible to end user via server virtualization. The customers install or develop its own operating systems, software and applications. Providing virtual resources (compute, storage and communication) on requirement is known as Infrastructure as a Service (IAAS).

IaaS service provider: There are many service providers like Amazon, elastic compute cloud (EC2), Google Base, NaviSite, GoGrid, FlexiScale, Verizon Terremark, Savvis, HP, IBM, Sun and Linode, RackSpace.

5. APPLICATIONS OF CLOUD COMPUTING IN LIBRARY MANAGEMENT SYSTEM

With the fastly development of several ICT technologies, users' information needs are gradually more modified and now increasingly libraries reward user-oriented services. Hence, librarians should regularly study of new trends in ICT to fulfill the information needs of users. And only in this way, can they dominate the basic needs of their users. The library can build up such information and improve user satisfaction. ICT technology has been the inspiration for the development of the library. What's more, librarians can use new technologies to develop libraries and optimize library facilities and services.

Libraries are changing their services with addition of cloud and networking with the services to available these services without time and locations. Cloud computing provides several services for libraries that may assist to reduce technology cost and boost capacity consistency and performance for some kind of automation activities. Cloud computing has great prospective in for libraries. Libraries may add more content into the cloud computing. Following potential fields are recognized where Cloud computing services and applications may be applied:

5.1 Library Automation System

Automation is a field; most of the libraries are keen on day-to-day operations. Previously, automation in libraries is being carried out on a locally hosted server using a variety of commercial and open source integrated library management software and directed by internal IT professionals or library staff. Although, several software vendors and third-party services are now providing to host this service on the cloud to save libraries from spending on hardware. Apart from cost-benefit, libraries will be free from maintenance of undertakings like software maintenance, backup etc. For example vendors like Ex-Libris, OSS Labs.

5.2 Searching Scholarly Materials

Presently Knimbus cloud services embedded in the Information and Library Network (INFLIBNET) center have been integrated into its UGC INFONET Digital Library Consortium to find and retrieve scholarly contents

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that is attached to it. Knimbus is a cloud-based research platform that allows you to learn and contribute study scholarly material. Knimbus is a Knowledge Cloud, contributed to knowledge innovation and shared space for scholars and researchers. The journey to Knimbus began in 2010 by entrepreneurs Rahul Agarwal and Tarun Arora face the challenges of researchers to searching and accessing many information sources. Presently 100,000 academic institutions and research/development laboratories, scholars, researchers and scientists, as well as more than 50,000 researchers in worldwide are used Knimbus. It is a mutual platform for researchers to discover and share knowledge with peers and make it easy for users to find and access millions of journal articles, patents and eBooks for tagging, sharing and discussing this content with their peers.

5.3 Framework of Repositories and Digital Library

In this age of digital era each library needs a digital library to efficiently access their information, services and resources to certain network access. Therefore, each library has a digital library that is build up using any cloud based digital library software. DuraSpace has two software's called Dspace and Fedora Commons, but Dspace is widely used to frame repositories and digital libraries associated with Fedora Commons. Dura Cloud supplies the entire solution for developing a repositories and digital library with standard interfaces and open source code for both software.

5.4 Website Hosting

With the help of cloud technologies many libraries can host their own websites. Website hosting is one of the initial embracing of cloud computers because several organizations, including libraries prefer to host websites with third-party service providers rather than hosting and maintaining their own servers. An example of a service is hosting websites outside the Google Site Library servers and multiple editors allow access to the site in various places. The District of Columbia Public Library is using Amazon's EC2 service to host its website and offers libraries with faster extensible and idleness.

5.5 Storage of Documents

Libraries need space to store similar electronic files and documents like official correspondence, full-text documents, bibliographic records, teachings, etc. Currently, these are stored and retrieved through a personalized desktop or locally hosted server. Cloud computing is compensating for new services, which provide free space for storing files and documents. For instance Windows Sky Drive offers 25GB for storing and sharing files as well as documents online sync across multiple devices and enable collaboration across the web, regardless of their geographic areas. Likewise Dropbox, Microsoft OneDrive26, Box27, Apple iCloud28, Spideroak29, Amazon Cloud Drive30 and many projects have offered storage space on the cloud to facilitate organizations and individuals to store and share their files. CLOCKSS31 (Controlled Lots of Copies Keeps Stuff Safe) and PORTICO32 provides libraries a enduring "dark archive solution" of e-resources and digital collections, offering defense against the latent loss of retrieve to e-literature vital to a library's collection. In India Tata Institute of Fundamental Research Bangalore National Centre for Biological Sciences are using Portico. Offers CLOCKSS31 (a content protected by many copies) and a Portico 32 library

5.6 To Build up Community Strength

Cloud computing technology provides libraries with a great opportunity to build networks amid library professionals and aspiring information seekers using various social networking tools. WhatsApp, Twitter and Facebook are the most popular social networking services that play a vital role in increasing community strength. These collaborative efforts of libraries will save time, competency and wider gratitude, create collaborative intelligence for better decision-making, and provide the platform for sharing ideas and knowledge of intellectual communication and innovation

5.7 Browsing Library Data

Several libraries already have online catalogs and allocate bibliographical data with Online Computer Library Center (OCLC). It is a great example of using cloud computing to contribute library data together over the years. WorldShare Management Services (WMS) an incorporated group of cloud based library management applications of OCLC provides libraries cost savings, workflow functionality, and capability to distribute new trends to patrons by allocating data, and work around the libraries. Traditional library systems often have to spend on maintaining servers and software, and these costs are reduced by WMS. Its memberships contain Remote Database Search, Serial Management, Custom Reporting course Reserve, Open URL Fixer, all over Listing Services and Worldcat searching Services Group Views. WMS incorporates all print and e- resource management workflows containing selection, acquisition and maintenance in the same web-based WorldShare interface. WorldCat gives your library more visible on the web and superior information about your system.

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6. CONCLUSION

This study provides the inferences and concepts of cloud based applications in libraries to improve their services in a more competent way. Cloud computing is an innovative trends in ICT era. Libraries are currently moving towards cloud computing and are taking benefit of cloud based services especially in creating digital libraries, social networking and information communication. The role of library professionals in this virtual age is to spread cloud-based services as a consistent medium for ease of use and dissemination of library services to their patrons.

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AGMENTED REALITY IN MEDICAL SCIENCE - A NEW VISION

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ABSTRACT
The main purpose of this paper is to examine some (potential) applications of augmented reality in our day-to-day life. For the readers who are not familiar with or less known to the world of augmented reality. We hope that this paper will be a useful map for researchers who are going to explore further and deeper connections in augmented reality, although some parts of the map are very rough and other parts are empty, and waiting for the readers to fill in.

Keywords: Augmented Reality Tools, Sensorama, HoloLens, AR in operations.

INTRODUCTION

Augmented reality is an interactive experience of a real world environment by combining real world objects with computer generated perceptual information. This can be done sometimes across multiple sensory modalities, including visual, auditory, haptic, somatosensory and olfactory sensors. The information perceived can be constructive or destructive. Hence, augmented reality alters one's perception of real world environment where as virtual reality replaces the uses real world environment with a simulated one.

I. HISTORY

The idea of an electronic display / spectacles that overlay data or enhance the real-life perception was first put forth by L. Frank Baum, the author of 'character maker'. A cinematographer named Morton Heilig, was the first to create and patent a simulator called 'Sensorama' [6]. This device was created around 1957 to 1962. It gave the user the augmented experience of visuals, sound, vibration and smell. Though it was a revolutionary invention at that time, it did not get as much popularity as expected.

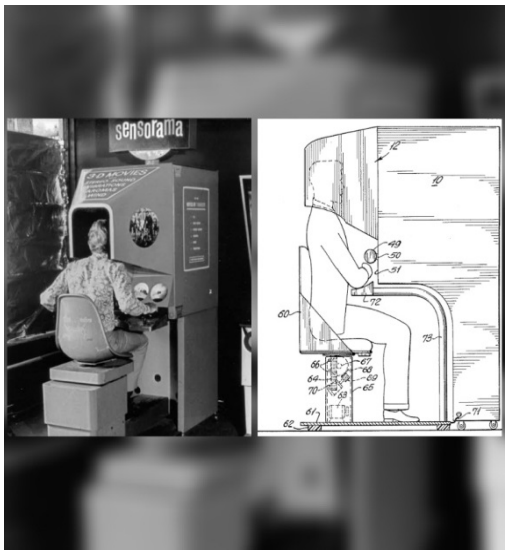

Figure-1: Sensorama. [5]

The first head-mounted display was developed by Ivan Sutherland in 1968[6]. This device was portrayed as a window into the virtual world. The next major invention the 'Videoplace' was developed by Myron Krueger in 1975[6]. It allowed users to interact with the virtual objects which was not implemented by Ivan Sutherland. Steve Mann was the first to create a wearable computer. This device was a computer vision system with text and graphical overlays over a photographically mediated scene.

The term augmented reality is attributed to Thomas P. Caudell, a former Boeing researcher[6]. An authentic example of augmented reality is Windows Holographic and the HoloLens announced by Microsoft in 2015.

Another example of this technology implemented in the gaming world was Pokémon Go, a game that made everyone go crazy.

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Magic Leap in 2017 announced the use of Digital Lightfield technology embedded in the Magic Leap One headset[6]. The creator's edition headset included the glasses and a computing pack worn on your belt.

AUGMENTED REALITY IN HEALTHCARE

Augmented reality revolutionary technology as you see today is a doorway to innovations tomorrow. It is the future in multiple fields like Computer-Aided Design (CAD), mechanics, automobile industries and several other industries which also includes the healthcare sector. Around the world there is a considerable population with amputated limbs that requires mechanical assistance to carry-out their lives normally. Now this could be helped by applying augmented reality in different fields of health-care department.

Figure-2: Augmented Reality in Medical Study.[3]

Take for example, if the doctors could virtually see the output of the operation beforehand there would be much lesser mishaps. Similarly, if we could virtually overlap the expected outcome over the actual scan of a person, it would become much easier for the doctor to actually understand and assess the condition of the patient, hence expecting a better recovery.

Figure-3: Understanding the medical condition. [3]

It not only makes us equipped with the information but we can also try different methods beforehand and look at the outcomes as explained earlier and deal with the problem in the easiest possible manner. This will surely reduce the risk factor involved in complicated operations. To add up to all of the above aspects, it is also cost efficient, as you are not required to setup any kind of machinery for this purpose but just equip the people concerned with the augmented reality device and each one would be able to see the projections.

AUGMENTED REALITY FOR SURGEONS

Mark Crawford says bio engineers are seriously looking forward at using virtual and augmented reality tools for expanding their design capabilities in medical imaging and computation, simulations and implants or devices.

For a very long time now, researchers, surgeons, developers and bio-engineers have been searching different ways to enhance the medical treatment technologies. In order to do so, they must gain the knowledge of human anatomy. For doing so they have been using human cadavers and animal models to wax and plastic models. The major goal behind this is to provide the patient with better treatments with minimal side-effects. As augmented

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reality tools continue to become more advanced, more bio-engineers are seeking them to expand their design capabilities. AR also enables shared or multi-user experiences that provide an enhanced level of education and discussion for students and medical practitioners.

Figure-4: Double Slit Experiment [3]

Microsoft HoloLens is considered a powerful AR tool for bioengineers. This wearable device integrates 3D medical images with the physical elements of this surrounding elements. The components and sensors in HoloLens allow this images to be interactive, so the users fitted with the device can all view the image at the same time. This way the participants can view the image and input their comments or suggestions regarding the surgery or any implant to increase the effective outcome. These tools are a great benefit for better understanding while studying or working on torturous or tightly packed anatomy like brain or the heart. Mark Griswold, a globally recognized radiology researcher, stated “I never fully understood their 3D structure until i saw them in HoloLens” after going through datasets of brain MRIs.

I presume this would be more advantageous than dissecting cadavers for learning body’s system. Mark Griswold also says “You can take part in and out. You can turn it around. You can see the blood pumping- the entire system”.

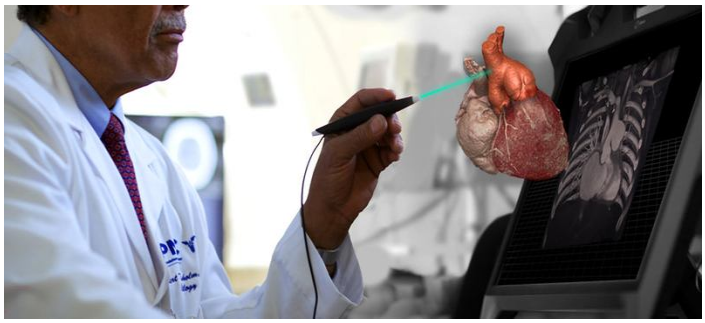

Figure-5: AR being used during operations.[1]

Dr. Dmitry Korkin says “The body networks such as disease systems are so complex and dense that they look like a big mess.” He is currently working on developing new ways to see these complex networks using HoloLens. HoloLens is also being used to reconfigure operating rooms so they can better handle the needs.

Figure-6: AR to understand complex networks [3]

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CONCLUSION

To conclude this we would like to say that with the new arising problems in the field of medical science, introduction of new technologies is becoming increasingly important.

In the above applications there is a vast scope of understanding for anyone wanting to pursue medical science. These tools make it easier to understand complicated networks, work on fixing any problems related, and creating tools or formulating devices or methods for further use effectively.

Augmented reality does not meddle in with the working systems of the body but rather creates a superficial layer for visual perception, helping us to see the possible implications of the method to be applied for a given medical condition without actually harming the patient in any form.

Therefore we can say that in near future augmented reality can be said to be the best planning and distinguishing tool to be used by mankind to solve multiple problems, not just related to humans but also the components of nature like plants and other animals.

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COMPARATIVE STUDY AND OPTIMIZATION OF STRUCTURAL STEEL IN INDUSTRIAL STRUCTURES

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ABSTRACT
Steel structures also have much better strength-to-weight ratios than RCC and they can also be easily dismantled. But the challenge is to decide the system, strength and economic way of construction of industrial shed. As the economy is only possible in case of material take off. In this study three advance system of industrial shed are compared to obtain the less material take off and good performance over the wind and earthquake loading. Following are the few aspects of this study is focused on. (a) Construction Time – It is one of the important factor in which allows faster occupancy and earlier realization of revenue. (b) Lower Cost - Because of systems approach, considerable saving is achieved in design, Manufacturing and erection cost. (c) Construction efficiency –System which is more efficient in construction manner and material availability to be delivered to the site ready to assemble, effectively saving both time and cost. (d) Energy efficient - Durable, pre-insulated metal cladding with insulating foam core for the exterior wall partitions, liners and ceiling combined with greater solar reflectivity ensures efficient, resulting in a significant reduction in electric costs.

Keywords:Industrial Steel Building, Castellated structure, Hollow steel tube structure structure response spectrum, Effective system in steel building.

I. INTRODUCTION

In many situations, lighter steel structure was invariably preparing to the heavier Alternatives such as reinforce concrete or priestess concrete. The main advantages of steel structure were its intrinsic strength, prefabrication and quicker transportability to the work site and faster erection. Steel structures can easily dismantle without loss to the integrity of the original structure. Most structural steel units were prefabricated in a workshop with a superior quality control compared to In-situ construction. Tolerance specified in the Indian Standard codes for steel structural component during the fabrication erection were small compared to similar reinforced concrete structures. Steel also plays an important role in composite construction in conjunction with reinforced and prestressed concrete structure. With the development of steel as a construction material, the varieties of steel sections were also increased. In this study optimization of structural steel for large span industrial shed obtained by comparing various systems, following mentioned systems are used for study.

A. Pre-engineered building system

The design of industrial building is governed mainly by functional requirements andthe need for economy of construction. In cross-sections, these buildings will range from singleor multi bay structures of larger span when intended for use as warehouses or aircraft hangersto smaller span buildings as required for factories, assembly plants, maintenance facilities,packing plants etc. The main dimensions will nearly always be dictated by the operational activities involved, but the structural designer's input on optimum spans and theselection of suitable cross-sections profile can have an important bearing on achieving overalleconomy. An aspect where the structural designer can make a more direct contribution is inlengthwise dimensions i.e. the bay lengths of the building. Here a balance must be struckbetween larger bays involving fewer, heavier main components such as columns, trusses, purlins, crane beams, etc. and smaller bays with a large number.

B. Castellated Beam structure system

Castellated beams are such structural members, which are made by flame cutting arolled beam along its centerline and then rejoining the two halves by welding so that theoverall beam depth is increased by 50% for improved structural performance against bending.Since Second World War many attempts have been made by structural engineers to find newways to decrease the cost of steel structures. Due to limitations on minimum allowabledeflection, the high strength properties of structural steel cannot always be utilized to bestadvantage. Thus, several new methods aimed at increasing stiffness of steel member, without any increase in weight of steel required. Castellated beam is one of the best solutions.

C. Hollow tube structural system

Steel members have high strength per unit weight. Therefore, a steel member ofhollow section which has less unit weight can resist heavy weight. The study is oriented to determine the structural and economic efficiency of hollow sections over usual rolled sections in design of steel trusses in industrial complexes. Indian Standard

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Code IS 800:2007 was used to design the sample trusses and the tolerances were taken into regard from the standard guidelines. The study also covers various advantages of Hollow Steel Sections(HSS) in various facets of consideration to enhance the serviceability of the structure It also includes the manufacturing and connection details of hollow sections.

II. OBJECTIVES OF STUDY

1. To study and understand the Pre- Engineered Building concept with their advantagesand limitations.
2. To study and understand the castellated beam structure system with their advantagesand limitations
3. To study and understand the hollow structural tube system with their advantages and limitations.
4. To compare the weight and economy of PEB, Castellated system and hollow steel tubesystem. For 45m and 60m wide span industrial shed.
5. To Utilize the non-prismatic rigid frames with slender elements, for primary structuralframing members.
6. To utilize the high strength-to-weight ratio of steel which leads to help in reductionof the total load on structure and saving of construction time and cost and to studyof economic aspects of cold formed steel over hot rolled steel, for the Secondarystructural members.
7. To optimize the member sizes for all three systems by using iteration method in staad pro.
8. To employ analysis and design software STAAD Pro and to study the wind analysisof steel building.

III. METHODOLOGY

The problem of this dissertation will be to carried out comparative & optimization of structural steel shed using various systems for industrial shed. The aim of the study is to evaluate economic importance from conventional shed structure, Pre-engineered building system, castellated beam system and hollow structural steel system. The approach used in order to accomplish the objective to which includes comparison of industrial building frame for combinations of span 15m and material cross section for given loading conditions. The analysis and design carried out in STAAD PRO and results are compared. The typified designs have been presented for the following different parameters.

Structural Parameters

- *Span Length of Frame15m*
- *Spacing between Frames 5.9 m.&6.5m(middle bay)*
- *Roof Slop 1 in 3*
- *Column Height 10.3m*
- *Wind Zone III*
- *Earthquake Zone III*

Wind Direction Angle – 0, 90 degree

2. Windward coefficient, Cp – as mention in calculation

3. Leeward Coefficient, Cp – as mention in calculation

4. Basic Wind Sped Vb (m/s) – 67

5. Terrain category – 1 Structure class – A

6. Risk Coefficient, K1 – 1.0

7. Topography factor – K3 – 1.0

Earthquake Load

The loading due to earthquake is assessed based on the provisions of IS: 1893(Part-1):2002

Seismic Zone = III

Table-2 Zone factor (Z) = 0.16

Table-6 Importance Factor (I) = 1.75

Table-7 Response Reduction Factor (R) = 5.0

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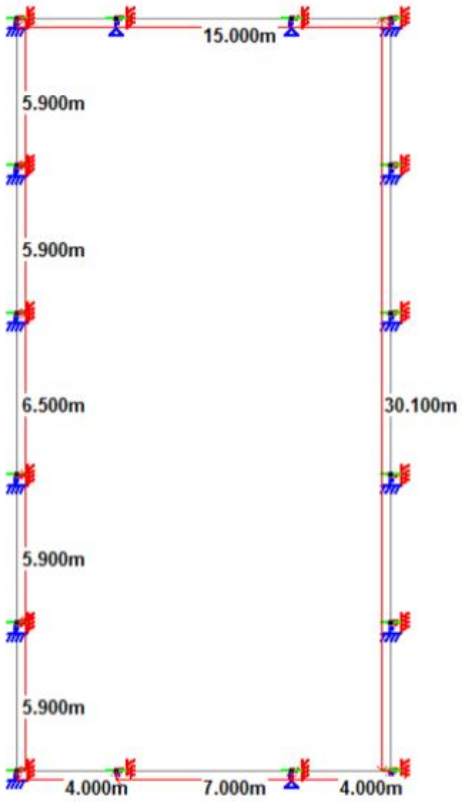
Soil type = Medium soil



Structural Plan & Elevation

Industrial shed with 15 m wide x 30.10m x 10.3m height is considered for analysis with frame spacing of 5.9m 7 in center 6.5m.

Creating the Models:

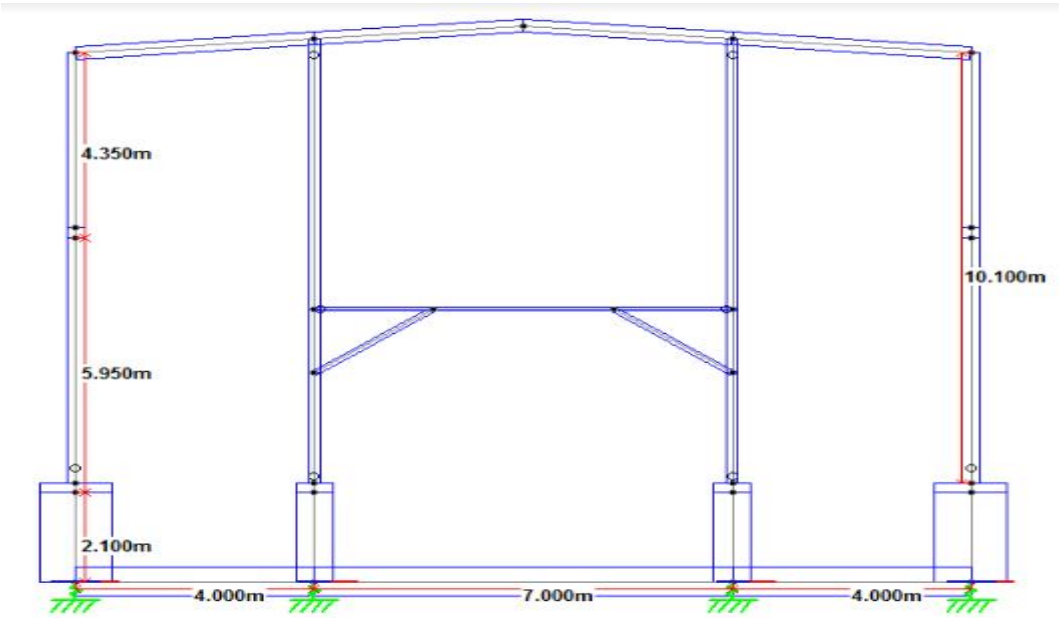
Using STAAD Pro software models are created detail of model structural system used for study as follow.

Model 1 (M1): Conventional industrial frame with standard I section Rafter and Column.

Model2 (M2): PEB frame structure

Model3(M3): Industrial shed with Hollow tube section

Model4 (M4): Industrial shed with castellated beam section.



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Model 1 with following section properties: -	
Column	ISMB 600
Rafter	ISMB 500
Roof level Tie Beam	ISMB 150
Plan Bracing (Roof level)	ISA65X655
Vertical Bracing (Side)	ISA80X80X8
Pedestal Size	1200x600mm
RCC Tie beam (pedestal to pedestal)	350x700mm

Model 2 with following section properties: -	
Column	ISMB 600
Column Reduced	ISMB 400
Rafter	ISMB 500
Roof level Tie Beam	ISMB 150
Plan Bracing (Roof level)	ISA65X655
Vertical Bracing (Side)	ISA80X80X8
Pedestal Size	1200x600mm
RCC Tie beam (pedestal to pedestal)	350x700mm

Model 3 with following section properties: -	
Column	RHS 300X200X12.0
Rafter	RHS 300X200X8.0
Roof level Tie Beam	SHS 100X100X4.0
Plan Bracing (Roof level)	SHS 80X80X4
Vertical Bracing (Side)	SHS100X100X4.0
Pedestal Size	1200x600mm
RCC Tie beam (pedestal to pedestal)	350x700mm

Model 4 with following section properties: -	
Column	RHS 300X200X12.0
Rafter	RHS 300X200X8.0
Roof level Tie Beam	SHS 100X100X4.0
Plan Bracing (Roof level)	SHS 80X80X4
Vertical Bracing (Side)	SHS100X100X4.0
Pedestal Size	1200x600mm
RCC Tie beam (pedestal to pedestal)	350x700mm

Load case

1. Load case 1: Response spectrum X direction
2. Load case 2: Response spectrum Z direction:
3. Load case 3: Dead Load:
4. Load case 4: Live Load
5. Load case 5: Thermal Load (+ve)
6. Load case 6: Thermal load (-ve)
7. Load case 7: Wind Load (+x) Internal Pressure
8. Load case 8: Wind Load (-X) Internal Pressure
9. Load case 9: Wind Load (+Z) Internal Pressure
10. Load case 10: Wind Load (-Z) Internal Pressure
11. Load case 11: Wind Load (+X) Internal Suction

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12. Load case 12: Wind Load (-X) Internal Suction
13. Load case 13: Wind Load (+Z) Internal Suction
14. Load case 14: Wind Load (-Z) Internal Suction

Load Combinations

Load combinations for Serviceability

DL + LL

DL + 1.0*Wind X Pressure

DL + 1.0*Wind Z Pressure

DL + 1.0*Wind X Suction

DL + 1.0*Wind Z Suction

DL + 0.8*LL + 0.8*Wind X Pressure

DL + 0.8*LL + 0.8*Wind Z Pressure

DL + 0.8*LL + 0.8*Wind X Suction

DL + 0.8*LL + 0.8*Wind Z Suction

Load combinations for Strength

DL + LL

1.2(DL+LL+Wind X Pressure)

1.2(DL+LL+Wind Z Pressure)

1.2(DL+LL+Wind X Suction)

1.2(DL+LL+Wind Z Suction)

1.5(DL+Wind X Pressure)

1.5(DL+Wind Z Pressure)

1.5(DL+Wind X Suction)

1.5(DL+Wind Z Suction)

0.9DL+1.5wind X Pressure

0.9DL+1.5wind Z Pressure

0.9DL+1.5wind X Suction

0.9DL+1.5wind Z Suction

Method of Analysis

Following analysis has been carried in addition toanalysis for gravity loading.

Seismic analysis

Dynamic method -Response spectrum method

IV. RESULTS AND DISCUSSION

Following are the structural parameter for Industrial shed to arrive at conclusion of this project.

1. Maximum Displacement of column for each model in Earthquake load (X & Z direction)
2. Maximum Displacement of column for each model in wind load (X & Z direction)
3. Maximum Displacement of beam.
4. Base reaction for heavily loaded column.
5. Utilisation Ratio for Colum & rafter
6. Structural weight for industrial shed.

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Displacement

Displacement is the governing criteria for the shed structure column top is checked for the lateral displacement in lateral load i,e Seismic & Wind load. As per IS code lateral displacement limit is Height/300.for the models which we analyzed height of column is 10.10m hence lateral displacement limit is 10100/300 = 33 mm.

Lateral Displacement Due to Earthquake load:

Following are the tabulated result showing the maximum column top displacement due to Earthquake in X & Z direction.

Column Displacement for Earthquake load				
	Model 1	Model 2	Model 3	Model 4
Earthquake in X direction	17 mm	19 mm	17.5mm	15 mm
Earthquake in Z direction	14 mm	16.21mm	10mm	12 mm

Lateral Displacement Due to Wind load

Following are the tabulated result showing the maximum column top displacement due to wind load in X & Z direction. Following tabulated results are maximum case from the internal pressure & internal suction case.

Column Displacement for Wind load				
	Model 1	Model 2	Model 3	Model 4
Wind in X direction	29.02 mm	30.05 mm	26 mm	23.26 mm
Wind in Z direction	16.89 mm	18.23mm	19 mm	15 mm

Vertical Displacement in Beam (Rafter):

Vertical displacement of rafter due to the lateral or gravity loading is the governing parameter of analysis. As per IS code allowable limit of vertical displacement is Span/200 for 15m span of rafter allowable limit of deflection = 15000/300 = 50mm Following are the results of all four-model showing maximum vertical displacement of the beam.

Vertical displacement of Rafter in Y direction				
	Model 1	Model 2	Model 3	Model 4
Deflection in Y direction	32 mm	31.27 mm	28 mm	26 mm

Base Reaction

Base reaction for structure checked for the strength load combinations of loads. Base reaction is used for the designing of pedestal and foundation. Following table shows the maximum base reaction for strength load case

Base Reaction In heavily loaded column KN				
	Model 1	Model 2	Model 3	Model 4
Vertical Reaction	274kN	153kN	265kN	266kN
Maximum Moment	185 kN-m	104 kN-m	176 kN-m	184 kN-m

Utilisation Ratio

Autilisation ratio abbreviated to U/R also called utilisation factor or unity factor is defined as the ratio of the actual to maximum allowable performance values.

$$\text{Utilisation Ratio} = \frac{\text{Actual performed value}}{\text{Allowable performance value}}$$

Following table showing results from the staad maximum utilisation ratio for the maximum design loading (strength load cases). utilisation ratio should be less than 1, which is consider as member passing against the bending moment and shear value

MaximumUtilisation Ratio from staad				
	Model 1	Model 2	Model 3	Model 4
Heavy loaded column	0.78	0.93	0.92	0.8
Heavy loaded Rafter	0.90	0.89	0.9	0.69

Material of Tonnage

In this parameter, total tonnage of structure is calculated in staad pro by using the command of member take off, tonnage of structure is very important parameter which is directly related to the cost of structure. Following are every model member tonnage is mentioned

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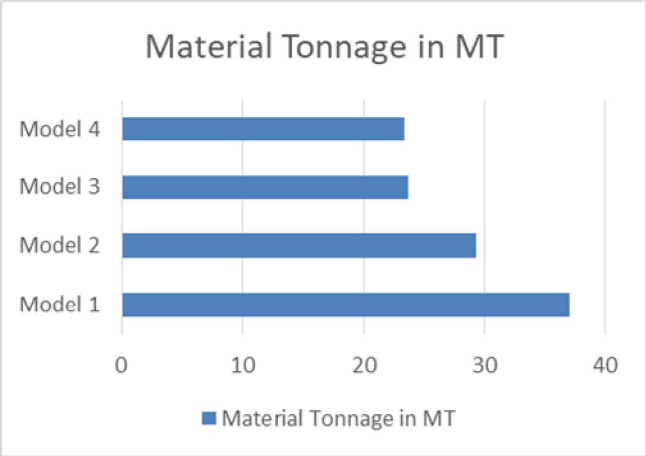

V. CONCLUSION & FUTURE COPE OF STUDY

The most effective and deciding basic parameter studied during this whole analysis was displacement & member weight of structure. The result section shows the variation in displacement with hollow structural member & castellated beam. The following conclusion are made from present study

The use of hollow steel tube column gives the better option compared to standard I section profile.as it has stormy moment of inertia in both direction.

The use of castellated beam gives the better performance in terms of displacement & tonnage of member.

The maximum reduction in displacement subjected to earthquake is 40% for the model 4 which is with considering castellated beam. Also, it can be observed hollow structural members also shows reduction in displacement is 30%.

The maximum reduction in displacement subjected to wind is 35% for the model 4 which is with considering castellated beam. Also, it can be observed hollow structural members also shows reduction in displacement is 25%.

The maximum reduction in vertical displacement is 38% for the model 4 which is with considering castellated beam. Also, it can be observed hollow structural members also shows reduction in displacement is 26%.

It is observed that model 1 have the maximum base reaction & base moment whereas model 3 for hollow structural members has the less base reaction & base moment.it can be conclude that hollow structural member has less member weight hence the base reactions are less.

Member utilization ratio decide the strength of member, in design of steel member pass or fail of design decided on utilization ratio. From the results, it can be concluding that model 4 in which castellated beam is used is utilized about 80 to 90% in rest of model member strength increased above the 90%.

Tonnage of material is deciding factor it is related to the cost of project. From the results, it can be concluded that model 4 with castellated beam gives the less material tonnage also it is observed that hollow sections also useful to reduce the weight of structure.

Thus, from above all comparisons & observations it can be globally concluded that model with castellated beam shown significant effect on all comparative parameter.

SCOPE OF FUTURE STUDY

1) Castellated beam can be compared with analytic & experimental work.
2) Same system can be analyzed by considering crane beam load and results can compared.
3) Present system can be compared with increasing the span of shed like 25m, 35m & 50 m and results can be compared for the different span.
4) Further optimization of the sizes can possible from the design.
5) We can study on individual system with different loads and various spans.
6) Design code can be change to check the results i,e BS codes, American code can be used.
7) Present study also compared by doing connection design and to check the total tonnage of structure.

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CRIME DATA ANALYTICS USING HADOOP, SPARK AND ZEPPELIN

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ABSTRACT
With the emergence of internet and futuristic Internet of things, the data is enhancing every today. The huge amount of data produced from the various applications like internet, social media, bio-informatics, sensors data, web log data from different systems/ mobile devices connected to internet and weather forecasting from different agencies etc. The processing of this gigantic and huge amount of data using database system is unfeasible. The proposed framework is developed using big data Hadoop, Spark, Zeppelin for analytics on large amount of crime data taken from the open web source of USA from 2006-2016[19] & the results obtained, can be used to improve performances of police, police patrolling in the given area of occurrence to reduce the crime. Using Zeppelin visualization, the police can simply analyze the location where the probability of crime is high and can prevent it from happening. Zeppelin visualization acts as a medium between big data model and police personal. In this work we tries to address and find the different most number of crime occurring in the city, depending on the premises types such as commercial, residential, highways, secluded places and ensure the presence and deployment of additional police patrolling based on this. Also we let the police personal or the public in general to search in real time and know the status of their complaint or FIR lodge details from any part of the world and its action taken report for the given incidence number in very fast, effective and in an efficient manner, when done conventionally can come more time and resources. Our proposed worked also tries to address these issues to lets the decision making bodies to work and refine their strategies to control the crime rate based on these ratings.

Keywords: Big Data; Data Analysis; Data Visualization; Hadoop; Crime Data.

INTRODUCTION
Much of the police work is not proactive and strategic in nature, but reactive and incident-focused. Policing is on the road to a more realistic, reliable and sustainable approach to crime reduction. Even though the police do much more than fight crime, they respond to civil disturbances, maintain law and order, and even take up social work[1][21]. The role of big data is to offer a novel encounters and occasions in front of police and digital forensic investigators. It also stresses upon the prerequisite of novel tools that are well-trained to identify, collect, preserve and analyses big data evidences in a protected manner. Apart from this, the tools should be skillful of to avert the data from tempering to uphold the integrity of the evidence for future use. The new technique and training personnel are also required by the digital forensic investigators to deal with the challenges presented by the big data. The future prospects require new algorithmic approach for solving the complexity and challenges of forensic analyzer to investigate and report the evidence to the court[2].

Each company is facing ever-increasing challenges in recent times that need to be tackled quickly and efficiently. With an ever-increasing population, crime and crime rate analysis of related data is a huge issue for governments to make strategic decisions to maintain law and order, which is really necessary to keep the country's society safe from crime[21]. The best place to look for scope for improvement is the voluminous data that is raw in format created by applying Big Data Analytics (BDA) from different sources on a regular basis.

BDA refers to the tools and procedures that can be used to turn the raw data collected into relevant, useful and essential information that helps the judiciary and legislature to take steps to keep crimes in check in a Decision Support System (DSS). With the ever-increasing rates of population and crime, certain patterns need to be identified, studied and debated in order to make well-informed decisions in order to maintain a proper law and order and thus have a sense of security, security and well-being among the country's citizens. We used the US dataset available on the https:/www.data.gov/ website for this study[19].

- The objective of this work is to develop an application using big data Hadoop for doing analytics on large of amount data & give outputs and outputs can used to improve performances related to business, education, hospitals, governments departments like polices, defense etc.

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1. Find out top 3 crime cities in US based on data set

With the continually increasing population and crime rates, certain trends must be discovered, So that policing can be maintain appropriately and thereby having a sense of security and well-being among the people of the country. Our proposed worked will try to address these issues to lets the decision making bodies to work and refine their strategies to control the crime rate based on this ratings.

❖ **Find out top 3 crime type in US based on data set**

This objective tries to address and find the crime type, in which the subject or the offender is brutal for example murder or in which violent, or drug abuse, possession of weapons and its illegal usage

1. Find out top 3 premise type crime take place max in US based on data set

This objective will let the decision making bodies to work and refine their strategies to control the crime rate depending on the premises types such as commercial, residential, highways, secluded places and ensure the presence and deployment of additional police patrolling based on this.

❖ **To find out crime reported status by incident number**

This objective let the police personal or the public in general to search and know the status of their complaint or FIR lodge details from any part of the world and its action taken report for the given incidence number in very fast, effective and efficient manner, when done conventionally can come more time and resources.

❖ **To find out the performance of us polices**

This objective lets the higher authorities to know how each state/city/area police personal are performing, based on the new number of incident number generated and its smooth closure after conduction the probe and resolving the issues or by forwarding the case to the judiciary for necessary action. If the performance is not up to the desired level, then the concerned area police personnel can be made accountable.

The Crime analysis not only just informs police personnel about strategic targets and persons, but also allows citizens to engage in crime prevention beforehand [18], it also lets the higher ups to tweak the policies, which they can review and reach out to implement the specific strategies to address their strategic or desired goals.

LITERATURE REVIEW

The Following are the few challenges for the police under the current scenario:

1. Working effectively across national, regional and international boundaries.
2. Staying at the center of highly dynamic criminal networks.
3. Responding to the new types of crime and executing it approach.
4. Engaging with more transitory communities and individuals and people more connected by social media than through their places of residence.
5. Meeting growing public standards for protection and demand for a visible presence at a time of diminishing resources.

Faced with these and other challenges and challenged to do more with less, the danger is that the service will return to familiar ground: reactive, sensitive policing, distributing resources to respond to immediate demands rather than more strategic, long-term demands. Community involvement, local police, working relationship and problem-solving can all be at risk as other departments return to their core activities. It is now more critical than ever to prioritize resources to achieve the most effect. In the new world of policing in the 21st century, the role of reliable proof of performance will become more and more important at a time when it may become more and more difficult to generate [20].

Meeting the challenges

A process of drastic and informative changes is facing the police services. Neighborhood police will need to develop new approaches to community engagement and create mutual effectiveness around common norms and cultural values, particularly in transitory, culturally diverse communities. It will be important to carefully manage public expectations of what the police can and can not offer. So better sources of collective intelligence will need to be fostered, for instance, on new types of criminal activity, secret crime, so systemic crime that cross borders. Many of these reforms would require a different policing style, one that fosters local communities ' faith and confidence and fulfills their needs and expectations. It will entail a step change in the management of information, with more effective methods of collecting, exchanging and reviewing intelligence to better inform tasks and strategic decision taking. Developing these skills in highly diverse and mobile communities will be essential for successful problem-solving.

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Aditya B. Patel et al [3], reports the experimental work on topics of big data. This paper describes the optimal solutions for the processing of larger data sets using Hadoop cluster, Hadoop Distributed File System (HDFS) for storage and Map Reduce programming system for parallel processing.

Mukherjee, A. et al [4], stated that Big data analytics identify vast amounts of data processing to collect useful information and reveal hidden trends. Here, they apply to the Map-Reduce System developed by Google for Big Data Analytics. Apache Hadoop is the open source framework used to build the Map-Reduce System of Google. In this task, the face book job traces are used to compare the performance of SF-CFS with the HDFS using the Statistical Workload Injector for MapReduce (SWIM). SWIM comprises thousands of jobs with complex patterns of data delivery and computation..

Garlasu D et al [4], Authors stated that Grid computing provided the advantage of storage space, processing capacity, and deployment use of Hadoop technology. Grid Computing provides the distributed computing concept. The advantage of having a Grid computing center is the high capacity of storage and the higher power of transmission. Grid computing also makes an important contribution to scientific research and lets scientists analyze and store complex and large data as well.

Sagiroglu Set et al [5], Describe the nature of Big Data, its scale, processes, experiments, advantages and data challenges. The big data's serious problem is privacy and protection. Big data samples clarify the environment analysis, research in the biological sciences, life sciences, etc. Through this paper, we can conclude that any company with big data in any sector should take advantage of its careful analysis for the purpose of problem solving. It is easy to extract the knowledge from the complex data sets by using the Big Data Information Discovery. The overall assessment explains that with changing times, the data is rising and becoming multifaceted. In addition to gathering and running the data, the crucial task is to dig out the useful information from the data collected. There are many challenges related to big data, according to the Intel IT Center, which are data development, data infrastructure, data range, data visualization, data speed to name but a few.

Ling Liu et al [6], here the authors explained that Tech scientists, we're living in interesting times. Data has been the Internet accident No. 1 that has been growing rapidly over the past decade. Big data analytics have the prospect of revealing deep insights concealed by big data that surpass the capability of existing systems, such as consumer gaze, exposed by analyzing the activities of customers, social and geographical data. Data has been mainly used over the past 40 years to track and monitor business activities and scientific events, and data will also be used in the next 40 years to gain new insights, influence business decisions, and accelerate scientific discovery. The key challenge is to provide the right frameworks and resources for quick and simple-to-use measurement of big data. In this important aspect, the exploration of multi-dimensional reuse opportunities and challenges to deliver big data analytics as a service is significant.

Keith C.C. Chan et al [7], explained that the Big Data refers to solar and complex data sets that can not be managed by traditional data processing tools and technologies. Big Data Analysis is the method of analyzing these data to discover latent trends in them. Drug research is synonymous with big data analytics as the method may involve an extremely large amount of organized and unstructured biomedical data from a wide range of studies and surveys obtained by hospitals, labs, pharmaceutical companies or even social media.. Such data may include data on sequencing and gene expression, data on drugs including molecular analysis, data on protein and drug interactions, data on clinical trials and electronic patient records, data on patient activity and self-report in social media, data on regulatory surveillance, and literature where patterns and data on drug repurposition and data on protein-protein interfaces can be found.

Roger Schell et al [8] explained that the Big data means measuring and running the database for huge amounts of data, remotely from the data owner's company. Since access to data from various and varied domains is a key value proposition of big data, security and privacy will play a major role in big data research and technology. Making effective use of big data requires access to data in that domain from any domain, or from any other domain to which it is licensed.

Shunmei Meng et al. [9], explained that Recommendation systems for service have been shown as valuable tools for providing users with correct recommendations. The number of customers, providers and online information has grown rapidly over the past decade, giving rise to the issue of big data analysis for service recommender systems. Consequently, when storing or analyzing such large-scale data, conventional service recommender systems frequently suffer from scalability and inefficiency issues. In addition, most of the service recommender systems offered offer the same ratings and rankings of services to different users without taking into account the needs of different users and thus failing to meet the customized requirements of users.

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Xingdong Wu et al [10], explained that Big Data is about massive, complex and increasing data sets with numerous, independent sources. Big Data is now growing rapidly in all fields of science and engineering, including physical, biological and biomedical sciences, with the rapid development of networking, data storage and data collection capacity. This research introduces a HACE theorem characterizing the characteristics of the Big Data rebellion and proposes a Big Data processing model from the perspective of data mining. The data-driven model gives rise to demand-driven aggregation of sources of information such as mining and analysis, modeling of user interest, and considerations of security, privacy. In the data-driven paradigm and also in the Big Data movement, they research the daunting issues. While the word Big Data simply concerns data volumes, the HACE theorem indicates that Big Data's key characteristics are 1) Big Data are huge in volume with heterogeneous and diversified data sources, 2) Big Data are autonomous with distributed as well as have a decentralized control and 3) Big Data are complex as well as evolving in data and knowledge associations. Such combined characteristics suggest that Big Data need a big mind to consolidate data for maximum values.

Shan Suthaharan [11], explained that the General problem of Network Imposition Traffic Big Data classification. This addresses the machine challenges associated with network interference forecasting associated with Big Data issues. Predicting a potential invasion attack in a network requires constant traffic data collection and learning on the fly about their features. The network's continuous processing of traffic data contributes to Big Data problems caused by its Big Data scale, complexity and speed properties. Understanding the characteristics of the network involves a machine learning method capturing global awareness of traffic patterns. Resolving the Big Data properties leads to major system challenges for machine learning frameworks implementation.

Ahmed E. Yourself et al [12] explained that in this paper we are introducing a Healthcare Information Systems (HIS) system based on large data analytics in mobile cloud computing environments. This system provides a high level of mixing, interoperability, availability and data sharing among health care providers, patients, and practitioners. Electronic medical records (EMRs) are incorporated and stored in the cloud storage area for patients distributed between different care delivery organizations (CDOs).; this creates an Electronic Health Records (EHRs) for each patient. Mobile Cloud allows fast Internet access and condition of EHRs from anywhere and at any time via different platforms.

Ashwin Belle et al [13], explained that The rapidly expanding field of Big Data Analytics continues to play a key role in the development of healthcare and testing practices. It has developed tools for gathering, controlling, analyzing, and integrating large volumes of dissimilar, organized, and unstructured data from current healthcare systems. Big data analytics has recently been used to help in the provision of treatment and the discovery of disease.

Ho Ting Wong et al [14], explained that Big data is a hot topic in academia, and health researchers are definitely not an exception. The article aims to provide a description of the advantages of conducting such research using big data in emergency medicine research. Big data is an innovative and cost-effective approach to science, and emergency medicine researchers could use this approach to produce high-quality research at a faster pace. Big data, on the other hand, provides versatility in the study of a data set from different perspectives. Furthermore, because government organizations already have a significant amount of big data, analysis using big data can be carried out at very low cost.

D. P. Acharjya, et al [15], has done a extensive survey on A vast repository of terabytes of data generated daily from various modern IT systems and digital technologies such as the Internet of Things and cloud computing. Management of such a voluminous data requires a lot of hard work at multiple levels to derive and mine the ability to make decisions. Big data analytics is therefore an area of research and development that is current and heavy. Such fields need to be addressed and the potential impact of the complexities of big data, open research problems, and the related tools and techniques. As a consequence, this work provides a platform for multi-stage analysis of big data.

M.I. Pramanik **et al [16], Presents big data analytics for security and criminal investigation, in this work they proposes a** propose A system for dealing with big data from the criminal investigation point of view. In this dissertation, the social network analysis (SNA) is divided into two sections. One of them is relational analysis where the solutions to network partitioning, clustering and association rule mining are used because they can more accurately estimate different types of centrality. Therefore, clustering techniques were used to connect an individual in criminal investigation with an entity and/or vehicle. Here they addressed the merits and challenges of applying Big Data Analytics to the area of predictive analytics and outlining the future directions of Big Data Analytics enhanced criminal investigations.

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III PHASES INVOLVED IN BIG DATA

Big data processing involves five different phases

- **Data Acquisition and Recording** – Big data surely have some basis of origin. It is not formed from a vacuum. Different scientific experiments being accepted out in the world today produces petabytes of data per day. Much of this data is of no use and has to be filtered out. The first challenge is to set filtering parameters so such that useful data doesn‘t get discarded. For example, suppose one sensor reading differs considerably from the rest: it is likely to be due to the sensor being defective, but how can we be sure that it is not an artifact that deserves attention? Research that can intelligently process this raw data to a size that its users can handle while not missing the needle in the haystack is needed. The second challenge is related to automatically generating right metadata for illustrating the type of recorded data, method of its recording and measurement. In scientific M experiments, considerable detail regarding specific experimental conditions and measures may be required that are able to interpret the results correctly, and it is important that such metadata be recorded with observational data.
- **Information Extraction and Cleaning** – It is stated here that information collected is not in an analysis ready format. For example, consider the collection of electronic health records in a hospital, comprising transcribed dictations from a number of physicians, structured data from sensors and measurements, and image data such as xrays. The data in this format cannot be efficiently analyzed. In order to extract the required information from the sources under consideration and present it in a standardized format appropriate for analysis, an information extraction method should be applied for such data. That's a big challenge. Such data may include images and videos, which is highly dependent on application.
- **Data Integration, Aggregation, and Representation** – It is not sufficient to merely collect, record and throw the data into a storehouse. If we have huge data sets in storehouse, then it will be almost not possible for the user to find the desired data when required. But with adequate amount of metadata there is some expect but still challenges persists due to differences in experimental details and in data record structure. Data demanding is much more than simply locating, identifying, understanding and citing data. All this process wants to happen in a complete automatic manner for an effective large scale analysis. Suitable database design is most significant. There are many different ways in which data can be stored. Certain designs will be better than others for convinced purposes and possibly may carry drawbacks for other purposes. Therefore it can be concluded that database design is an art and needs to be carefully executed by trained professionals.
- **Query Processing, Data Modeling, and Analysis Methods for querying and mining**– There is no doubt in the fact that big data is varied, imprecise and not structured. Even then big data is a large amount of value as compared to small individual comments as general statistics obtained from large sample are more accurate. When it comes to mining, it requires clean and efficiently accessible data. Provision should be there for declarative query and mining interfaces. Well-organized mining algorithms and computing environments is another important requirement.
- **Interpretation** – Big data analysis is of no use if consumers are unable to understand the concept of analysis. Decision makers are presented with the outcomes of the study and are consistent in order to understand the findings. It takes effort to explain this. This requires a thorough examination of all the assumptions made and a retracing of the analysis. There are more than a few sources of errors such as program can hold bugs, and assumptions can be based on data vulnerable to errors. No responsible consumer should give authority for all of this to the computer system. As an alternative, the results produced by the computer system will be recognized and verified. All this can be made simple by the computer system and because of its density, this is a huge challenge for big data.

Loading of Data Using Apache Components

Apache Sqoop was designed to move massive, structured data. It specializes in RDBMS relation and transfers the structured data to the HDFS. Sqoop has a generic JDBC adapter that helps move data from all kinds of RDBMS together with all well-known SQL services like MySQL and SQL+ oracle. Another project that transfers data into the HDFS is Apache Flume. For aggregating, transferring and processing unstructured data, it is a distributed and secure application**.**

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IV PROPOSED FRAMEWORK

BLOCK DIAGRAM

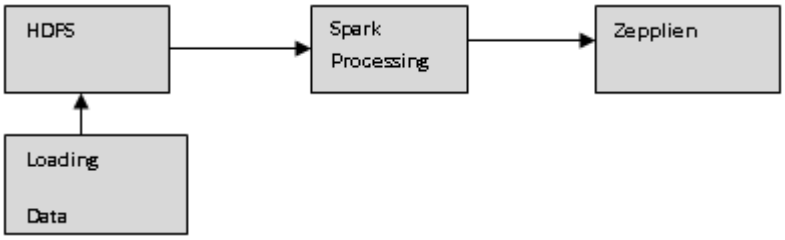

Figure-1: Block Diagram of the Proposed framework using Big Data Hadoop

The data set from the local file system i.e. LFS is loaded into HDFS cluster, The HDFS is single node cluster. Master node, Data node and all other demons are there in same machine. The spark engine is used to processes the huge data with V3 i.e. Velocity, Volume, Varsity .The processed data is ejected into zeppelin with spark integrated and data can visualized into graphical form.

Hadoop uses HDFS and MapReduce respectively to adopt a master slave architecture concept for data storage and distributed data processing. The data storage master node is Hadoop HDFS is the NameNode and the Work Tracker is the master node for parallel data processing with Hadoop MapReduce. The other devices in the Hadoop cluster that store data and perform complex computations are the slave nodes in the Hadoop architecture. Every slave node has a Task Tracker daemon and a DataNode that synchronizes the processes with the Job Tracker and NameNode respectively. In Hadoop architectural implementation the master or slave systems can be setup in the cloud or on premise.

A file on HDFS is split into multiple bocks and each is replicated within the Hadoop cluster. A block on HDFS is a blob of data within the underlying file system with a default size of 64MB.The size of a block can be extended up to 256 MB based on the requirements

Application data and file system metadata are stored separately on dedicated servers by Hadoop Distributed File System (HDFS). The two critical components of the Hadoop HDFS architecture are NameNode and DataNode. Application data is stored on DataNodes servers and the metadata of the file system is stored on NameNode servers. To order to ensure data durability, HDFS replicates the file content on several DataNodes depending on the replication factor. The NameNode and DataNode use TCP-based protocols to communicate with each other. For the effective efficiency of the Hadoop architecture,

HDFS must satisfy certain pre-requisites –

• High capacity should be provided for all hard drives.

• Good network speed for intermediate data transfer control and replication blocking

FLOW DIAGRAM

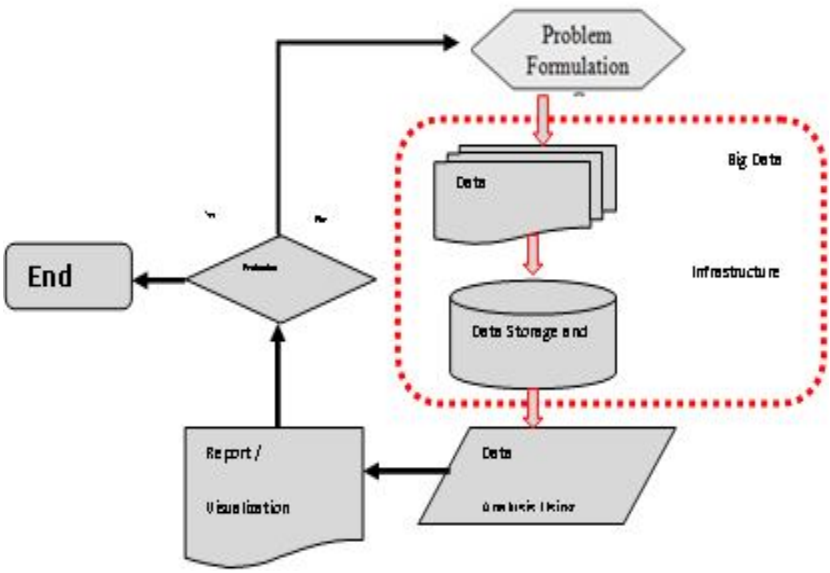

Figure-2: Flow Diagram of the Proposed framework using Big Data Hadoop

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Name Node

1. All HDFS namespace files and directories are listed on the NameNode containing various attributes such as permissions, change timestamp, disk space limit, namespace cap, and access times. NameNode maps the entire structure of the file system to memory. At restarts, two files and modifications are used for persistence.
2. ***Fsimage*** file contains the ***Inodes*** and the list of blocks which define the metadata. It has a complete snapshot of the file systems metadata at any given point of time.
3. The edits file contains any modifications that have been performed on the content of the ***fsimagefile.*** Incremental changes like renaming or appending data to the file are stored in the edit log to ensure durability instead of creating a new ***fsimage*** snapshot every time the namespace is being altered.

Data Node

DataNode controls the state of an HDFS node and communicates with blocks. DataNode can perform CPU-intensive tasks such as semantic and language analysis, statistics and machine learning tasks, and I / O-intensive tasks such as clustering, data import, data export, scan, decompression, and indexing. For data processing and conversion, a DataNode needs a lot of I / O.

That DataNode connects to the NameNode on start-up and performs a handshake to check the DataNode's namespace ID and program version. If either of them fails, the DataNode must automatically shut down. By submitting a block report to the NameNode, a DataNode verifies the block replicas in its possession. The first block report will be sent as soon as the DataNode registers. DataNode sends a pulse to the NameNode every 3 seconds to confirm the operation of the DataNode and the block replicas it hosts.

The heart of Hadoop's distributed computing framework is its java-based Hadoop MapReduce programming paradigm. Map or Reduce is a particular type of guided acyclic graph that can be extended to a wide range of cases of business use. Map function transforms the piece of data into pairs of key-value and then sort the keys where a reduction function is applied to combine the key-based values into a single output.

SPARK ARCHITECTURE

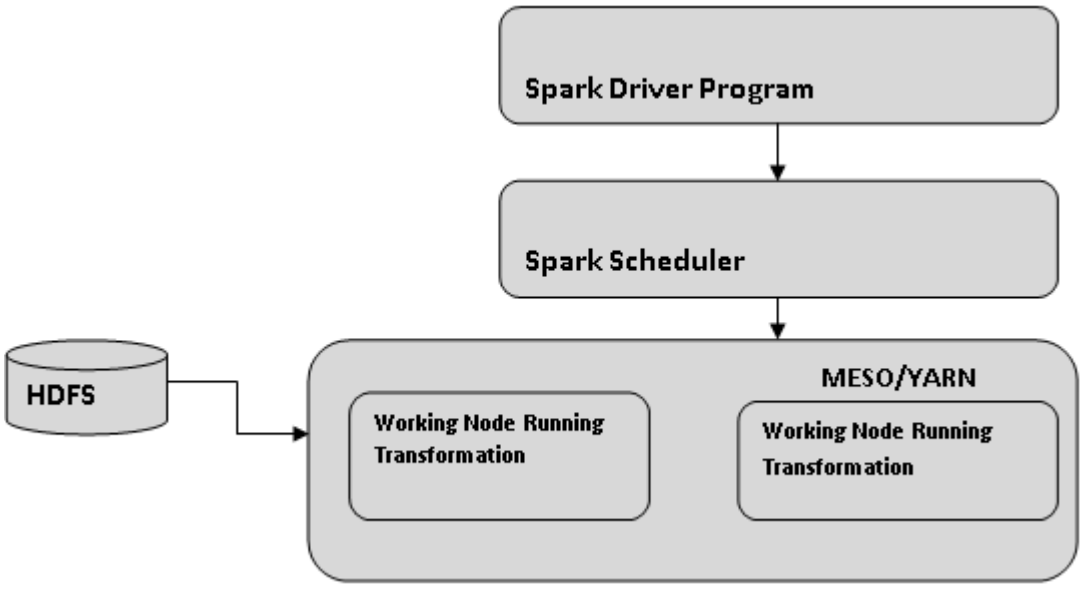

Figure-3: Spark Architecture

Apache Spark has a well-defined and layered architecture in which all the components and layers of the spark are loosely coupled and interconnected with different extensions and libraries. Two major abstractions are based on Apache Spark Architecture-

• Resilient Distributed Datasets (RDD)

• Directed Acyclic Graph (DAG)

Resilient Distributed Datasets (RDD)

RDD's are the set of data items separated into partitions that can be stored in memory on the spark cluster's staff nodes. As far as data sets are concerned, apache spark supports two types of RDDs–Hadoop Datasets built from

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files stored on HDFS and parallel collections based on existing Scala collections. Spark RDD supports two separate process forms–Transformations and Behavior.

Directed Acyclic Graph (DAG)

Direct - Transformation is an action which transitions data partition state from A to B.

Acyclic -Transformation cannot return to the older partition

DAG is a sequence of computations performed on data where each node is an RDD partition and edge is a transformation on top of data. The DAG abstraction helps eliminate the Hadoop MapReduce multi0stage execution model and provides performance enhancements over Hadoop.

Steps when Spark Job is Submitted

1. When a spark user code is sent by a client, the driver implicitly transforms the code containing transformations and actions into a logically oriented acyclic graph (DAG).
2. The driver software also performs other modifications such as pipeline transformations at this stage and then transforms the logical DAG with collection of stages into a physical execution plan.
3. This generates small physical execution units under each stage after developing the physical execution plan. Then activities to be sent to the Spark Cluster are packed.
4. The driver software then speaks to the manager of the cluster and resource negotiations.
5. Instead, on behalf of the driver, the cluster manager launches executors on the worker nodes.
6. At this stage, the driver sends tasks based on data placement to the cluster manager. We register with the driver system before executors start execution so that the driver has a holistic view of all the executors.
7. Now executors are beginning to perform the different tasks assigned by the driver software.
8. The driver software can control the collection of executors running at any point in time when the spark application is running.Driver program in the spark architecture also schedules future tasks based on data placement by tracking the location of cached data.
9. When the key) (function driver programs are exiting or calling the Spark Context stop) (feature, it will terminate all executors and release resources from the cluster manager.

The layout of a higher-level Spark program is-RDD's are generated from the input data and new RDD's are extracted from existing RDD's using different transformations, after which an operation is carried out on the data.In any spark program, the DAG operations are created by default and whenever the driver runs the Spark DAG will be converted into a physical execution plan.

Launching a Spark Program

Spark-submit is a single script that is used to submit a spark program and launches the cluster function. There are several options through which spark-submit script can communicate with various cluster managers and monitor how many resources the application gets. For a few cluster managers, spark-submit will run the driver on the worker node in the cluster as in YARN, while it only runs on local machines for others.

Apache Spark follows a master/slave architecture with two main daemons and a cluster manager –

i. Master Daemon – (Master/Driver Process)

ii. Worker Daemon –(Slave Process)

A spark cluster has a single Master and Slaves / Workers of any number. The driver and executors run their individual Java processes and users can run them in the same horizontal spark cluster or on different machines, i.e. in a vertical spark cluster or mixed machine configuration.

- It's the Spark Shell's central point and entry point (Scala, Python, and R). The driver program runs the application's main) (function and is the location where the context of the Spark is generated. Spark Driver has several components–DAG Scheduler, Task Scheduler, Backend Scheduler and Block Manager responsible for converting spark user code into real cluster spark work.
- The driver software running on the spark cluster master node plans the execution of the job and negotiates with the cluster manager.
- Translates the RDD into the graph of execution and divides the graph into multiple stages.

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- Driver stores all of the Resilient Distributed Databases and their partitions metadata.
- Jobs and Tasks Execution Cockpits-Driver program transforms a user workload to smaller tasks. The executors then perform tasks, i.e. the processes of the worker that perform individual tasks.Driver exposes the information about the running spark application through a Web UI at port 4040.

APACHE ZEPPELIN

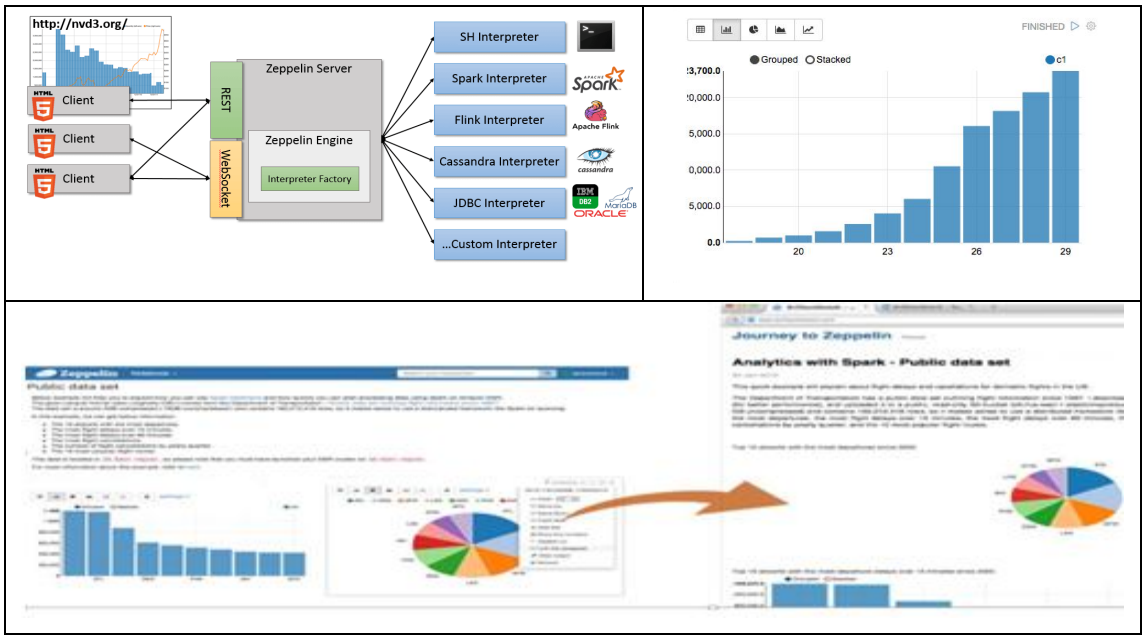

Figure-4: Apache Zeppelin Architecture and Interface with our work

Apache Zeppelin offers optimized Apache Spark integration, in particular. You don't have to create for it a separate module, plug-in or library.

1. Data Ingestion
2. Data Discovery
3. Data Analytics
4. Data Visualization & Collaboration

Apache Zeppelin along with Spark integration provides

- Automatic Spark Context and SQL Context injection
- Runtime jar dependency loading from local file system or maven repository. Learn more about dependency loader.
- Cancelling job and displaying its progress

DATA VISUALIZATION

Apache Zeppelin already includes some simple maps. Visualizations are not limited to Spark SQL query, it is possible to recognize and visualize any output from any language backend.Apache Zeppelin aggregates values with quick drag and drop and shows them in the pivot table. For multiple aggregate values, like number, count, average, min, max, you can easily create a map.

Working together can be shared between partners by sharing your notebook and paragraph file URL. Then Apache Zeppelin, like the partnership in google docs, can broadcast any changes in real-time.

Apache Zeppelin offers a URL for showing the result only, with no menus and buttons inside notebooks. In this way, you can conveniently insert it into your website as an iframe. If you'd like to learn more about this option.

V DATA AND RESULTS

Hardware/ Software and Crime Data Used for this work:

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Table-I: Software and Hardware Requirements used for the Proposed Work

VMware	**11**	Data Crime data is provided for Louisville Metro Police Divisions only. Crime data does not include smaller class cities and data set format is csv
		https://www.data.gov
VMware Hardware Configuration Setup		Details of data set:- INCIDENT NUMBER DATE_REPORTED DATA_OCCURED CRIME_TYPE ATT_COMP PREMISE_TYPE BLOCK_ADDRESS CITY ZIP_CODE
Processor	**4-Processors**	
RAM	**6 GB**	
HDD	**50 GB**	
Software		
Ubuntu OS	**14.04**	
Java	**8**	
Apache Hadoop	**2.6.5**	
Apache Spark	**2.0.2**	
Scala	**2.12.1**	
Apache Zeppelin	**0.6.2**	

Snaps Shots of the Proposed Work

	A	B	C	D	E	F	G	
1	INCIDENT	DATE_REPORTED	DATE_OCCURED	CRIME_TYPE	ATT_COMP	PREMISE_TYPE	BLOCK_ADDRESS	C
2	80-16-061	20-07-2016 12:32	20-07-2016 12:32	THEFT/LARCENY	COMPLETED	RESIDENCE / HOME	9800 BLOCK TIVERTON WAY	L
3	80-16-012	12-02-2016 01:21	12-02-2016 01:21	OTHER	COMPLETED	GROCERY / SUPERMARKET	9500 BLOCK PRESTON HWY	L
4	80-16-011	06-02-2016 11:30	06-02-2016 11:30	OTHER	COMPLETED	RESIDENCE / HOME	E JACOB ST / S SHELBY ST	L
5	80-16-013	15-02-2016 19:12	15-02-2016 19:12	OTHER	COMPLETED	OTHER RESIDENCE (APARTMENT	8900 BLOCK ELKS BLUFF DR	L
6	80-16-011	08-02-2016 11:11	08-02-2016 11:11	OTHER	COMPLETED	GROCERY / SUPERMARKET	3400 BLOCK BRECKENRIDGE LN	L
7	80-16-011	06-02-2016 10:17	06-02-2016 10:17	DRUGS/ALCOHOL VIOLAT	COMPLETED	HOTEL / MOTEL / ETC.	100 BLOCK CENTRAL AVE	L
8	80-16-012	10-02-2016 15:14	10-02-2016 15:14	DRUGS/ALCOHOL VIOLAT	COMPLETED	HIGHWAY / ROAD / ALLEY	6300 BLOCK HUNTERS GROVE RD	L
9	80-16-012	11-02-2016 15:00	11-02-2016 15:00	DRUGS/ALCOHOL VIOLAT	COMPLETED	HIGHWAY / ROAD / ALLEY	DIXIE HWY / SAN JOSE AVE	S
10	80-16-011	08-02-2016 12:06	08-02-2016 12:06	OTHER	COMPLETED	CHURCH / SYNAGOGUE / TEMPL	200 BLOCK W WELLINGTON AVE	L
11	80-16-012	11-02-2016 15:00	11-02-2016 15:00	DRUGS/ALCOHOL VIOLAT	COMPLETED	HIGHWAY / ROAD / ALLEY	DIXIE HWY / SAN JOSE AVE	S
12	80-16-013	16-02-2016 17:54	30-12-2015 12:00	THEFT/LARCENY	COMPLETED	RESIDENCE / HOME	7800 BLOCK ST ANDREWS CHURCH RI	L
13	80-16-012	10-02-2016 15:14	10-02-2016 15:14	DRUGS/ALCOHOL VIOLAT	COMPLETED	HIGHWAY / ROAD / ALLEY	6300 BLOCK HUNTERS GROVE RD	L
14	80-16-013	15-02-2016 19:38	15-02-2016 19:38	DRUGS/ALCOHOL VIOLAT	COMPLETED	HIGHWAY / ROAD / ALLEY	E LIBERTY ST / S PRESTON ST	L
15	80-16-013	13-02-2016 01:35	13-02-2016 01:35	DRUGS/ALCOHOL VIOLAT	COMPLETED	PARK / PLAYGROUND	3700 BLOCK RIVER RD	L
16	80-16-013	16-02-2016 08:50	15-02-2016 17:00	BURGLARY	COMPLETED	OTHER RESIDENCE (APARTMENT	5000 BLOCK WABASH PL	L
17	80-16-013	16-02-2016 06:48	16-02-2016 06:48	OTHER	COMPLETED	GOVERNMENT / PUBLIC BUILDIN	1300 BLOCK S 4TH ST	L
18	80-16-013	16-02-2016 19:46	12-02-2016 12:00	OTHER	COMPLETED	OTHER RESIDENCE (APARTMENT	2100 BLOCK BUECHEL BANK RD	L
19	80-16-013	15-02-2016 09:33	15-02-2016 09:33	OTHER	COMPLETED	HIGHWAY / ROAD / ALLEY	12000 BLOCK SHELBYVILLE RD	M
20	80-16-013	12-02-2016 23:38	12-02-2016 23:38	DRUGS/ALCOHOL VIOLAT	COMPLETED	HIGHWAY / ROAD / ALLEY	6800 BLOCK SOUTHSIDE DR	L
21	80-16-013	15-02-2016 14:35	15-02-2016 08:00	OTHER	COMPLETED	OTHER RESIDENCE (APARTMENT	900 BLOCK S 4TH ST	L
22	80-16-013	15-02-2016 17:53	15-02-2016 01:00	OTHER	COMPLETED	RESIDENCE / HOME	1900 BLOCK ROWAN ST	L
23	80-16-013	15-02-2016 18:56	15-02-2016 18:30	OTHER	COMPLETED	OTHER RESIDENCE (APARTMENT	2300 BLOCK GOLDSMITH LN	L

Staring Hadoop Single Cluster:-

Below syntax start-all.sh start " the HDFS cluster"

```
hadoopuser@ubuntu:~$ start-all.sh
This script is Deprecated. Instead use start-dfs.sh and start-yarn.sh
18/04/19 01:38:14 WARN util.NativeCodeLoader: Unable to load native-hadoop libra
ry for your platform... using builtin-java classes where applicable
Starting namenodes on [localhost]
localhost: namenode running as process 3744. Stop it first.
localhost: datanode running as process 3876. Stop it first.
Starting secondary namenodes [0.0.0.0]
0.0.0.0: secondarynamenode running as process 4045. Stop it first.
18/04/19 01:38:33 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your
ble
starting yarn daemons
resourcemanager running as process 4243. Stop it first.
localhost: nodemanager running as process 4383. Stop it first.
hadoopuser@ubuntu:~$ jps
3744 NameNode
4243 ResourceManager
3876 DataNode
5815 Jps
4045 SecondaryNameNode
4447 SparkSubmit
4383 NodeManager
hadoopuser@ubuntu:~$
```

Loading the Crime Data from LFS TO HDFS.

Below syntax:-

Hadoop fs – put

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```
hadoopuser@ubuntu:~$ hadoop fs -put /home/sarfaraz/Desktop/newCrime_Data_2016_0.csv /pda_collge
```

Staring Spark in Hadoop Cluster

Below syntax:-

Spark-shell

```
sarfaraz@ubuntu:~$ spark-shell
Using Spark's default log4j profile: org/apache/spark/log4j-defaults.properties
Setting default log level to "WARN".
To adjust logging level use sc.setLogLevel(newLevel).
18/04/09 21:32:12 WARN NativeCodeLoader: Unable to load native-hadoop library fo
r your platform... using builtin-java classes where applicable
18/04/09 21:32:13 WARN Utils: Your hostname, ubuntu resolves to a loopback addre
ss: 127.0.1.1; using 192.168.76.133 instead (on interface eth0)
18/04/09 21:32:13 WARN Utils: Set SPARK_LOCAL_IP if you need to bind to another
address
18/04/09 21:32:15 WARN SparkContext: Use an existing SparkContext, some configur
ation may not take effect.
Spark context Web UI available at http://192.168.76.133:4040
Spark context available as 'sc' (master = local[*], app id = local-1523289734609
).
Spark session available as 'spark'.
Welcome to
      ____              __
     / __/__  ___ _____/ /__
    _\ \/ _ \/ _ `/ __/  '_/
   /___/ .__/\_,_/_/ /_/\_\   version 2.0.2
      /_/
```

Loading the data set from hdfs location path into spark processing with Scala programming language.

Below syntax:-

Val df = spark .read .csv(“HDFS LOCATION PATH”)

```
scala>  val df= spark.read.csv("hdfs://localhost:9999/pda_collge/newCrime_Data_2016_0.csv")
df: org.apache.spark.sql.DataFrame = [_c0: string, _c1: string ... 7 more fields]

scala> df.show()
+--------------+--------------+--------------+--------------------+--------+--------------------+--------------------+----------+--------+
|           _c0|           _c1|           _c2|                 _c3|     _c4|                 _c5|                 _c6|       _c7|     _c8|
+--------------+--------------+--------------+--------------------+--------+--------------------+--------------------+----------+--------+
|INCIDENT_NUMBER|  DATE_REPORTED|  DATE_OCCURED|          CRIME_TYPE| ATT_COMP|       PREMISE_TYPE|       BLOCK_ADDRESS|      CITY|ZIP_CODE|
|   80-16-061522|20-07-2016 12:32|20-07-2016 12:32|       THEFT/LARCENY|COMPLETED|   RESIDENCE / HOME|9800 BLOCK TIVERT...|LOUISVILLE|   40242|
|   80-16-012758|12-02-2016 01:21|12-02-2016 01:21|               OTHER|COMPLETED|GROCERY / SUPERMA...|9500 BLOCK PRESTO...|LOUISVILLE|   40229|
|   80-16-011194|06-02-2016 11:30|06-02-2016 11:30|               OTHER|COMPLETED|   RESIDENCE / HOME|E JACOB ST / S SH...|LOUISVILLE|   40203|
|   80-16-013631|15-02-2016 19:12|15-02-2016 19:12|               OTHER|COMPLETED|OTHER RESIDENCE (...|8900 BLOCK ELKS B...|LOUISVILLE|   40220|
|   80-16-011695|08-02-2016 11:11|08-02-2016 11:11|               OTHER|COMPLETED|GROCERY / SUPERMA...|3400 BLOCK BRECKE...|LOUISVILLE|   40220|
|   80-16-011182|06-02-2016 10:17|06-02-2016 10:17|DRUGS/ALCOHOL VIO...|COMPLETED|HOTEL / MOTEL / ETC.|100 BLOCK CENTRAL...|LOUISVILLE|   40209|
|   80-16-012301|10-02-2016 15:14|10-02-2016 15:14|DRUGS/ALCOHOL VIO...|COMPLETED|HIGHWAY / ROAD / ...|6300 BLOCK HUNTER...|LOUISVILLE|   40216|
|   80-16-012586|11-02-2016 15:00|11-02-2016 15:00|DRUGS/ALCOHOL VIO...|COMPLETED|HIGHWAY / ROAD / ...|DIXIE HWY / SAN J...|   SHIVELY|   40216|
|   80-16-011678|08-02-2016 12:06|08-02-2016 12:06|               OTHER|COMPLETED|CHURCH / SYNAGOGU...|200 BLOCK W WELLI...|LOUISVILLE|   40214|
|   80-16-012586|11-02-2016 15:00|11-02-2016 15:00|DRUGS/ALCOHOL VIO...|COMPLETED|HIGHWAY / ROAD / ...|DIXIE HWY / SAN J...|   SHIVELY|   40216|
|   80-16-013723|16-02-2016 17:54|30-12-2015 12:00|       THEFT/LARCENY|COMPLETED|   RESIDENCE / HOME|7800 BLOCK ST AND...|LOUISVILLE|   40214|
|   80-16-012301|10-02-2016 15:14|10-02-2016 15:14|DRUGS/ALCOHOL VIO...|COMPLETED|HIGHWAY / ROAD / ...|6300 BLOCK HUNTER...|LOUISVILLE|   40216|
|   80-16-013632|15-02-2016 19:38|15-02-2016 19:38|DRUGS/ALCOHOL VIO...|COMPLETED|HIGHWAY / ROAD / ...|E LIBERTY ST / S ...|LOUISVILLE|   40202|
|   80-16-013041|13-02-2016 01:35|13-02-2016 01:35|DRUGS/ALCOHOL VIO...|COMPLETED|   PARK / PLAYGROUND|3700 BLOCK RIVER ...|LOUISVILLE|   40207|
|   80-16-013732|16-02-2016 08:50|15-02-2016 17:00|            BURGLARY|COMPLETED|OTHER RESIDENCE (...|5000 BLOCK WABASH...|LOUISVILLE|   40214|
|   80-16-013710|16-02-2016 06:48|16-02-2016 06:48|               OTHER|COMPLETED|GOVERNMENT / PUBL...|1300 BLOCK S 4TH ...|LOUISVILLE|   40208|
|   80-16-013736|16-02-2016 19:46|12-02-2016 12:00|               OTHER|COMPLETED|OTHER RESIDENCE (...|2100 BLOCK BUECHE...|LOUISVILLE|   40218|
|   80-16-013482|15-02-2016 09:33|15-02-2016 09:33|               OTHER|COMPLETED|HIGHWAY / ROAD / ...|12000 BLOCK SHELB...|MIDDLETOWN|   40243|
|   80-16-013021|12-02-2016 23:38|12-02-2016 23:38|DRUGS/ALCOHOL VIO...|COMPLETED|HIGHWAY / ROAD / ...|6800 BLOCK SOUTHS...|LOUISVILLE|   40214|
+--------------+--------------+--------------+--------------------+--------+--------------------+--------------------+----------+--------+
```

Analytics on Data set with Spark to find out top 3 Crime City in USA

Performing groupBy operation to achieve the result with count. The aim to find the top 3 crime cities to achieve sort by descending order to achieve the final result .

Syntax:-

valgroupBy(“with select column “).count()

group.sort($”count”.desc).show()

```
scala> val group = df.groupBy("_c7").count()
group: org.apache.spark.sql.DataFrame = [_c7: string, count: bigint]

scala> group.show()
+------------------+-----+
|               _c7|count|
+------------------+-----+
| BEECHWOOD_VILLAGE|   32|
|        PLANTATION|   19|
|   PARKWAY_VILLAGE|    3|
|     ROLLING_HILLS|   52|
|       WINDY_HILLS|   29|
|         BANCROFT|    2|
|     JEFFERSONTOWN|  101|
|     LANGDON_PLACE|   22|
|              MEDV|   12|
|          NORWOOD|   30|
|          PROSPECT|    9|
|       WELLINGTON|    7|
|          LONDON|    1|
|     HOUSTON_ACRES|    5|
|        ANCHORAGE|    4|
| WORTHINGTON_HILLS|   32|
|    SENECA_GARDENS|    4|
| NORBOURNE_ESTATES|    3|
|GRAYMOOR/DEVONDALE|    8|
|          SYCAMORE|    2|
+------------------+-----+
```

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```
scala> group.sort($"count".desc).show()
+------------------+-----+
|               _c7|count|
+------------------+-----+
|        LOUISVILLE|73974|
|        MIDDLETOWN|  458|
|           LYNDON|  401|
|          SHIVELY|  212|
|              null|  192|
|      HURSTBOURNE|  169|
|  WATTERSON_PARK|  155|
|     FOREST_HILLS|  138|
|  DOUGLASS_HILLS|  125|
|    JEFFERSONTOWN|  101|
|      ST_MATTHEWS|   84|
|     WEST_BUECHEL|   63|
|    ROLLING_HILLS|   52|
|          LYNNVIEW|   48|
|HURSTBOURNE_ACRES|   44|
|BEECHWOOD_VILLAGE|   32|
|WORTHINGTON_HILLS|   32|
|       HOLLYVILLA|   32|
|     POPLAR_HILLS|   30|
|          NORWOOD|   30|
+------------------+-----+
```

Analytics on Data set with Spark to find out top 3 Crime types in USA

Performing groupBy operation to achieve the result with count. The aim to find the top 3 crime types in USA achieve sort by descending order to achieve the final result.

Syntax:-

valgroupBy(“with select column “).count()

group.sort($”count”.desc).show()

```
scala> val group = df.groupBy("_c3").count()
group: org.apache.spark.sql.DataFrame = [_c3: string, count: bigint]

scala> group.show()
+------------------+-----+
|               _c3|count|
+------------------+-----+
|             FRAUD| 3624|
|           WEAPONS| 1080|
|DRUGS/ALCOHOL VIO...|11312|
|      THEFT/LARCENY|12664|
|             ARSON|   10|
|         SEX CRIMES|  431|
|            ASSAULT|11627|
|               DUI|    5|
|        CRIME_TYPE|    1|
| MOTOR VEHICLE THEFT| 3629|
|VEHICLE BREAK-IN/...| 5212|
|DISTURBING THE PEACE|  437|
|           ROBBERY| 1325|
|          HOMICIDE|   86|
|             OTHER|15268|
|         VANDALISM| 5211|
|          BURGLARY| 4926|
+------------------+-----+
```

```
scala> group.sort($"count".desc).show()
+------------------+-----+
|               _c3|count|
+------------------+-----+
|             OTHER|15268|
|      THEFT/LARCENY|12664|
|           ASSAULT|11627|
|DRUGS/ALCOHOL VIO...|11312|
|VEHICLE BREAK-IN/...| 5212|
|         VANDALISM| 5211|
|          BURGLARY| 4926|
| MOTOR VEHICLE THEFT| 3629|
|             FRAUD| 3624|
|           ROBBERY| 1325|
|           WEAPONS| 1080|
|DISTURBING THE PEACE|  437|
|         SEX CRIMES|  431|
|          HOMICIDE|   86|
|             ARSON|   10|
|               DUI|    5|
|        CRIME_TYPE|    1|
+------------------+-----+
```

Analytics on Data set with Spark to find out top 2 Crime PREMISE_types in USA

Performing groupBy operation to achieve the result with count. The aim to find the top 3 crime types in USA achieve sort by descending order to achieve the final result.

Syntax:-

valgroupBy(“with select column “).count()

group.sort($”count”.desc).show()

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```
scala> group.sort($"count".desc).show()
+--------------------+-----+
|                 _c5|count|
+--------------------+-----+
|    RESIDENCE / HOME|26379|
|HIGHWAY / ROAD / ...|15166|
|     OTHER / UNKNOWN| 7017|
|PARKING LOT / GARAGE| 5962|
|OTHER RESIDENCE (...| 5130|
|DEPARTMENT / DISC...| 3559|
|GROCERY / SUPERMA...| 1555|
|          RESTAURANT| 1078|
|   CONVENIENCE STORE| 1021|
|SERVICE / GAS STA...| 1007|
|COMMERCIAL / OFFI...|  892|
|SPECIALTY STORE (...|  825|
|HOTEL / MOTEL / ETC.|  818|
|DRUG STORE/DR`S O...|  787|
|   PARK / PLAYGROUND|  685|
|NON-ATTACHED RESD...|  665|
|SCHOOL - ELEMENTA...|  498|
|GOVERNMENT / PUBL...|  454|
|    BAR / NIGHT CLUB|  451|
|BANK / SAVINGS & ...|  356|
+--------------------+-----+
```


```
scala> group.sort($"count".desc).show()
+--------------------+-----+
|                 _c5|count|
+--------------------+-----+
|    RESIDENCE / HOME|26379|
|HIGHWAY / ROAD / ...|15166|
|     OTHER / UNKNOWN| 7017|
|PARKING LOT / GARAGE| 5962|
|OTHER RESIDENCE (...| 5130|
|DEPARTMENT / DISC...| 3559|
|GROCERY / SUPERMA...| 1555|
|          RESTAURANT| 1078|
|   CONVENIENCE STORE| 1021|
|SERVICE / GAS STA...| 1007|
|COMMERCIAL / OFFI...|  892|
|SPECIALTY STORE (...|  825|
|HOTEL / MOTEL / ETC.|  818|
|DRUG STORE/DR`S O...|  787|
|   PARK / PLAYGROUND|  685|
|NON-ATTACHED RESD...|  665|
|SCHOOL - ELEMENTA...|  498|
|GOVERNMENT / PUBL...|  454|
|    BAR / NIGHT CLUB|  451|
|BANK / SAVINGS & ...|  356|
+--------------------+-----+
```


Analytics on Data set with Spark to find out Crime status with Id number

Performing groupBy operation to achieve the result with count. The aim to findCrime status with Id number in USA . Sort by descending order to achieve the final result.

Syntax:-

valgroupBy(“with select column “).count()

group.sort($”count”.desc).show()

```
scala> val group = df.groupBy("_c0","_c4").count()
group: org.apache.spark.sql.DataFrame = [_c0: string, _c4: string ... 1 more field]

scala> group.show()
18/04/19 03:01:32 WARN TaskMemoryManager: leak 4.3 MB memory from org.apache.spark.unsafe.map.BytesToBytesMap@3092d713
18/04/19 03:01:32 WARN TaskMemoryManager: leak a page: org.apache.spark.unsafe.memory.MemoryBlock@1755c4ed in task 1444
18/04/19 03:01:32 WARN TaskMemoryManager: leak a page: org.apache.spark.unsafe.memory.MemoryBlock@3872a66d in task 1444
18/04/19 03:01:32 WARN Executor: Managed memory leak detected; size = 4456448 bytes, TID = 1444
+------------+---------+-----+
|         _c0|      _c4|count|
+------------+---------+-----+
|80-16-012963|COMPLETED|    1|
|80-16-013773|COMPLETED|    1|
|80-16-008738|COMPLETED|    1|
|80-16-009719|ATTEMPTED|    1|
|80-16-008346|COMPLETED|    1|
|80-16-010067|COMPLETED|    1|
|80-16-003896|COMPLETED|    1|
|80-16-010083|COMPLETED|    1|
|80-16-014527|COMPLETED|    1|
|80-16-013344|COMPLETED|    1|
|80-16-014587|COMPLETED|    1|
|80-16-010205|COMPLETED|    3|
|80-16-009989|COMPLETED|    1|
|80-16-010779|COMPLETED|    1|
|80-16-015120|COMPLETED|    1|
|80-16-015217|COMPLETED|    1|
|80-16-024767|COMPLETED|    1|
|80-16-010897|COMPLETED|    1|
|80-16-011082|COMPLETED|    1|
|80-16-024977|COMPLETED|    1|
+------------+---------+-----+
```

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```
scala> group.sort($"count".desc).show()
+------------+---------+-----+
|         _c0|      _c4|count|
+------------+---------+-----+
|80-16-063276|COMPLETED|   10|
|80-16-029073|COMPLETED|   10|
|80-16-012516|COMPLETED|    9|
|80-16-047031|COMPLETED|    9|
|80-16-025310|COMPLETED|    8|
|80-16-048788|COMPLETED|    8|
|80-16-040472|COMPLETED|    8|
|80-16-012666|COMPLETED|    8|
|80-16-055430|COMPLETED|    8|
|80-16-035662|COMPLETED|    8|
|80-16-019594|COMPLETED|    7|
|80-16-030540|COMPLETED|    7|
|80-16-006529|COMPLETED|    7|
|80-16-089319|COMPLETED|    7|
|80-16-062444|COMPLETED|    7|
|80-16-051573|COMPLETED|    7|
|80-16-081655|COMPLETED|    7|
|80-16-017636|COMPLETED|    7|
|80-16-026555|COMPLETED|    7|
|80-16-083650|COMPLETED|    7|
+------------+---------+-----+
```

Analytics on Data set with Spark to find out performance of polices in USA

Performing groupBy operation to achieve the result with count. The aim to find out performance of polices inUSA. Sort by descending order to achieve the final result.

Syntax:-

valgroupBy(“with select column “).count()

group.sort($”count”.desc).show()

```
scala> val group = df.groupBy("_c7","_c4").count()
group: org.apache.spark.sql.DataFrame = [_c7: string, _c4: string ... 1 more field]

scala> group.show()
+------------------+---------+-----+
|               _c7|      _c4|count|
+------------------+---------+-----+
|          PROSPECT|COMPLETED|    9|
|          MOORLAND|COMPLETED|   13|
|    WATTERSON_PARK|COMPLETED|  152|
|     JEFFERSONTOWN|ATTEMPTED|    1|
|      POPLAR_HILLS|ATTEMPTED|    1|
|           LEAWOOD|COMPLETED|    1|
|      AUDUBON_PARK|COMPLETED|    5|
|       SPRING_MILL|COMPLETED|    4|
|        NORTHFIELD|COMPLETED|   15|
|        WASHINGTON|COMPLETED|    1|
|       FISHERVILLE|COMPLETED|    1|
|MOCKINGBIRD_VALLEY|COMPLETED|    1|
|         THORNHILL|COMPLETED|    2|
|     JEFFERSONTOWN|     null|    1|
|              MEDE|COMPLETED|    9|
| HURSTBOURNE_ACRES|COMPLETED|   44|
|         FINCASTLE|COMPLETED|   19|
|           NORWOOD|COMPLETED|   28|
|          WILDWOOD|ATTEMPTED|    1|
| WORTHINGTON_HILLS|ATTEMPTED|    1|
+------------------+---------+-----+
```

```
scala> group.sort($"count".desc).show()
+-----------------+---------+-----+
|              _c7|      _c4|count|
+-----------------+---------+-----+
|       LOUISVILLE|COMPLETED|72565|
|       LOUISVILLE|ATTEMPTED| 1174|
|       MIDDLETOWN|COMPLETED|  456|
|           LYNDON|COMPLETED|  395|
|       LOUISVILLE|     null|  235|
|          SHIVELY|COMPLETED|  209|
|             null|COMPLETED|  191|
|      HURSTBOURNE|COMPLETED|  166|
|   WATTERSON_PARK|COMPLETED|  152|
|     FOREST_HILLS|COMPLETED|  134|
|   DOUGLASS_HILLS|COMPLETED|  125|
|    JEFFERSONTOWN|COMPLETED|   99|
|      ST_MATTHEWS|COMPLETED|   83|
|     WEST_BUECHEL|COMPLETED|   62|
|    ROLLING_HILLS|COMPLETED|   52|
|         LYNNVIEW|COMPLETED|   46|
|HURSTBOURNE_ACRES|COMPLETED|   44|
|       HOLLYVILLA|COMPLETED|   32|
|BEECHWOOD_VILLAGE|COMPLETED|   31|
|WORTHINGTON_HILLS|COMPLETED|   31|
+-----------------+---------+-----+
```

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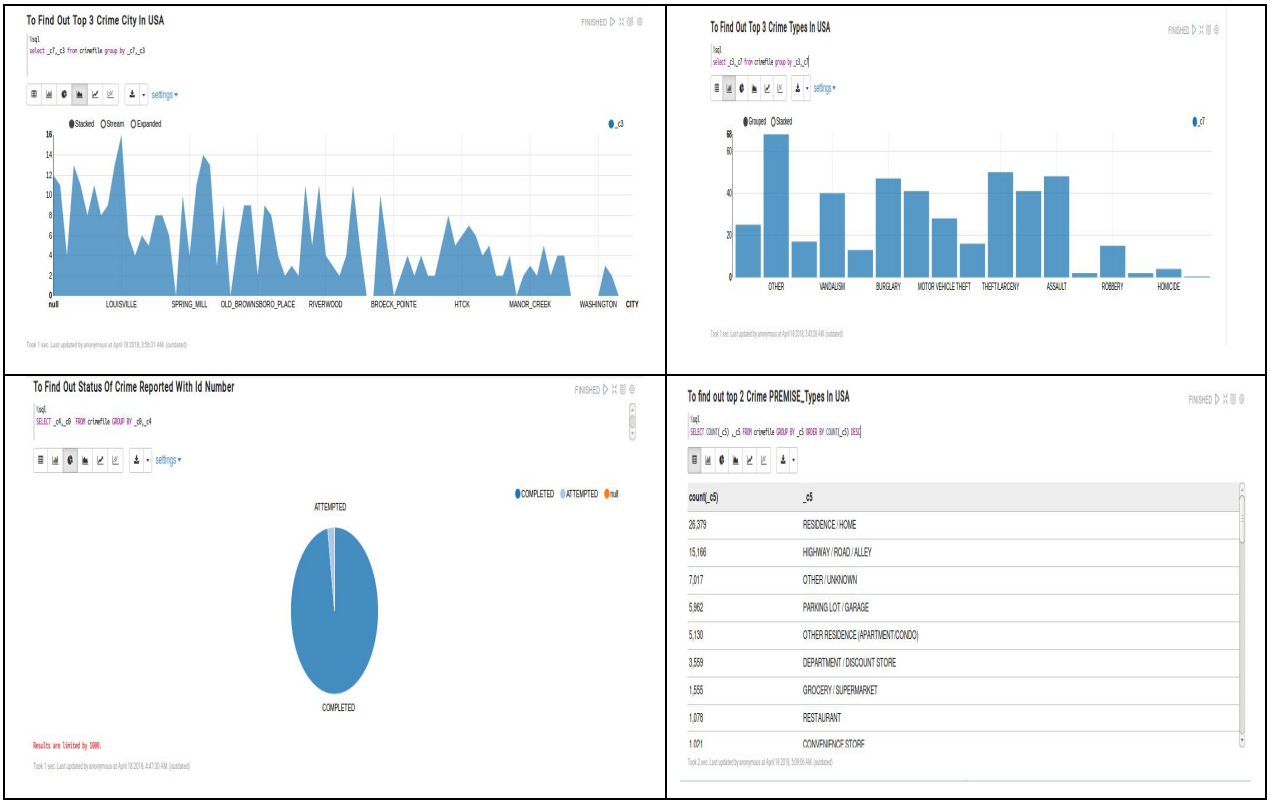
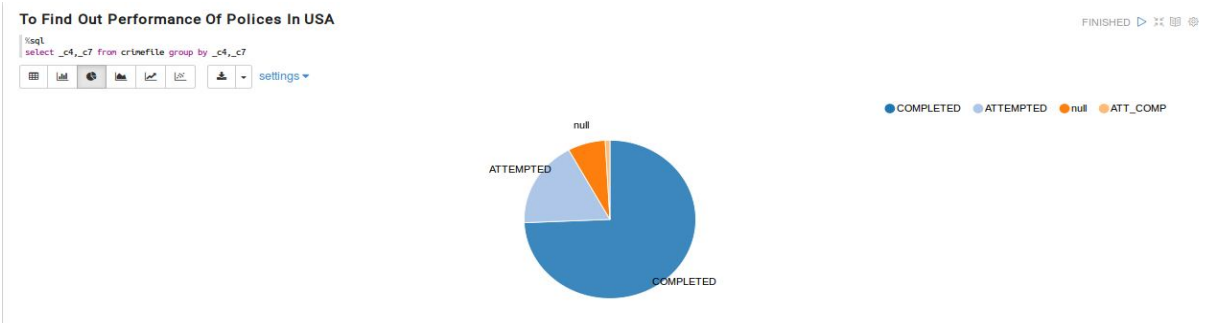
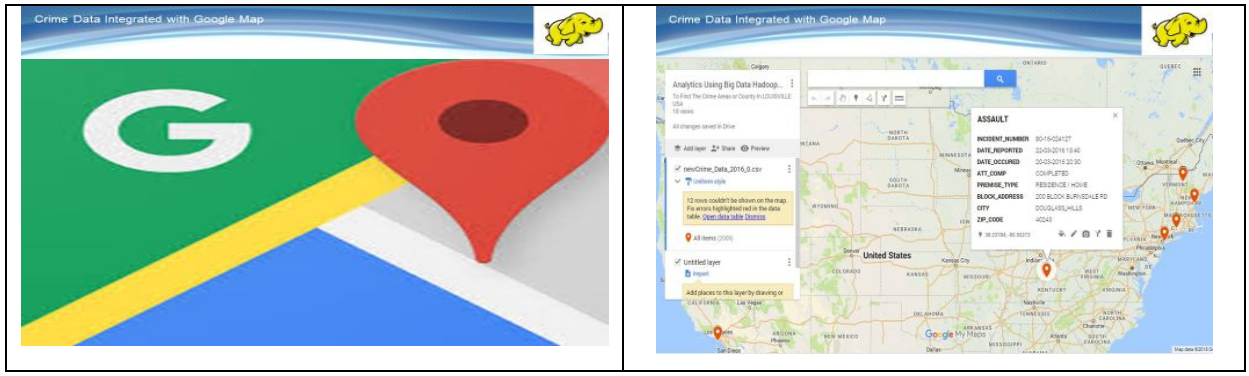
Staring Zeppelin on Hadoop Single Cluster, Zeppelin is data visualization tool





Crime Data Integrated with Google Map



With help of the google map, the authorized users can view the exact location, date, time and typeof the crimeand the user can avoid this locations or if then it is must require to visit then the user can be prepared with all aspects and be cautious.

CONCLUSIONS AND SCOPE FOR FUTURE WORK

Big Data Analysis refers to the techniques and methods that can be used to turn this raw data into useful and critical information that helps the judiciary and legislature to take steps towards keeping crimes in check. With the ever-increasing rates of population and crime, certain patterns need to be identified, analyzed and debated in order to make informed decisions so that law and order can be properly maintained. If the number of complaints

from a particular state is found to be very high, increased police presence, swift resolution of complaints, strict vigilance and scrutiny by the higher officials can provide extra security to the people there by helping to keep a watch on the changing scenarios and make informed decisions. Crimes against women are becoming more and more depressed and creating problems for the government. It is necessary to find the number of such crimes, particularly those against young women (age 18-30 years). Extra security must be given in order to avoid the problem of law and order. For a long time, police departments have used data to explain the nature of crime. But with access to more personal data than ever before, police use the technology of big data to solve crimes faster. Through our work we have been able to achieve the stated goals.

This analysis can be carried out in Fully Distributed cluster mode, which is Hadoop daemons operating on a cluster with identical machine data, in different sectors. . An advance system can be implemented using the Machine Learning and Multilayer Perceptron (MLP) Artificial Neural Network (ANN) with enhanced capabilities like Predictive Hotspot Mapping, Predictive Risk Assessment of Individuals, Visual Surveillance, Forecasting, and Open-Source Analytics.

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DESIGN ANALYSIS AND TESTING OF CENTRIFUGAL PUMP IMPELLER

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ABSTRACT
Impeller is a rotating components of a centrifugal pump. In that the excessive vibration is a good indicator that indicates some damaging phenomenon occurring within a impeller. Mostly machinery problems result from the interaction between an exciting force, associated structural and hydraulic resonance frequencies. When exciting force is stronger at natural frequency the amplitude of vibration becomes maximum. Hence the main objective of this is to carryout vibration analysis and experimentation on various materials to find out alternate suitable material and to minimize the vibration and to improve the performance of pump impeller. To find out the natural frequency of a impeller modal analysis was carried out. Cad model generation was done in CATIA V5, meshing in HYPER MESH and ANSYS is for post processing. Re-analysis and experimentation was done using different material to check the vibration response on the impeller.

I INTRODUCTION

AN impeller is a rotating component of a centrifugal pump, which transfer energy from motor to the fluid being pumped by accelerating the fluid centrifugally from the center of rotation. It usually made of iron, steel, bronze, brass, aluminum or plastic. The fluid which flow outward from the center of rotation due to centrifugal phenomenon increases pressure by converting the velocity achieved from the impeller. Usually impellers are short cylinders with an open inlet for accepting fluid from suction pipe, vanes provided to push the fluid radially and keyed or threaded bore provided for a drive-shaft. The impeller may be called rotor also. A centrifugal pump contains the rotating and the stationary part. The rotating part includes a shaft and a pump impeller while the stationary part is composed of the casing, bearing, electric motor and an associated cooling fan. Mechanical vibration sources are carried out by vibration of unbalanced rotating masses and friction in bearing and seals. Vibration in any machine component is undesirable. Vibration may be dangerous in many ways i.e. it causes damage to the structure, loosening of bearing may occur etc.

A. Mechanical Vibrations Sources

1) Motor and shaft: When the motor in the hydraulic system is rotating at a high speed, the rotating part imbalance can result in periodic unbalanced force. The vibration occur due to the displacement of its shaft from its neutral position due to some external forces generated when the shaft rotates. The shaft vibration frequency is equal to motor rotation frequency.

2) Coupling: Alignment of motor shaft and prime mover driven shaft is very important to minimize the vibration.

3) Pipeline and Tank: Pipeline and tank are not the source of vibration. The vibration is influenced by other components, such as pressure and flow pulsation, mechanical vibration and so on. When natural frequencies and vibration frequency of pipeline and tank is same, then resonance occurs, resulting in strong vibration. Especially when the pipeline is too slender or meticulous and direction changes to a great extent, more easily to cause vibration.

II PROBLEM STATEMENT

Always some vibration produce in the operation of any mechanical system but when it crosses the desire limit, vibration is unavoidable. Vibration is an indicator of some problem with a mechanism, or it may be a cause of other problems. Vibration of impeller in centrifugal pump is responsible to reduce performance of pump. So most important is to find out and minimize the vibration by doing proper vibration analysis and experimental analysis of components.

III METHOD OF VIBRATION REDUCTION

Mainly two main group of vibration reduction methods, i) passive method and ii) active method.

Passive method uses materials and mechanical linkages that absorb and damp these mechanical waves. Active method involves sensors and actuators that produce destructive interference that cancels out incoming vibration.

IV VIBRATION ANALYSIS

A centrifugal pump impeller model designed by using CatiaV5R19 and then imported a solid model to Hype

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mesh 12.0. Then mesh model imported into the ANSYS 15.

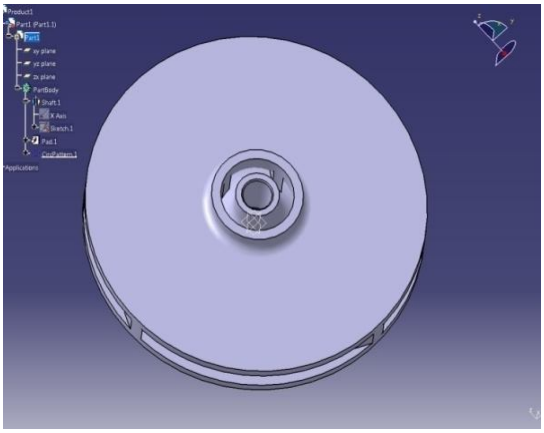

Figure-4.1: 3D model

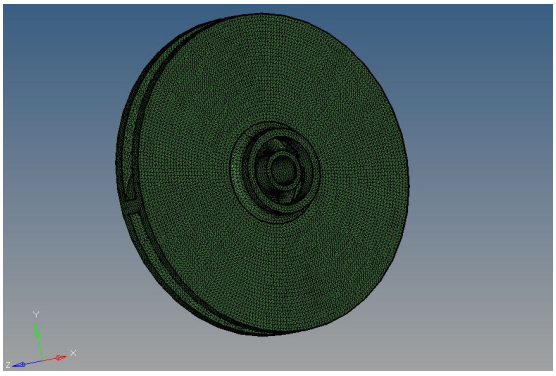

Figure-4.2 Meshing of Impeller

Analysis of impeller has done for three different materials viz. MS, Al alloy and Glass/Epoxy materials.

Mild steel, Aluminum alloy and Glass Fiber Materials Properties are as given below :

Table-4.1: Material properties of MS, AL alloy and Glass fiber.

Mechanical Properties	Symbol	Steel	Al alloy(6063)	Glass fiber
Young's Modulus	E	210 GPa	68.9 GPa	40GPa
Poisson's ratio	ν	0.3	0.33	0.24
Density	ρ	7850kg/m^3	2700 kg/m^3	2000 kg/m^3

Analysis process starts after applying run in the solver software. Solver first calculate the deflections with respect to the boundary conditions applied. Then analysis carried out by taking three different materials to find out displacement and natural frequency for six mode (six reading).

Displacement and natural frequency for MS and Al alloy materials is:

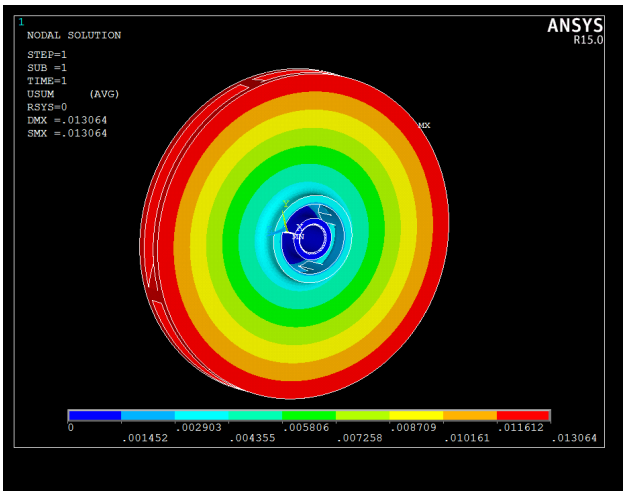

Figure-4.3: Displacement result for impeller (MS)

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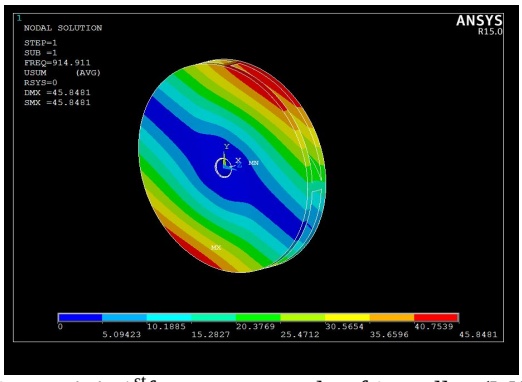

Figure-4.4: 1st frequency mode of impeller (MS)

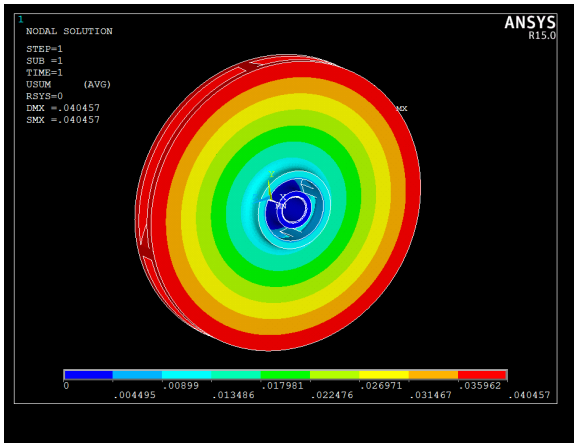

Figure-4.5: Displacement result for impeller (AL alloy 6063)

Displacement and natural frequency for Glass / Epoxy material is

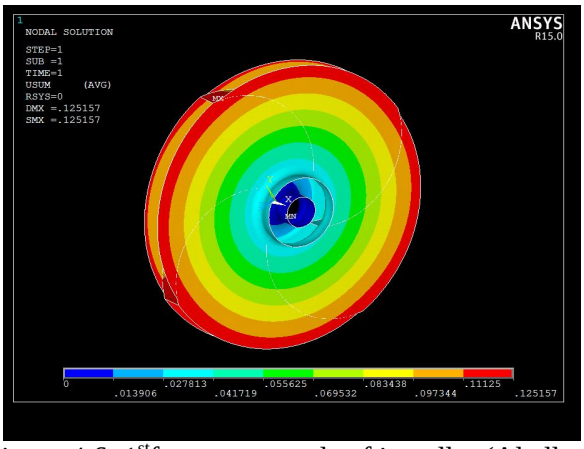

Figure-4.6: 1st frequency mode of impeller (Al alloy)

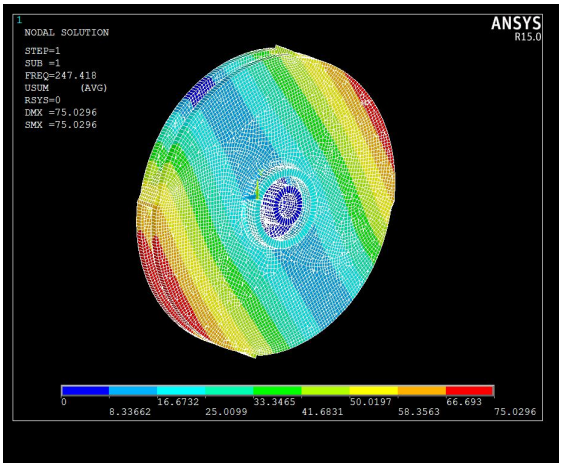

Figure-4.7: Displacement result of impeller (Glass fiber)

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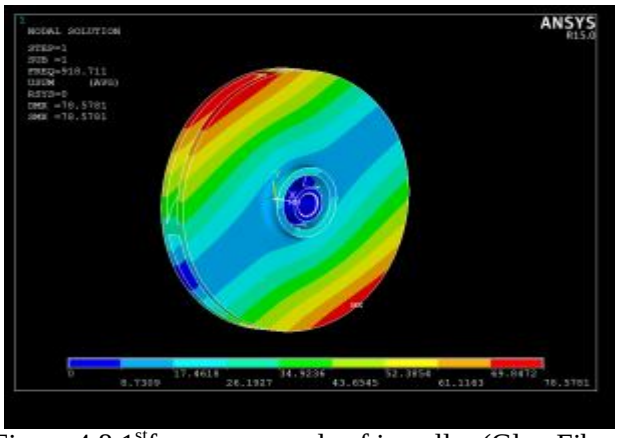

Figure 4.8:1st frequency mode of impeller (GlassFiber)

Analysis of impeller has done for three different materials viz. MS, Al alloy and Glass/Epoxy materials. From the result of finite element analysis it is found that all the materials have stress value less than their respective yield stress value. So the design is safe.

Following table shows the displacement, stress and various frequency mode for three different materials:

Table-4.3: Max. displacement and stress values

S.No.	Material	Max. Stress	Max. Displacement
1.	Steel	31.95 MPa	0.013 mm
2.	Aluminum Alloy 6063	31.72 MPa	0.04 mm
3.	Glass Fiber	112.49 MPa	0.12 mm

Modal analysis has been carried out to find the variation in frequency for number of sets.

Table-4.4: Frequency mode for three different materials

Mode	Mild Steel	AL Alloy	Glass Fiber
1.	914.91 Hz	918.71 Hz	247.41 Hz
2.	916.26 Hz	920.06 Hz	258.92 Hz
3.	1353.04 Hz	1315.2 Hz	638.41 Hz
4.	1712.55 Hz	1712.03 Hz	869.41 Hz
5.	2192.04 Hz	2157.56 Hz	1312.06 Hz
6.	2688.12 Hz	2649.14 Hz	1620.15 Hz

V CONCLUSION

In this paper vibration analysis is carried out on three different materials to reduce the vibration and to improve the performance of pump impeller. From that, it was found that the maximum deformation and low natural frequency is possible for Glass fiber as compared to Mild Steel and Al Alloy 6063. Also Glass fiber has the least density so that weight reduction is possible. Due to low weight and low natural frequency of glass fiber impeller, it is the best alternate suitable material for pump impeller.

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DESIGN AND ANALYSIS OF ELECTROMAGNETIC DAMPER FOR VIBRATION SUPPRESSION OF STRUCTURES

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ABSTRACT
This Paper presents the use of eddy current due to electromagnet is sufficient to suppress the structure vibration. Electromagnetic principle is used normally in brake systems, transmission or for damping phenomena. For damping phenomena the advantage as compared to some other devices is no mechanical contact, no wear and is simple technique. In this article finite element analysis (FEA) software was used to develop the model. Start is done by plotting different mode shapes of structure and then by eddy current due to electromagnetic damping the vibration of structure. We can reduce the damping of varying mass by this damper and also reduce damping coefficient. Damper consists of neodymium iron grade N 50 magnet. By utilizing the damper it is observed that there is more difference in damping when experimental result is compared with analytical result.

INTRODUCTION
Damping due to eddy current is more efficient form of damping. Important parts of damping are permanent magnet, conducting disc of copper. When conductor moves through stationary magnetic field or vice versa electromagnetic forces are produced and these electromagnetic forces can be used to suppress the vibrations of a flexible structure. Drag force or damping force is generated which dissipates kinetic energy into ohmic heat. These dampers have found huge applications, as compared to viscous, viscoelastic or piezoelectric damper. Advantages of electromagnetic based eddy current damper are mechanical contact is eliminated, more reliable, high thermal stability and vacuum compatibility. Certain disadvantages are due to large mass and more packing size.

Normally in the design of transformers or electromagnetic motors laminated steel is used to reduce to reduce eddy current losses. By splitting the conductor, electrical resistance can be increased in the current loops. For electromagnetic damper we should reduce the loop resistance, hence the area of conductors is usually more than the area of magnetic field. By utilizing this approach of "split the magnets to increase eddy current via alternating the magnetic poles.

To illustrate this idea, consider two extreme cases as follows. Figure 1a) shows a moving conductor in a uniform magnetic field of the same width. In Fig. 1b) the magnetic field is split into two with alternative pole directions. When the conductor is moving at position as shown in the figure, instantaneous electric charges are induced in both cases, as indicated in Figs. 1a) and 1b). However eddy current loop and damping exist only in case b) but not in case a) .Case a) is similar to two identical batteries connected in parallel. If the conductor plate is wider than the magnetic field, or the B flux density is not uniform, eddy current and damping force exist in both cases in Fig. 1, but the damping force in case b) will be much larger than that in case a)

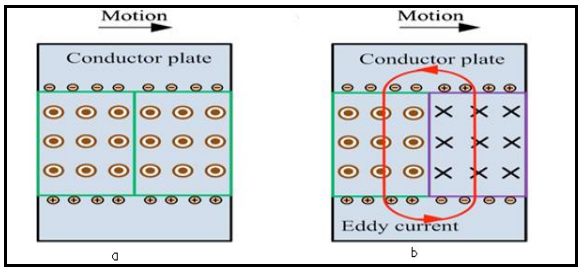

Fig-1: Illustration of Two Types of Arrangements of Magnetic Field for Eddy Current Dampers: (a) Uniform Magnetic Field & (b) Alternating Magnetic Field

A. Analysis of a Conducting plate in a Uniform Magnetic Field.
According to our intuitive illustration based on electrical current loops, we see that the damping Coefficient of a moving conductor plate in an Alternating magnetic field is larger than the plate in a Uniform magnetic field. In the following, we will describe the analytical model of the eddy current Damper in a uniform magnetic field, and then present the modeling of the eddy current damper in the alternating magnetic field. Fig. 2a) shows the eddy current damper composed of a conductor moving with a relative velocity v (m/s) in a rectangular magnetic field

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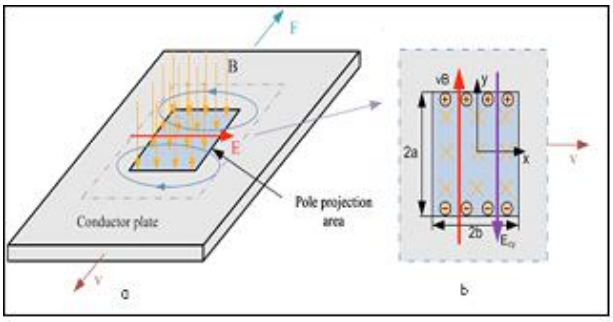

Fig-2: (a) Eddy Current Damping of a Moving Conductor (b) Electric Field Due to Eddy Current

B. Analysis of Conducting Plate in Alternating Magnetic Fields.

Consider the two configurations of magnetic fields, as shown in Figs. 2a and 2b.

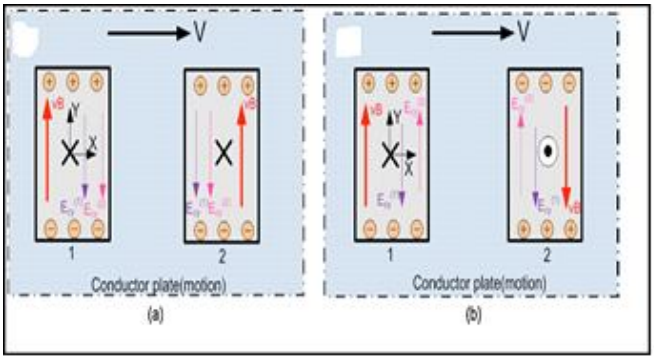

Fig-3: Electric Field Distribution of the Conductor Plate in (a) Unidirectional Magnetic Field & (b) Alternating Magnetic Field

If the direction of two magnetic fields is the same (Fig. 3a), the electrostatic field intensity increases and they further decrease the effect of the electromotive field. As a result, the total electric field intensity and current density inside the magnetic field will be decreased.

If the direction of magnetic fields is opposed Fig.3b) the electrostatic field intensity is decreased, and the total electric field intensity and the eddy current density inside the magnetic field are increased. This is the physical interpretation that is why the eddy current damping can be improved significantly by alternating the magnet poles.

If a moving conductor plate is in an array of alternating magnetic fields, the effect of damping properties is not simply equivalent to the simple combination of two alternating magnetic fields analyzed earlier. Let us take the four alternating magnetic fields in fig 4)

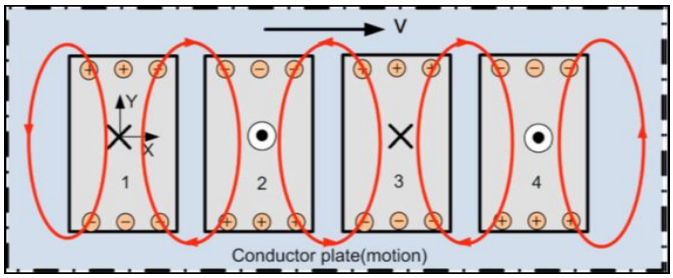

Fig-4: Illustration of Eddy Current in a Conductor Plate Moving in an Array of Alternating Magnetic Field

II METHODOLOGY

We see that the damping coefficient is proportional to the square of the magnetic flux density B, so it is critical to have a large flux density B, which we achieve by choosing high-intensity rare earth magnets and by designing low reluctance magnetic loops. Figure 5) shows a schematic view of the eddy current damper design. A total of 26 permanent magnets neodymium iron boron grade N50 are arranged one over the other on both size of copper conductor plate .The pole direction of magnets in each row is arranged in an alternating pattern. One slots with a gap of. 5 mm exist between the rows to allow the motion of the one conductor plate. Two pieces of soft iron are set in the back of the first and last rows of the magnets to reduce the reluctance of the magnetic loops. We choose copper as the conductor materials because of its high electrical conductivity. Fig 6) shows eddy current damper with mass. The overall dimension of various parts are as Follows

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TABLE-I: MODEL PARTS OF EDDY CURRENT DAMPER & THEIR DIMENSIONS

Model Parts of eddy current damper and their dimensions.		
S No	Part Name	Dimension(mm)
1	Neodymium Iron Boron Magnet	25x5x2 & 40x10x5
2	Base(Wood)	48x100x16
3	Copper Plate	93x81x2
4	Two Soft Iron Piece	96x93x2
5	Soft Iron Piece Packed on Wood Plate	100x93x12
6	Wood Plate in which copper plate is fixed.	120x82x15
7	Weight Used	1 kg,2 kg,3 kg,4 kg.

Fig-5: Eddy Current Damper

Fig-6: Eddy Current Damper with Mass

III RESULT AND DISCUSSION

From the experiment following result is obtained. Frequency is inversely proportional to damping. As Frequency increases

There is reduction in damping. Developed electromagnetic damper is tested for varying masses such as 1kg, 2kg, 3kg & 4kg.Figure 6.1, 6.2, 6.3 and 6.4 as show in the graph of reduction in damping for 30Hz, 35Hz, 40Hz and 45Hz frequency at load 1kg, 2kg, 3kg and 4kg. Result is shown in the following result table.

TABLE-II: RESULT TABLE

Result Table				
	Damping			
Frequency	Load 1Kg	Load 2Kg	Load 3Kg	Load 4Kg
30Hz	3.94	5.8	7.85	9.02
35Hz	3.19	4.2	5.21	7.67
40Hz	2.88	3.2	4.08	5.44
45Hz	2.06	2.8	3.19	4.21

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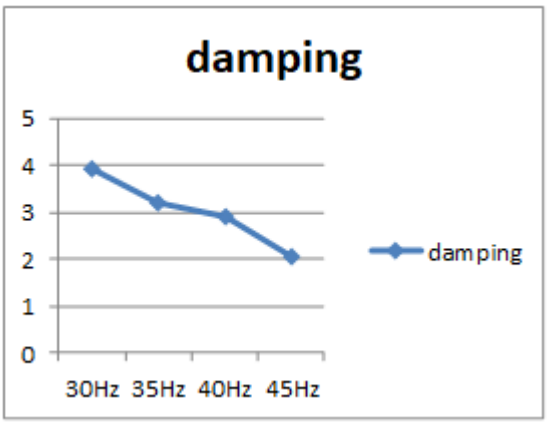

Fig-6.1: Graph of Damping at Load of 1 kg

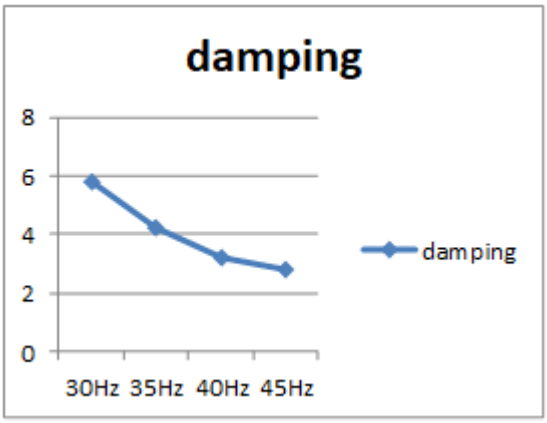

Fig-6.2: Graph of Damping at Load of 2 kg

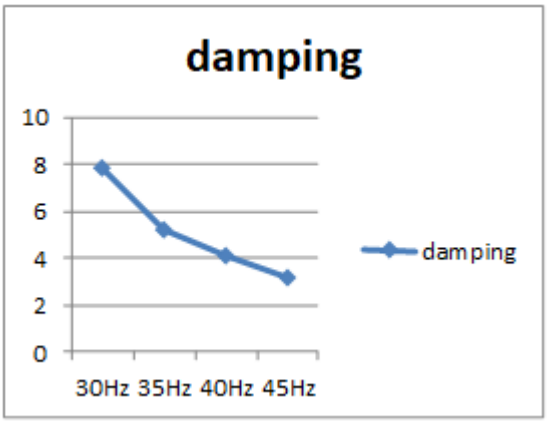

Fig-6.3: Graph of Damping at Load of 3 kg

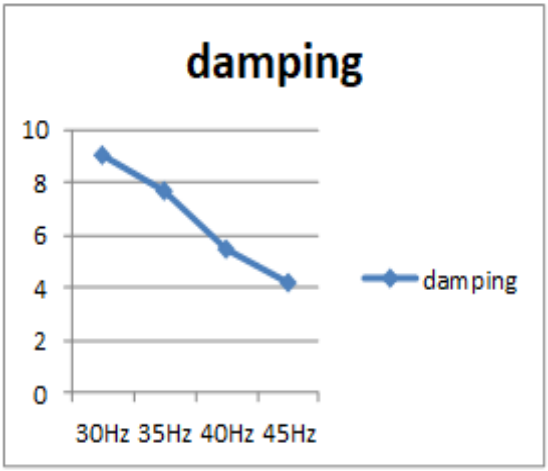

Fig-6.4: Graph of Damping at Load of 4 kg

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IV ACKNOWLEDGMENT
Before we get into thick of the thing I would like to add a few heartfelt words for the people who were the part of this Project Seminar in numerous ways. I offer my gratitude and it is my privilege to acknowledge indebtedness to my estimated Guide Dr P M Bagade. It is stern guidance and grandeur of him which has brought this work in a proper channel. This guidance not only helps me to collect the knowledge but also to gain the confidence which would help me in future. My association with him as a student has been extreme pleasing. I pay my sincere thanks to Dr N B Kardekar, HOD of Mechanical Engg. Department of PVPIT, Bavadhan for the valuable guidance. I would also like to thank Dr C M Sedani, Prof B D Patil, Prof P K Parase, Prof D C Desale for their encouragement and valuable suggestions. Finally heartfelt appreciation to the all those who have directly and indirectly helped me in completion of this Project Report and Seminar.

V CONCLUSION
This paper considers the design and analysis of strong eddy current damper with more damping density. Magnetic field is split and poles are arranged in alternate pattern so as to reduce eddy current loops and hence results in more effective damping. As per electromagnetic theory analytical model for induced eddy current damping is proposed. Experiments are performed. Results of experiments demonstrate that new type of eddy current damper has significantly high efficiency and compactness with a damping density and dimensionless damping constant. Furthermore experiments also indicate damping coefficients reduces along increasing frequency or velocity.

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DESIGN AND FABRICATION OF ORGANIC COMPOSTING FERTILIZER

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ABSTRACT
Potentially recyclable nutrients are largely in the form of the organic materials-night soil, animal manure, sewage sludge, composts, slaughter house wastes, and crop residues. There are some who believe that only naturally derived organic material should be used as fertilizer. Organic fertilizers do, indeed, have valuable properties as soil amendments. In particular, their humus content enhances the efficiency of mineral fertilizer, improves soil structure, increases water retention by soil, and decreases soil erosion. Vegetation like all living things requires certain foods for its survival and growth. For this purpose, fertilizers or manure are the materials to be added to the soil and sometimes to foliage to supply nutrients to sustain plants and promote their abundant and fruitful growth. The elements that constitute these plants foods are divided into three classes. Primary Nitrogen (N), phosphorus (usually expressed as P2O5), and potassium (expressed as K2O) • Secondary - calcium (Ca), magnesium (Mg) and Sulphur (S) • And Minor or so called micro nutrients Iron (Fe), Manganese (Mn), Copper (Cu) Zinc (Zn), Boron(B) and Molybdenum. So, we made the machine which converts organic waste into soil fertilizer by drying it in controlled temperature and controlled humidity as required for activating bacteria. It contains heater, exhaust system, rotating fins, motor, etc.

Keywords: Organic Fertilizer, Soil Erosion, Manure, Soil Structure.

INTRODUCTION
Agriculture is always an important industry, which is the primary condition for production. It provides food, industrial raw materials, capital and exports to other sectors of the national economy. It is well known that agriculture has a huge market potential, especially in organic fertilizer production. When it comes to organic fertilizer production, organic fertilizer has a direct relation to it. With the development in agriculture, the benefits of organic fertilizer are increasingly conspicuous. In this view, it is profitable and feasible for entrepreneur/investors to start organic fertilizer business!

Organic fertilizer is rich in organic matters. It not only provides inorganic & organic nutrients, but also improves physical and chemical properties of soil. In addition, it has abundant raw materials resources from crop straws, livestock manure, leftovers, or municipal sludge. With the increasing living level and green food demand, most farmers, aiming to improve the market competitiveness of their agricultural products, are willing to apply organic fertilizer to improve the crops quality, therefore organic fertilizer production amount should also increase to meet the market need.

From the point of view of investors, starting an organic fertilizer production line needs to take many factors into consideration, such as planning and design, production technology and market analysis. You also need to register your company, find the location of organic fertilizer plant, pay attention to the packaging and design a marketing strategy. In addition, it would be better to seek support from the government or get the sponsor. It is very important to choose the right location. Since it may produce offensive odors, you are supposed to take full account of the factors before starting an organic fertilizer production line.

LITERATURE REVIEW
The main goal of organic fertilizer plant is to produce organic fertilizer that uses a variety of materials containing organic matters and nitrogen, phosphorus and potassium in plant growth. Before starting an organic fertilizer plant, you need to make an investigation of the local organic raw materials market. To make a survey of needed information for factory construction, e.g., the kind of raw materials, acquisition and transportation ways and shipping cost.

The most essential thing to realize continuous organic fertilizer production is to promise the incessant supply of organic raw materials! Due to the characteristics of big volume and difficulty in transportation of raw materials, it had better to establish your organic fertilizer factory in places with sufficient supply of organic materials, such as near big pig farm, chicken farm etc.

In organic fertilizer production process, there are many common organic materials, Manufacturer usually choose the most abundant organic material as the main raw materials of their organic fertilizer, and use other organic raw materials or moderate NPK elements as additives, for example, an organic fertilizer factory

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established near a farm, and there are plenty of agricultural waste every year. The manufacture would like to choose crops straw as his main raw materials, and animal manure, peat and zeolite as accessories.

In short, organic materials, containing organic matter and nutrients which is necessary to promote the growth of crops, can be used as raw materials in organic fertilizer production process. Production technology can be designed according to different raw materials.

Livestock manure is important raw materials for organic fertilizer production. It has strong resistance. When it is sticking to the fertilizer equipment, it has a direct effect on the machinery. Ammonia and sulfur dioxide, produced during fermentation of crop straws and livestock manure, are corrosive. Therefore, when you purchase organic fertilizer production line, you should note the anti-corrosion. In most cases, spray coating for protection against corrosion on steel mill or use special raw material for processing equipment.

If we decide to do domestic organic fertilizer business, you should make an analysis on crops varieties in your locals/country, annual production and consumption of organic fertilizer, farmers preferences in applying organic fertilizer and compound fertilizer, development tendency of organic fertilizer in the next several years etc.

ORGANIC FERTILIZER MARKET ANALYSIS

You can make an analysis on organic fertilizer consumption, production, export and import. Make a concrete study of the data in recent years. Have in-depth understanding of organic fertilizer market development at home and abroad. Make clear of future development trend of local organic fertilizer market. And then find out the most popular organic fertilizer. Which type will be the next best-selling organic fertilizer? Fan Way Fertilizer Machinery has made some detailed analysis on organic fertilizer market, such as Organic Fertilizer Market Analysis in Indonesia.

DETAILS

Selection of Materials

To prepare any machine part, the type of material should be properly

Selected by considering design, safety and following points:

The selection of material for engineering application is given by the following

Factors

1) Suitability of the material for the required components.
2) Suitability of the material for the desired working conditions.
3) Availability of materials.
4) Cost of the materials.

In addition to the above-mentioned factors the other mechanical & physical prosperities should be considered while selecting material for fabrication

COMPONENTS INCLUDED (IMPORTANT)

DESIGN OF SHAFT

FABRICATION

Frame

This is the Frame in to which all the components or parts of machine are fitted. This frame is fitted with the help of welding. Raw material for the frame.

Shaft

Shaft is a rotating machine element which is used for transmitting power from one place to another place. In order to transmit power from one place to another place various members like pulleys, gears etc., are mounted on the shaft.

PROCESS PLANNING

Process planning is an important function, which takes place directly after the design of product. It takes the information received and creates a plan for manufacturing. The process planning involves an application of systematic procedures which involves following steps: -

A) PRELIMINARY PART PRINT ANALYSIS.

B) DETERMINATION LOGICAL SEQUENCE OF OPERATION.

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PROCESS

Compost and Composting

Composting is an aerobic process (Oxygen needs to be present) by bacteria and other micro-organisms that breaks down any type of organic waste into soil. To work properly, the right quantities and proportions of Nitrogen, Carbon and Oxygen need to be provided, and as a result you obtain a rich, safe and fully mature compost that can be used without any further mix for potting, agriculture and gardening. The most important change triggered by composting is the transformation of Nitrogen into different molecules, in order:

- Ammonium (NH4+)
- Nitrites (NO2-)
- And finally, Nitrates (NO3-) which are absorbed by plants and animals.

Mature compost is chemically stable and is recognized as an exceptional soil fertilizer and conditioner of great use for improving soil water retention and prevents desertification.

What is not Composting?

Dehydrating the waste (i.e. drying the waste using heat), rotting by anaerobic bacteria (No need of oxygen to be present) or any other process that doesn't produce a chemically stable and ready to use compost. Many systems claim to prepare compost, but mainly just remove the water in the waste without properly breaking down the Nitrogen molecules in it. These systems are very energy hungry as they need to heat the waste for evaporating the water in it, and obtain as a result a product rich in Ammonium (NH4+), a compound involved in water pollution, acid rain and smog. This so called "compost" invariably requires further processing before being safe for agricultural use or disposal.

What machine can compost

Biodegradable waste includes any organic matter in waste which can be broken down into carbon dioxide, water, methane or simple organic molecules by micro-organisms and other living things using composting, aerobic digestion, anaerobic digestion or similar processes. Biodegradable waste can be found in municipal solid waste (sometimes called biodegradable municipal waste, or BMW) as green waste, food waste, paper waste, and biodegradable plastics. Other biodegradable wastes include human waste, manure, sewage, sewage sludge and slaughterhouse waste. In the absence of oxygen, much of this waste will decay to methane by anaerobic digestion.

In many parts of the developed world, biodegradable waste is separated from the rest of the waste stream, either by separate kerb-side collection or by waste sorting after collection. At the point of collection such waste is often referred to as green waste. Removing such waste from the rest of the waste stream substantially reduces waste volumes for disposal and also allows biodegradable waste to be composted.

EXPECTED OUTCOME

- Automatic system.
- Reduction in time for processing waste to fertilizer.
- Low effort.
- Rich quality of fertilizers can be obtained.
- Odorless.
- Reduce the volume of waste.
- Very small floor area is needed.
- The entire process is a natural & biological.
- Proper waste management.
- Reduces non-biodegradability.
- Increases tree plantation activities in the society.
- Can be successfully used for vegetation.
- Reasonable running cost.
- It has low maintenance.

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FUTURE SCOPE

- Benefits include reduction in greenhouse gas emissions, improved nutrient recycling, reduced water usage, increased crop yields and carbon storage in soils.
- Wheels can be added at the base so that it is easily transportable.
- Chopping blades can be added.
- Blade setup can be made with multiple sizes for thick and thin vegetables.
- Blade setup can be removable.
- Composting area to be made transparent.
- Proper handle for movement of compost bin.
- Mechanism for addition of compost starter and final output compost removal.
- The machine can be made movable in the farm by providing wheels of tire to it which can move more freely without any problem in the farm or on muddy land.
- By using a sieve having small hole diameter the same machine can be used as a thresher to obtain the refined grains after harvesting.
- Machine can help the farmers & small businessmen to be self-efficient & dependent for their everlasting need of compost thereby ultimately bringing an upliftment in their own standard of living & economy

CONCLUSION

Organic fertilizers contain only plant or animal-based materials that are either a byproduct or end product of naturally occurring processes, such as manures, leaves and compost. The biggest advantage of an organic fertilizer is that the danger of over-fertilization is reduced as the nutrients are released slowly and hence, they are available over a longer period and only few applications are required. Organic fertilizer improves the soil by escalating the soil's ability to hold water and nutrients and decreases the erosion and soil crusting caused by rain and wind. Using organic fertilizer adds more natural nutrients, feeds important microbes in the soil and improves the structure of the soil. Organic fertilizers continue to improve the soil even after the plants have taken the nutrients they need and therefore, the longer the soil is fed with organic fertilizers, the better its composition and texture will be.

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DIGITAL IMAGE WATERMARKING USING DWT AND CHIRP-Z TRANSFORM

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ABSTRACT
Digital watermarking has been attracted growing courtesies as it has been current resolution to copyright security and content authentication that become a concern to be addressed in multimedia technology. This work presents a novel watermarking model based on discrete wavelet transform (DWT) in combination with chirp z-transform (CZT) and singular value decomposition (SVD). Initially, the input image is decomposed into its frequency sub-bands by using DWT. Then, the high-frequency sub-band is transformed into z-domain by employing CZT. Further by SVD, watermark is added to singular matrix of the transformed image. Finally, the watermarked image is obtained by taking inverse of CZT and inverse of DWT. This hybrid model combines benefits of all three algorithms. The experimental result shows that the algorithm is imperceptible and robust to several attacks and signal processing operations.

Keyword: Watermarking, Discrete Wavelet Transform (DWT), Chirp-Z Transform (CZT) and Singular Value Decomposition (SVD).

I. INTRODUCTION

With speedy growth of computer networks, and internet technologies, interactive program information is stored and transported as digital messages building communication easy and convenient. Though digital broadcasting of messages has made communication faster and easier, it has also been leads to various types of infringements on digital information that includes illegal copying, illegal reproduction of original contents, easy access, authorized manipulations, and malicious attacks. Digital watermarking is a well-known technology which helps to keep multimedia information from illegal copying, manipulation, and distribution problems by inserting ownership information into digital multimedia content without it been noticed by visual representation. Water-marking techniques are usually clustered into spatial and frequency domain algorithm. The spatial algorithm embeds watermark into digital content by pixel modification.

However frequency domain watermarking has higher computational cost, it has been confirmed to be more robust and imperceptible than spatial domain watermarking. Currently, discrete wavelet trans-form (DWT) [2] [6], discrete cosine transform (DCT) [3] [7], the discrete Fourier transform (DFT)[15] [6] and Zernike moments [16] are frequently used frequency domain watermarking; however, DWT is most widely used due to its frequency spread, multiresolution ability, and spatial localized nature of its wavelet.

Recently, singular value decomposition (SVD) has been adopted by most examiners to implant a watermark. SVD is a universal linear algebra method for a diversity of applications. It's usage in watermarking supports to get better transparency and robustness since minor disparities of singular value do not affect visual perception of cover image. Another transform algorithm that has been used by researcher for image reconstruction is chirp z-transform (CZT) [5] [10].CZT is a technique for evaluating z-transform of a signal. Z-domain transfer functions can be factored into polynomials with poles and zeros as its roots, where poles model peak energy concentration of frequency spectrum and zeros model troughs of the frequency spectrum.

Here, we have proposed a new watermarking technique based on DWT in combination with the CZT and SVD [8]. This algorithm combines advantages of these three transforms. The algorithm can help satisfy the robustness and imperceptibility characteristics of a good watermarking algorithm by greatly improving the visual quality of the watermarked image.

II. LITERATURE SURVEY

This section describes the literature survey of the proposed work based on research carried out by many researches related to various approaches for digital image watermarking.

Mehran Andalibiet.al [01] has presented a techniquefor invisible grayscale logo watermarking that works through adaptive texturization of logo. The strategic idea of thistactic isto reorganize watermarking task to a texture similarity task. They firstly isolate host image into suitably textured and poorly textured regions. Next,

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for textured sections, they convert logo into a visually similar texture through Arnold transform and one lossless rotation; whereas for poorly textured regions, they uses only a lossless rotation. The iteration for the Arnold transform and the angle of lossless rotation are determined by a model of visual texture similarity. Lastly, for all region, they embed transformed logo into that region through a standard wavelet based embedding model. They employ a multi-step extraction stage, in which an affine parameter estimation is first performed to compensate for possible geometrical transformations.

Kamal Nayan Kauret.al [02] has suggested that watermarking is such a practice that helps to conquer copyright protection. Here, they have reviewed DWT-SVD watermarking scheme for image watermarking. They have projected a new technique for image watermarking by utilizing visual cryptography which creates two shares with DWT-SVD. The scheme is highly secured and vital to image processing assault. The given model also gives an insight into implementation of the contained algorithm step-by-step and shows the future prospects.

Nazir A.Loanet.al [03] has presented a blind digital image watermarking technique which is based on chaotic encryption applicable to both color and grayscale images. Discrete Cosine Transform (DCT) is employed before embedding watermark in the host image. The host image will be divided into 8×8 non-overlapping blocks and watermark bit is embedded by modifying difference between DCT coefficients of adjacent blocks. Arnold Transform is utilized with addition to chaotic encryption to add double layer security to the watermark. 3 different variants of proposed scheme have been tested. The simulation results show that proposed scheme is robust to most image processing operations like median filtering, JPEG compression, cropping, sharpening, etc.

Yu Yanget.al [04] has told that crucial characteristics for watermark registration and detection without data alteration can be utilized in an audio zero-watermarking scheme. Here, a novel audio zero-watermarking technique based on discrete wavelet transform (DWT) and discrete cosine transform (DCT) is suggested. The watermark is registered by equating mean absolute values of adjacent frame coefficients after DWT and DCT. Experimental outcomes proves that the proposed scheme is strongly robust to common attacks such as low-pass filtering, AWGN, requantization, down sampling, and MP3 compression. A performance analysis of the proposed scheme shows that all bit error rates after attacks are zero.

Lauri Lauret.al [05] has given a strong grayscale watermarking method based on face detection. Face detection model is used to invent a face on host image and this part of image is converted into frequency domain employing DWT. CZT is applied on low-frequency sub-band from previous step and LU decomposition is used on outcome. Diagonal matrix from LU decomposition is further decomposed by SVD and watermark is embedded into singular values. Numerous experiments are run on that algorithm and results are compared with novel and state-of-the-art techniques. The results show that proposed method has good imperceptibility and robustness characteristics.

Saritha P Ambadekaret.al [06] have proposed a digital image watermarking model based on discrete wavelet transform (DWT) and encryption. Watermark embedding and extraction algorithm using DWT coefficients, distance measurement, and encryption are demonstrated. DWT through multiresolution analysis gives much needed simplicity in watermark embedding and extraction through watermark encryption. The technique results in PSNR greater than 50 dB and is resistance to noise, geometric, and compression attack. The proposed technique may be applied for copyright and content authentication applications.

Budimir Lutovacet.al [07] have suggested to utilize Zernike moments of DCT transform to get an efficient watermarking scheme. Predominantly, novelty of proposed approach relies on technique for choosing of features that will enable both preserving the image quality and robustness to attacks. Also, a criterion for selection of image blocks suitable for watermarking is given. It is based on 1-norm of Zernike moments. The effectiveness of proposed watermarking algorithm is proved on several examples considering various types of attacks (compression, noise, and filtering, geometrical attacks).

Amit Kumar Singet.al [08] this paper presents a secure multiple watermarking model based on discrete wavelet transform (DWT), discrete cosine transforms (DCT) and singular value decomposition(SVD). For identity authentication purpose, the proposed method employs medical image as the image watermark, and the personal and medical record of patient as text watermark. In the embedding process, the cover medical image is decomposed up to second level of DWT coefficients. Low frequency band (LL) of the host medical image is transformed by DCT and SVD. The watermark medical image is also transformed by DCT and SVD. The singular value of watermark image is embedded in the singular value of the host image. Furthermore, the text watermark is embedding at the second level of the high frequency band (HH) of the host image. In order to enhance the security of the text watermark, encryption is applied to the ASCII representation of the text watermark before embedding.

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G S Kalraet.al [09]have presented a technique of digital image watermarking for color images that have implemented in frequency domain. Before inserting the watermark, they added the Hamming codes row wise as well column wise in intensity component of color image. Two encryption techniques were implemented on the ECC inserted watermark for its security. The pixel position for inserting the watermark was calculated using starting row and column number for that 8×8 block. Pixel embedding strength is calculated using criteria that low frequency is robust in general signal processing attacks, thus choosing less value to be embedded and vice-versa. Results show that the watermarking algorithm is robust against common signal processing attacks.

Pejman Rastiet.al [10] have suggested work addresses the aforementioned issue by introducing a robust and imperceptible non-blind color video frame watermarking algorithm. The method divides frames into moving and non-moving parts. The non-moving part of each color channel is processed separately using a block-based watermarking scheme. Blocks with an entropy lower than the average entropy of all blocks are subject to a further process for embedding the watermark image. Finally a watermarked frame is generated by adding moving parts to it. Several signal processing attacks are applied to each watermarked frame in order to perform experiments and are compared with some recent algorithms.

III. METHODOLOGY

The proposed work procedure for watermark embedding and watermark extraction has been illustrated in the Figure. 3 and Figure. 4. This section proposes a watermarking scheme based on the DWT in combination with the CZT and SVD. This hybrid model combines the advantages of these three transforms. The algorithm can help satisfy the robustness and imperceptibility characteristics of a good watermarking algorithm by greatly improving the visual quality of the watermarked image and being robust against common signal processing operations and attacks.

1. Discrete Wavelet Transform (DWT): Discrete wavelet transform (DWT) is a process of multi-scale and spatial-frequency decomposition to an image. In DWT-based watermarking system, DWT is used to decompose an aimed image into four types of sub-bands that are LL, HL, LH and HH. LL is low frequency component, and has a low resolution, representing approximate information of an image [11]. The other three are horizontal high-frequency part, vertical high-frequency part, and high frequency part, respectively, and their resolutions are high, representing detailed image information. One or more sub-bands can be used to embed watermark information. DWT is an efficient frequency model for HVS, which is widely applied in the field of image compression and enhancement [8].

Wavelet transform has the characteristics of multi-resolution, so hierarchical display is a feasible application of continuous image transmission. In watermark applications, it has less computation complexity when watermark is embedded hierarchically or nested by using DWT technology. DWT-based techniques reflect better robustness against numerous attacks compared with watermarking in spatial domain [6]. Another feature of DWT is ability to choose various filter banks for required broadband. The commonly used filters are Haar, Daubechies, Coiflets and Biorthogonal, and adjustments can be easily done when required. With regard to a multidimensional signal, the ideal of DWT is to divide signal into high and low frequencies, and the low frequency part is further split up into high and low frequencies till original signal is completely decomposed, as shown in Figure 1 and Figure 2. After the process of inverse wavelet transform (IDWT), the image can be reconstructed.

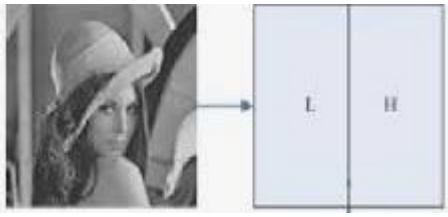

Figure-1: 1-Level DWT

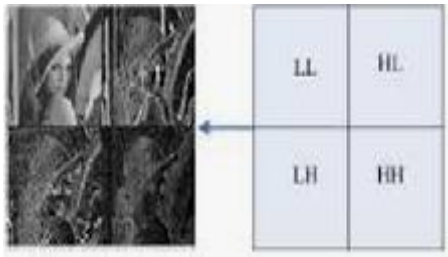

Figure-2: 2-Level DWT

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2. Chirp-Z Transform (CZT):Chirp-Z transform (CZT) is an algorithm for computing Z transform of a series of samples. The transform supports to effectively evaluate Z transform at points on Z-plane that lie on a circular or spiral contour beginning at any arbitrary point on Z-plane. Z-domain transfer functions can be factored into polynomials with poles and zeros as its roots. Describing a system in terms of its poles and zeros is an effective tool for examining behavior of that system, where poles indicates roots of the feedback part of transfer function and the zeros represent the roots of the feed forward part of the transfer function. The CZT helps to investigate systems by precisely locating the poles and zeros of its transfer function [5].

The major rewards of employing the CZT is that sharpness of resonance peak can be enhanced by computing Z-transform along a contour that lies closer to the pole(s). Since CZT has ability of evaluating the Z transform at points both inside and outside the unit circle, by evaluating the transform off the unit circle, the contour can be adjusted to pass closer to the poles of the signal, causing the spectrum to sharpen.

The three main applications of chirp-z transforms are

- High resolution, narrow band frequency analysis.
- Time interpolation or sampling rate changing.
- Enhancement of poles.

1. Singular value Decomposition (SVD):The singular value decomposition (SVD) of $m \times n$ real valued matrix A with $m \times n$, performs orthogonal row and column operations on A in such a way that resulting matrix is diagonal and diagonal values (singular values) are organizedin decreasing value and coincide with square root of the Eigen values of $A^T A$ [2] [17]. The column of the $m \times m$, U hasmutually orthogonal unit vectors, as are the columns of the$n \times n$, Vmatrix. U and V are orthogonal matrices i.e. given in the Eq. (1).

$$U^T U = V^T V = VV^T = I \qquad (1)$$

S is as pseudo diagonal matrix, having diagonal elements as singular values [8].We can get the matrix A again by using following approach given in the Eq. (2):

$$A = USV^T \qquad (2)$$

There are three main properties to employ the SVD method in digital watermarking scheme:

- When a small perturbation is added to an image, its singular values do not change significantly due to the stability property of the singular value.
- Pairs of singular vectors specify the geometry of the image, and the singular value specifies the luminance of an image layer.
- The intrinsic algebraic image properties are represented by the singular values.

2. Watermark Embedding Process: the step by step procedure for the watermark embedding procedure is illustrated below:

✓ Apply DWT to the input image to decompose into sub bands given in the Eq. (3).

$$[LL, LH, HL, HH] = DWT(I) \qquad (3)$$

✓ Compute Chirp-Z transform for the high frequency sub band given in the Eq. (4).

$$[I2] = CZT(HH) \qquad (4)$$

✓ Apply SVD to $[I2]$to further decompose itgiven in the Eq. (5).

$$[UHH \;\; SHH \;\; VHH] = SVD(I2) \qquad (5)$$

where SHH is diagonal matrix with higher entries of decomposed input image.And UHH ,$VHH$are the orthogonal matrix of decomposed image.

✓ Apply SVD to $[I2]$to input watermark image W,as given in the Eq. (6).

$$[Ulogo \; Slogo \; Vlogo] = SVD(W) \qquad (6)$$

Where $Ulogo$ and $Vlogo$are the orthogonal matrix of the decomposed watermark image. And $Slogo$ is the

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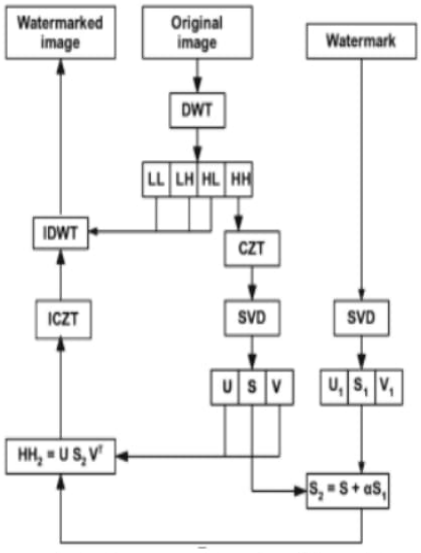

Figure-3: Watermark Embedding Process

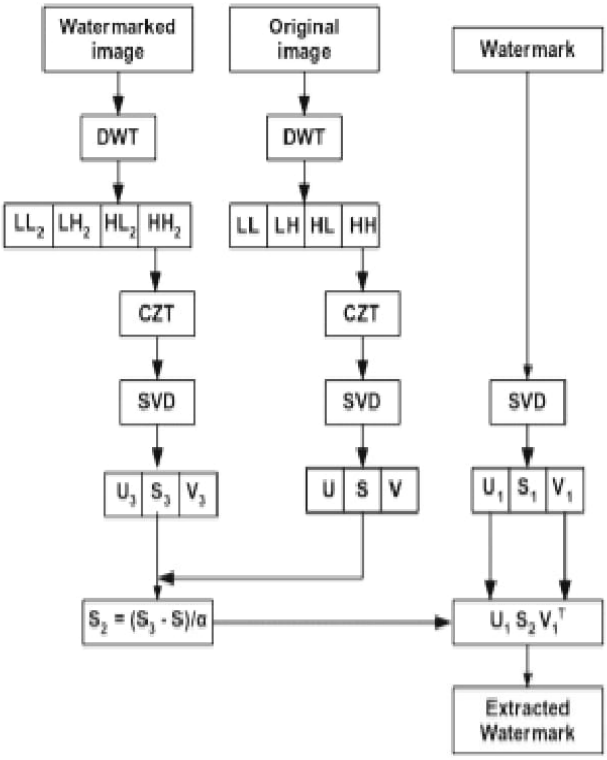

Figure-4: Watermark Extraction Process

Diagonal matrix with the higher entries of decomposed watermark image.

- ✓ Modify the singular values of input decomposed image with the singular values of the watermarked image using scaling factorα,as given in the Eq. (7).

$$S_2 = SHH + \alpha * Slogo \qquad (7)$$

- ✓ Combine the orthogonal matrix of decomposed input image with modified singular value matrix,as given in the Eq. (8).

$$I3 = Uhh * S_2 * Vhh^T \qquad (8)$$

- ✓ Compute the inverse Chirp-Z transform of$I3$to get high frequency sub band,as shown in Eq. (9).

$$[HH_2] = -CZT(I3) \qquad (9)$$

- ✓ Compute inverse DWT of decomposed image using HH_2,instead of HH as shown in Eq. (10).

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$$Watermarked = IDWT(LL, LH, HL, HH_2) \quad (10)$$

3. ***Watermark Extraction Process:*** the step by step procedure for the watermark extracting procedure is illustrated below:

- ✓ Apply DWT to the input image I to decompose into sub bands, as shown in the Eq. (11).

$$[ELL\ ELH\ EHL\ EHH] = DWT(I) \quad (11)$$

- ✓ Apply DWT to $I3$ to decompose into sub bands, as shown in the Eq. (12).

$$[ELL1\ ELH1\ EHL1\ EHH1] = DWT(I3) \quad (12)$$

- ✓ Compute CZT of high frequency component of I as shown in the Eq. (13).

$$I4 = CZT(EHH) \quad (13)$$

- ✓ Compute CZT of high frequency component of $I3$ as shown in the Eq. (14).

$$I5 = CZT(EHH1) \quad (14)$$

- ✓ Apply SVD to $I4$ to further decompose it as follows in the Eq. (15).

$$[UHH\ SEHH\ VHH] = SVD(I4) \quad (15)$$

- ✓ Apply SVD to $I5$ to further decompose it as follows in the Eq. (16).

$$[UHH1\ SEHH1\ VHH1] = SVD(I5) \quad (16)$$

- ✓ Apply SVD to watermark image W to further decompose it as follows in the Eq. (17).

$$[UHH2\ SEHH2\ VHH2] = SVD(W) \quad (17)$$

- ✓ Subtract the singular values of the decomposed image to singular values of the watermark image and divide it by scaling factor, as follows in the Eq. (18).

$$[S3] = (SEHH2 - SEHH)/\alpha \quad (18)$$

- ✓ Combine the orthogonal matrix of watermark image with modified singular value matrix,as given in the Eq. (19).

$$I3 = UHH1 * S_3 * VHH1^T \quad (19)$$

IV. EXPERIMENTAL RESULTS

The experimental results of the proposed model has illustrated below. The different parameters are used to calculate the efficiency of the proposed technique, those are illustrated below.

- ❖ **Mean Square Error (MSE):** The mean squared error (MSE) or mean squared deviation (MSD) of an estimator (of a procedure for reckoning an unnoticed quantity) measures average of squares of errors—that is, the average squared difference between estimated values and what is estimated. MSE is a risk function, equivalent to expected value of squared error loss. The fact that MSE is mostof the time strictly positive (and not zero) is because of randomness or because estimator does not account for information that could yield a more accurate estimate. The MSE is a measure of quality of an estimator—it is always non-negative, and values nearer to zero are better. I.e. given in the Eq. (20).

$$MSE = \frac{1}{mn}\sum_{i=0}^{m-1}\sum_{j=0}^{n-1}[I(i,j) - k(i,j)]^2 \quad (20)$$

- ❖ **Peak Signal-to-Noise Ratio:** Peak signal-to-noise ratio, often abbreviated PSNR, is an engineering word for ratio among maximum conceivable power of a signal and power of corrupting noise which affects the fidelity of its representation. Because several signals have a very wide dynamic range, PSNR is typically expressed in terms of the logarithmic decibel scale.

The PSNR (in dB) is defined as in the Eq. (21).

$$PSNR = 20.log_{10}(MAX1) - 10.log_{10}(MSE) \quad (21)$$

Here $(MAX1)$ is maximum pixel value of an image.

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$$a = a - mean2(a) \quad (22)$$

$$b = b - mean2(b) \quad (23)$$

$$c = sum(sum(a.*b))/sqrt(sum(sum(a.*a)) * sum(sum(b.*b))) \quad (24)$$

- **Structural Similarity Index (SSIM):** SSIM is utilized for measuring similarity among two images. The SSIM index is a full reference metric; in other words, measurement or prediction of image quality is based on an initial uncompressed or distortion-free image as reference. SSIM is designed to improve on traditional methods such as peak signal-to-noise ratio (PSNR) and mean squared error (MSE).

The SSIM index is calculated on various windows of an image. The measure between two windows x and y of common size N×N is, illustrated in Eq. (25).

$$SSIM(x,y) = \frac{(2\mu_x\mu_y + C_1)(2\sigma_{xy} + C_2)}{(\mu_x^2 + \mu_y^2 + C_1)(\sigma_x^2 + \sigma_y^2 + C_2)} \quad (25)$$

With μ_x is the average of x, μ_y is the average of y, σ_x^2 is the average of x, σ_y^2 is the average of y, and σ_{xy} is the covariance of x and y.

$$C_1 = (k_1 L)^2 \quad (26)$$

$$C_2 = (k_2 L)^2 \quad (27)$$

Eq. (8) and Eq. (9) two variables to stabilize the division with weak denominator, L is the dynamic range of the pixel values. k_1=0.01 and k_2=0.03 by default.

SSIM satisfies the condition of symmetry. I.e. illustrated in the Eq. (28).

$$SSIM(x,y) = SSIM(y,x) \quad (28)$$

The proposed technique is applied on the 512*512 input host images and watermark image is taken of size 128*128. The proposed DWT-CZT-SVD based watermarking model is tested using several examples.

Figure. 5 and Figure. 6 shows the resultant output of proposed DWT-CZT-SVD model.Figure. 7 shows the different types of attacks on input host image and Figure. 8 is the respective extracted images. Table 1. Shows the resultant normalized correlation coefficients (NCC) comparison with existing work after different attacks. Form this we can conclude than our experimental setup gives higher NCC than existing

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The three main applications of chirp-z transforms are

- High resolution, narrow band frequency analysis.
- Time interpolation or sampling rate changing.
- Enhancement of poles.

4. ***Singular value Decomposition (SVD):*** The singular value decomposition (SVD) of $m \times n$ real valued matrix A with $m \times n$, performs orthogonal row and column operations on A in such a way that resulting matrix is diagonal and diagonal values (singular values) are organizedin decreasing value and coincide with square root of the Eigen values of $A^T A$ [2] [17]. The column of the $m \times m$, U hasmutually orthogonal unit vectors, as are the columns of the$n \times n$, Vmatrix. U and V are orthogonal matrices i.e. given in the Eq. (1).

$$U^T U = V^T V = VV^T = I \quad (1)$$

S is as pseudo diagonal matrix, having diagonal elements as singular values [8].We can get the matrix A again by using following approach given in the Eq. (2):

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$$A = USV^T \qquad (2)$$

There are three main properties to employ the SVD method in digital watermarking scheme:

- When a small perturbation is added to an image, its singular values do not change significantly due to the stability property of the singular value.
- Pairs of singular vectors specify the geometry of the image, and the singular value specifies the luminance of an image layer.
- The intrinsic algebraic image properties are represented by the singular values.

5. ***Watermark Embedding Process:*** the step by step procedure for the watermark embedding procedure is illustrated below:

✓ Apply DWT to the input image to decompose into sub bands given in the Eq. (3).

$$[LL, LH, HL, HH] = DWT(I) \qquad (3)$$

✓ Compute Chirp-Z transform for the high frequency sub band given in the Eq. (4).

$$[I2] = CZT(HH) \qquad (4)$$

✓ Apply SVD to $[I2]$to further decompose itgiven in the Eq. (5).

$$[UHH\ SHH\ VHH] = SVD(I2) \qquad (5)$$

where SHH is diagonal matrix with higher entries of decomposed input image.And UHH ,$VHH$are the orthogonal matrix of decomposed image.

✓ Apply SVD to $[I2]$to input watermark image W,as given in the Eq. (6).

$$[Ulogo\ Slogo\ Vlogo] = SVD(W) \qquad (6)$$

Where $Ulogo$ and $Vlogo$are the orthogonal matrix of the decomposed watermark image. And $Slogo$ is the

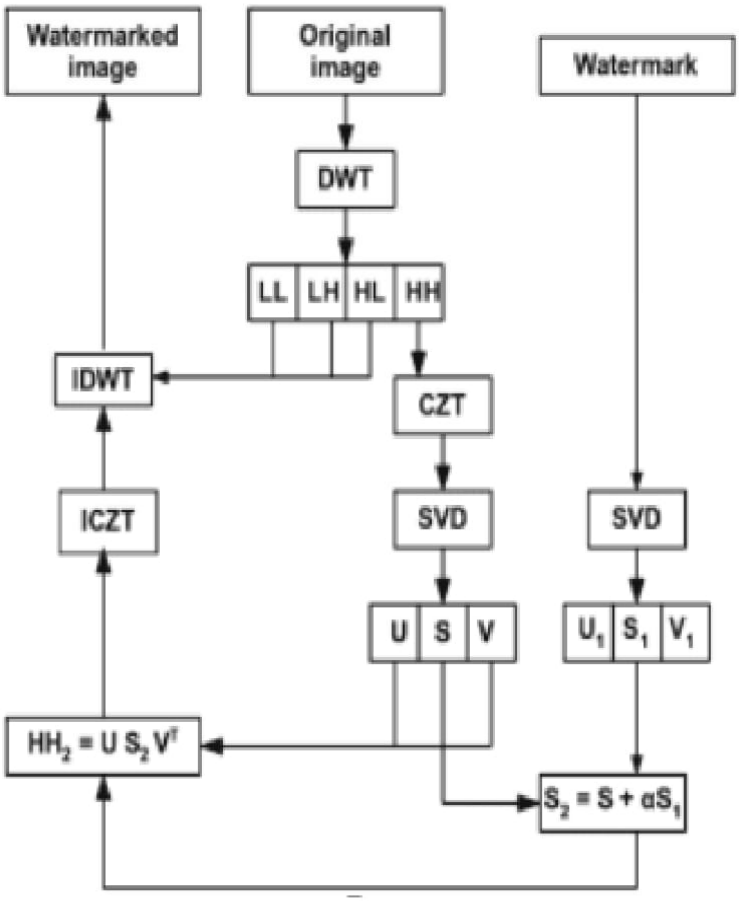

Figure-3: Watermark Embedding Process

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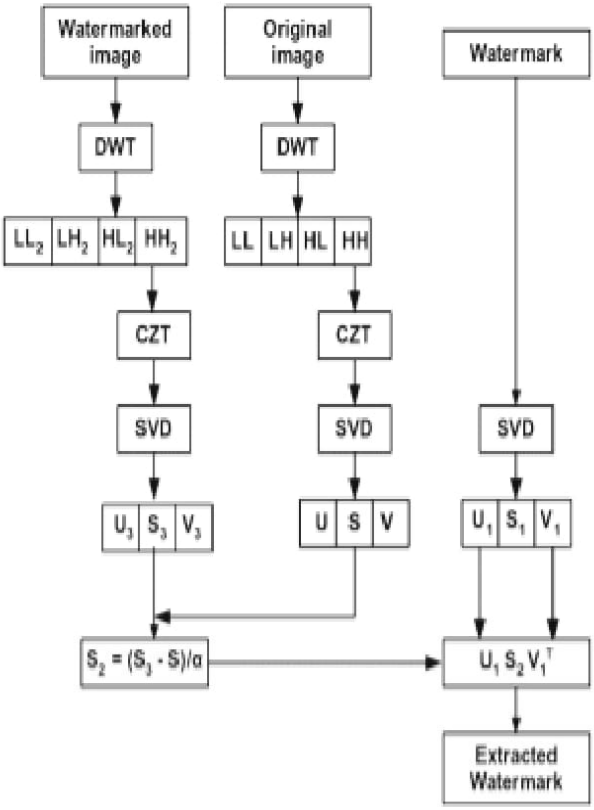

Figure-4: Watermark Extraction Process

Diagonal matrix with the higher entries of decomposed watermark image.

- ✓ Modify the singular values of input decomposed image with the singular values of the watermarked image using scaling factorα,as given in the Eq. (7).

$$S_2 = SHH + \alpha * Slogo \quad (7)$$

- ✓ Combine the orthogonal matrix of decomposed input image with modified singular value matrix,as given in the Eq. (8).

$$I3 = Uhh * S_2 * Vhh^T \quad (8)$$

- ✓ Compute the inverse Chirp-Z transform of$I3$to get high frequency sub band,as shown in Eq. (9).

$$[HH_2] = -CZT(I3) \quad (9)$$

- ✓ Compute inverse DWT of decomposed image using HH_2,instead of HH as shown in Eq. (10).

$$Watermarked = IDWT(LL, LH, HL, HH_2) \quad (10)$$

6. Watermark Extraction Process: the step by step procedure for the watermark extracting procedure is illustrated below:

- ✓ Apply DWT to the input image I to decompose into sub bands, as shown in the Eq. (11).

$$[ELL\ ELH\ EHL\ EHH] = DWT(I) \quad (11)$$

- ✓ Apply DWT to $I3$ to decompose into sub bands, as shown in the Eq. (12).

$$[ELL1\ ELH1\ EHL1\ EHH1] = DWT(I3) \quad (12)$$

- ✓ Compute CZT of high frequency component of Ias shown in the Eq. (13).

$$I4 = CZT(EHH) \quad (13)$$

- ✓ Compute CZT of high frequency component of $I3$as shown in the Eq. (14).

$$I5 = CZT(EHH1) \quad (14)$$

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- ✓ Apply SVD to $I4$ to further decompose it as follows in the Eq. (15).

$$[UHH\ SEHH\ VHH] = SVD(I4) \quad (15)$$

- ✓ Apply SVD to $I5$ to further decompose it as follows in the Eq. (16).

$$[UHH1\ SEHH1\ VHH1] = SVD(I5) \quad (16)$$

- ✓ Apply SVD to watermark image W to further decompose it as follows in the Eq. (17).

$$[UHH2\ SEHH2\ VHH2] = SVD(W) \quad (17)$$

- ✓ Subtract the singular values of the decomposed image to singular values of the watermark image and divide it by scaling factor, as follows in the Eq. (18).

$$[S3] = (SEHH2 - SEHH)/\alpha \quad (18)$$

- ✓ Combine the orthogonal matrix of watermark image with modified singular value matrix,as given in the Eq. (19).

$$I3 = UHH1 * S_3 * VHH1^T \quad (19)$$

V. EXPERIMENTAL RESULTS

The experimental results of the proposed model has illustrated below. The different parameters are used to calculate the efficiency of the proposed technique, those are illustrated below.

- ❖ **Mean Square Error (MSE):** The mean squared error (MSE) or mean squared deviation (MSD) of an estimator (of a procedure for reckoning an unnoticed quantity) measures average of squares of errors—that is, the average squared difference between estimated values and what is estimated. MSE is a risk function, equivalent to expected value of squared error loss. The fact that MSE is mostof the time strictly positive (and not zero) is because of randomness or because estimator does not account for information that could yield a more accurate estimate. The MSE is a measure of quality of an estimator—it is always non-negative, and values nearer to zero are better. I.e. given in the Eq. (20).

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$C_1 = (k_1 L)^2$ (26)

$C_2 = (k_2 L)^2$(27)

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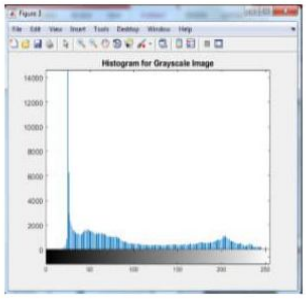
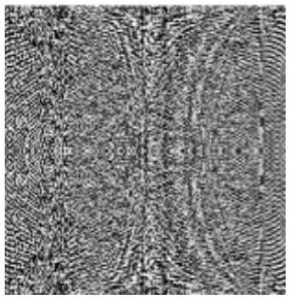
(a) Input Image

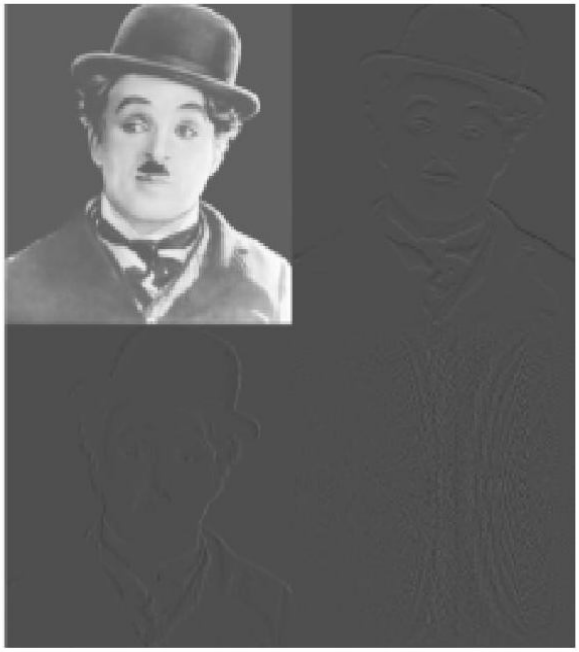
(b) Gray Image



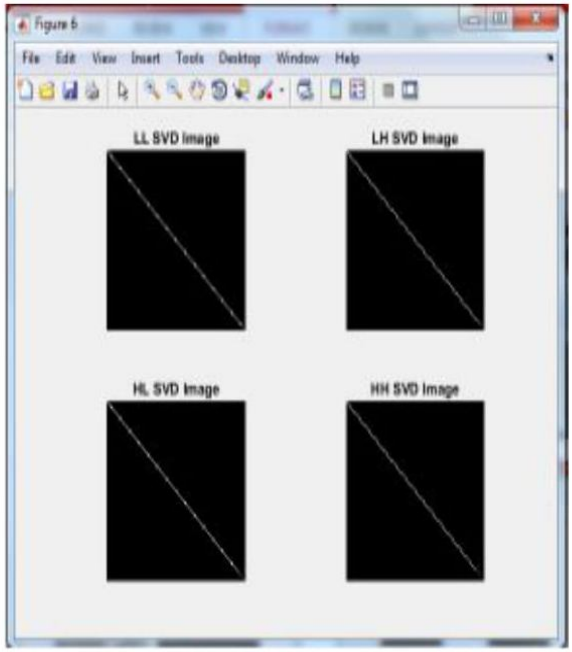
(c) Histogram



(d) CZT Output



(e) DWT Segmentation



(f) LL, LH, HL, HH of SVD Image

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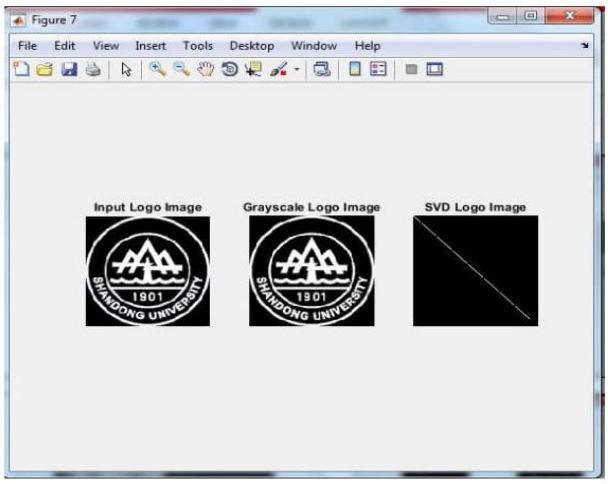
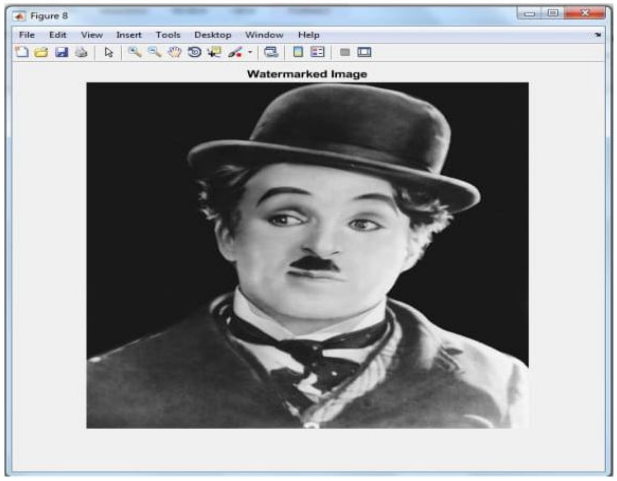
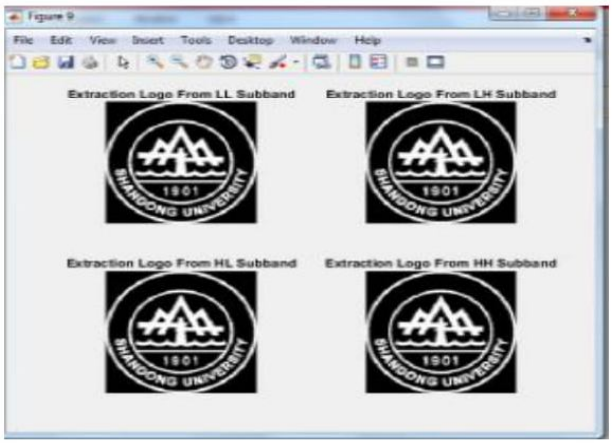


(g) Logo Image



(h) Watermarked Image

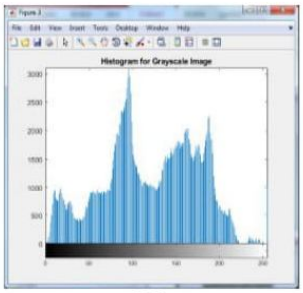


(i) Extracted Image

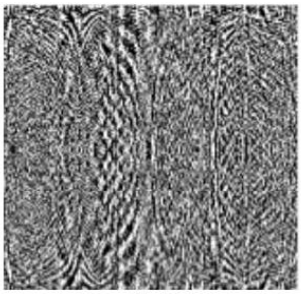
Figure-5: Resultant Output Parameters Example 1

(a) Input Image

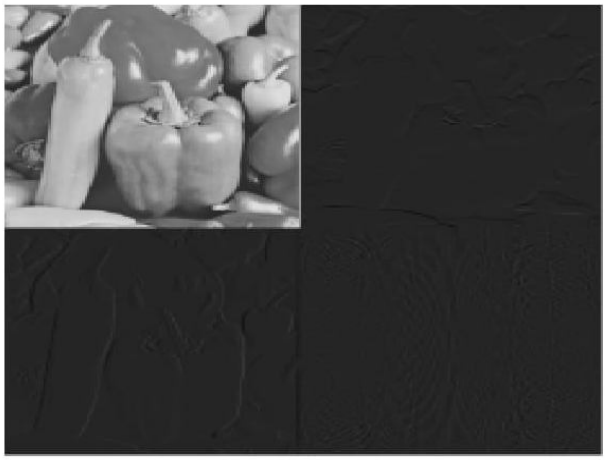
(b) Gray Image



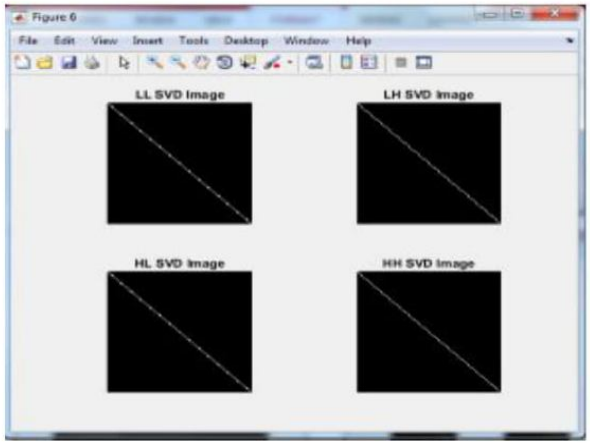
(c) Histogram



(d) CZT Output



(e) DWT Segmentation



(f) LL, LH, HL, HH of SVD Image

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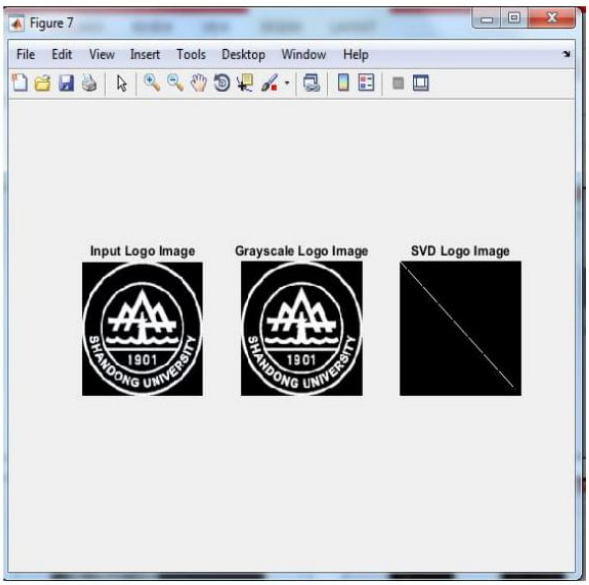
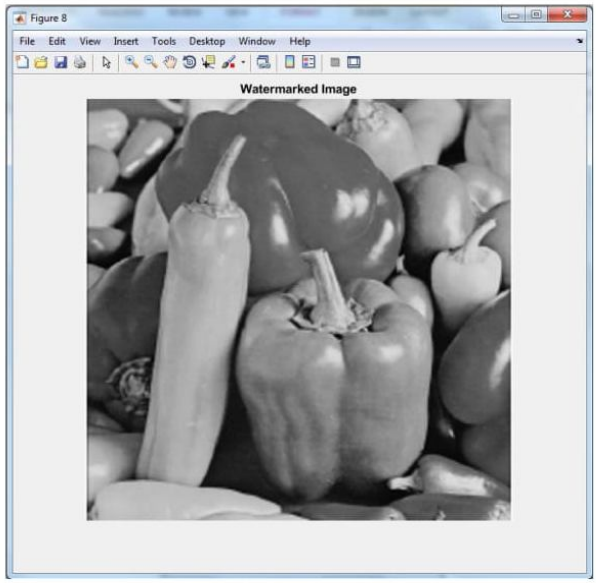
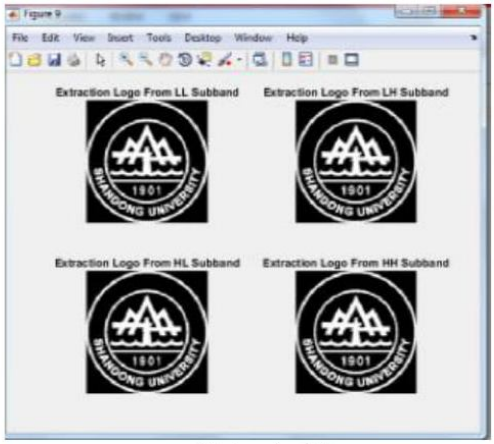


(g) Logo Image



(h) Watermarked Image



(i) Extracted Image

Figure-6: Resultant Output Parameters Example 2

(a) Noisy Image

(b) Blurred Image

(c) Cropped Image

(d) Rotated By -90

(e) Rotated By +90

(f) Sharpened Image

(g) Translated Image

(h) Row, Column Blank

Figure-7: Different Types of Attacks

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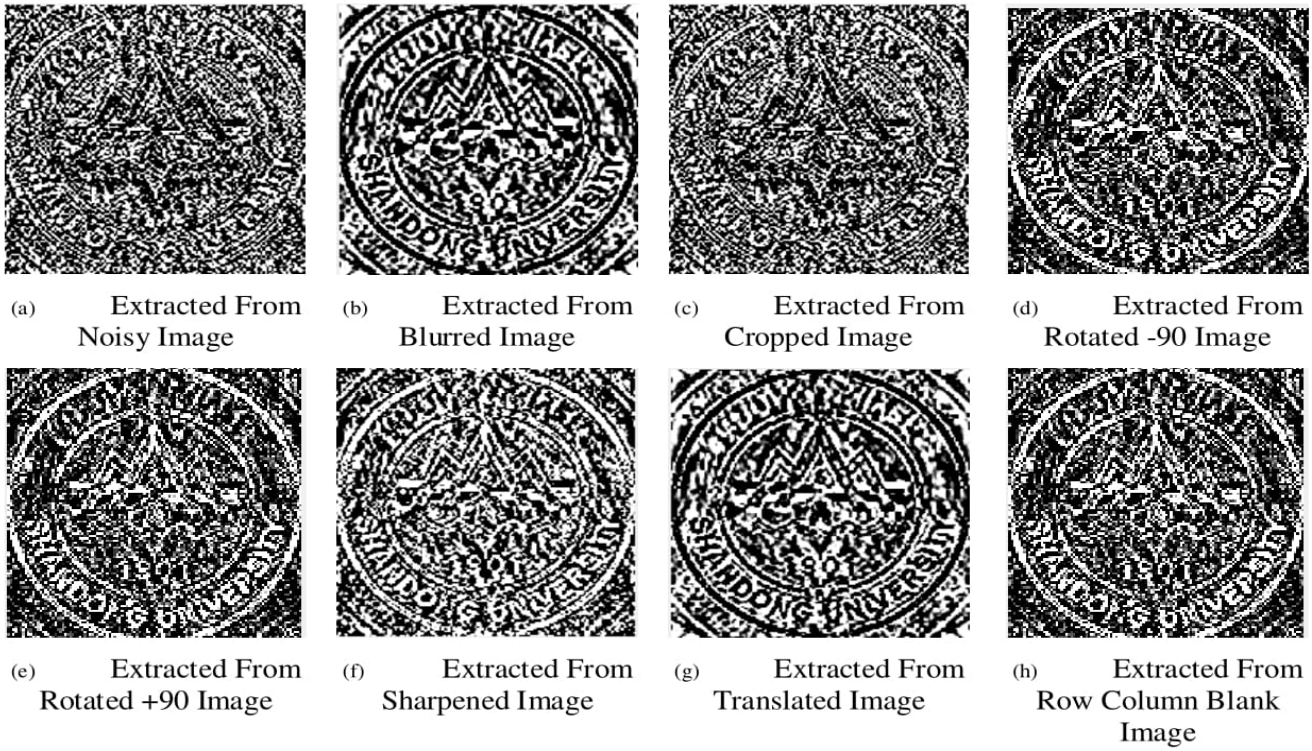

(a) Extracted From Noisy Image
(b) Extracted From Blurred Image
(c) Extracted From Cropped Image
(d) Extracted From Rotated -90 Image
(e) Extracted From Rotated +90 Image
(f) Extracted From Sharpened Image
(g) Extracted From Translated Image
(h) Extracted From Row Column Blank Image

Figure-8: Extracted Images

Table-1: Comparison of NCC Values

Various Attacks	Lauri Laur et.al [5]	Pejman Rasti et.al [6]	Amit Kumar Sing et.al [8]	Proposed (DWT-CZT-SVD)
Salt & Pepper Noise	0.7946	0.9616	0.8653	0.9843
Blurring	0.8725	0.8937	0.7102	1.008
Cropping	0.9781	0.9144	0.9829	0.9988
Rotation by -90	0.8810	0.8411	0.8224	0.9183
Rotation by +90	0.8810	0.8411	0.7527	0.9183
Sharpening	0.9377	0.9806	0.8787	0.9925
Translation	0.8948	0.9618	0.8247	0.9585
Row & Column Blank	0.9990	0.8149	0.6189	0.9991
Average Value	0.9048	0.9012	0.8072	0.9722

Table-2: Result Parameters

Input Images	MSE	PSNR	SSIM	NCC
Animal	0.1160	57.4856	0.9996	0.9999
Boat	0.1164	57.4704	0.9992	1.0000
Cat	0.1419	56.6119	0.9990	0.9999
Charlie	0.1059	57.8801	0.9992	1.0000
Clock	0.1487	56.4097	0.9993	0.9999
Einstein	0.1236	57.2095	0.9989	0.9999
Vegetable	0.1203	57.8231	0.9987	0.9999
Lady	0.1087	57.7665	0.9992	0.9999
Lana	0.1216	57.2821	0.9990	0.9999
Tajmahal	0.1185	57.3938	0.9993	0.9999
Average Value	0.1222	57.3333	0.9992	0.9999

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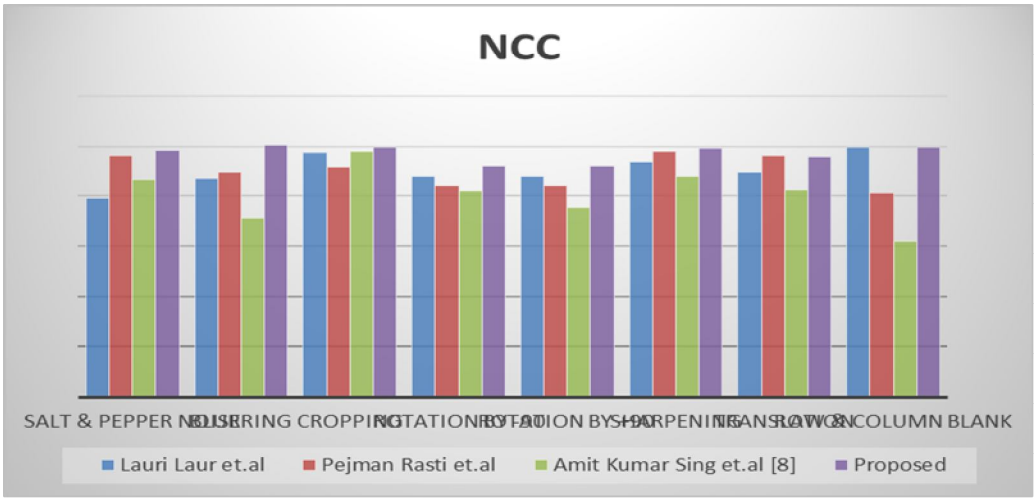

Figure-9: Normalized Correlation Coefficient (NCC) Comparison Graph

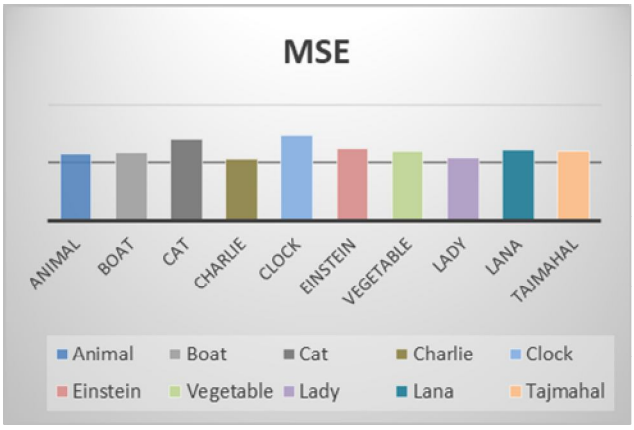

Figure. 10: Resultant MSE Graph

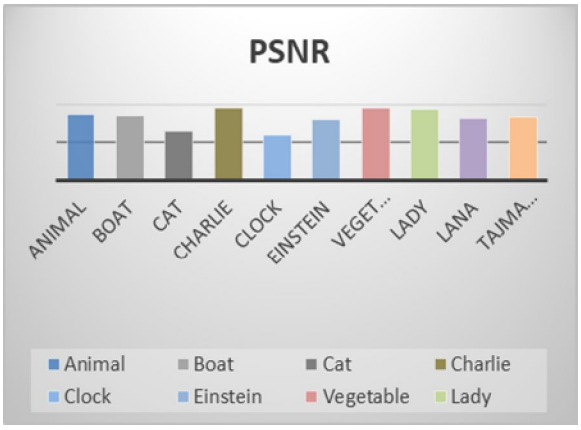

Figure. 11: Resultant PSNR Graph

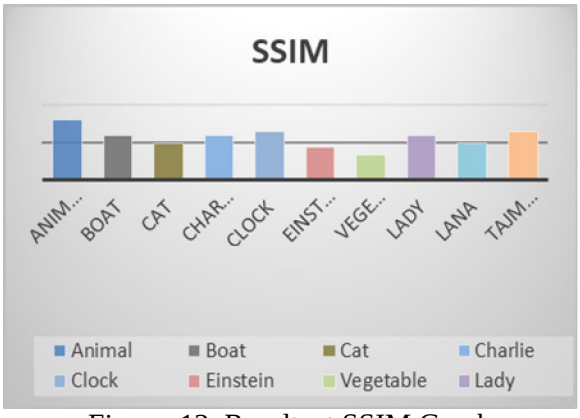

Figure. 12: Resultant SSIM Graph

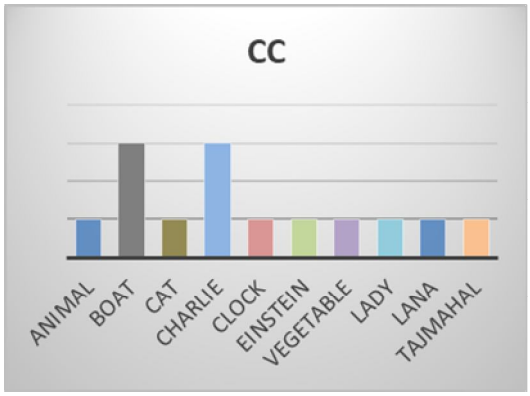

Figure. 13: Resultant CC Graph

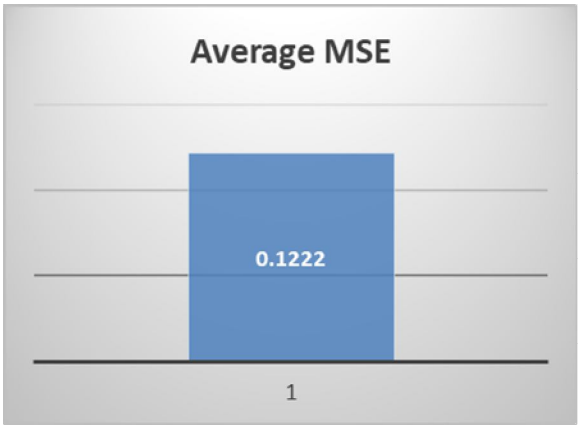

Figure. 14: Average MSE Graph

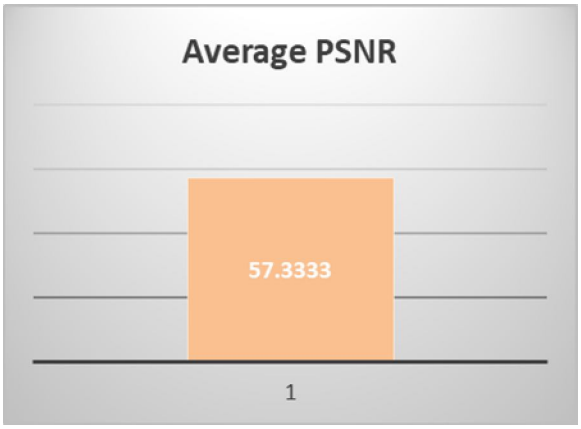

Figure. 15: Average PSNR Graph

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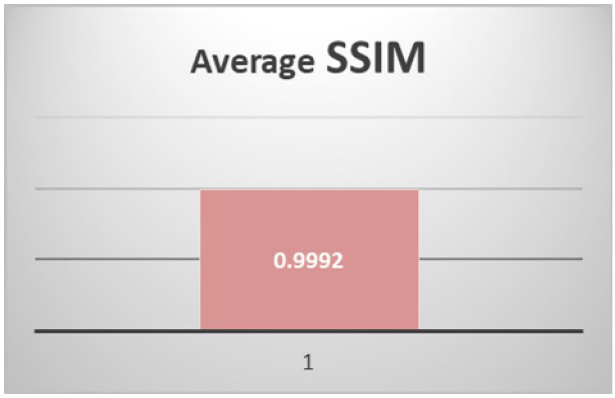

Figure. 16: Average SSIM Graph

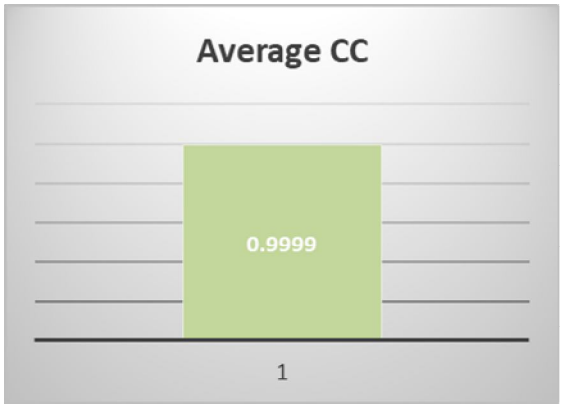

Figure. 17: Average CC Graph

VI. CONCLUSION

The proposed watermarking scheme incorporates DWT, CZT and SVD. The image was decomposed into frequency sub-bands using DWT. Then, the watermark was added to the singular matrix of transformed low-frequency sub-band in z-domain. The performance of various variants are tested for many image processing operations such as, rotation, cropping, translation, salt & pepper noise etc. The experimental analysis on different images showed that the proposed DWT-CZT-SVD algorithm is capable of producing high quality watermarked images and our scheme is highly resilient to above attacks. The comparison results depicts that proposed scheme outperforms many state-of-the art techniques interms of robustness, imperceptibility etc.

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DIGITIZATION OF GLASS TUBE ROTAMETER [GTR]

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ABSTRACT
Measurement of flow rate is an essential requirement of process Industry. There are many methods which are employed for flow measurement based on the requirements. The most commonly used for low viscosity, transparent fluids are Glass Tube Rotameter (GTR). The principle of operation for a GTR is based on the mechanical force balance between the weight of the float and the magnitude of flow rate. The current work aims at converting the GTR into a digital device using the ultrasonic sensor. The ultrasound transmitted by the sensor gets reflected by the float back to the sensor the time required for the ultrasound to come back and the speed of the sound gives the exact location of the float which can later be calibrated to measure the flow rate. The objective is to have a sensitive, accurate and cost-effective GTR working on digital principle.

Keywords: Measurement, GTR, ultrasonic sensors, flow rate.

I. INTRODUCTION

Rotameters is known as variable area flowmeter on which the drop rate in the pressure is constant and the flowrate is the function of the area of constriction. The market for rotameters is more demanding and competitive each passing day and this requires constant technological innovation of companies in that sector. The manufacturer who is competing in the market wants its product to be manufactured at effective cost and better accuracy. The set-up of the rotameter should be effective and take less time to get accurate readings. Modification of the rotameter and its basic components parameters such as weight of float, variable area, and attachment of various types of sensors such as ultrasonic and I.R sensors leads to gives out the preferable hype in accuracy domain of rotameters. Use of modern methods such as ultrasonic sensors enable the improvements in rotameters by measuring the accurate displacement of float which gives out astounding accuracy rate in terms of digital output. Glass tube rotameter is a type of rotameter which gives out manual reading in the Industrial domain. So, to get rid of the manual reading and less accurate GTR setup into an affordable digitalize meter the correct selection of sensors generates the optimum conditions during the manufacturing of rotameter and becomes the main exigency of the rotameter manufacturing industry.

II. LITERATURE REVIEW

Bruce M. Howe et.al [1] Studied the rotameter with laser Doppler anemometry (LDA) and computational fluid dynamics (CFD). He found out that the computational fluid dynamics (CFD) code is capable of reproducing the features of the flow indicated by the laser Doppler anemometer. His experiment results give a convincing demonstration of the utility of modern tools of computational and experimental fluids mechanics to improve the analysis and design of flow meters which traditionally had tone treated empirically.

Pavan Kumar et.al [2&3] conducted experiments in CFD tool ANSYS FLUENT 14 software to analyze flow through a Rotameter, that was available in Fluid Mechanics Laboratory of their Institute. Here the geometry was considered as the 2D axisymmetric and meshing of geometry done by quadrilateral. Water is considered as fluid and steel is used as the float. From the experiments, it is concluded that the use of CFD gives good accuracy results within ± 1 % errors and the drag force will remain the same from 4 – 40 LPM flow rate of water

Deepa C N* et.al [4] Validate the CFD methodology by using a flow-through pipe in a turbulent flow. In their study they used ANSYS FLUENT -14 software, with 2D –axisymmetric along with proper boundary condition and mesh convergence turbulent flow through a pipe is chosen for validation. They found out that ANSYS FLUENT 14 CFD software can be used for the design and analysis of flow-through Rotameter. However, the Methodology has to be validated and suitable turbulence model and convergence criteria as well as discretization to be selected.

Ling Guo et.al [5] analyse the flow field of ultrasonic flowmeter with small diameter and low flow and discuss the influences on the flow field and power factor of exact pipe structure and the variation using different Reynolds number. He found out that the installation point of the ultrasonic transducer and temperature/pressure sensor will disturb the laminar flow field, the velocity will not be standard parabolic distribution any longer, and the reflux is generated at the transducer; the length of reflux has the same trend with Reynolds number.

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L.koval et.al [6] Studied the measurements of distance by the ultrasonic sensor by using ultrasonic sensor SRF08. He studied two types of ultrasound 1. Active ultrasound, when applied exhibits physical or chemical effects.2. Passive ultrasound output is contrast generated at the much lower (usually small) valve. they experimented about Communication with the sensor. The entire communication system with sensor consists of a PC and of universal communication card NI USB-8451, which offers two interfaces SPI, and I2C. To communicate with the sensor has been selected I2C interface. they studied and carried Practical measurement for different distances up to a maximum distance of 750 cm to determine the measurement accuracy of the sensor. Further, it also has been verified a directional sensor characteristic, directional characteristics, according to the manufacturer's data sheets ultrasonic sensor transducers makes a beam angle of 55 °.

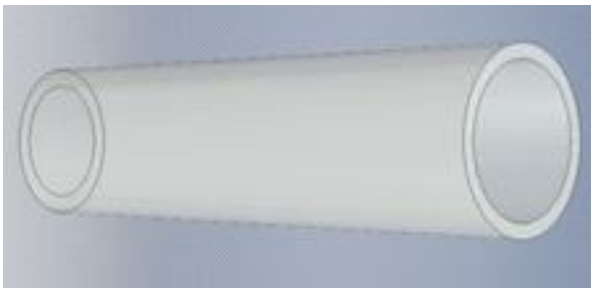
III. DETAILS

In this study, we focus on the modification of GTR [glass tube rotameter] to measure the flow rate more accurately and to gain control over the flow rate using ultrasonic sensors.

Components included (important)

1.Glass tube

The following setup consists of a variable area glass tube as the name suggests they have gradually increasing area from bottom to top for proper flow of the fluid, the bottom and top diameter, height and thickness depends upon the range of flow measurement that needs to be carried out by the rotameter it has a fixed standard size.

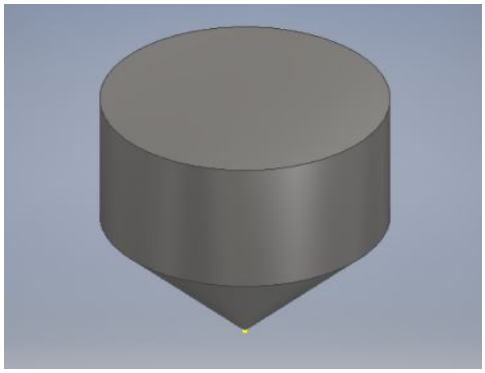


Glass Tube

Serial number	Parameters	Standard size available
1	Thickness	SDG30, SDG40, SDG50 SDG60, SDG70 SDG80 SDG90
2	Length / Height	
3	Bottom Diameter	
4	Top Diameter	

2.Float

The next in the component list comes the Centre float, it is a solid piece of metal that comes in various shapes but generally in half-cylinder and half cone shape. It is made up of material like SS316 and SS316L some exceptional fluids like dangerous chemicals material like PTFE [Polytetrafluoroethylene] and PVC [Polyvinyl chloride]. There is an orifice at both the ends of the tube which regulates the flow.



Float

3.Sensors

Two sensors can be used in the following setup the first one is JSN-SR04T ultrasonic module which is controlled and monitored by Arduino and the second one is ISA500 underwater altimeter which is controlled and monitored by software named Seaview.

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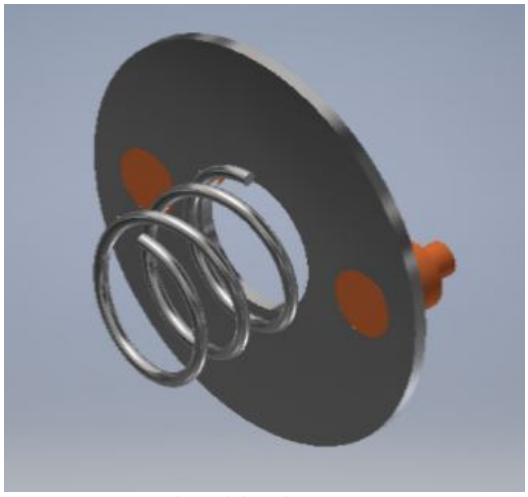
JSN-SR04T & ISA500 ALTIMETER

IV. PROCESS

When the flow changes the float makes displacement resulting the change in the distance between ultrasonic sensor placed on top and the float top surface there is a certain relation between the distance between sensor and float towards the flow rate that is as flow rate increases the distance between them decreases by this one can locate the exact position of float and compare it to the flow rate.



SENSOR SETUP

The speed of sound for its all category [audible, ultrasound, infrasound] is same it depends upon the density which is different for different medium unlike light speed of sound increases in denser medium which is why it travels faster in water rather than air it is known that speed of sound in air is 340m/s where is in water it travels with the speed range of 1480m/s to 1498m/s it means that it require less time to cover the same distance than in air which is why the minimum sensing distance of an ultrasonic sensor is greater than the regular one which works in air the equation which is used to locate the float is the basic speed vs time vs distance equation

$$speed = \frac{distance}{time}$$

$$distance = speed * time$$

The sound covers double the distance while traveling back to the sensors

$$distance = \frac{speed * time}{2}$$

By introducing the above logic in the Arduino program elimination of that extra returning distance travelled by the sound waves can be achieved.

The calibration can be done with the help of simple logic and pre-measured flow rate flown through set up, the flow rate needs to be measured in LPM [liter/min] or LPH [liter/hour]. Consider the flow of 20LPM is passed through the setup and the deflection shown by the float reads 20mm. supposedly one can find out the flow rate required to deflect the float by 1mm this information can be given to software to display the accurate value for every 1mm of deflection. V.

V. CONCLUSION

Through this setup, it is anticipated that the accuracy, sensitivity, and cost will be more effective than the current model available. As the current model works on the analog measuring principle this will be more accurate and sensitive because of the involvement of digital elements in the setup. The cost parameter will also be benefitted other expensive flowmeter will be having a lesser percentage of accuracy than this setup.

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DISASTER MANAGEMENT IN INDIA

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ABSTRACT
India is one of the most disaster prone countries in the world . disaster strike causing a devastating impact on human life, economy and environment? Various disasters like earthquake, landslides, volcanic eruptions, fires, flood and cyclones are natural hazards that kill thousands of people and destroy billions of dollars of habitat and property each year.. In India, as in the l. The GOI have a national emergency plan for disaster management, some of the state also has a disaster management plan, but there is a lack of awareness in the public. Many Indian States do not have disaster management plan due to limited resources. Considering these problems, this paper enlight more integrated disaster management system in India. This paper will provide important information in three mutually reinforcing areas viz. disaster preparedness, response and rehabilitation management. The various case studies for disaster management will be discussed.

Keywords: Disaster, Mitigation, Hazards, Risk, Safety Management, India, National Disaster Management Authority (NDMA)

1 INTRODUCTION

1.1 What is disaster?

Disaster is an event or series of events, which gives rise to casualties and damage or loss of properties, infrastructures, environment, essential services or means of livelihood on such a scale which is beyond the normal capacity of the affected community to cope with. Disaster is also sometimes described as a "catastrophic situation in which the normal pattern of life or eco-system has been disrupted and extra-ordinary emergency interventions are required to save and preserve lives and or the environment".

The whole cycle of Disaster Management can be depicted by following figure 1.1.

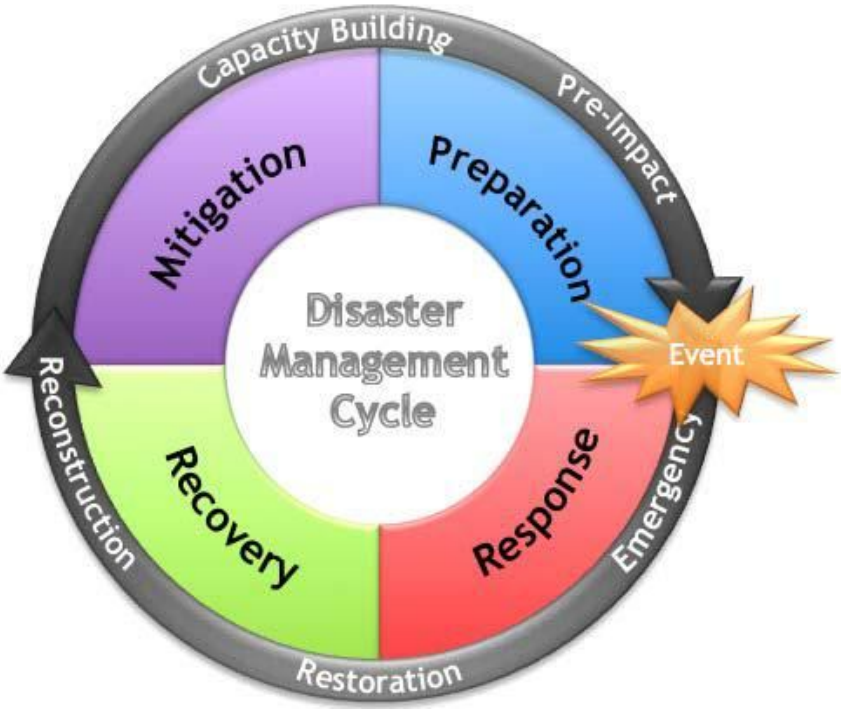

Figure-1.1: Etymology

1.2 Types of disaster

Disasters are mainly of two types –

1) Natural disaster

2) Man made disaster

These are further classified into major/minor natural disaster and major/minor manmade disasters. Some of the disasters are listed in Table 1 below.

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Table-1: Types of disaster.			
	Major natural disasters		**Minor natural disasters**
□	Flood	□	Cold wave
□	Cyclone	□	Thunderstorms
□	Drought	□	Heat waves
□	Earthquake	□	Mud slides
		□	Storm
	Major manmade disaster		**Minor manmade disaster**
□	Setting of fires	□□□	Road / train accidents, riots
□	Epidemic	□	Food poisoning
□	Deforestation	□	Industrial disaster/ crisis
□	Pollution due to prawn	□	Environmental pollution
	cultivation		
□	Chemical pollution.		
□	Wars		

1.3 Risk

Risk refers to the probability or threat of loss, liability, injury, damage, or any other negative occurrence resulting from external or internal vulnerabilities.

1.4 Vulnerability

Vulnerability describes the characteristics and circumstances of a community, that make it susceptible to the damaging effects of a hazard,on account of their nature, construction and proximity to hazardous terrain or a disaster prone area"

1.5 Hazards

A hazard is any object, situation, or behaviour that has the potential to cause injury, ill health, or damage to property or environment

The extent of damage in a disaster depends on:

i) The impact, intensity and characteristics of the phenomenon and

ii) How people, environment and infrastructures are affected by that phenomenon.

This relationship can be written as an equation:

Disaster Risk = Hazard + Vulnerability

1.6 The Indian Scenario for Disaster Management

India due to its geo-climatic and socio-economic condition is prone to various disasters. During the last thirty years' time span the country has been hit by 431 major disasters resulting into enormous loss to life and property. According to the Prevention Web statistics, 143039 people were killed and about 150 crore were affected by various disasters in the country during these three decades. The disasters caused huge loss to property and other infrastructures costing more than US $ 4800 crore. In India, the cyclone which occurred on 25th November, 1839 had a death toll of three lakh people. The Bhuj earthquake of 2001 in Gujarat and the Super Cyclone of Orissa on 29th October, 1999 are still fresh in the memory of most Indians and cloud burst and mudflow in Leh and surrounding areas in the morning of 6th August, 2010.

The most recent natural disaster of a cloud burst resulting in flash floods and mudflow in Utterakhand and Kedarnath areas in the early hours of 16th June, 2013, caused severe damage in terms of human lives as well as property. There was a reported death toll of 1200 persons, about 5000 missing persons, 4200 pets (have economic value) 3,661 damaged houses in about 500 villages and 27,350 hectares of affected crop area**.[2]

2 DISASTER RISK MANAGEMENT PROGRAMME

The Government of India (GOI), Ministry of Home Affairs (MHA) and United Nations Development Programme (UNDP) signed an agreement in August 2002 for the implementation of "Disaster Risk Management" Programme to reduce the vulnerability of the communities to natural disasters, in identified multi– hazard disaster prone areas.

2.1 Disaster management in India "Government of India" [1] "Ministry of Home Affairs": The role of emergency management in India falls to National Disaster Management Authority of India, a government agency subordinate to the Ministry of Home Affairs. In recent years there has been a shift in emphasis from

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response and recovery to strategic risk management and reduction, and from a government-centered approach to decentralized community participation. The Ministry of Science and Technology, headed by Dr Karan Rawat, supports an internal agency that facilitates research by bringing the academic knowledge and expertise of earth scientists to emergency management.

A group representing a public/private has recently been formed by the Government of India. It is funded primarily by a large India-based computer company and aimed at improving the general response of communities to emergencies, in addition to those incidents which might be described as disasters. Some of the groups' early efforts

Disaster Management Plan in India includes the following:-

- Institutional and policy framework;
- Early warning system;
- Institutional and policy framework;
- Early warning system;

Disaster prevention and mitigation

i) India has been very vulnerable to natural hazards and calamities. The Bhuj earthquake accounted for 13,805 deaths, the super cyclone in Orissa accounted for 9,885 deaths. The Government are of the view that if appropriate mitigation measures had been taken these casualties could have been reduced significantly.

ii) Each year disasters also account for the loss of thousands of crops in terms of social and community assets. It is clear that development cannot be sustainable without building in mitigation into the planning process. Keeping the above factors in view, the Government of India have brought about a change in policy which emphasizes mitigation, prevention and preparedness. A strategic roadmap is prepared on the succeeding pages that has been drawn up for reducing the country's vulnerability to disasters. Action for reducing our vulnerabilities to disasters shall be taken in accordance with the roadmap. The roadmap will be reviewed every two years to see if any change in direction is necessary.

Disaster Management Plan in India includes the following:-

- Institutional and policy framework;
- Early warning system;
- Disaster prevention and mitigation;
- Preparedness.

2.1.1 Institutional and policy framework

The institutional and policy mechanisms for carrying out response, relief and rehabilitation have been well-established since Independence. These mechanisms have proved to be robust and effective insofar as response, relief and rehabilitation are concerned.

At the national level, the Ministry of Home Affairs is the nodal Ministry for all matters concerning disaster management.

National Crisis Management Committee (NCMC). Crisis Management Group.

2.1.2 Early Warning System

Cyclone

Indian Meteorological Department (IMD) is mandated to monitor and give warnings regarding Tropical Cyclone (TC). Monitoring process has been revolutionized by the advent of remote sensing techniques. A TC intensity analysis and forecast scheme has been worked out using satellite image interpretation techniques which facilitate forecasting of storm surges.

The meteorological satellite has made a tremendous impact on the analysis of cyclones. INSAT data has also been used to study the structures of different TCs in the Bay of Bengal.

At present there are 166 flood forecasting stations on various rivers in the country which includes 134 level forecasting and 32 inflow forecasting stations, river-wise break up. The flood forecasting involves the following four main activities:

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Observation and collection of hydrological and hydro-meteorological data.

i) Transmission of data to forecasting centres.

ii) Analysis of data and formulation of forecast.

iii) Dissemination of forecast.

For other natural disasters specific early warning systems are under progress.

2.1.3 Disaster prevention and mitigation

The Government of India have adopted mitigation and prevention as essential components of their development strategy. The Tenth Five Year Plan document has a detailed chapter on Disaster Management.

The Government of India have issued guidelines that where there is a shelf of projects, projects addressing mitigation will be given a priority. Measures for flood mitigation were taken from 1950 onwards. As against the total of 40 million hectares prone to floods, an area of about 15 million hectares has been protected by construction of embankments.

A National Core Group for Earthquake Mitigation has been constituted consisting of experts in earthquake engineering and administrators.

A Disaster Risk Management Programme has been taken up with the assistance from UNDP, USAID and European Union in 169 most hazard prone districts in 17 States including all the 8 North Eastern States.

Under this programme disaster management plans have been prepared for about 3500 villages, 250 Gram Panchayat, 60 blocks and 15 districts.

The Central Government is now in the process of training and equipping 96 specialist search and rescue teams, each team consisting of 45 personnel including doctors, paramedics, structural engineers, etc.

A 200 bedded mobile hospital, fully trained and equipped is being set up by the Ministry of Health and attached to a leading Government hospital in Delhi. The Geographical Information System (GIS) data base is an effective tool for emergency responders to access information in terms of crucial parameters for the disaster affected areas.

2.1.4 Preparedness

Mitigation and preparedness measures go hand-in-hand for vulnerability reduction and rapid professional response to disasters.

The Central Government is now in the process of training and equipping 96 specialist search and rescue teams, each team consisting of 45 personnel including doctors, paramedics, structural engineers, etc.

A 200 bedded mobile hospital, fully trained and equipped is being set up by the Ministry of Health and attached to a leading Government hospital in Delhi. The Geographical Information System (GIS) data base is an effective tool for emergency responders to access information in terms of crucial parameters for the disaster affected areas.

2.2 Maharashtra Disaster Management Plan

Maharashtra is the first state to prepare a comprehensive State Disaster Management Plan and also undertake risk assessment and vulnerability analysis of the state. These studies address the vulnerability of various districts, talukas within these districts, and clusters of villages in these districts to earthquakes, floods and cyclones, epidemics, road accidents and fire, and chemical and industrial disasters. A separate volume on Standard Operating Procedures, details the manuals for various departments to be activated during an emergency.

In the District Control Room, the following desks are recommended to be set up for improving the capability of the district administration to respond to disasters more effectively : Operations disk, Service desk, Infrastructure desk, Health desk, Logistics desk, Agriculture desk, Communication and Information Management desk and Resources desk. Detailed instructions have been provided to the district administration about the setting up of the District Control Room , wireless network, linking all tehsil headquarters to the District Control Room. Other Voluntary agencies, including NGOs. Public sector Private sector community helps in disaster management

2.3 Mumbai (Metro Polyton City), India Disaster Risk Management profile

Functional arrangements. Consistent with the national approach, Mumbai's Disaster Management Plan [4] refers to its goals of mitigation strategy as:

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To substantially increase public awareness of disaster risk so that the public demands safer communities in which to live and work.

To significantly reduce the risks of loss of life, injuries, economic costs, and destruction of natural and cultural resources that result from disasters.

- Inter-City Linkages.
- Land Use Management.

2.3.1 Vulnerability issues

Fire and industrial accidents have been part of the landscape of the city. Floods. Mumbai DMP identifies 10 sections along the Central Railway. Chemical (transport, handling), biological, and nuclear hazards.

Earthquakes. Mumbai lies in the Bureau of Indian Standards (BIS) in Seismic Zone III.

3 CASE STUDIES OF DISASTER OCCURRED IN INDIA

3.1 landslide

On 30 July 2014, a landslide occurred in the village of Malin in the Ambega on taluka of the Pune district in Maharashtra, India. The landslide, which hit early in the morning while residents were asleep, was believed to have been caused by a burst of heavy rainfall, and killed at least 151 .Deforestation was the primary undelaying anthropogenic cause of the landslide. One additional reason was changing agricultural practices – villagers had recently shifted from cultivation of rice and finger millet to wheat, which required levelling of steep areas, which contributed to instability of the hills. Also the construction of the nearby Dimbhe Dam ten years ago was considered as a possible reason. The instability of the hillsides was due to the construction activities, which are often done without careful analysis of environmental consequences. Stone quarrying, among other types of construction.

3.2 Management of earthquake

India high earthquake risk and vulnerability is evident from the fact that about 59 per cent of India's land area could face moderate to severe earthquakes. During the period 2000 to 2010, more than 25000 lives were lost due to major earthquakes in India, which also caused enormous damage to property and public infrastructure. All these earthquakes established that major casualties were caused primarily due to the collapse of buildings.[3]

These emphasise the need for strict compliance of town planning bye-laws and earthquake resistance building codes in India. These guidelines have been prepared taking into account an analysis of critical gapes responsible for specific risk.

These guidelines emphasise the need for carrying out the structural safety audit of existing lifelines structures and other critical structures in earthquake prone areas, and carrying out selective seismic strengthening and retrofitting.

The earthquake guidelines rest on the following six pillars of seismic safety for improving the effectiveness of earthquakes management in India.

The following are the 6 pillars

Earthquake resistant construction of new structures.

Selective seismic strengthening and retrofitting of existing priority structures and lifeline structures.

Regulation and enforcement. Awareness and preparedness.

Capacity development of education, training, R & D, capacity building and documentation.

Emergency response.

3.3 The Bhopal gas tragedy

The careless siting of industry and relatively poor regulatory controls leads to ill-health in the urban centers. The Bhopal gas tragedy on December 2nd, 1984, where Union Carbide's plant leaked 43 tons of methyl isocyanate and other substances, used in the manufacture of pesticides, is one of the worst industrial accidents in the recent past. Of the 520,000 people who were exposed to the gas, 8,000 died during the first week and another 8,000 later. The impact on the survivors is visible even today.

Conclusion: The government of India and respective state government through their pollution control board have laid down strict regulation and monitoring system for industries to avoid any such accident. Every industry is forced to have the safety measures and disaster management plan.

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3.4India tsunami [5]

On December 26, 2004 the tsunami caused extensive damage in 897 villages in five states/UTs in India. During the tsunami 4,259 were Injured, 5,555 people were missing and 10,749 were dead. The major sectors affected in each state: fisheries and boats, ports and jetties, roads and bridges, power and ICT, housing, water supply and sewerage and social infrastructure.

Rescue and relief operations were adjusted to be speedy, effective and timely by the external agency i.e. undertaking debris removal and disposal of bodies, dispatching relief material, providing food, water, and medical assistance. Adopting good past practices:

Earlier disaster management programs, done successfully, were revisited to carry forward the lessons learned.

Encourage ownership of solutions by potential beneficiaries to ensure sustainability.

Encourage partnerships of government, beneficiaries, community-based women's organizations and NGOs to ensure sustainable development.

Demonstrate that project implementation can be assured through a fully empowered Project Management Unit with competent leadership.

Address need for a long term approach to O&M funding.

3.5 Maharashtra Disaster Management Plan

Maharashtra is the first state to prepare a comprehensive State Disaster Management Plan and also undertake risk assessment and vulnerability analysis of the state. These studies address the vulnerability of various districts, talukas within these districts, and clusters of villages in these districts to earthquakes, floods and cyclones, epidemics, road accidents and fire, and chemical and industrial disasters. A separate volume on Standard Operating Procedures, details the manuals for various departments to be activated during an emergency.

In the District Control Room, the following desks are recommended to be set up for improving the capability of the district administration to respond to disasters more effectively : Operations disk, Service desk, Infrastructure desk, Health desk, Logistics desk, Agriculture desk, Communication and Information Management desk and Resources desk. Detailed instructions have been provided to the district administration about the setting up of the District Control Room , wireless network, linking all tehsil headquarters to the District Control Room. Other Voluntary agencies, including NGOs. Public sector Private sector community helps in disaster management

3.6 Role of engineers for disaster management

Engineer plays a very important role in disaster management, engineer gives information about climate conditions etc, without an engineer we can't imagine the world. Not only a particular branch is important every branch has its own importance, like how our five fingers is important to our hand like that every branch has its own importance, they can form association to help in times of disaster. Engineers can help in managing disasters in many ways, and s can help in rehabilitation and resettlement of victims

4 CONCLUSION

Thus, efficient management of disasters, will help and save the lives. rather than mere response to their occurrence has, in recent times, received increased attention within India. This is as much a result of the recognition of the increasing frequency and intensity of disasters as it is an acknowledgement that good governance, in a caring and civilized society, needs to deal effectively with the devastating impact of disasters.

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EFFECT ON CONCRETE BY REPLACEMENT OF RIVER SAND WITH MANUFACTURED SAND

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ABSTRACT
In recent years, concrete technology has made significant advances which have resulted in economical improvements in strength of concretes. This economical development depends upon the intelligent use of locally available materials. One of the important ingredients of conventional concrete is natural sand or river sand, which is expensive and scarce. In India, the conventional concrete is produced by using natural sand obtained from riverbeds as fine aggregate. However, due to the increased use of concrete in almost all types of construction works, the demand of natural or river sand has been increased. To meet this demand of construction industry excessive quarrying of sand from river beds is taking place causing the depletion of sand resources. The dwindling sand resources have not only posed the environmental problems but also have caused the rivers to change their flow direction. This fact has forced the Government to lay down restrictions on sand quarrying process resulting in the scarcity and significant increase in its cost. Thus the scarcity of natural sand has forced to find the suitable substitute. The cheapest and the easiest way of getting substitute for natural sand is by crushing natural stone to get manufactured sand of desired size and grade which would be free from all impurities. The promotional use of manufactured sand will conserve the natural resources for the sustainable development of the concrete in construction industry.

In the present an attempt has been made to discuss the effects such as workability and compressive strength of concrete prepared by replacing natural sand with manufactured sand at different replacement levels (0%, 20%, 40%, 60%,80% and 100%). The development of cracks and their measurement is also studied. The results have shown that the natural sand can be replaced with manufactured sand up to a maximum replacement level of 62% in order to produce concrete of satisfactory workability and compressive strength and also with cracks of lesser areas.

Keywords: Natural sand, manufactured sand, compressive strength, crack pattern.

1.0 INTRODUCTION
Concrete is the most widely material of construction all over the world. A huge quantity of concrete is consumed by construction industry all over the world. In India, the conventional concrete is produced by using natural sand obtained from the riverbeds as fine aggregate. One of the important ingredients of conventional concrete is natural sand or river sand, which is expensive and scarce. However, due to the increased use of concrete in almost all types of construction works, the demand of natural or river sand has been increased. To meet this demand of construction industry, excessive quarrying of sand from river beds is taking place causing the depletion of sand resources. The scarcity of natural sand due to such heavy demands in growing construction activities have forced to find the suitable substitute. One of the cheapest and the easiest ways of getting substitute for natural sand is by crushing natural stone to get manufactured sand of desired size and grade **[1]**. The promotional use of manufactured sand will conserve the natural resources for the sustainable development of the concrete in construction industry **[2]**.

Manufactured sand is a process controlled crushed fine aggregate produced from quarried stone by crushing or grinding and classification to obtain a controlled gradation product that completely passes the 4.75 mm sieve. Manufactured sand generally contain more angular particles with rough surface textures and flatter face than natural sand that are more rounded as a result of weathering. Over the time some investigations have shown that angular particles, rough surface of manufactured sand influences the workability and finish ability in fresh concrete. The manufactured sand have to satisfy the technical requisites such as workability, strength and durability of concrete and hence it has become necessary to study these properties in order to check the suitability and appropriate replacement level of manufactured sand in comparison with the natural sand for producing concretes in an economical way**.**

In the present paper an attempt has been made to experimentally study the strength of concrete cubes and cracking patterns of concrete slab panels by replacing the natural sand with manufactured sand at various replacement levels of 20%, 40% 60% 80% 100%. The results have shown that the natural sand can be replaced with the manufactured sand up to a maximum replacement level of 62% in order to produce concrete of satisfactory strength. The results have also indicated that concrete slab panels showed minimum area of cracks on its surfaces thus improving the durability property.

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2.0 EXPERIMENTAL WORK

2.1.1 Materials Used

The properties of various materials used in making the concrete (M20) are discussed in the following sections.

Cement

Ordinary Portland cement of 53 grade satisfying all the requirements of IS12269-1987 [4] was used in making the concrete slab panels and cubes in the experimental work.

Natural (River) Sand

The natural sand having fineness modulus of 2.9 and conforming to zone III as per IS: 383-1970 **[5]** was used for the experimentation after washing it with clean water. The specific gravity of this natural sand was found to be 2.73. The water absorption and moisture content values obtained for the sand used was found to be 5.91% and 1.01% respectively.

Manufactured sand (Crushed sand)

The crushed sand having fineness modulus of 2.84 and conforming to zone III as per IS: 383-1970 **[5]** was used for the experimentation after washing it with clean water. The specific gravity of this manufactured sand was found to be 2.97. The water absorption and moisture content values obtained for the sand used was found to be 6.5% and 1.0% respectively.

Coarse Aggregate

Crushed stone aggregates of 20mm size obtained from local quarry site were used for the experimentation. The fineness modulus of coarse aggregates was found to be 6.2with a specific gravity of 2.78 The water absorption and moisture content values obtained for the sand used was found to be 2.6% and 0.51% respectively.

2.1.2 Mix Proportions Adopted

The concrete of M20 grade was designed using the IS Code method (IS: 10262-1982) **[6]** of mix design and proportions were obtained after applying necessary corrections to suit field conditions. The final mix ratio expressed as parts of water: cement: fine aggregate: coarse aggregate was 0.50:1:1.583:3.275.

2.1.3 Casting of Concrete specimens

The mix proportion as obtained by following the guidelines of IS: 10262-1982**[6]** was used in making the concrete mixes in the form of cubes and slab panels for study of compressive strength and crack patterns. The required quantities of all the ingredients were taken by weigh batching. The concrete cubes of 150mm side and slab panels of 500x300x50mm size were cast by replacing the natural sand at replacement levels of 0%, 20%, 40%, 60% and 80% using manufactured sand. The mixing of all the ingredients of concrete was done by taking their appropriate contents on a water-tight platform. The mixture was turned twice in dry state and then the required quantity of water was added to it and again the entire mixture was turned twice till a homogenous mass of concrete was obtained. The workability of the concrete so prepared was studied by conducting slump test as per the standard procedure given in IS: 1199–1959**[7]**. The results of the slump test are presented in the Table 1.

Table-1: Workability values of Concrete for diff.% replacement of natural sand

% replacement of natural sand by manufactured sand	Workability Tests		
	Slump (mm)	Compaction factor	Flow (%)
0	40	0.91	27.16
20	48	0.92	25.70
40	50	O.90	9.32
60	**56**	**0.90**	**11.33**
80	54	0.90	7.68
100	44	0.865	9.12

Standard cube specimens were cast using the procedure described in IS: 516–1959 and were immediately covered with wet cloths and kept there for 24 hours and then released in water tank for 28 days curing. The concrete slab panels were also prepared by following the same procedure. However, the slab panels at each replacement level of natural sand with manufactured sand were observed to see the development of cracks after

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7 hours of casting. The cracks appeared on the surface of slab panels were marked on the transparent paper by keeping it over the surface of slab panels for finding the area of crack. The measurement of cracks for its width was done with help of a microscope of 0.001mm least count as shown in figure 3. The cracks were also measured for their spacing on the surface of slab panels. The areas of the cracks worked out from the dimensions of cracks are presented in the Table 2.

Table-2: Workability values for different % replacement of natural sand by manufactured sand

% replacement of natural sand by manufactured sand	0	20	40	60	80	100
Area of crack (mm2)	13.34	2.60	2.23	1.22	3.24	5.23

Testing of Specimens

After 28 days curing period, the concrete cube specimens cast by replacing natural sand with manufactured sand at different replacement levels were tested under a compression testing machine (Figure 4) following the procedure given in IS:516–1959 **[8]**.

Figure 3: Measurement of cracks Using microscope

Figure 4: Compression Test on Cube Specimen

The crushing loads were noted and the average compressive strength of three specimens was determined. The compressive strength values of all the specimens are presented in Table 3.

Table-3: Comp. St. for different % replacement of natural sand by manufactured sand

% replacement of natural sand by manufactured sand	0	20	40	60	80	100
Area of crack Compressive strength (N/mm2)	23.49	27.21	31.40	35.16	33.28	33.28

RESULTS AND DISCUSSIONS

From the results of workability tests (slump, compaction factor and flow) a relationship between slump, compaction factor and flow value for different percentage replacement of natural sand by manufactured sand is plotted and is shown in figure 5. From this relationship it is observed that the concrete mixes provide better workability in terms of slump, compaction factor and flow values for 60% replacement of natural sand by manufactured sand.

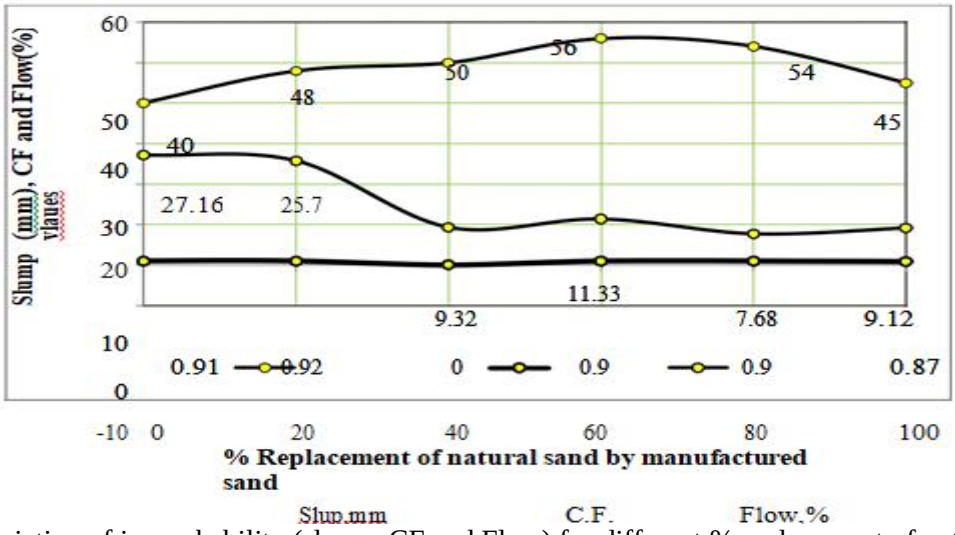

Figure-5: Variation of in workability (slump, CF and Flow) for different % replacement of natural sand by manufactured sand

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From the results of compressive strength test and measured areas of cracks at different percentage replacement of natural sand a variation in compressive strength and area of cracks for percentage replacement of natural sand is shown in figure 6. From figure 6, it is observed that the concrete mixes at 60% replacement of natural sand by manufactured sand gives greater strength and minimum area for cracks but beyond this (60%) replacement level the compressive strength shows a reduction trend while area cracks goes on increasing. Thus, it is seen that a maximum percentage replacement of natural sand should be limited to 60% so that satisfactory concretes can be produced.

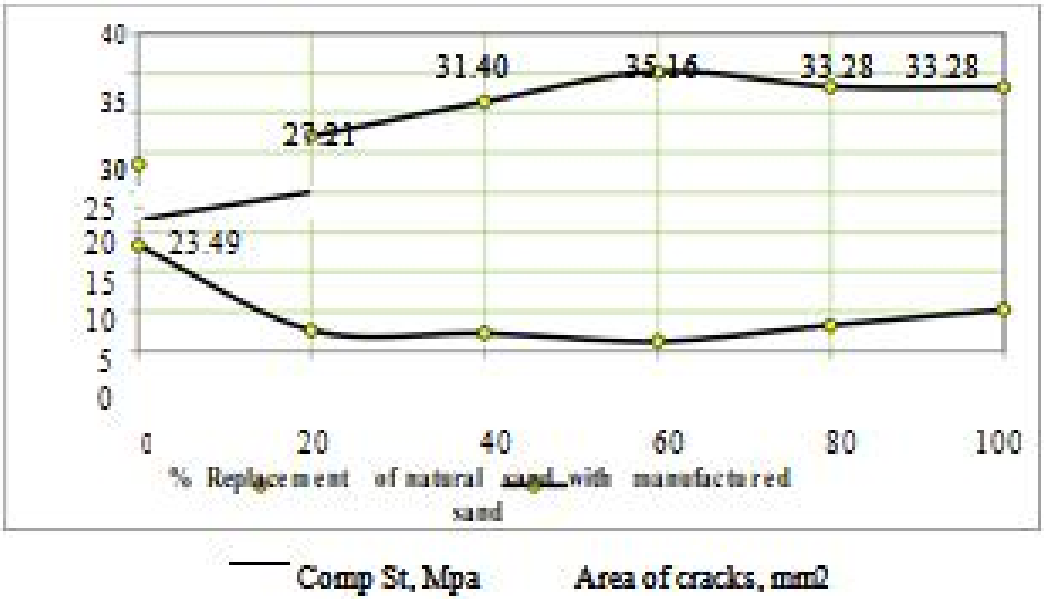

Figure-6: Variation of comp. st. and area of cracks for different % replacement of natural sand by manufactured sand

CONCLUSIONS

Effect of replacement of natural sand by 62% manufactured sand results in producing the concrete of satisfactory workability and strength properties. It is also possible to minimize the area of surface cracks of concrete, thus achieving the durable concrete. However, for more than 62% replacement of natural sand by manufactured sand causes reduction in compressive strength of concrete mixes with increase in the area of cracks.

The replacement of natural sand with manufactured sand will help in conserving the natural resources of sand and maintain the ecological balance of the nature.

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EFFICIENCY IMPROVEMENT OF VORTEX TUBE, BY VARYING INSIDE SURFACE ROUGHNESS OF CYLINDRICAL HOT TUBES

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ABSTRACT

Refrigeration plays an important role in developing countries, mainly for the preservation of food, medicine and air conditioning. Conventional refrigeration systems use Freon as a refrigerant. As they are the main cause of ozone depletion, extensive research work is underway on alternative refrigeration systems. The Vortex tube is an unconventional cooling device, without moving parts that can produce cold air and hot air from the compressed air source without affecting the environment. When a high pressure air is injected tangentially into the vortex chamber, a strong vortex flow will be created which will be split into two air flows. It can be used for any type of spot cooling or heating application. In this document, the counter-flow vortex tube is compared with different performances of hot surface roughness tubes. It was found that the vortex tube with surface roughness of Ra = 6.264 µm exceeded the hot tubes with surface roughness of Ra = 4.510 µm and Ra = 3.133 µm respectively from 6% to 26% and from 16% to 52% in COP . The COP of the vortex tube increases as the roughness of the inner surface of the hot tube increases

A vortex tube contains the different main parts vortex chamber inlet and cold terminal orifice, hot control valve and orifice. It works in such a way that the fluid enters the tube circles around an axis that is called a vortex. And that rotation creates a vortex from the compressed air and separates that flow into two hot and cold air flows. From its center, the super-cooled air that is delivered through the cold end door is exceeded. The surface finish of the nozzle and tube, ie the hot end, plays an important role in the performance of the vortex tube. In this document it is observed that the vortex tube with main surface roughness values of cylindrical hot tubes is used to increase the efficiency of the tube vortex. It results in COP of the vortex tube.

Keywords: Vortex chamber, Roughness value of cylindrical hot tubes, COP of the system, Efficiency of tube.

INTRODUCTION

The vortex tube is a static thermal tube that separates the flow of compressed gas into two flows; a cooler flow than the inlet flow while the other flow is warmer than the inlet flow. The vortex tube has no moving parts and separation occurs due to vortex flow generation without requiring any external mechanical work or heat transfer. The vortex tube was first discovered by Ranque [1, 2] who was granted a French patent for the device in 1932 and a US patent in 1934. Ranque encountered the vortex tube phenomenon while he was working experimentally with the vortex tube pump in 1928 In 1945 Rudolf Hilsch [3] conducted a vortex tube experiment focused on thermal performance with different inlet pressure and geometric parameters. In recent years it has been known that the vortex tube is a low cost and an effective solution to many spot cooling problems. The separation mechanism inside the vortex tube remains until now not completely understood [4]. The ability to obtain hot or cold flow streams using compressed gas has allowed the use of the vortex tube in many engineering applications such as electronic cooling, food cooling, cooling of the fire suit and machinery cooling during operation. Despite its reduced capacity, the Ranque-Hilsch swirl tube (RHVT) is very useful for some thermal management applications due to its simplicity, high durability, compactness, lightness, sturdiness, reliability, low maintenance and safety costs [5] . RHVT can be classified into two types [6]: (1) counter-flow RHVT and (2) uni-flow RHVT. In the counter-current type RHVT the cold flow moves in the opposite direction to the hot flow, while in the uni-flow type, the hot and cold flows flow in the same direction. In general, counter-current RHVT is recommended over RHVT uni-flow due to its efficient energy separation [6]. The Vortex tube is widely treated in literature through experimental and numerical analyzes. The experimental work of Nimbalkar and Muller [7] indicated that there is an optimal diameter of the cold end orifice to obtain maximum energy separation. Furthermore, the results [7] showed that the maximum value of the energy separation was always reachable with a cold fraction of 60% regardless of the diameter of the orifice and the inlet pressure. The optimal ratio between diameter and length of the hot side was studied by Dincer et al. [8, 9]. The performance of the vortex tube was studied for three different working gases: air, oxygen and nitrogen and the results were reported using strip views in a vortex tube in Perspex [10]. Aydın and Baki [10] and Hamdan et al. [11] indicated that the inlet pressure and the cold mass fraction were the most important operating parameters. Hamdan et al. [11] in their experimental work investigated the effect of numerous operating and geometric parameters on the thermal performance of the vortex tube, in which the effect of position of the vortex plug, the pressure of the inlet gas, the number were covered. of vortex generator inlet nozzles and

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insulation during the study. Eiamsa-ard [12] studied the effect of multiple inlet nozzles, the ratios of the diameter of the cold orifice and the inlet pressure. Eiamsa-ard [12] reported that energy separation increased when the number of nozzles increased to four nozzles. The increase in the number of nozzles and the supply pressure leads to an increase in the intensity of the vortex / swirl and therefore to the separation of the energy in the tube

DESIGN AND CONSTRUCTION DETAILS

The design details of vortex tube: Diameter of vortex tube D = 20 mm; Length of vortex tube L = 135 mm. Diameter of orifice Do = 6 mm, Diameter of nozzle D*RN R*= 5 mm, No of nozzle= 1, Material= Mild steel, Inlet pressure= 4 - 8 bar, Surface roughness values of hot tube 3.133, 4.510 and 6.264 μm.

EXPERIMENTAL SET UP

A two-dimensional cross section of the used vortex tube is shown in Fig. 1a. The compressed air at room temperature is used as a working fluid at different inlet pressure values. The compressed air enters the middle of the vortex tube in a chamber that distributes the air into several inlet nozzles that promote the generation of vortex flow inside the vortex generator, Fig. 1b. The vortex flow is separated into two exits in which the hot air exits the outer perimeter of the vortex while the cold air exits from the center of the vortex in the opposite direction, as shown in Fig. 1a. A vortex cap shown in Fig. 1c is used to stop the flow rotation leaving the hot side of the vortex tube. The detailed drawing and dimensions of the vortex generator are shown in Table 1. The schematic diagram of the mass heat transfer of the experimental configuration is shown in Fig. 2. The compressed air is supplied through the compressor storage tank for ensure uniform pressure with minimal variation.

The size of the storage tank is 1 m^3 and the system is kept running for half an hour before performing the test to allow the system to warm up and stabilize the tank temperature. The maximum rated pressure of the compressor is 12 bar, even if all strokes have an inlet pressure of 5 bar or less. The compressed gas has passed through a dehumidifier, an oil filter and a particle separation filter to ensure the use of dry and clean air. The air is expanded into the vortex tube chamber and separated into the flow of hot air and cold air flow. The cold flow in the central region comes out of the tube through the central orifice closest to the inlet nozzle, while the hot flow in the outer ring leaves the tube through another outlet away from the inlet. The inlet air flow is regulated through the flow meter valve while the pressure is controlled by a pressure regulator connected to the compressor tank outlet. All the experimental tests are conducted in a similar way following a specific procedure, in which the compressor works for half an hour to allow the attainment of the compressed air inlet temperature. The pressure inside the pressurized tank is kept above 6 bar while a check valve is used to ensure the experiment a uniform continuous inlet pressure of 5 bar. In the event of a pressure drop within the tank of less than 6 bar, the test is maintained until the pressure builds up inside the air tank. A short plastic fitting is used at the cold / hot outlet to allow the thermocouples to be fixed and reduce the effect of heat transfer. Temperatures are recorded over a period of time using the portable portable data recorder with eight data inputs. A Borden tube gauge with 0.2 bar uncertainty is used to measure the inlet pressure

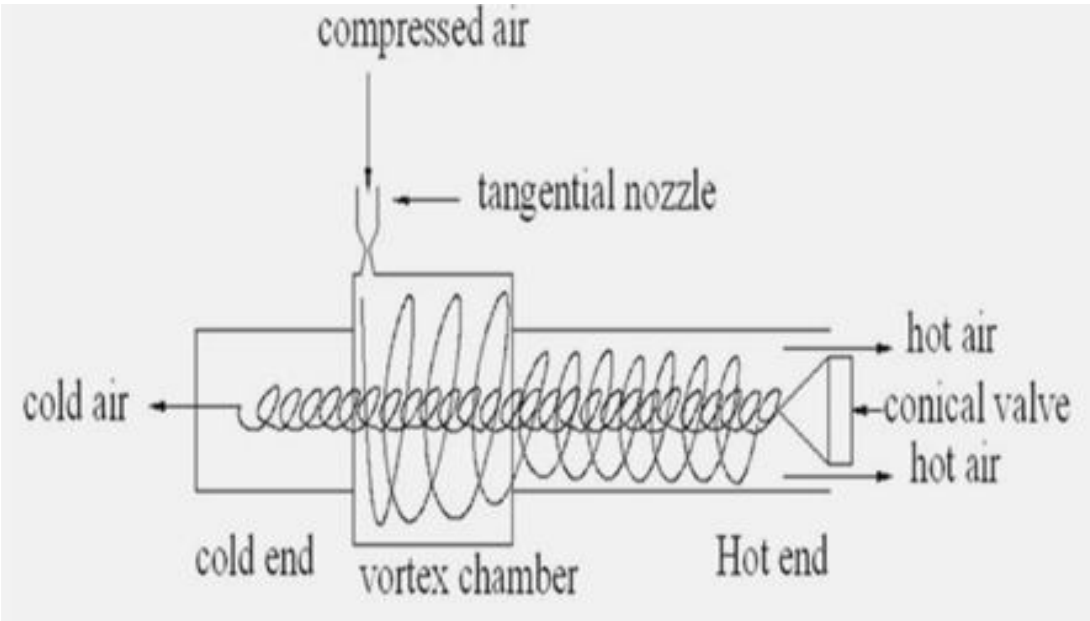

Fig-1: 2D View of Vortex Tube

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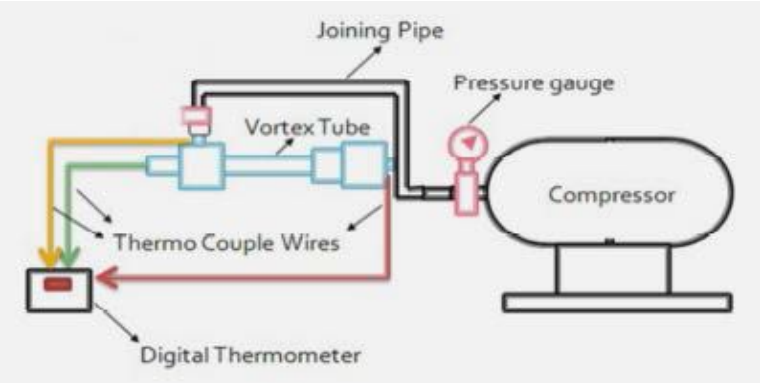

Fig-2: Experimental Set Up

The experimental setup consists of a compressor, a vortex tube and a temperature indicator. A stop valve at the outlet of the compressor tank controls the air entering the vortex chamber. The inlet pressure is measured by a pressure gauge. The air temperatures at the entrance, at the cold end, at the hot end and at the ambient air are measured using the thermocouple (copper constant). Fig. 2 shows the general view of the experimental setup. The compressor was initially started for about 20 minutes. to achieve a stable 4 bar (g) compressor air tank pressure. The temperatures in each position are tabulated. Therefore the same series of readings are taken at a pressure of 4, 5, 6, 7 and 8 bar. The air temperatures at the cold and hot end are the vital parameters that determine the COP of the vortex tube. The experiment is carried out with different hot tubes of surface roughness.

MATHEMATICAL ANALYSIS

List of symbols

COP - Coefficient of performance

C_p - Specific heat at constant pressure (kJ/kg K)

D - Vortex tube inner diameter (m)

P_{in} - Inlet pressure (bar)

m_h - Hot mass flow rate (kg/sec)

m_c - Cold mass flow rate (kg/sec)

m_{in} - Inlet mass flow rate (kg/sec)

RHVT – Ranque - Hilsch vortex tube

r - Radial coordinate

T_h - Hot outlet temperature (^{0}C)

T_c - Cold outlet temperature (^{0}C)

T_{in} - Inlet temperature (^{0}C)

D_{Th} - Temperature difference between the inlet and the hot outlet,

$D_{Th} = T_h - T_{in}$ D

T_c - Temperature difference between the inlet and the cold outlet,

$DT_c = T_{in} - T_c$

When the vortex tube is used as a cooling device (cold flow is used), the device is called a refrigerator and the COP is calculated by dividing the desired output (cooling load) on the required input (compression energy). The compression energy is calculated for the isothermal process (at constant temperature) which represents the minimum ideal compression work. While the cooling load is calculated for the ideal gas, as shown below

$$COP_R = \frac{Cooling\ load}{Isothermal\ compression\ energy} = \frac{\dot{m}_c C_p (T_{in} - T_c)}{\dot{m}_{in} R T_{in} \ln(P_{in}/P_{atm})} \quad (1)$$

$$COP_R = \varepsilon \left(\frac{C_p}{R}\right) \frac{1 - T_c/T_{in}}{\ln(P_{in}/P_{atm})} \quad (2)$$

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The isothermal compression energy intake is adopted in this study since the compressor is kept in constant operation while the compressed air is stored in a large container (1 m3) with a sufficient surface to keep the compressed air at uniform room temperature during the test. When the vortex tube is used as a heating device (hot flow is used), the device is called a heat pump and the COP of the heat pump is defined as follows

$$COP_{HP} = \frac{Heating\ load}{Isothermal\ compression\ energy} = \frac{\dot{m}_h C_p (T_h - T_{in})}{\dot{m}_{in} R T_{in} \ln(P_{in}/P_{atm})} \quad (3)$$

$$COP_{HP} = (1-\varepsilon)\left(\frac{C_p}{R}\right)\frac{T_h/T_{in} - 1}{ln(P_{in}/P_{atm})} \quad (4)$$

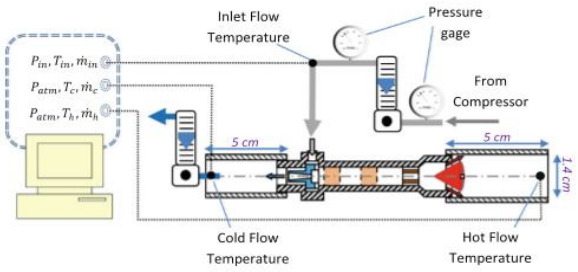

Fig-3: Vortex Tube Specification

It is clear that at any given pressure the temperature of the cold end of the hot roughness surface of 6.264 µm is better than the hot roughness tubes of surface 3.333 µm and 4.510 µm and the temperature difference between them is inversely proportional to the pressure, that is, the temperature difference is progressively increasing with pressure. From Fig. 5, the temperature of the hot end of the hot roughness surface tube of 6.264 µm is greater than the hot roughness surface pipes of 3.133 µm and 4.510 µm. From this we can say that the temperature difference between them is proportional to the pressure, that is the temperature difference B increases progressively with the pressure. Fig. 5 is plotted for pressure V / s COP. The graph shows that the COP of the vortex tube with hot surface roughness tube of 6.264 µm is higher than the hot surface roughness tubes of 3.133 µm and 4.510 µm. From Fig. 5, Fig. 6, we note that the performance of the vortex tube with hot surface roughness tube 6,264 µm is better than the vortex tube with hot surface roughness tubes Mand 3,110 µm Mand 4,510 µm. After evaluating the performance of the vortex tube with cylindrical hot tubes of different surface roughness, it was found that the vortex tube with high surface roughness hot tube offers better performance than the cylindrical hot tube with low surface roughness, ie an increase in COP of about 7% -52%. The cold temperature, hot temperature and COP values obtained for cylindrical hot tubes at various pressures are

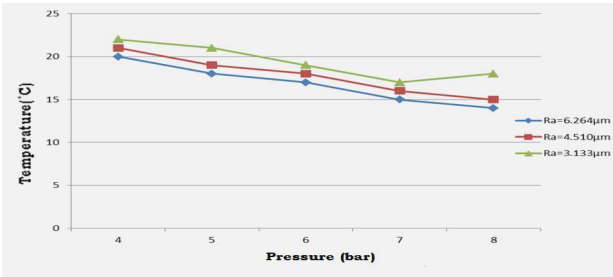

Fig-4: Inlet Pressure v/s Cold End Temp

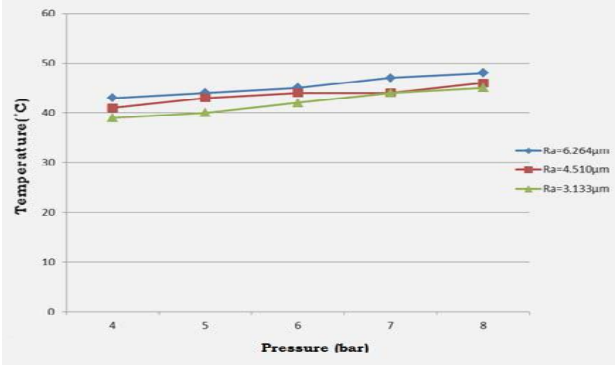

Fig-5: Inlet Pressure v/s Hot End Temperature

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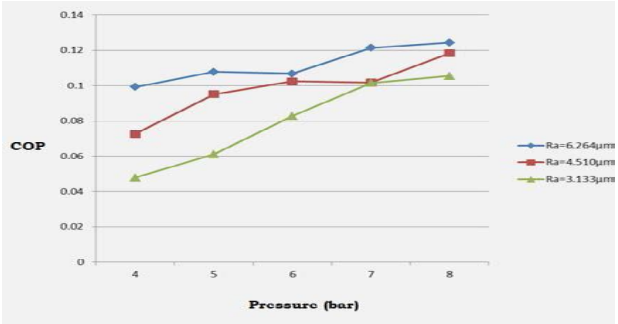

Fig-6: Inlet Pressure v/s COP

RESULT AND DISCUSSION

From Fig. 4 it is clear that at any given pressure the temperature of the cold end of the hot roughness surface layer of 6.264 µm is better than the hot roughness superficial tubes of 3.133 µm and 4.510 µm and the temperature difference between them is inversely ie proportional to the pressure, the temperature difference progressively increases with pressure. From Fig. 6, the temperature of the hot end of the hot surface roughness tube of 6.264 µm is greater than the hot roughness surface pipes of 3.133 µm and 4.510 µm. From this we can say that the temperature difference between them is proportional to the pressure, ie the temperature difference progressively increases with pressure. Figure 6 is plotted for pressure V / s COP. The graph shows that the COP of the vortex tube with hot surface roughness tube of 6.264 µm is higher than the hot surface roughness tubes of 3.133 µm and 4.510 µm. From Fig. 4, Fig. 5, Fig. 6 we note that the performance of the vortex tube with hot surface roughness tube 6,264 µm is better than the vortex tube with hot tubes of surface roughness 3,133 µm and 4,510 µm

After evaluating the performance of the vortex tube with cylindrical hot tubes of different surface roughness, it was found that the vortex tube with high surface roughness hot tube offers better performance than the hot cylindrical tube with low surface roughness, or an increase in COP of about 7% -52%. The cold temperature, hot temperature and COP values obtained for cylindrical hot tubes at various pressures are

Table.1. Vortex Tube with 6.264 µm surface roughness hot tube

S:NO	Pressure Pi(bar)	Cold temperature Tc (°C)	Hot temperature Th (°C)	COP
1	4	20	43	0.0992
2	5	18	44	0.1078
3	6	17	45	0.1067
4	7	15	47	0.1214
5	8	14	48	0.1266

Table.2. Vortex Tube with 4.510 µm surface roughness hot tube

S:NO	Pressure Pi(bar)	Cold temperature Tc(°C)	Hot temperature Th(°C)	COP
1	4	21	41	0.0721
2	5	19	43	0.0951
3	6	18	44	0.1024
4	7	16	44	0.1017
5	8	15	46	0.1189

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Table.3. Vortex Tube with 3.133 µm surface roughness hot tube

S:NO	Pressure Pi(bar)	Cold temperature Tc (°C)	Hot temperature Th (°C)	COP
1	4	22	39	0.0478
2	5	21	40	0.0611
3	6	19	42	0.0828
4	7	17	44	0.1015
5	8	18	45	0.1054

Table.4. Comparison of COP of cylindrical hot tubes with Ra=6.264 µm & Ra=4.510 µm

S.NO	Pressure in Bar	COP of cylindrical hot tube R_a=6.264µm	COP of cylindrical hot tube R_a=4.510µm	% increase in COP of R_a=6.264µm hot tube
1	4	0.0992	0.0726	26.81
2	5	0.1078	0.0951	11.78
3	6	0.1067	0.1024	04.03
4	7	0.1214	0.1017	16.23
5	8	0.1266	0.1184	06.48

Table.5. Comparison of COP of cylindrical hot tubes with Ra=6.264 µm & Ra=3.133 µm

Table.5. Comparison of COP of cylindrical hot tubes with Ra=6.264 µm & Ra=3.133 µm

S NO	Pressure in Bar	COP of cylindrical hot tube Ra=6.264µ	COP of cylindrical hot tube Ra=3.133µm	% increase in COP of Ra=6.264µm hot tube
1	4	0.0992	0.0478	51.81
2	5	0.1078	0.0611	43.32
3	6	0.1067	0.0828	22.39
4	7	0.1214	0.1015	16.39
5	8	0.1266	0.1054	16.75

The performance of the vortex tube was evaluated by conducting the experiment, replacing the cylindrical hot tubes with different surface roughness at various inlet pressures. The other parameters such as diameter of the orifice, nozzle remain unchanged. The highest COP is obtained at 8 bar for a cylindrical hot tube of Ra = 6.264 µm and the value is 0.1266. The lowest cold temperature for vortex tube with cylindrical hot tube of Ra = 6.264 µm is 14˚C at 8 bar and with hot cylindrical tube of Ra = 4.510 µm it is 15˚C at 8 bar and with hot cylindrical tube of Ra = 3.133 µm is 18 ° C at 8 bar. The maximum hot temperature for vortex tube with hot cylindrical tube of Ra = 6.264 µm is 48˚C at 8 bar and with hot cylindrical tube of Ra = 4.510 µm is 46˚C at 8 bar and with hot cylindrical tube of Ra = 3.133 µm it is 45 ° C at 8 bar. The fraction of cold mass obtained is better for the vortex tube with the cylindrical hot tube of Ra = 6.264 µm compared to the hot cylindrical tubes of Ra = 4.510 µm and Ra = 3.133 µm as shown in the tables above. The maximum difference of 34˚C between the temperature of the hot and cold ends for vortex tube with cylindrical hot tube of Ra = 6.264 µm and the maximum difference of 31˚C between the temperature of the hot and cold ends for vortex tube with cylindrical tube of Ra = 4.510 µm is obtained and a maximum difference of 27˚C between the temperature of the hot and cold ends for the vortex tube with the cylindrical tube of Ra = 3.133 µm

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CONCLUSION

A series of experiments were conducted to study the performance of the vortex tube based on different design parameters mainly: (1) inlet pressure, (2) cold mass fraction, (3) number of inlet nozzles, (4) position of the vortex cap (5) angle of entry of the nozzles and (6) arrangement of the nozzles. The following has been concluded from the experimental data. Inlet pressure is the driving force for energy separation. Experimental data show that a greater temperature difference and a higher COP are reached as the inlet pressure increases. However, the increase in the COP depends on other parameters related to the vortex tube. The cold mass fraction is an important parameter that influences the energy separation performance in the vortex tube. And there is an optimal value to obtain the maximum temperature difference which is not the same for the maximum separation of the energy load or COP. The effect of the number of nozzles is very important. For the constant inlet pressure test, it is clear that there is an optimal number of nozzles for the maximum COPHP which depends on the operating conditions and the parameters of the vortex tube. For the current vortex geometry, the increase in the number of nozzles shows an inverse effect on the COP.

The effect of hot cylindrical tubes on the cold temperature drop, the warm temperature rise and the COP of the Vortex tube and the results obtained are analyzed. The cold fall temperature ΔTc increases with the increase of the incoming air pressure. The increase in the hot temperature ΔTh increases with the increase of the inlet air pressure. The COP of the vortex tube increases with increasing inlet pressure. From the results obtained, it was discovered that the performance of the vortex tube is better for hot tubes with high surface roughness. Optimal opening of the final gate value offers the best performance. The effect of the nozzle design is more important than the design of the cold orifice to achieve higher temperature drops. The surface finish of the nozzle and hot tube plays an important role in the performance of the vortex tube, a good surface finish leads to better performance. Therefore, be careful when manufacturing parts to get a good surface finish. The plotted graphs show the effect of the increase in inlet pressure with the temperature drop showing an increasing trend, or initially with an increase in the inlet pressure the temperature drop.

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EXAM CELL AUTOMATION SYSTEM

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ABSTRACT
Examination is a core activity of any educational institution. As the examination arrives there exists a lot of work like consolidating the time table, seating arrangement and invigilation allotment which will be done manually and it takes lot of time and requires man power. Thus, an automated system would solve the above stated problem in just few clicks of work. The purpose of developing Examination Management Automation System is to computerize the traditional way of conducting exams. It is a web and android application that can be used by students and exam cell coordinator using their smart phones or PCs. The project keeps track of various details in modules such as Students Details, Staff Details, and Hall Details with proper descriptions. It also has some features to generate reports for bundle handovers, absentee's statement and roll lists.

Currently Exam cell activity mostly includes a lot of manual calculations and is mostly paper based. The project aims to bring in a centralized system that will ensure the activities in the context of an examination that can be effectively managed. This system allows students to enroll themselves into the system by registering their names or by sharing details to admin. This is done by providing their personal and all the necessary details like Name, email, examination, semester, etc. The provided details are then entered by admin into the system to create their hall tickets and also creates login id and password for them. After creating the hall ticket, the system mails the link of soft copy to every student who have registered. Students containing link in the mail can view and print the hall ticket and also can login into the system using login id and password to modify or update their details like Phone number, email-id, etc.

Keywords: Exam Cell Automation , Teacher Duty Allocation , Staff Login, Student Login ,Student Record etc.

1. INTRODUCTION

1.1 Description

Most of the important processes in the institutes are carried out manually such as the registration of the students, managing huge information about students, faculty members i.e. the teaching and nonteaching staff, managing documents for different entities which leads to enormous bulk of work. This results in poor efficiency, lots of documentation which again leads to unmanageable data, tedious process and requires a lot of time and human resource. The main goal of the Exam Cell Automation System is to minimize these workloads and make the Exam Cell process much more convenient to follow. The Exam Cell processes include the managing of student's academic status distinguished by the year, the departments, the classes as well as with respect to subjects. The Exam Cell process also includes the generation of hall tickets, the generation of exam forms along with the k.t. forms, the generation of results, the generation of gazette copies etc. These all processes are carried out either manually or with the help of some third party software. The use of multiple software for carrying out a process is never considered efficient.

1.2 Problem Definition

This project consists of several modules which are used in the exam cell process. The project represents an automated system which ensures the reduction of the tediousness, more effective work and systematic management. The project deals with the registration of students, the faculty members, generation of automated exam form as well as the k.t. form. It will also generate the automated results for the students which can be accessed remotely. The project is capable of checking the eligibility of the students i.e. if they're eligible for the next semester, based on which respective hall tickets will be generated for the students.

1.3 Current Systems

The existing systems implemented in educational institutes are traditional systems in which all the work is done by hand. Some of the systems which generate the Gazettes as per Mumbai University are VIVA[4] and Khushi [5] systems.

2. REVIEW OF LITREATURE

2.1 XamClick Exam Cell Automation System by Harsha Khutafale, Hardika Mate, Vaishnavi Sabnawis, Prof.Nilesh Patil, International Journal of Advanced Research in Computer Science and Software Engineering-2016

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2.1.1 Description
Xamclick Exam Cell Automation System[1] is a proposed system published in the International Journal of Advanced Research in Computer Science and Software Engineering-2016. The sys- tem proposes to reduce the manual work which requires extra efforts and extra time to process. The system was proposed by the educational institute 'Rajiv Gandhi Institute of Technology' to maintain records of the students. The system focuses on presenting information in easy and intelligent manner which provides facilities like online registration, profile creation of students which will lead to reduce the paper work in the institutes.

2.1.2 Drawbacks
The biggest weakness in this system is the security. The proposed system is prone to security attacks, password cracking which may lead to fabricated data or loss of data. This will result in a very critical condition for the system as well as the institute. The risk of loss of data will force the institute to manage records manually which leads to bulky work, large number of documents, increased workload and the system will become more prone to errors.

2.1.3 Overcoming Drawbacks
Our system will overcome security problem by automating maximum processes of exam cell. Each and every user will be given specific privileges through which the users will not be able to access any other information. The Faculty members who are responsible for entering the marks into the system will be given privileges for a specific time. They need to submit the marks to the system in the given duration, after which the privileges will be taken from them, making the entries non editable. This will not only increase the security of the system but also the reliability and efficiency of the system

2.2 Exam-Cell Automation System
2.2.1 Description
Currently Exam cell activity mostly includes a lot of manual calculations and is mostly paper based. The project aims to bring in a centralized system that will ensure the activities in the context of an examination that can be effectively managed. This system allows students to enroll themselves into the system by registering their names or by sharing details to admin. This is done by providing their personal and all the necessary details like Name, email, examination, semester, etc. The provided details are then entered by admin into the system to create their hall tickets and also creates login id and password for them. After creating the hall ticket, the system mails the link of soft copy to every student who have registered. Students containing link in the mail can view and print the hall ticket and also can login into the system using login id and password to modify or update their details like Phone number, email-id, etc. Admin is also responsible for generation of mark sheets for every registered student. There will be total three to six semesters where each semester contains maximum seven subjects. Admin can enter the marks of every student into their respective mark sheet using the systemâTMs GUI or via Database entry. Every student mark sheet will be created and printed separately. Thus on a whole it serves as a complete automated software which handles the every tedious and complex process handled during the examination times by the exam cell of a college.

2.2.2 Drawbacks
Accuracy Issues: A computerized system alone does not ensure accuracy, and the warehouse data is only as good as the data entry that created it. As the system is online, the student may fail to receive email or any important notification

2.2.3 Overcoming Drawbacks
Our system will ensure the security for the users which the above system fails to ensure.

2.3 Automated Examination Support System by Bondre Ru- tuja Avinash, Durgi Varsha Vijaykumar, Mohite Prad- nesh Rajeev, Parkar Vishal V, International Journal of Current Engineering and Technology-2015

2.3.1 Description
The Automated Examination Support System[3] is a proposed system published in the Inter- national Journal of Current Engineering and Technology. The system deals with the activities related to examination. The system proposes to generate hall tickets, generation of results etc. The system provides different permissions and accessibility rights to different users as per the requirement. The system will produce data for all the users in the system if wanted access to providing no privacy or secrecy. Each user will have his/her working status displayed on the system.

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2.3.2 Drawbacks

Even though the proposed system is related to all the examination processes required by the University of Mumbai, the system doesn't provide any effort in generating mark sheets as well as generation of gazette copies. The system only deals with calculation of CGPI and SGPI by the use of formulae for conversion of percentage into grade point indices.

2.3.3 Overcoming Drawbacks

Our system will overcome the drawback of not generating the results by providing a function of Gazette copy generation along with Mark Sheet generation as per the requirement of the University of Mumbai. Our system provides a convenient environment for users by giving them flexibility into the system.

2.4 VIVA & KHUSHI

2.4.1 Description

The University of Mumbai suggested two systems for easing the Exam Cell Process. The two systems are VIVA[4] and KHUSHI[5]. VIVA is a software developed by the VIVA College, Virar, Thane. The VIVA software is a gazette generator which takes the data input from the excel sheets and converts it into gazettes by inserting the data in the gazette format provided by the University of Mumbai. KHUSHI is an automated software which processes multiple activities leading to faster and convenient processes in the exam cell. KHUSHI produces analysis reports, generates gazette copies, maintains student history along with different multiple activities.

2.4.2 Drawbacks

For just the Generation of Gazette copies, VIVA costs around 35000/- INR along with a yearly maintenance of 5000/- to 10000/- INR, a huge amount for a single process. KHUSHI alone costs 150000/- INR, a one time price with maintenance support. The history maintained in this system is in the form of Excel Sheets which can be easily edited by any non authorized person if accessed which is harmful to the institute.

2.4.3 Overcoming Drawbacks

It is not necessary to pay such huge amount for some processes to be automated. Our system will provide a free trial for a specific period for institutes. Our System will be fixed to low cost for convenient use as the cost price shouldn't be an issue. Our system will generate the mark sheets along with gazette copies as required by the University of Mumbai. Unlike above software, our system will store data in databases and not in Excel Sheets which is much more secure and difficult to extract. The access to student's record will be available on just a query to the database. Similarly, changes can be made in the database by the authorised person if required just by throwing a query into the system. The databases will be given privileges and access rights to particular users through which the security of the system will beenhanced.

2.5 PDF Marksheet Generator, Sanket Mandare, Tyagraj Son- awane, Aman Trivedi, K. T. V.Reddy, I.J. Information Technology and Computer Science, 2014

2.5.1 Description

PDF Mark sheet Generator[6] is a system which generates mark sheet for individual student. The admin of the system enters the marks of each student. That information will be stored in internal collection information database. Percentage and grade is calculated manually. After the marks of all the students is entered by the admin of the system, Gazette is generated and then by clicking the mark sheet generator button. Then application generates the mark sheet of all the students automatically with the grades calculated. Mark sheets will be in PDF format.PDF mark sheets cannot be easily tampered with and require use of complex software. The PDF file of mark sheet of every student will be stored in mark sheet database. And then application makes mark sheets available via Internet on demand.

2.5.2 Drawbacks

The major drawback of the system is PERCENTAGE and GRADES are calculated MANU- ALLY. It increases the workload of the staff and as it is processed manually there are chances of making mistakes. A lot of time is consumed in performing calculations. The system is per- forming only two functions that is generating Gazettes and then the Mark sheet of individual student.

2.5.3 Overcoming Drawbacks

Our proposed system calculates percentage and grades automatically and not manually, which eliminates the chance of any mistakes or errors. In addition to this, it provides various different functions for ease to Exam Cell Staff, Head of the Department, Faculties and Students. All the details are stored in the database so it can be easily retrieved by the exam cell for checking or updating the details. Gazette is generated automatically, no

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extra time or efforts of the Exam Cell staff are required to list out the students who have cleared the semester or the students with A.T.K.T.

2.6 Technological Review

2.6.1 PHP

PHP is a server-side scripting language designed primarily for web development but also used as a general-purpose programming language. Originally created by Rasmus Lerdorf in 1994, the PHP reference implementation is now produced by The PHP Development Team. PHP originally stood for Personal Home Page, but it now stands for the recursive acronym PHP: Hypertext Preprocessor.

2.6.2 MySQL

MySQL is an open-source relational database management system (RDBMS). Its name is a combination of "My", the name of co-founder Michael Widenius' daughter, and "SQL", the abbreviation for Structured Query Language. The MySQL development project has made its source code available under the terms of the GNU General Public License, as well as under a variety of proprietary agreements. MySQL was owned and sponsored by a single for-profit firm, the Swedish company MySQL AB, now owned by Oracle Corporation. For proprietary use, several paid editions are available, and offer additional functionality.

2.6.3 Bootstrap

Bootstrap is a free and open-source front-end web framework for designing websites and web applications. It contains HTML- and CSS-based design templates for typography, forms, but- tons, navigation and other interface components, as well as optional JavaScript extensions. Un- like many web frameworks, it concerns itself with front-end development only. Bootstrap is the second most-starred project on GitHub, with more than 107,000 stars and 48,000 forks.

2.6.4 Dia

Dia has a modular design with several shape packages available for different needs: flowchart, network diagrams, circuit diagrams, and more. It does not restrict symbols and connectors from various categories from being placed together. Dia has special objects to help draw entity- relationship models (obsoleted tedia2sql or newer parsediasql can be used to create the SQL DDL), Unified Modeling Language (UML) diagrams, flowcharts, network diagrams, and simple electrical circuits. It is also possible to add support for new shapes by writing simple XML files, using a subset of Scalable Vector Graphics (SVG) to draw the shape.

3. PROPOSED SYSTEM

3.1 Description

1. Student Register

- To register students have to just provide their Personal Details like Name, Address, Phone No, etc., and a photo, to the enroll himself into the System.

2. Admin Login

- Admin can view who has enrolled into the system, and can see all the new enrollment on his login.

3. Send Email

- After creating the hall ticket, the system mails the link of soft copy to every student who have registered.

4. Student Login

- Students can use their credentials provided by admin to login into the system

5. View and Update Details

- System allows registered students to view and modify/update the personal details like Phone number, email-id, etc.

6. Mark sheet Generation

- System allows admin to generate mark sheet of examination for every student.

7. Role of Admin

Add / Update / Delete / View staff members in database

View Student Registration in Database

Generate Marksheet

8. Role of Staff

View Students Registration

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Add Student Marks

9. Role of Student

Register into the System

Enroll of Examination – Online

Download Hall Ticket

View Marks

Fill Exam Forms

4. CONCLUSION

Ultimately the result of the implementation of this project will lead to reduce the workload of these students, the faculty members and the exam-cell staff. The result would be a fully-fledged working Automated Examination Process System. Apart from this the students will be able to view their results, their academic status on the system itself. The faculty members will be able to enter the marks for respective subjects for the students. The Exam-cell staff will be able to enter the external examination marks of the students. The Head of the department will be able to monitor the status of the students as well the marks verification and validation for the students will be done by the head of department. There won't be any need to use multiple different systems for different activities. The processes will be covered by the proposed system. This will reduce the tediousness of the manual processes and give a chance for efficient, flexible and automated processes.

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FABRICATION OF CLOTH DRYING MACHINE USING A CONDENSATION UNIT

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ABSTRACT
The following paper discusses to study the clothes dryer machine by using heat. There are many cabinet dryers which are widely used today as an alternative to natural clothes drying, especially for those who are busy working from morning until evening, having limited time and for the residents in urban areas. Nowadays cabinet dryer are already offered in the market, but they are expensive to afford. A cloth dryer has to be made with the help of available materials. Its efficiency is investigated with respect to how fast it is able to dry up the clothes. Hence a set of experiments are performed to determine the worthiness of this dryer. The main advantage of this dryer is that it can work all round the year, with a built-in auxiliary heating system. Also, with no moving parts, it consumes less power than conventional dryers in washing machines. It can easily be built with commonly available materials such as plastic moulded body, aluminium motor, timer output etc. The comparison of two different materials such as iron and aluminium are done for best results. The cloth drying machine is designed on Solidworks and analysed on Ansys 2018.

Keywords: Design, Analysis, Cloth Dryer, Aluminium Motor, Solidworks, Ansys 2018.

INTRODUCTION
Now days drying clothes usually use natural way by using the energy from the Sunlight and the wind, but nowadays the technology is plentifully developed upward and the clothes dryers that use the electric energy or other energy come to use extensively, Especially in the urban area where limited sunlight (cloudy days) and restricted air flow of house types such as high rise condominiums and apartments, natural drying is prohibited in some housing areas for aesthetic reasons and conventional domestic electric dryers are too expensive and inefficient decreasing energy losses and heat recovery is important research topics, nowadays. Many cabinet dryers widely use, especially those who are busy working. Besides that, most of laundries today have their own dryer cabinet. It is not just because to run their operation at all the time, but they also can prevent the risk to the cloths that might lose or dirty. Cabinet dryer on the market nowadays is using electrical power as a source in generating heat.

The design available in markets are very bulky and uses lots of energy because it is not utilized properly half of energy get wasted to the surrounding. The size of the product made very compact so when it needs to be get used we can unfold it and extend it to its ultimate size where we can hang clothes and two heating sources. Because two heating sources are provided time required to dry cloths is less as compared to other expensive devices which also uses lots of energy to dry the cloths.

TYPES OF DRYERS
Spin Dryer: This machine simply spins their drums faster than a typical washer could in order to extract addition water from the load. They may remove more water in two minutes than a heated tumbler dryer can in twenty minutes, saving significant amounts of time and energy. Although spinning alone will not completely dry clothing, this additional step saves a worthwhile amount of time and energy for large laundry operations such as those of hospitals. **Condensation Dryer:** Just as in a normal dryer, condensation dryers pass heated air through the load. However, instead of exhausting this air the dryer uses a heat exchanger to cool the air and condense the water vapour into either a drain pipe or a collection tank. Afterwards, this air is run through the loop again. The heat exchanger typically uses ambient air as its coolant, therefore the heat produced by the dryer will go into the immediate surroundings instead of the outside, increasing the room temperature slightly. In some designs, cold water is used in the heat exchanger, eliminating this heating but requiring increased water usage.

Dehumidifier Dryers: By keeping a low humidity, dehumidifiers encourage fast evaporation without high heat. This type if dryer is suitable for clothes that can withstand tumbling but not high heat.

Heat Pump Dryers: A closed-cycle heat pump clothes dryer uses a heat pump to dehumidify the processing air. Such dryers typically use under half the energy per load of a condenser dryer. Whereas condensation dryers use a passive heat exchanger cooled by ambient air, these dryers use a heat pump. The hot humid air from the tumbler is passed through a heat pump where the cold side condenses the water vapor into either a drain pipe or a collection tank and the hot side reheats the air. In this way not only does the dryer avoids the need for ducting,

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but it also conserves much of its heat within the dryer instead of exhausting it into the surroundings. Heat pump dryers can therefore use less than half the energy by either condensation or traditional dryers. Heat pump dryers use about 1kWh (kilowatt hour) of energy to dry an average load instead of 2 for a condenser dryer or from 3 to 9, for a conventional electric dryer. Domestic heat pump dryers are designed to work in typical ambient temperatures from 5 degrees Celsius to 30 degrees Celsius. Below 5 degree Celsius, drying time increases significantly. As with respect to ambient air, the higher humidity of the air used to dry the clothes has the effect of increasing drying times however, because heat pump dryers conserve much of the heat of air they use, the already-hot air can be cycled more quickly, possibly leading to shorter drying times than tumbler dryers, depending on the model.

Contrary to Internet rumors, the first tumble dryer was not invented by American George T. Sampson. A handcranked version was created in 1799 by a Frenchman named Pochon. Sampsons's United States patent (number 476,416) which he received on June 7th, 1892 was for an improved rack for holding wet clothes near a heat source. Heat tumble dryers appeared in the 20th century.

LITERATURE REVIEW

1. Professor J. Ross Moore (1938): This paper gives us an overview and the origin of the concept of drying clothes. The first electric dryer was invented in the early 20th century. Inventor J. Ross Moore was tired of hanging his clothing outside, especially during the winter. To help keep his wardrobe out of the freezing weather, he built a shed to house his clothes while they dried. In addition, he added a stove. The clothing would hang on the line in front of the fire and dry. This was the beginning of the development of electric dryers. For the next three decades, Moore worked to eventually build a gas and electric unit, but couldn't find anyone to help him get his idea the frigid winters, he built a shed, installed a stove and hung the clothes there to dry.
2. Professor Pochon (1799): In this paper we can see study about the invention of a ventilator which is very similar to a tumble dryer. In 1799, a Frenchman known as Pochon invented the ventilator, a precursor to the modern tumble dryer. This early clothes dryer was a rotating metal drum with holes bored into it. Wet clothes were placed inside the drum which was then positioned over an open fire and cranked by hand.
3. George T. Sampson (June 7th, 1892): This paper focusses on the using of heat from a stove rather than a ventilator. On June 7, 1892 an African American named George T. Sampson received a patent for a device similar to Pochon's ventilator. Sampson's invention used the heat from a stove rather than an open fire. Thus it was a more efficient way of drying up the clothes rather than using an open fire which was far more dangerous.
4. Seung Phyo Ahn, Seong Hwan Kim, Yong Gap Park, Man Yeong Ha (May 2019): From this Research paper we can learn that a vented dryer is a system in which outside air flows in, and moisture from wet clothes is evaporated using a heat source and discharged directly outside. This study experimentally investigates the thermal characteristics and drying mechanisms of such a dryer along with the main factors that affect the drying performance. The heat and mass transfer coefficients in the drum increased at the beginning of the drying process and gradually decreased due to the reduction of moisture in the clothes. The air entering the electric heater was preheated by heat that leaked from the drum and other parts in the dryer. This phenomenon recovers approximately 5–8% of the heat. Although the drying time increases when decreasing energy consumption, there is a heating algorithm that can achieve energy-star performance while minimizing the increase in drying time by appropriately setting the heater input at the beginning and end of drying.
5. J. Lee, N. Hoeller, D. Rogers, S. Musnier, F.A. Salustri (27th August, 2009): This paper describes that clothes dryer machine are one of the most energy-consumptive appliances in the residential sector, but there has been relatively little work to study its environmental aspects and improve upon its design and efficiency. The research group is began such a project, with the ultimate goal of which is to provide decision-making tools for the public and policy makers.
6. Chris Woodford (13th July, 2018): This paper describes the design and analysis of clothes drying machine system and helps us to understand the science behind the cleaning and the drying of clothes. The paper conveys information such as water is the world most versatile cleaner, but it's amazing how much of it you can waste when you do the laundry. On its shortest and simplest setting, with only a half load of washing, my old clothes washing machine uses about 20 litres (5 gallons) of water; with multiple rinses, many machines will easily use double that much. Most of that water is spun out at high speed (think centrifuge)

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and then drained away, but even the most efficient machines leave a significant amount of wetness lingering in your clothes. pangam30@gmail.com

7. Paul Bendt, Ecos (2009): This paper describes dryer operation and testing undertaken by Ecos and explains the differences that have been observed. Emphasis is placed on simple and inexpensive changes that could reduce energy consumption by half. Dryers also place a large load on the home's HVAC system, and dramatic savings are possible here as well. Further results show that gas dryers have lower environmental impacts than electric dryers, often lower than even the hoped-for improvements of advanced technologies. We recommend changes to the test procedures and metrics so that energy efficiency can be recognized and rewarded. These results will provide the basis for effective programs and policies that could save 50 billion kWh per year in energy spent drying clothes.
8. Ali Alahmer, Mohammed Al-Dabbas (14th October, 2013): This research paper presents the design and construction of the energy efficient, time saving, cost effective of passive solar powered clothes dryer. This manuscript begins with a derivation of mathematical model represents of solar dryer followed with an analysis of the elements necessary for successfully designing the various components of a solar dryer. The solar drying performance achieved an average drying rate of 0.35 kg/h and drying time of 3 h in a typical day, even under local low ambient humidity of around 35% and at moderate outdoor wind speed. Also, the computational fluid dynamic CFD of transient thermal behavior based on Navier-Stokes equations was used to demonstrate the prevailing temperature rises in the solar natural-ventilation system associated with the internal heat flux due to solar radiation and moisture removal. The efficiency of solar dryer was improved using Nano coating technology.
9. Richard D. Smith, John F. Gerling, Stephen D. Schultz (2002): This invention pertains generally to the drying of clothes and, more particularly, to a compact microwave clothes dryer and method. Microwave clothes dryers were first envisioned as a means to transfer heat energy directly to the moisture in clothes without the need for hot air. This results in lower drying temperatures and reduced fabric wear, as well as being faster and more energy efficient. It also permits the drying of delicate fabrics that might otherwise require dry cleaning. Studies have shown that the concept of microwave clothes dryers is technically feasible, but that the practical and economic feasibility of full size residential dryers is questionable

METHODOLOGY

The project is about the designing the mechanical part of the machine and to fabricate the mechanical part of the system.Besides that it is also needed to apply all knowledge and skill that required to make it done. The design and construction of the Clothes dryer is to dry clothes up to 5kg with a height of 1.4m and a diameter of 0.6m and it has to be moveable with wheels attached at the bottom and this has to be done with the available engineering materials. However, this is for academic purpose, a similar project for general people with greater clothes capacity can be done with a selection of better engineering materials. The design of a clothes dryer machine usually come with a machine washing in which there is a chamber for washing the clothes and then there is chamber for drying up the washed clothes, however people face problems due the ground space taken by the washing machine and there aren't much options when it comes to a power efficient clothes dryer in the market. This project focusses on providing an alternative for a solo clothes dryer which is energy efficient, requires less space, easy to carry and is comparatively less in price.

SELECTION OF MATERIALS

Many parts of a washing machine are manufactured from sheet steel, usually coated with zinc to improve rust resistance. The steel manufacturer supplies the metal in a coil, which allows the material to be cut to size with minimum waste or automatically fed into the forming process. On some models made by Speed Queen, the spin tub is made of stainless steel**.** All other models use a steel (called enameling iron) designed for a porcelain coating. For the wash tub, which isn't visible unless you open the machine cabinet, enamelling iron with a porcelain coating is generally used. Whirlpool is the exception, using plastic instead of enamelling iron for the outer wash tub.

However the main components of the cloth dryer machine is aluminium motor and the timer that is to be used for drying of the clothes and they are discussed below,

Aluminium Motor: Aluminium motors when compared to iron motors are light in weight and even caters to the needs of the project by providing higher efficiency and the ventilation is even better. These aluminium motors covers output from as little as 0.18Kw to 1.5Kw in frame sizes 63 to 132M in 2, 3 and 6 pole speeds. Some of the other advantages of aluminium motor over cast iron motor is its high resistance to corrosion and

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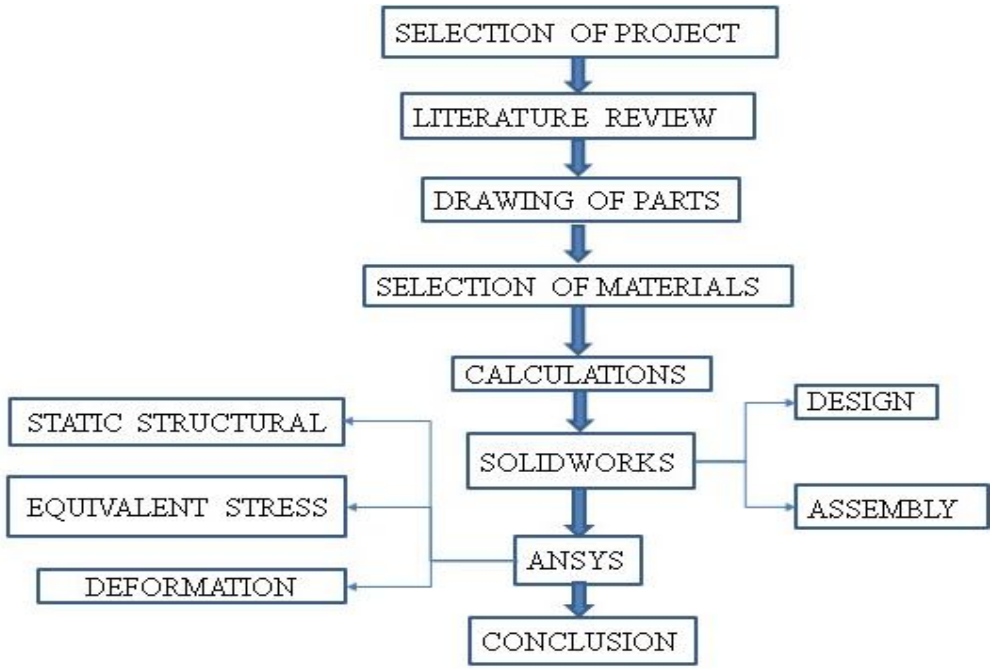
atmospheric attack and the fact that aluminium is almost one third the weight of cast iron. Hence using aluminium motor reduces the cost and increases the efficiency and the durability of the cloth drying machine.



OBJECTIVES

The objectives are as followed:

1. Develop a clothes dryer machine that can dry clothes in less amount of time.
2. Design the clothes dryer machine with suitable shape.
3. Analysis the beam structure (rod that supports the load of clothes) of the machine.
4. The time taken to dry the clothes using materials that has been chosen.

CONCLUSION

The designing of cloth dryer machine requires various components and different materials. The data or material for the project was collected from several research paper. The invention relates to a cloth drying machine which is less in price as well is more efficient. Literature review has been done for the cloth drying machine and many research papers were referred for Literature review. Hence the experiment plan is developed for the designing of the cloth drying machine.

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FACE DETECTION ATTENDANCE SYSTEM- FACE DETECTION TECHNOLOGY

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ABSTRACT
The face is one of the easiest ways to distinguish the individual identity of each other. Face recognition is a personal identification system that uses personal characteristics of a person to identify the person's identity. Human face recognition procedure basically consists of two phases, namely face detection, where this process takes place very rapidly in humans, except under conditions where the object is located at a short distance away, the next is the introduction, which recognize a face as individuals.

Keywords: Face Detection, Eigen Face, PCA, Matlab.

INTRODUCTION
Face recognition is an important application of Image processing owing to its use in many fields. Identification of individuals in an organization for the purpose of attendance is one such application of face recognition. Maintenance and monitoring of attendance records plays a vital role in the analysis of performance of any organization. The purpose of developing attendance management system is to computerize the traditional way of taking attendance. Automated Attendance Management System performs the daily activities of attendance marking and analysis with reduced human intervention. The prevalent techniques and methodologies for detecting and recognizing face fail to overcome issues such as scaling, pose, illumination, variations, rotation, and occlusions. The proposed system aims to overcome the pitfalls of the existing systems and provides features such as detection of faces, extraction of the features, detection of extracted features, and analysis of students' attendance. The system integrates techniques such as image contrasts, integral images, color features and cascading classifier for feature detection. The system provides an increased accuracy due to use of a large number of features (Shape, Colour, LBP, wavelet, Auto-Correlation) of the face. Faces are recognized using Euclidean distance and k-nearest neighbor algorithms. Better accuracy is attained in results as the system takes into account the changes that occur in the face over the period of time and employs suitable learning algorithms.

HISTORY
During 1964 and 1965, Bledsoe, along with Helen Chan and Charles Bisson, worked on using the computer to recognize human faces (Bledsoe 1966a, 1966b; Bledsoe and Chan 1965). He was proud of this work, but because the funding was provided by an unnamed intelligence agency that did not allow much publicity, little of the work was published. Based on the available references, it was revealed that the Bledsoe's initial approach involved the manual marking of various landmarks on the face such as the eye centers, mouth, etc., and these were mathematically rotated by computer to compensate for pose variation.

The distances between landmarks were also automatically computed and compared between images to determine identity.

Given a large database of images (in effect, a book of mug shots) and a photograph, the problem was to select from the database a small set of records such that one of the image records matched the photograph. The success of the method could be measured in terms of the ratio of the answer list to the number of records in the database. Bledsoe (1966a) described the following difficulties.

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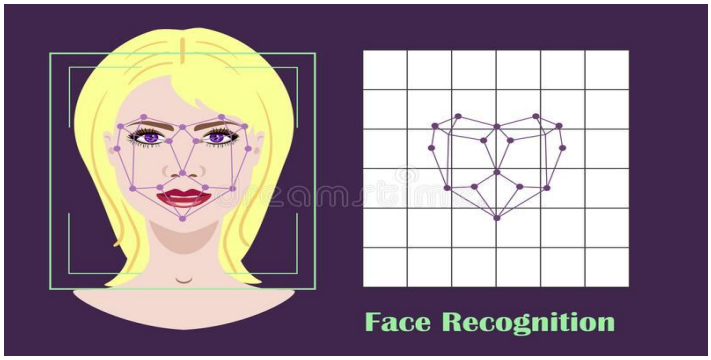
METHODOLOGY

In this proposed system, the system is instantiated by the mobile .After it triggers then the system starts processing the image for which we want to mark the attendance. Image Capturing phase is one in which we capture the image. This is basic phase from which we start initializing our system. We capture an image from a camera which is predominantly checked for certain constraints like lightning, spacing, density, facial expressions. The captured image is resolute for our requirements. Once it is resolute we make sure it is either in png or jpeg format else it is converted. We take individuals different frontal postures so that the accuracy can be attained to the maximum extent.

IV.CONCEPTS OF FACE DETECTION

Face detection is the process of automatically locating human faces in visual media (digital images or video). A face that is detected is reported at a position with an associated size and orientation. Once a face is detected, it can be searched for landmarks such as the eyes and nose.

Here are some of the terms that we use in discussing face detection and the various functionalities of the Mobile Vision API.



- **Face recognition** automatically determines if two faces are likely to correspond to the same person. Note that at this time, the Google Face API only provides functionality for face detection and not face recognition.
- **Face tracking** extends face detection to video sequences. Any face appearing in a video for any length of time can be tracked. That is, faces that are detected in consecutive video frames can be identified as being the same person. Note that this is not a form of face recognition; this mechanism just makes inferences based on the position and motion of the face(s) in a video sequence.
- A **landmark** is a point of interest within a face. The left eye, right eye, and nose base are all examples of landmarks. The Face API provides the ability to find landmarks on a detected face.
- **Classification** is determining whether a certain facial characteristic is present. For example, a face can be classified with regards to whether its eyes are open or closed. Another example is whether the face is smiling or not.

V. CONCLUSION

There may be various types of lighting conditions, seating arrangements and environments in various classrooms. Most of these conditions have been tested on the system and system has shown 100% accuracy for most of the cases. There may also exist students portraying various facial expressions, varying hair styles, beard, spectacles etc. All of these cases are considered and tested to obtain a high level of accuracy and efficiency. Thus, it can be concluded from the above discussion that a reliable, secure, fast and an efficient system has been developed replacing a manual and unreliable system. This system can be implemented for better results regarding the management of attendance and leaves. The system will save time, reduce the amount of work the administration has to do and will replace the stationery material with electronic apparatus and reduces the amount of human resource required for the purpose. Hence a system with expected results has been developed but there is still some room for improvement

SCOPE FOR FUTURE WORK

1. Currently, the system has reached the accuracy level up to 80% for partial and dense images. It can further be improved to obtain higher accuracy levels.

2. Further, 2 or more IP cameras can be employed and each image can be processed separately. The results of these can be merged to obtain better results and accuracy in denser classrooms.

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IDENTIFICATION OF FRUITS USING HSV FILTER

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ABSTRACT
In this paper we developed an algorithm to find specific fruit within pictures containing mixed fruit on relatively simple backgrounds. This algorithm characterizes the pixels based on hue, saturation, and value thresholds set through quantitative analysis and adjustment. Then, the algorithm rejects some clusters of pixels that are too small to be fruit, and performs morphological operations to smooth the fruit shapes. The algorithm performs very well on images with a clear background and fruit that do not overlap. It achieves 98.3% accuracy for identifying fruit across three test images. However, the algorithm degrades when there is excessive overlap of fruit; it cannot distinguish neighboring fruit.

Keywords: Thresholds, Morphologicaloperations, Clusters, Pixels, Algorithm.

1. INTRODUCTION

We have written an algorithm to find and count different types of fruit within color images. Specifically, the fruit we focused on are apples (only red), oranges, and bananas. This may seem trivial – a simple color filter to separate red, orange, and yellow should suffice. However, this is not nearly so simple. The fruits vary in color and shading enough that there is significant overlap in the colors. For example, an orange with an under-ripe portion may look quite yellow, like a banana. On the other hand, an apple that is too dark and in the shade may not even look like a fruit to that algorithm. We have created an algorithm that can find most fruits accurately under various circumstances. For our algorithm to function as intended the image must have a background that does not match the fruit color. Our algorithm can accommodate a wide array of lighting conditions, but it struggles to identify multiple fruit of the same type that are touching. .

2. PREPROCESSING

The first step of our fruit finder is to filter based on the pixel color characteristics. To establish metrics to for the filter, we needed to do quantitative analysis of the colors of the fruit. We started by examining the RGB color values of each of the fruitusingphotos taken under daylight and fluorescent lighting conditions. We found that RGB would be very difficult to come up with reliable metrics. For example, to define a color range for apples, there would need to be a range of red values, a different range of green values, and yet another range of blue values. These ranges would define a 3D "cube" of color that encompasses many colors, not all of which would be red. Coming up with RGB ranges in this way would yield too wide of a range of colors and would not be appropriate for separating fruit.

Instead of using the RGB color space, we chose to use HSV for our color filtering. This would give us a single range for the hue, then separate ranges for saturation and value. This would be much easier to specify the colors of our fruit. We started by converting the images to HSV using MATLAB's built-in rgb2hsv function. We plotted hue, saturation, and value histograms of daylight and fluorescent images for each fruit.

2.1 Apples

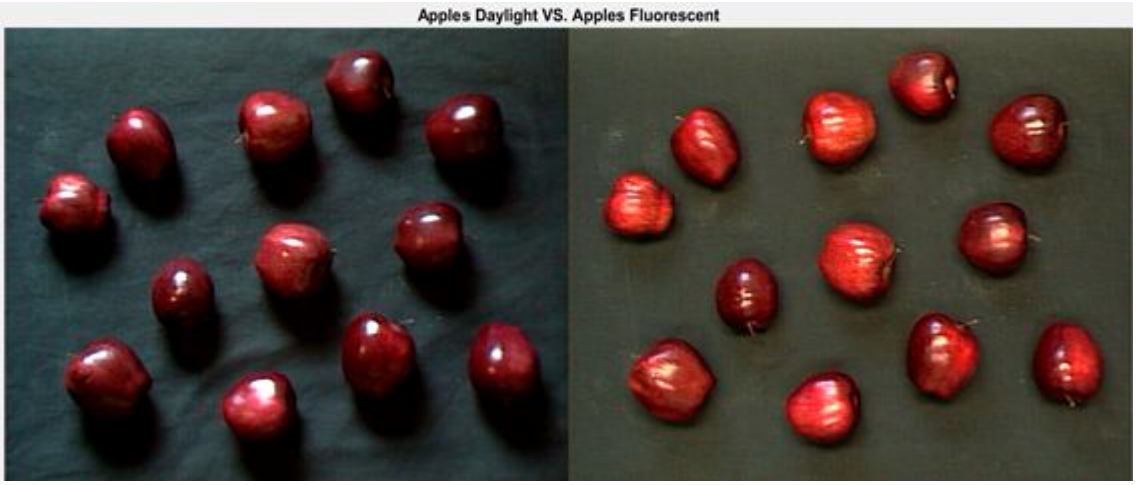

Figure-1: This compares the images for apples in the daylight (left plot) and in fluorescent light (right plot)

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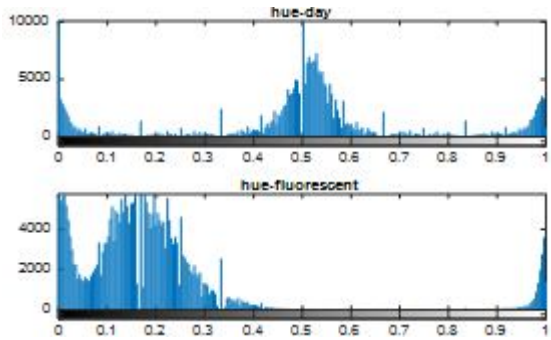

Figure-2: This shows the histogram of the hue values for 'apples_day.tiff' (top plot) and 'apples_fluor.tiff' (bottom plot)

Since we know the apples are red, we are only interested in the hues from 0 to 0.1, and from 0.9 to 1, roughly. This matches our apple hue histogram in Figure 2, where there are peaks at 0 and 1. We can assume that anything outside that range is not an apple, and therefore can be ignored for our apple filter. For the histograms for the saturation and value, we will only examine the saturation and value data corresponding to hues < 0.1 or >0.9.

From Figure 2, we can see that the saturation depends largely on the lighting. However, in both histograms, there are more saturation values between 0.5 and 1. We speculate that saturations below this value may be background pixels that were not removed by our preliminary filter. We will move on to use a saturation cutoff of 0.5 for our initial filter design.

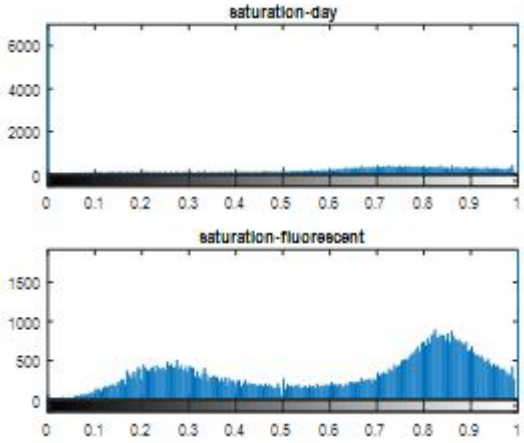

Figure-3: This shows the histogram of the saturations after applying the rough hue filter for 'apples_day.tiff' (top plot) and 'apples_fluor.tiff' (bottom plot)

From Figure 3, we can gather that for apples, the value is greatly dependent on the lighting of the picture, so we must accommodate a wide range of values with our filter. From these graphs, we chose to accept values greater than or equal to 0.05. Also examining the photos of the apples in Figure 1, we can see the apples can get very dark, which supports the decision to set a relatively low value cutoff for apples.

2.2 Bananas

Figure-4: This compares the images for bananas in the daylight (left plot) and in fluorescent light (right plot).

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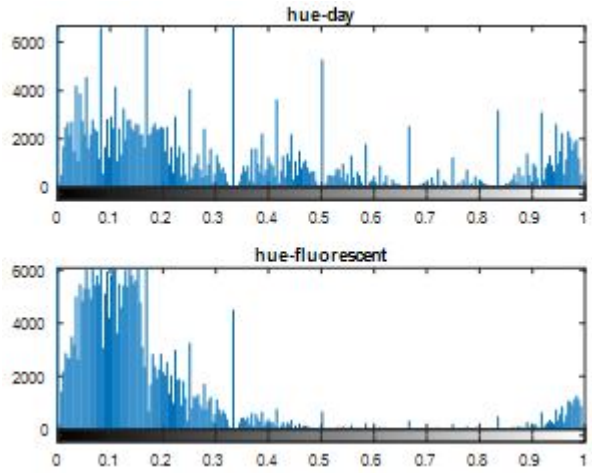

Figure-5: This shows the histogram of the hue values for 'bananas_day.tiff' (top plot) and 'bananas_fluor.tiff' (bottom plot)

From Figure 6, we can interpret that the banana's hues are not very distinct from the background image. We can estimate the hue of the bananas is between 0.1 to 0.3, because that is the general range for yellow. For the saturation and value histograms, we will only examine pixels with hue between 0.1 and 0.3.

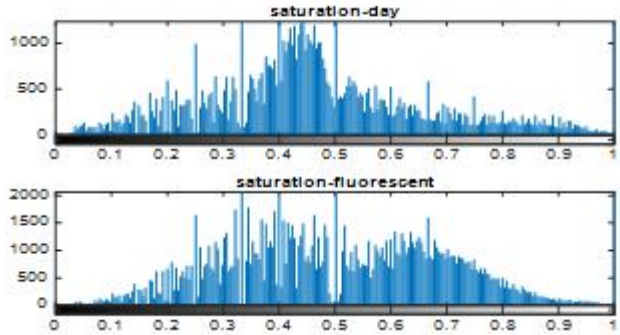

Figure-6: This shows the histogram of the saturations after applying the rough hue filter for 'bananas_day.tiff' (top plot) and 'bananas_fluor.tiff' (bottom plot)

From Figure 7, we can tell that these pixels follow a fairly normal distribution for saturation. We can choose an initial saturation cutoff of 0.4.

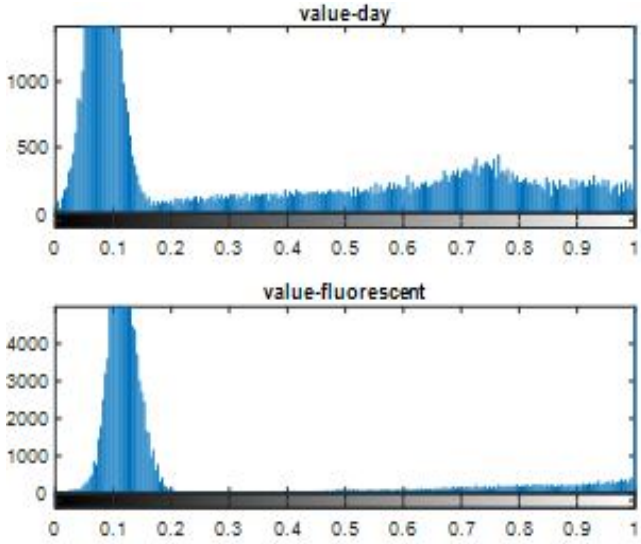

Figure-7: This shows the histogram of the values after applying the rough hue filter for 'bananas_day.tiff' (top plot) and 'bananas_fluor.tiff' (bottom plot).

From Figure 8, we can see there is a large peak in value at roughly 0.1. We can assume that this peak is caused by background pixels, because the bananas are much lighter in color than the background. We wish to reject this background peak, so we chose an initial value cutoff of 0.25.

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2.3 Oranges

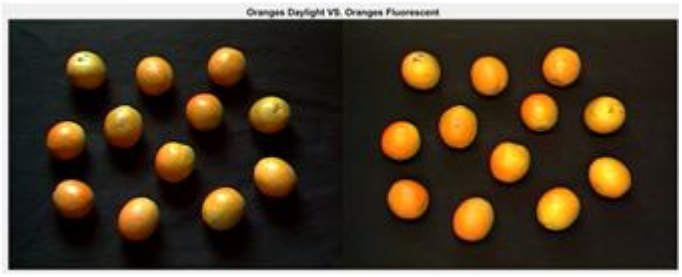

Figure-8: This compares the images for oranges in the daylight (left plot) and in fluorescent light (right plot)

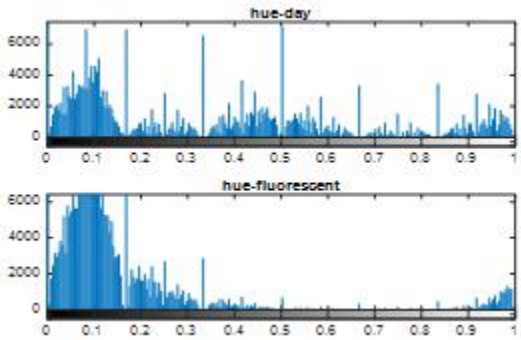

Figure-9: This shows the histogram of the hue values for 'oranges_day.tiff' (top plot) and 'oranges_fluor.tiff' (bottom plot)

From Figure 10, we can see that there is a peak in hue from 0 to 0.15, which corresponds roughly with the color orange. We will filter based on this range of hues. The histograms for saturation and value only examine pixels with hues in that range.

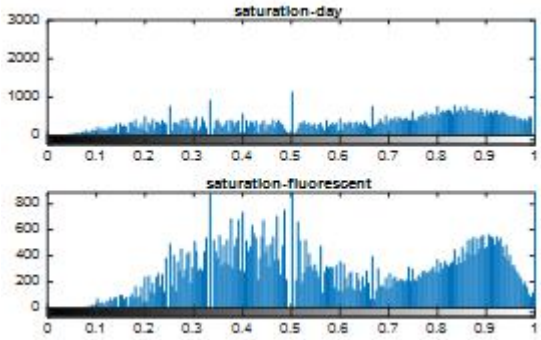

Figure-10: This shows the histogram of the saturations after applying the rough hue filter for 'oranges_day.tiff' (top plot) and 'oranges_fluor.tiff' (bottom plot)

From Figure 11 we can see that the saturation has a peak from 0.7 to 1. There is also a raised section from 0.3 to 0.5, but this is fairly low saturation and could be due to the background pixels which were not filtered out by the preliminary filter. We will choose an initial saturation cutoff of 0.5 for the oranges.

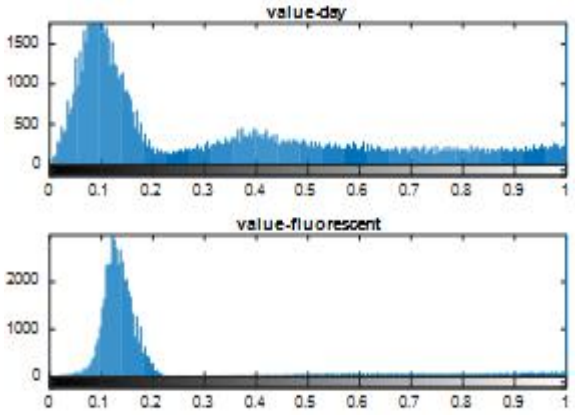

Figure-11: This shows the histogram of the values after applying the rough hue filter for 'oranges_day.tiff' (top plot) and 'oranges_fluor.tiff' (bottom plot)

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Finally, Figure 12 shows a large peak in value between 0 and 0.2, which may be attributed to the background pixels which were not removed by the preliminary filter. We will choose an initial lower value limit of 0.3 in attempt to reject background pixels.

3. HSV FILTERS : After collecting and analyzing the HSV histograms for the fruit, we created a filter based on the rough values we found. This initial filter can be found in table 1.

Table-2: This shows the thresholds we define for the initial fruit HSV filter.

	Hue	Saturation	Value
Apple	H<=0.1 or H>=0.9	S>=0.5	V>=0.05
Orange	0<=H<=0.15	S>=0.5	V>=0.3
Banana	0.1<=H<=0.3	S>=0.4	V>=0.25

Using the initial threshold values in Table 1, we created a filter that would determine whether each pixel would pass the threshold for each fruit. We created an RGB mask to specify where the output of this filter. Red pixels correspond with apples, green pixels correspond with oranges, and blue pixels correspond with bananas. The RGB mask also shows where the filter identified multiple types of fruit. For example, many of the bananas are cyan, meaning they are both blue and green. The filter identified the banana to be both a banana and an orange.

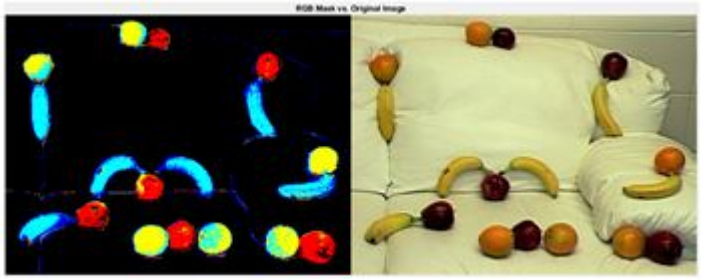

Figure-12: Left: RGB mask using the initial filter values in Table 1.Right: original image, mixed_fruit2.tiff. See additional images and masks in Appendix A.

From Figure 13, it is apparent that our thresholds need some work: most of the bananas were identified as both bananas and oranges, and most of the oranges were identified as both apples and oranges. Knowing this, we adjusted the hue thresholds of all three fruit so there would not be overlap. We came upon the final hue thresholds shown in Table 2. Similarly, we adjusted the value and saturation limits so that the masks would display as much of the fruit as possible without introducing any additional background pixels. The final value and saturation limits we chose to use can be found in Table 2.

Table-2: This shows the thresholds we define for the final fruit HSV filter

	Hue	Saturation	Value
Apple	H<=0.06 or H>=0.89	S>=0.5	V>=0.05
Orange	0.06<=H<=0.115	S>=0.4	V>=0.25
Banana	0.125<=H<=0.25	S>=0.5	V>=0.25

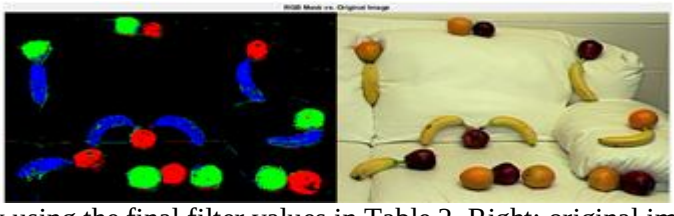

Figure-13: Left: RGB mask using the final filter values in Table 2. Right: original image, mixed_fruit2.tiff. See additional images and masks in Appendix B.

Figure 14 shows the performance of the final filter. All the fruit are masked with their respective color aside from a few stray pixels and small clusters. However, these are small enough that they can be removed via post-processing.

4. POST-PROCESSING The fine-tuning of thresholds on the HSV data was not able to give us an accurate mask of the mixed fruit. We do not want small, incorrectly identified clusters of to be counted as fruit. Therefore, we came up with a series of morphological operations to clean up the masks. Prior to performing dilation and erosion, we chose to remove the clusters smaller than 50 pixels. This operation reduces the likelihood that dilation and erosion would create large clusters that would be counted as fruit later.

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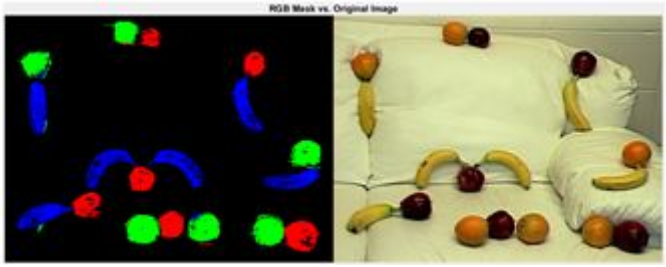

Figure-14: Left: RGB mask after removing clusters fewer than 50 pixels. Right: original image, mixed_fruit2.tiff. See additional images and masks in Appendix C

As we can see in Figure 15, the very small pixel clusters were successfully removed.Based on the distance from the object to the camera, the average size of the fruit in the pictures may vary from hundreds of pixels to tens of thousands of pixels. We found the average cluster size of the remaining clusters to approximate the average size of each fruit. We decided to remove the clusters accounting for smaller than one-third of the average size of the object on each picture. This removed clusters that were greater than 50 pixels, but too small to be a fruit.

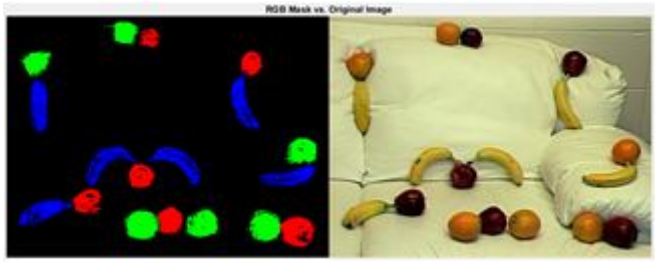

Figure-15: Left: RGB mask after removing clusters smaller than 1/3 of the average cluster size. Right: original image, mixed_fruit2.tiff. See additional images and masks in Appendix D

We can see from Figure 16 that some of the larger clusters of pixels that were not an entire fruit were removed. For example, in Figure 15, there was a small cluster of orange right below the bottom-left banana. In Figure 16, thiscluster has been removed.

When observing the other two pictures shot from different distances, we noticed that we still needed morphology to fill in the internal holes inside the fruit.

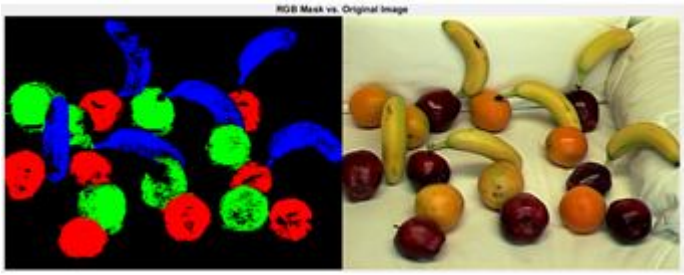

Figure-16: Left: RGB mask after removing clusters smaller than 1/3 of the average cluster size. Right: original image, mixed_fruit3.tiff.

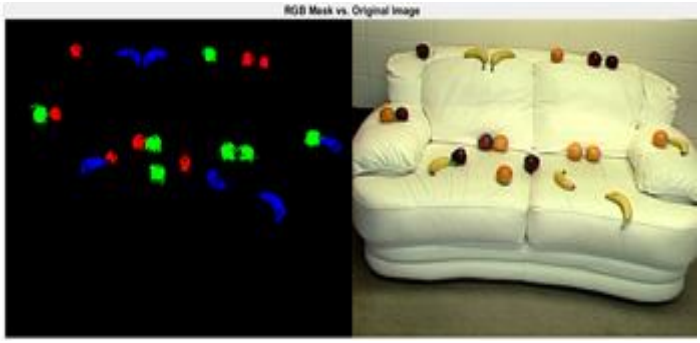

Figure 17: Left: RGB mask after removing clusters smaller than 1/3 of the average cluster size. Right: original image, mixed_fruit1.tiff.

Fruit in Figure 17 are full of internal holes, while fruit in Figure 18 have small lines coming from them that need to be removed as well.

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To address these issues, we chose to perform a closing then opening operation with an 8-neigborhood structural element on the masks. We chose to close first so that small holes would be closed, and the fruits would be internally connected. We then opened to isolate small fragments that are barely attached to the fruit. An 8-neighborhood structural element worked well to fill small holes without distorting the shape of the fruit. When we tried a 4-neighborhood structural element, it was not large enough to fill the holes.

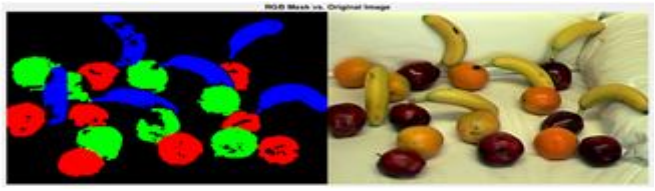

Figure-18: Left: RGB mask after a closing and an opening. Right: original image, mixed_fruit3.tiff. See additional images and masks in Appendix E.

The initial closing and opening operations managed to aggregate the fruit and fill some holes, but they were not sufficient. We can see in Figure 19 that there are still a few small clusters of pixels that detached from the fruit when we opened. To remove these small clusters, we chose to remove all clusters smaller than one-fourth of the average cluster size.

Figure-19: Left: RGB mask after another removing clusters smaller than ¼ of the average cluster size. Right: original image, mixed_fruit3.tiff. See additional images and masks in Appendix F.

5. RESULTS Here we will discuss the results of our algorithm. We used a built-in MATLAB function, regionprops, to gather the size and centroid of each fruit.

Table-3: This shows the size and centroid of each identified fruit in mixed_fruit1.tiff

Fruit	Size	Centroid Row	Centroid Column
Apple 1	343	93.606	143.41
Apple 2	333	131.74	48.249
Apple 3	229	196.72	208.47
Apple 4	444	247.12	185.58
Apple 5	334	332.69	217.9
Apple 6	308	447.26	60.357
Apple 7	239	478.68	65.126
Orange 1	620	65.103	143.95
Orange 2	637	274.32	188.8
Orange 3	640	281.81	233.02
Orange 4	441	378.13	53.515
Orange 5	1201	427.18	201.16
Orange 6	565	567.79	180.3
Banana 1	633	161.14	218.95
Banana 2	540	231.82	53.931
Banana 3	617	274.73	56.19
Banana 4	566	388.96	244.03
Banana 5	911	496.5	278.42
Banana 6	498	601.47	188.07

Table-4: This shows the size and centroid of each identified fruit in mixed_fruit2.tiff

Fruit	Size	Centroid Row	Centroid Column
Apple 1	1892	161.1	369.41
Apple 2	1847	267.57	319.07
Apple 3	1030	285.61	43.923
Apple 4	1993	325.67	406.96

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Apple 5	1485	486.39	94.601
Apple 6	2888	576.87	428.07
Orange 1	1902	59.955	93.38
Orange 2	1723	236.37	33.285
Orange 3	3066	269.62	416.04
Orange 4	2691	389.18	413.86
Orange 5	2950	513.78	418.2
Orange 6	2427	587.18	269.31
Banana 1	2572	72.874	388.83
Banana 2	2729	65.215	178.33
Banana 3	2592	198.09	290.1
Banana 4	2806	343.99	290.9
Banana 5	2693	468.28	175.49
Banana 6	2478	562.84	320.63

Table-5: This shows the size and centroid of each identified fruit in mixed_fruit3.tiff

Fruit	Size	Centroid Row	Centroid Column
Apple 1	5691	36.995	299.33
Apple 2	5613	148.33	420.09
Apple 3	3825	163.29	287.97
Apple 4	3962	185.75	175.45
Apple 5	6255	345.2	381.05
Apple 6	2488	462.27	176.03
Apple 7	2796	471.88	305.62
Apple 8	4576	543.56	384.09
Orange 1	5518	52.355	167.25
Orange 2	2182	138.43	210.75
Orange 3	6070	189.63	360.48
Orange 4	5147	281.45	180.09
Orange 5	4376	303.94	319.94
Orange 6	5229	426.98	246.75
Orange 7	6005	454.81	364.66
Banana 1	5513	101.81	230.15
Banana 2	4949	257.61	241.35
Banana 3	4069	249.08	96.583
Banana 4	5492	388.99	160.12
Banana 5	4835	492.11	63.312
Banana 6	6630	571.59	237.24

Table-6: This table contains the actual and computed count for each of the fruit in mixed_fruit1.tiff

Fruit	Actual	Computed	Percentage
Apple	7	7	100.0%
Orange	7	6	85.7%
Banana	6	6	100.0%
Total	20	19	95.0%

Table-7: This table contains the actual and computed count for each of the fruit in mixed_fruit2.tiff

Fruit	Actual	Computed	Percentage
Apple	6	6	100.0%
Orange	6	6	100.0%
Banana	6	6	100.0%
Total	18	18	100.0%

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Table-8: This table contains the actual and computed count for each of the fruit in mixed_fruit3.tiff

Fruit	Actual	Computed	Percentage
Apple	8	8	100.0%
Orange	7	7	100.0%
Banana	6	6	100.0%
Total	21	21	100.0%

From Tables 6-8, we can compute that, out of the 59 fruit total, the algorithm found 58 of them, which yields an accuracy of 98.3%. The only error was incorrectly identifying a group of two nearby oranges as a single orange in mixed_fruit1.tiff.

6. DISCUSSION

Based on the data in Tables 6-8, we correctly detected98.3% of the fruit from the three provided test images. There were no false detections. The only error that the algorithm made was that two oranges in mixed_fruit1.tiff were close together and were identified as one orange. This error can be partially attributed to the proximity of the oranges, but also that the oranges are located along an relatively orange shadow on the couch in the background. If this line were not touching the oranges, it might have been removed by our morphological operations. However, since it was part of the orange cluster, it was not removed by these operations. The other way this shadow on the couch could have been removed was further fine-tuning of the h, s, and v thresholds for the oranges. This failure points out that our algorithm does not perform very well with varied backgrounds, particularly from a long distance away. Decreasing thesize of the fruit makes it harder to distinguish colorful background noise from fruit.

While the high percentage of fruit detected may indicate that our algorithm performed very well, the resulting masks are not perfect. Many of the fruits have blemishes or color variations that our algorithm does not recognize.For example, several of the apples and oranges have reflections that were not considered to be part of the fruit by the algorithm. We attempted to fill in these regions of the mask with morphology, but we could not completely fill them while maintaining the correct shape of the fruit.

7. FUTURE SCOPE

Our algorithm could be improved significantly through the use of an edge detector. From the edge detection, we could find information about the shape of a formation. Shape coupled with color characteristics could make it easier to classify fruit. Additionally, it would make filling a shape easier. We would have the boundaries of an entire fruit, so we could simply fill in all of the pixels in the mask that fall inside the detected edge of the fruit.

This would solve the problem of the apple reflections or banana bruises. It would be ideal to reject the background using color thresholds prior to using edge detection to avoid finding unrelated edges in the background.

In the long term, to improve our fruit finder, we would want to gather a very large sample of fruit images and feed these to a machine learning algorithm so that it can determine a precise set of classifiers. Once it has these classifiers, identifying fruit in new images should be much more accurate.

8. CONCLUSION

Our study on finding fruit showed that using color thresholds and morphology alone is not sufficient for classifying images. Even with simple backgrounds, our algorithm was unable to distinguish every fruit. Additional information such as edge features and shape may be needed to create a more complete fruit finding algorithm.

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IMPLICATIONS OF SYSTEM IDENTIFICATION OF A AGRICULTURAL VEHICLE USING CGPS

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ABSTRACT
The automatic operation of farm vehicles can have great benefits both in farm productivity and hazardous or impossible operations. Automatic control offers many potential improvements over human control; however, previous efforts have failed largely due to sensor limitations. Carrier Phase Differential GPS (CDGPS) is an enabling technology that provides a high-bandwidth, low-noise measurement of multiple vehicle states. System identification techniques can then be used to generate a mathematical model for automatic control system design and implementation.

In this work, previous controls research on a large tractor test bed is extended to demonstrate two different methods of system identification. Using a priori knowledge of the tractor dynamics, an extended Kalman filter is implemented and demonstrates model parameter identification. A Linear Quadratic Regulator (LQR) controller, based on these parameters, performs closed loop line tracking with a demonstrated error of better than 1.8 cm standard deviation.

The same data is used with the Observer/Kalman Filter Identification (OKID) method, which assumes no a priori information about the system dynamics. It is shown that the estimator/controller designed with this system demon-strates equivalent experimental performance. The OKID methodology differs from the extended Kalman filter by utilizing solely the input and output streams to determine the structure and order of the plant model.

INTRODUCTION
Autonomous guidance of ground vehicles is not a novel idea. Previous attempts have largely failed due to sensor limitations. Some experimental systems require cumber-some auxiliary guidance mechanisms in or around the field [1,2]. Others rely on vision systems that require clear daylight, good weather, or field markers that require deci-phering by pattern recognition [3,4]. Since the advent of modern GPS receivers, a single, low-cost sensor is now available for measuring multiple vehicle states. GPS- based systems already have a myriad of uses in land-based vehicles, including meter level code-differential tech-niques for geographic information systems (GIS) [5-7], driver-assisted control [8], and automatic ground vehicle navigation [9].

Using precise differential carrier-phase measurements of satellite signals, CDGPS has demonstrated centimeter-level accuracy in position measurements [10], and 0.1° accuracy in vehicle attitude determination [11]. System integrity becomes greatly enhanced with the augmentation of the GPS satellite signals by ground based pseudo-satel-lites [12]. Accurate and reliable measurements of multiple states by CDGPS lend themselves to system identification, estimation, and automatic control. CDGPS-based control systems have been utilized in such varying platforms as a model airplane [13], a Boeing 737 aircraft [10], an electric golf cart [14], and a farm tractor [15].

Figure-1: GPS-Equipped Tractor

The process of constructing models and estimating unknown parameters from experimental data is referred to as "system identification." Complex phenomena can exceed our scientific knowledge and ability to predict plant dynamics. Instead data from carefully-constructed experiments are used to build an adequate mathematical model for control. The goals of system identification are different from physical modeling. Physical modeling attempts to understand the entire process. In contrast, system identification adequately models the plant's char-acteristics only to the extent of mapping the input/output behavior sufficient for controlling the plant.

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This paper focuses on the system identification and subse-quent controller design of a farm tractor using CDGPS as the only sensor of vehicle position and attitude. System identification can provide the mathematical model necessary to implement an automatic control system, by careful analysis of the input and output data of a dynamic system.

Two different methods of using the acquired data are presented to generate linear models. These are used to generate automatic control systems, and then tested on a large farm tractor.

EXPERIMENTAL SETUP

Vehicle Hardware: The test platform used for vehicle identification and control testing was a John Deere Model 7800 tractor (Fig. 1). Four single-frequency GPS antennas were mounted on the top of the cab, and an equipment rack was installed inside. Front wheel angle was sensed with a potentiometer—the only non-GPS sensor used in the system—and actuated using a modified Orthman electro-hydraulic steering unit. A Motorola MC68HC11 microprocessor board was the communications interface between the control computer and the steering unit. The microprocessor converted serial commands from the control computer into pulse-width modulated signals which were sent to the power circuits that control the steering valves. Wheel position was sampled and digitized by the 'HC11 and sent to the controls computer at 20 Hz.

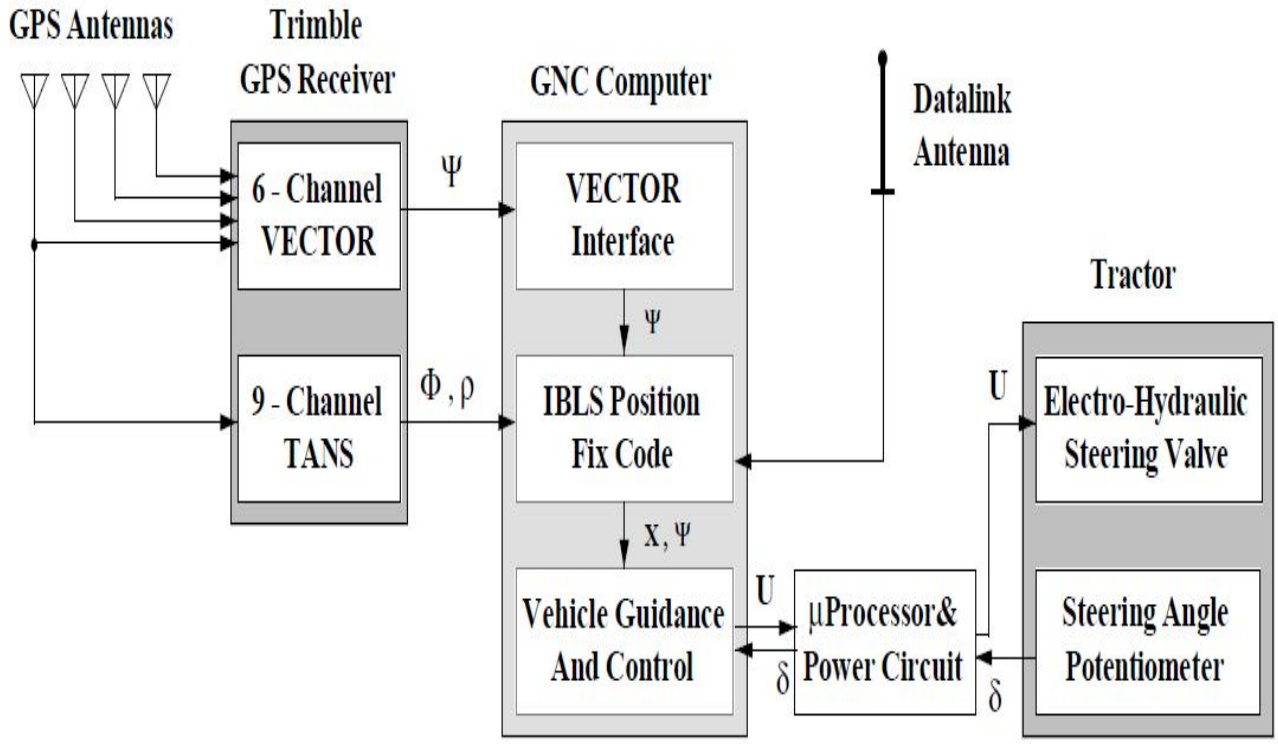

Figure 2 — GPS Hardware Architecture

GPS Hardware: The CDGPS-based system used for vehicle position is similar to the one used by the Integrity Beacon Landing System (IBLS) [10]. A four-antenna, six-channel Trimble Vector receiver produced attitude measurements at 10 Hz. A single-antenna Trimble TANS PC-card receiver produced code- and carrier-phase mea-surements—which were used to calculate vehicle position—at 4 Hz. An Industrial Computer Source Pentium-based PC running the LYNX-OS real-time operating system performed the attitude interface, position calculations, data collection and controls calculations using Matlab software. A block diagram representation of the hardware is pictured in Figure 2.

VEHICLE MODELING AND SYSTEM IDENTIFICATION DATA COLLECTION

The non-linearities are "linearized" through a look-up table implemented in the Guidance-Navigation-Control (GNC) computer. Agricultural farm vehicles must be able to operate over various types of terrain and with a variety of implements. The kinematic model (Fig. 3), based on simple geometry rather than inertias and forces, assumes both a constant velocity along the path, as well as no wheel slip. While the velocity may not vary a great deal, it is not constant, and the four wheel drive on the tractor cannot move the vehicle forward without slipping the wheels.

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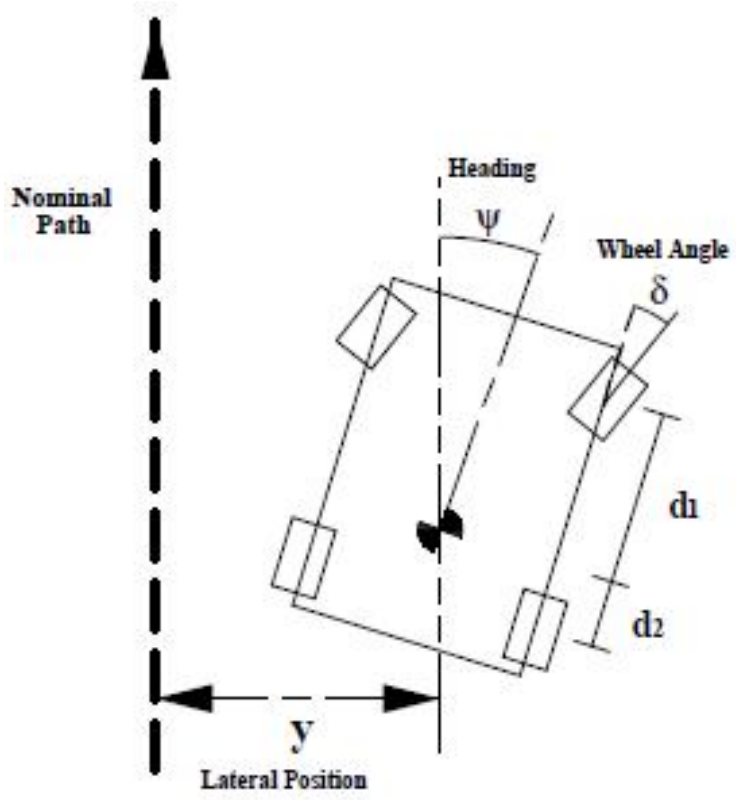

$$\begin{bmatrix} \dot{y} \\ \dot{\psi} \\ \dot{\delta} \end{bmatrix} = \begin{bmatrix} 0 & V & \frac{Vd_2}{(d_1+d_2)} \\ 0 & 0 & \frac{V}{(d_1+d_2)} \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} y \\ \psi \\ \delta \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u$$

Figure 3 — Simple Kinematic Model

Vehicle conditions can change, and it is expected that time-varying methods or adaptive controls methods will be required to achieve good line-following performance in these changing environments. Furthermore, the vehicle dynamics may change a great deal with different implements and/or soil types. Slopes or ground texture may also affect vehicle performance to the extent that a simple model based on geometric kinematics may not be adequate to control the tractor.

In order to gather data to perform a proper system identification of the farm tractor, a series of ten open-loop line following tests were run in which a human driver, through the GNC computer, caused the steering to either slew left or right at the maximum steering rate. Also, the driver commanded the steering rate to zero through the electro-hydraulic actuator in order to track a roughly straight line. This “pseudo”-random input was designed to apply the maximum power to the tractor through the controls and produce a rich output that would contain information from all modes of interest. A typical pass for system identification is pictured in Figure 4.

These data passes were run without an implement, in first gear, at a forward velocity of approximately 0.33 m/s (0.7 mph), and were subsequently used for calculation and validation of a linear plant model. In this particular research, the data was gathered separately and then processed as a “batch” for identification. Further research will allow the identification process and the data gathering process to occur simultaneously for “on-line” identification.

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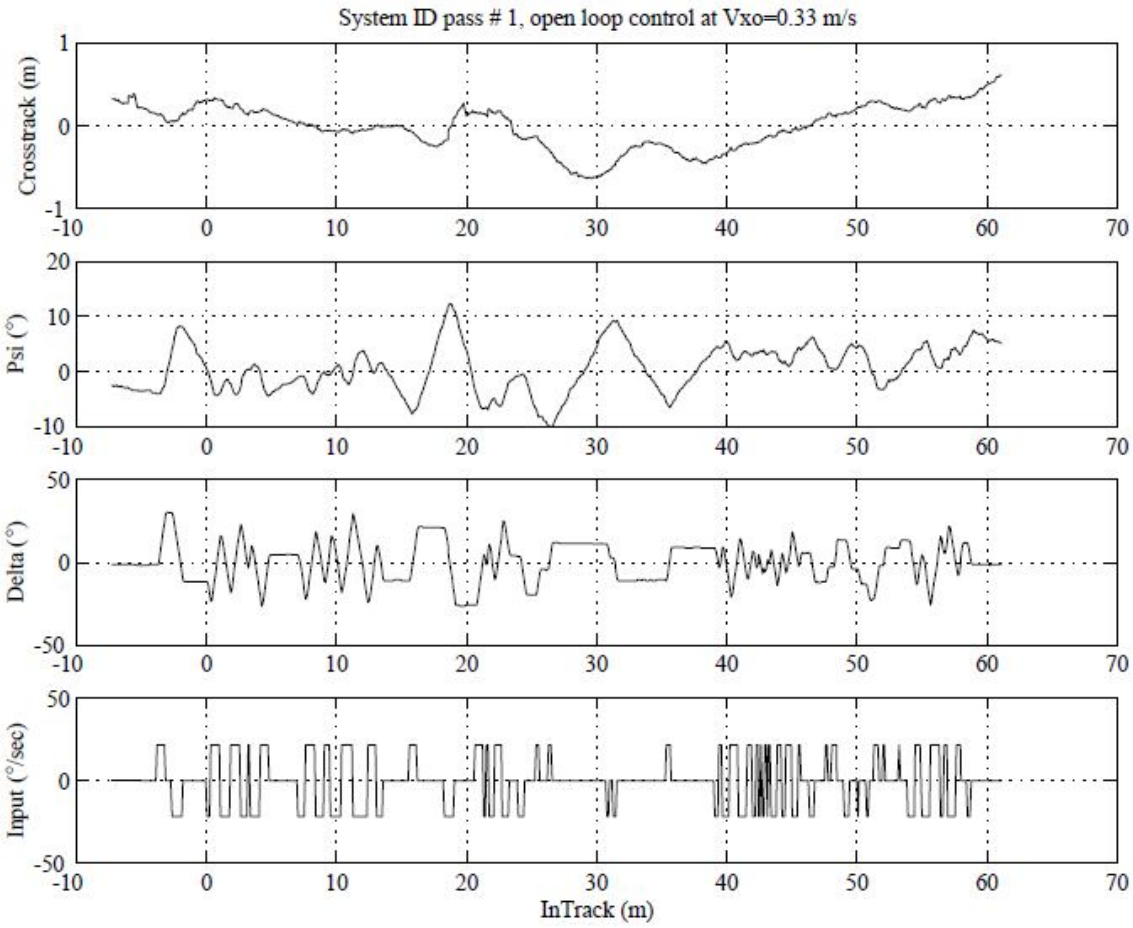

Figure-4: Typical System Identification Pass

CONCLUSIONS

This paper is significant because it extends the under-standing and implementation of a safe, low-cost control system for high-accuracy control of a ground vehicle. Farm tractor data was used for system identification and control synthesis, with a practical demonstration of vehicle control based on data alone—with no *a* priori knowledge of the system. A constant gain controller, based on the identified dynamics, was demonstrated to control the tractor along straight lines with a lateral position error of better than 1.9 cm standard deviation.

These results suggest that the transition from control of a lone tractor to control of the tractor and implement can be accomplished without an accurate physical model of implement-soil interaction. Current research indicates that the use of GPS-derived measurements for system identification and subsequent controller synthesis is an excellent starting point for an adaptive control scheme.

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INFLUENCE OF BEARINGS ON THE TORSIONAL VIBRATIONS OF GEAR BOX

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ABSTRACT
This paper contains the influence of bearings on the torsional vibrations of gear drives. This paper shows that the lateral deflection of shafts also contributes to the shaft torsional stiffness. An expression is derived now to determine the torsional flexibility of the shaft due to bearing elasticity and shaft lateral bending. The analysis is carried out by using ANSYS software. This analysis is to find out the frequency and total flexibility of the gear box to prevent the resonance. From the result, this analysis can show the range of frequency that is suitable for the gear box casing which can reduce resonance.

I. INTRODUCTION
Gear drives exist in several industrial machines like for instance in machine tools, automotive power transmission, air craft controls etc. A gear drive is powered by a Drive motor at the input end and it drives a load at a desired RPM. The power is transmitted through a series of gears and shafts mounted in bearings. The number of shafts and gears depends upon the number of speeds at the output. Various shafts in the gear drive rotate at different speeds. It is required that no shaft in the drive should resonate either in the lateral or torsional directions. In other words, the working frequencies and the natural frequencies should never coincide. The torsional natural frequencies depend on the torsional stiffness of the shafts and the inertias of the rotating masses like gears in the gear box. The natural frequency is given by the formula $\omega n = (K/M)\ 1/2/\ (2\ \pi)$ Where K is the gear drive stiffness and M is the inertia of the gear drive. K can be computed from the stiffness of individual gear shafts.

A gearbox is a mechanical method of transferring energy from one device to another and is used to increase torque while reducing speed. Torque is the power generated through the bending or twisting of a solid material. This term is often used interchangeably with transmission. Gear box is located at the junction point of a power shaft, it is often used to create a right-angle change in direction, as is seen in a rotary mower or a helicopter. Each unit is made with a specific purpose in mind, and the gear ratio used is designed to provide the level of force required. This ratio is fixed and cannot be changed once the box is constructed. The only possible modification after the fact is an adjustment that allows the shaft speed to increase, along with a corresponding reduction in torque.

In a situation where multiple speeds are needed, a transmission with multiple gears can be used to increase torque while slowing down the output speed. This design is commonly found in automobile transmissions. The same principle can be used to create an overdrive gear that increases output speed while decreasing torque.

II. SCOPE AND OBJECTIVE
The problem is faced in a machine tool gear box is resonance due to torsional vibrations. An attempt is made to avoid the resonance by improving the shaft diameters. But it did not work. Now it is proved that even the lateral deflection of shafts also contributes to the shaft torsional stiffness. An expression is derived now to determine the torsional flexibility of the shaft due to bearing elasticity and shaft lateral bending and there by compute the total torsional flexibility.

The method that is developed now is used for predicting the influence of bearing elasticity on the shaft torsional vibrations. The torsional stiffness is increased and there by the torsional resonance is avoided in the gear box. This is achieved not by just increasing the shaft diameter but by modifying the mounting shaft bearings also.

III. LITERATURE REVIEW
Miloš PROKOP, (1) Each unit of mechanical equipment has a different signature in the frequency spectrum. The vibration spectrum shows the areas of stress and undue energy. Vibration measurements trend changes at different locations along the units to predict problems. The key benefits include: monitoring equipment life, increasing equipment uptime, managing and scheduling maintenance work. Vibration analysis can determine misalignment unbalance, mechanical looseness, eccentric shafts, gear wear, broken teeth, and bearing wear. Using Laser Vibrometer is possible to get the data that are processed in different methods like FFT, Spectrogram, Cepstrum, Wavelet transform and Cyclostationary analysis.

Michal Hajˇzman, (2) The paper deals with the modelling of a real gearbox used in cement mill applications and with the sensitivity analysis of its eigen frequencies with respect to design parameters. The torsional model

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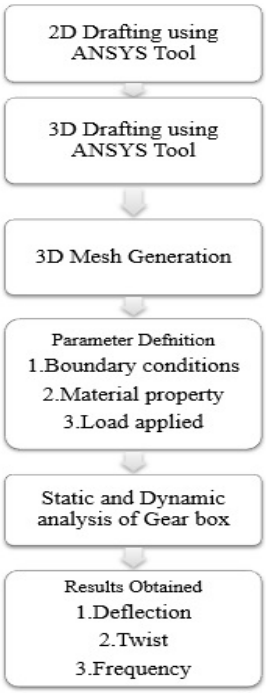
(including a motor and couplings) based on the finite element method implemented in an in-house MATLAB application is described. The sensitivity analysis of gearbox eigen frequencies is performed in order to avoid possible dangerous resonance states of the gearbox. The parameters chosen with respect to the sensitivity analysis are used for tuning the gearbox eigen frequencies outside resonance areas.

Pravin M. Kinge, (3) This technical paper is on stress analysis of gearbox used in sugar industry. ANSYS is used for stress analysis. The main objective for carrying out this analysis was to improves the life of the gear. After the analysis of gears from existing gearbox the reason for failure was found. The reason for failure of the gear was due to wear of gear teeth edges. This is caused due to high stress concentration along the gear teeth edges. To relieve these stress concentration three modifications in the design of gears were done and after that again stress analysis of the modified gears carried out. It is observed that the stress relieved from edges and got concentrated to the edges of the holes provided at the roots of the teeth. The three design modifications were done as first, the edges of the gear teeth were tapered by an angle of 20, second, making groove in the gear wheel and third, making holes at the roots of the gear teeth. The expected increase in life of the gears of the gearbox would be three years.

Pratik Gulaxea, N. P. Awate, (6) CA CAE techniques can be used to increase the performance of gearbox and thereby increase the efficiency of material handling trolley of cupola furnace. Also, to ensure simulation and experimental results, a prototype model was tested with the help of FEM software. This paper reviews the modelling and computer simulation as a tool for aiding gearbox used by various researchers earlier. The results of computer simulations and results obtained by actual experimentation were compared to get detailed idea about the parameters which can affect the increase in speed drastically. The factors were divided into four groups: design factors, production technology factors, operational factors and change of condition factors.

IV. METHODOLOGY



V. DERIVED EXPRESSION

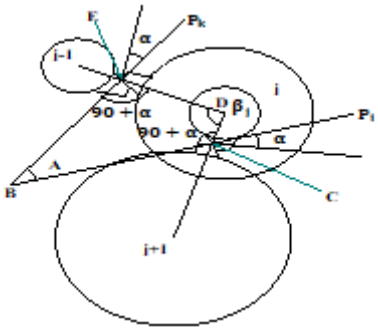


Fig-1: Gear Teeth in Mesh

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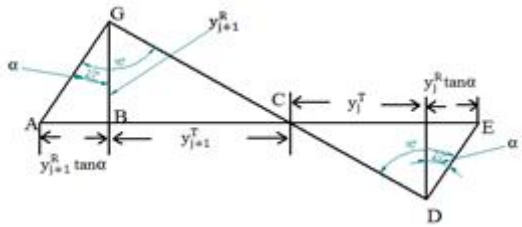


Fig-2: Lines of action of gear forces

Derived Expression for Torsional Flexibility

$$\frac{\theta}{T} = \frac{\delta_{ii}}{R_i^2 \cos^2\alpha} + \frac{\delta_{kk}}{R_k^2 \cos^2\alpha} - \left(\frac{2\delta_{ik}\cos(2\alpha + \beta_i)}{R_i R_k \cos^2\alpha}\right)$$

Where

β_i is the included angle at the shaft

α is the pressure angle

δ_{ii} is the deformation at gear i

δ_{kk} is the deformation at gear k

R_i is the radius of gear i

R_k is the radius of gear k

VI.CALCULATION AND RESULTS

DERIVED EXPRESSION RESULTS BEFORE MODIFICATION					
	Torsional Flexibility	**N (rpm)**	**Pure twist Ratio of gears**	**Elasticity reference to spindle**	**$K = \frac{1}{\theta}$ N-mm/rad**
Motor	$6.1850*10^{-8}$	4790.9	1.016	$6.2942*10^{-8}$	$5.88*10^{6}$
2nd shaft	$4.3413*10^{-8}$	4587.0	1.108	$4.810*10^{-8}$	$20.78*10^{6}$
3rd shaft	$8.9*10^{-9}$	1978.7	5.95	$5.2*10^{-8}$	$19.2*10^{6}$
4th shaft	$5.68*10^{-9}$	2102.4	5.27	$2.9*10^{-8}$	$34.48*10^{6}$
Spindle shaft	$6.2997*10^{-9}$	4830	1	$6.2997*10^{-9}$	$58.8*10^{6}$

Table: Derived Expression Results before Modifying bearing size

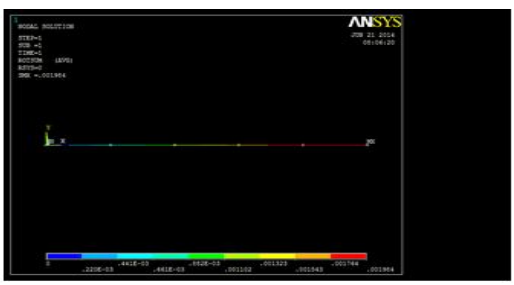
Net stiffness

$$\frac{1}{K} = 6.2942\times 10^{-8} + 4.8102\times 10^{-8} + 5.2\times 10^{-8} + 2.9\times 10^{-8} + 6.2997\times 10^{-9}$$

$$K = 5.04 \times 10^{6} \text{ Nmm/rad}$$

Deflection of shaft,

$$\theta = \frac{T}{K} = \frac{10000}{5.04\times 10^{6}} = 1.98 \times 10^{-3} \text{ rad} = 0.0019 \text{ rad}$$



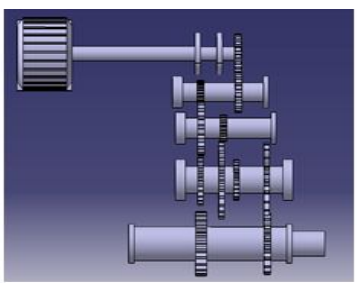


Fig-3: Deflection of the shaft before modification

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By Analysis using Ansys software

Deflection, $\theta = 0.001904$ rad

Total of I = 73.3 N mm sec^2

$\omega_n = (K/M)^{1/2}/(2\pi)$

$$\omega_n = \frac{1}{2\pi}\sqrt{\frac{K}{I}}$$

Where $K = 5.3 \times 10^6$ Nmm/rad

$$\omega_n = \frac{1}{2\pi}\sqrt{\frac{6.0 \times 10^6}{73.3}} = 41.6 \text{ Hz}$$

DERIVED EXPRESSION RESULTS					
	Torsional Flexibility	**N (rpm)**	**Pure twist Ratio of gears**	**Elasticity reference to spindle**	**$K = \frac{1}{e}$ N-mm/rad**
Motor Shaft	2.996 *10-9	4790.9	1.016	3.0*10-8	33.33*106
2nd shaft	2.6 *10-9	4587.0	1.108	2.8*10-8	35.71*106
3rd shaft	8.9*10-9	1978.7	5.95	5.2*10-8	19.2*106
4th shaft	5.68*10-9	2102.4	5.27	2.9*10-8	34.48*106
Spindle Shaft	6.299*10-9	4830	1	6.299*10-9	158.8*106

Table-2: Derived Expression Results after Modifying Bearing size

Net stiffness

$$\frac{1}{K} = 3.0\times 10^{-8}+2.8\times 10^{-8}+5.2\times 10^{-8}+2.9\times 10^{-8}+6.2997\times 10^{-9}$$

$K = 6.88 \times 10^6$ Nmm/rad

Defection

$$\theta = \frac{T}{K} = \frac{10000}{6.88 \times 10^6} = 1.45 \times 10^{-3} \text{ rad} = 0.0014 \text{ rad}$$

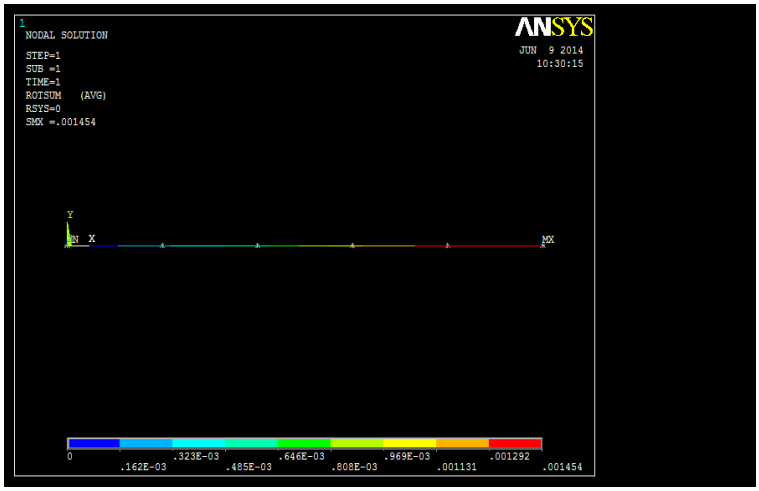

Fig-4: Deflection of the shaft after modification

By Analysis using Ansys software,

$\theta = 0.0014$ rad

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Inertia of Gears

INERTIA OF GEARS				
	Reference to the gear	**N (rpm)**	**Ratio of speeds**	**I (Nmm sec^2)**
1	$314.2*10^{-3}$	4790.9	1.016	0.3195
2	$37.2*10^{-3}$	4587.0	1.108	0.04121
3	$374.3*10^{-3}$	4587.0	1.108	0.4147
4	1.076	1978.7	5.95	6.4022
5	$62.14*10^{-3}$	1978.7	5.95	0.36
6	1.0133	2102.4	5.27	5.3400
7	5.7244	2102.4	5.27	30.16
8	$412.2*10^{-3}$	2102.4	5.27	2.17
9	4.8057	2102.4	5.27	25.3
10	2.6431	4830	1	2.6431
11	$172.27*10^{-3}$	4830	1	$172.27*10^{-3}$

Table-3: Inertia of Gears

Total of I = 73.3 N mm sec^2

$\omega_n = (K/M)^{1/2}/(2\pi)$

$$\omega_n = \frac{1}{2\pi}\sqrt{\frac{K}{I}}$$

Where $K = 6.88 \times 10^6$ Nmm/rad

$$\omega_n = \frac{1}{2\pi}\sqrt{\frac{6.88 \times 10^6}{73.3}} = 48.75 \text{ Hz}$$

VII. CONCLUSION

The method developed is used for predicting the influence of bearing elasticity on the shaft torsional vibration. The analysis of the model was carried out and by using the derived expression obtained torsional stiffness was 5.04 $\times 10^6$ Nmm/rad and obtained frequency was 41.6Hz.

After modifying the model by increasing shaft diameter and also the bearing sizes. For each shaft deformation was found. By using this deformation and derived expression torsional stiffness is calculated. The total torsional stiffness was found to be $6.88*10^6$ N-mm/rad and it is found to be higher than the $5.04*10^6$. The obtained frequency was 48.75 Hz. Finally computed total twist found to be 0.00145 rad.

It is found that just not by increasing the shaft diameter but also by modifying the mounting shaft bearings can improve the torsional stiffness. Thus, by the influence of bearings, torsional stiffness is increased and resonance is reduced.

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INTELLIGENT TRANSPORT SYSTEM USING GLOBAL INFORMATION SYSTEM

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ABSTRACT

Intelligent transport system refers to efforts to add information and communication technology to transport infra structured vehicles in an effort to manage factors that typically are at odds with each other like vehicles, loads and routes to improve safety and reduce vehicle wear transportation times and fuel consumption. Global information system is a computer based system which is used to digitally reproduce the features, present on the surface of earth and events that take place. Advanced Traveler Information Systems (ATIS) is one of the user services provided by ITS. With ATIS information, drivers make informed decisions and are better equipped to plan their route and estimate their travel time. Route planning is an essential component of ATIS, aiding travelers in choosing the optimal path to their destinations in terms of travel distance, travel time.

Nature has gifted man and animals the ability to move. With his intelligence man has developed transportation system leading to economic well-being. However we have to pay for this in the form of its undesirable effects as environmental impacts, energy consumption, congestion, casualties and money required to build infrastructure. This has led us to a more balanced and sustainable transportation system. Here Intelligent Transportation system comes into picture – the application of computer and communication technologies to transport problems. The old adage, 'knowledge is power' is the obvious solution to this.

In this paper, how an advanced traveler information system for a developed in GIS environment can be useful is shown. This user friendly system provides complete information of a city such as road network, tourist places within the city limits, hospitals, government and private offices, stadiums, bus and railway stations. This system provides shortest path and path to closest facility based on distance and drive time. The GIS can be used in bus stands, railway stations, airports, tourist information centers, in personal computers to give information to the travelers.

INTRODUCTION

Nature has gifted man and animals the ability to move. With his intelligence man has developed transportation system leading to economic well-being. However we have to pay for this in the form of its undesirable effects as environmental impacts, energy consumption, congestion, casualties and money required to build infrastructure. This has led us to a more balanced and sustainable transportation system. Here *Intelligent Transportation system* comes into picture – the application of computer and communication technologies to transport problems. Here *Intelligent Transportation system* comes into picture – the application of computer and communication technologies to transport problems.

Japanese seems to have initiated the whole modern day notion of ITS with work carried out in the 1980s. The United States was also addressing the application of ITS at an early stage in the course of the Electronic Route Guidance project (ERGS) in the 1970's. The European Union picked up the theme, and referred to it as Road Transport Informatics. In the course of time the name of this technology subjected to many changes until USA had given a name called ITS to it.

ATIS provides both preterit and en route information to the users, both of which offer distinctive advantages. The availability of preterit information drivers enhances their self-belief to use freeways and allows commuters to make better-informed transit choices. En route information and guidance saves travel time, helps a traveler avoid congestion, can improve traffic network performance, and is more efficient than paper maps or written instructions.

The old adage, 'knowledge is power' is the obvious solution to this. Customers want real-time information to help them select the best route to take at any given time. They need to know traffic speeds, incidents (accidents or lane closures), and road conditions. With Advanced Traveler Information Systems (ATIS) information, drivers make informed decisions and are better equipped to plan their route and estimate their travel time. The ultimate solution has a big mandate. Critical features include accuracy, timeliness, and reliability. The ideal solution is an up-to-the minute traffic information system that enables drivers to make more intelligent travel decisions at any time of the day and any day of the week. There is wide scenario of problems, which are specific to India, and indigenous solutions are required to suit its requirement of a cost effective, efficient, reliable and at the same time compatible with the present level of development in the country in the related areas.

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OBJECTIVES OF STUDY

1. This user friendly system provides complete information of a city such as road network, tourist places within the city limits, hospitals, government and private offices, stadiums, bus and railway stations.

2. This system provides shortest path and path to closest facility based on distance and drive time. A facility consisting of city bus routes with bus numbers, origin and destination points, and all intermediate stations have been included in the system.

PACKAGE DEVELOPMENT

1. MECHANISM

Developing *Advanced Traveler Information System (ATIS*) in *Geographic Information System (GIS) is main objective of current project*. In this system shortest path, closest facility and city bus routes were included. Besides these features location wise information and inter-city traveler information like bus, train and airways timing are also included. Mechanism involved in the development of package is described in following sections.

1.1 SHORTEST PATH

Shortest path is determined by *route planning* a fundamental issue which helps vehicle drivers to plan a route using route optimization criteria or planning criteria. The quality of a route depends on travel cost factors such as distance, travel time, travel speed and number of turns. Some drivers may prefer the shortest path based on distance and some prefer based on travel time. The route selection is done via on travel time. The route selection is done via user interface. Optimization of travel distance is done by storing distance in digital database and using route planning algorithms. While optimization of travel time is done by storing road length and speed limit in digital database, and using Speed = distance/time, travel time is calculated.

1.2 CLOSEST FACILITY

In the closest facility problem *route length* and *travel time* (drive time) were considered as *travel costs*. Different facilities like hospitals, bus stations, and tourist places were taken as themes in the project. Closest facility algorithm calculates all the routes from selected origin to facilities based on travel cost. It compares travel costs of these routes and gives one optimal route as output [1].

1.2 CITY BUS ROUTES

City buses with their numbers were stored in a data base in a compressed format because on one road segment there will be more than one bus. A search algorithm was used to find bus service number from selected origin and destination. According to bus number, road segments on the map were selected and highlighted with different color. The schematic flow chart of the package is shown as Fig 1.

2 SOURCE PROGRAM

The source program for this package has been written in Avenue programming language. Avenue is object-oriented and scripting language for ArcView GIS. Customization of the package was done in Avenue. The source code was divided into many numbers of scripts because in Avenue language functions or procedures are not available. Each script is used for a specified purpose.

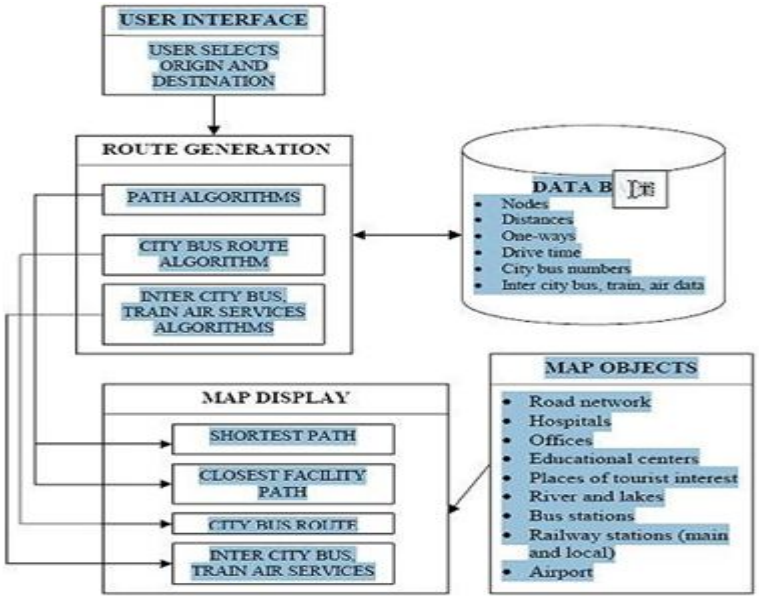

Fig-1

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3 SOFTWARE DEVELOPMENT FOR A CITY

Software that can be used in the development of current project is

- Arc View GIS version 3.1
- Network Analyst version 1.1b
- Avenue programming language

3.1 ARCVIEW GIS VERSION 3.1

Arc View GIS software is a desktop GIS with an easy-to-use, point-and-click graphical user interface (GUI) that lets us easily load spatial and tabular data so we can display the data as maps, tables, and charts. Arc View provides the tools we need to query and analyze the data and present results as presentation-quality maps.

3.2 NETWORK ANALYST

The Arc View Network Analyst is an extension product designed to use networks more efficiently. It can solve common network problems on any theme containing lines that connect.

3.3 AVENUE

Arc View scripts are macros written in Avenue, Arc View's programming language and development environment. With Avenue we can customize almost every aspect of Arc View, from adding a new button to run a script we write, to creating an entire custom application that we can distribute.

CONCLUSION

1. Digital traveler information system for a city can be developed in geographic information system (GIS) using Arc View GIS software package and it was customized using Avenue programming language.
2. This package has point-and-click graphical user interface (GUI) and it is user friendly also.
3. The developed package can show the following capabilities.

- Finding shortest path based on distance and drive time
- Finding closest facility and its path based on distance and drive time
- City bus routes
- Search engine - which searches different facilities in Hyderabad city
- Provides intercity bus, train and airways information (timings, distance and service name)
- Site tour planning

4. The developed package can be used in the following areas to give information to the travelers

- Bus stands
- Railway stations
- Airports
- Tourist information centers.
- In personal computers.

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LIFE CYCLE ANALYSIS OF A HOSTEL BUILDING USING CAPITAL BUDGETING AND ENERGY EFFICIENT APPROACH

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ABSTRACT
Construction sector is the largest source of greenhouse gas emission around the world. Due to the growing environmental problems it has become a crucial matter of concern. These ill effects of construction industry give both an opportunity as well as responsibility for the construction research community to develop eco-friendly buildings. Design Integrity is one of the most important parameter to be included during the conceptual stage of the building. Green building certification can be achieved through practicing various green building codes such as LEED, BEE, and ECBC etc. Sustainable development of the country will reduce the huge pressure of energy production in the country thereby saving raw resources and contributing towards the environment wellbeing. This research work is performed to evaluate the significance of using green building materials for achieving long term persistent saving in construction sector. Hence the life cycle cost analysis of a hostel building at conceptual stage is performed under two different criteria i.e. LCCA of building using conventional construction materials , LLCA of the same building in which building envelope material are partially replaced by green building materials. The non-structural brick walls are replaced by Prothermo brick, Aerated Autoclaved Blocks, Clear window is replaced by Double low e coating glass and XPS under deck insulation is provided to the top roof. The 3D model is built to derive the electrical energy consumption of the conventional and Green building using a software called "eQuest 3.65" .The future energy demand in terms of electricity, total operation and maintenance costs, revenue generation ,LCCA, Cash flow generation, Net Present Value, Pay Back period, Benefit Cost ratio of conventional building and green building is computed for a life span of 50 years to prove that though the initial construction cost of GB is 3% to10% higher than the conventional building. From the research work it had been proved that application green building materials provides huge amount of saving in electricity tariffs as compared to conventional building.

Keywords: - ACM-Advanced construction Material, Building Energy Modeling-BEM, Conventional Building–CB, Discount rate factor-DCF, Green Building-GB, Life Cycle Cost Analysis-LLCA, , Net Present Value-NPV

1.1 GENERAL
The construction sector is one of the largest sources of employment and hence its rapid enhancement is extremely important for the economic growth of our country. On the other hand, construction sector requires a large amount of renewable and non-renewable resource. Non-renewable resources such as coal, diesel, petrol, ground covers, forest etc. get depleted due to its tremendous use in building construction .Production of construction materials generates pollution and also involves depletion of different types of raw resources and spending huge amount of energy. The cycle of construction materials starts with the extraction of raw materials for its production, supply of manufactured material to construction sites, its use for construction activity till its delivery to occupants. Energy is further required for making the building comfortable to the occupants throughout its life span and then energy is required for demolition and its disposal.

1.2 LIFE CYCLE COST ANALYSIS METHOD
LCCA is a process of evaluating the total cost of a building starting from its conceptual stage i.e. from preparing drawings followed by its actual construction, followed by operation, maintenance, repair and finally its demolition and then computing its salvage/scrape value. It is evaluated on the basis that various building design substitutes can address the same requirements with the similar amount of effectiveness .The various alternatives used in LCCA would have different initial costs, operation costs, maintenance costs, repair costs and life spans. Considering a specific alternative, LCCA predicts the expenses on building required throughout all phases of its life span. Before performing LLCA, all data, drawing, designs and specification related to the project such as total cost of the building phase-wise construction schedule etc. must be available to obtain accurate results. (Dhruv et al, 2016).

The profit generated from benefits availed from a policy or scheme adopted in a building throughout the life span is called as life cycle saving. Payback period can be defined as the period in the useful operation phase of a building from the time the investment is done for the project, till the times the total investment is recovered and benefits start occurring henceforth

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1.2.1 Cost

There are various types of costs associated with LCCA at different phases of a building such as land owning, constructing, operating &maintaining, repair and replacement and then cost involved during disposing the building and its system at the end of its useful life. Land owning cost includes capital investment required for purchasing the land, mobilizing the work including all types of equipments and renovations. Land acquisition cost is of prime importance because the cost differs among various design alternatives and it is the major costs contributing towards the LCCA, hence various alternatives shall be compared in order to select the best alternative. Construction Cost includes the cost required for arranging manpower, construction material, tools and machineries, different types of mechanical, electrical and plumbing services and utilities, plus overhead, contingencies and contractor profits etc. The capital incurred in operational expenses for energy such as electricity, gas, water, and other utilities are called as water and energy cost. It is generally determined for complete building rather than evaluating for individual building systems. At initial phase it is not easy to calculate the total energy requirement of a construction hence the amount of energy required can be derived using building energy simulation process such as eQuest 3.65, TRACE 700, EnergyPlus, Ecotect software etc. In order to determine the energy tariff, quotation of current energy tariff from local supplier shall be taken into account. The replacement cost of any building parts, building systems are totally dependent on its estimated average life and total length of the study period. The remaining value of any building structure and its component at the end of its useful life or at the time of its replacement is called as residual value.

Net Present Value Method of LCCA

In this LCCA method, NPV concept is utilize to evaluate today worth of all the future cash flows produced from the project. For performing NPV, it is essential to consider the initial capital investment. It can be defined as the net profit which accrues after deducting the total initial investment from total present value of expected cash flows for the project

Where r is called as discount rate factor, n is called as number of year, B is the benefit in that year and I is the investment.

The Benefit cost ratio of a project can be defined as determining the total net benefits achieved from the total cost incurred to the society from implementing a policy

Payback period of a building is the period in useful operation phase of the building which comes after the total investment cost is recovered and from the time which actual revenue from the project starts generating revenue. It is the Break Even Point (B.E.P.)

1.3 Building Energy Modeling Process

Building Energy Modeling is flexible software that is utilized worldwide for evaluating and comparing energy performance of the building at different stages of building. It is function of various interdependent factors of buildings such as type of building, climatic condition, energy usage profile, structure geometry, footprint and zoning, Mechanical, Electrical and Plumbing (MEP) system, solar systems and occupant usage etc. The result accuracy of non-residential building energy performance ranges from more or less 10% to 40 %.(Clevenger &Heymaker, 2006). Hence, these results are reasonably sound and can be used as the basis for energy predictions. DOE -2 is an energy simulation engine formed by departmental of energy, USA and Lawrence Berkley National Laboratory to offer building energy simulation tools for all countries. (Birdsall, 1990).

3. OBJECTIVE OF THE STUDY

In every construction project, large amount of investment are incurred in order to get enormous profit margin. The expected profit margin can be increased substantially by applying various alternatives and design that will meet the same performance requirement. There is a need to evaluate and promote various energy efficient design and alternatives which will provide greater savings throughout the life span of the building and also it will contribute towards environment protection.

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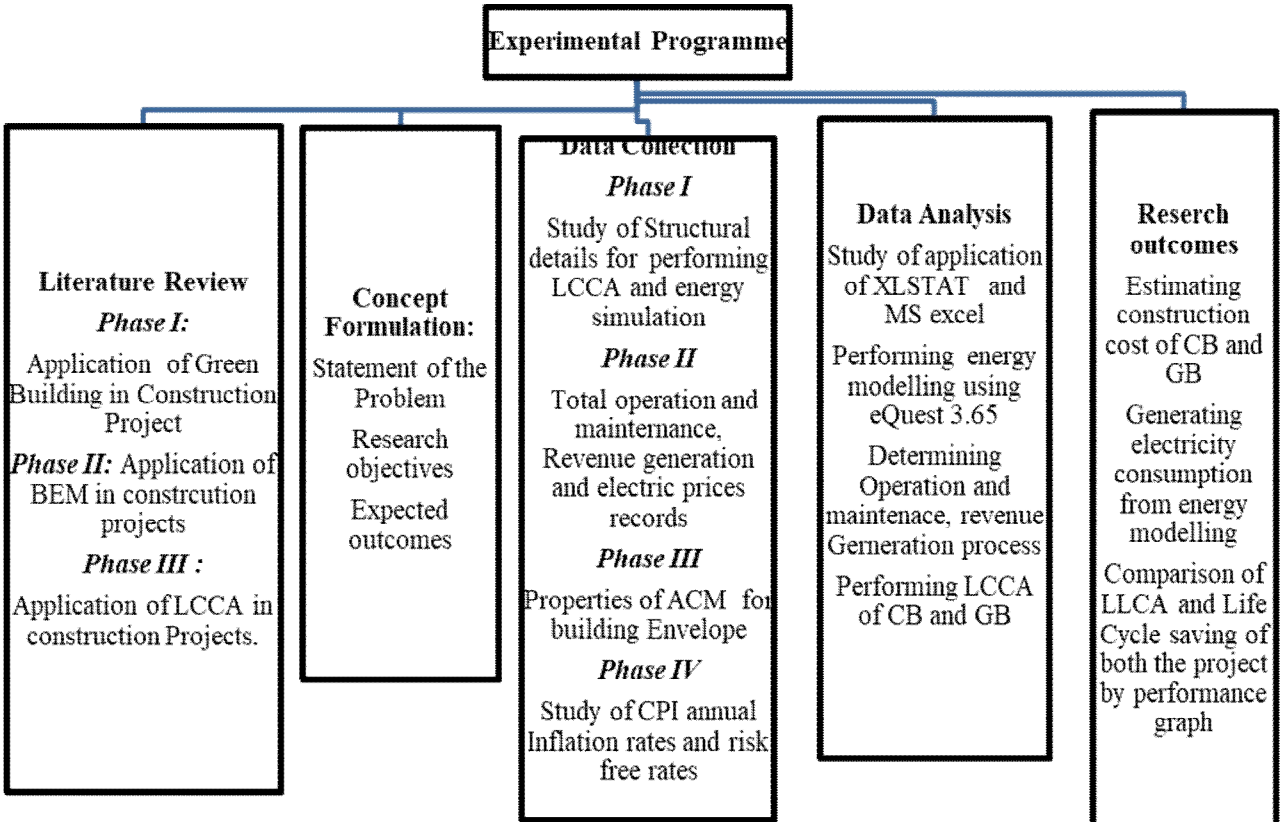
4. EXPERIMENTAL PROGRAMME



Figur-20: Flow Chart for Experimental Program

As shown in the above fig a flow diagram consisting of five stages is performed in the study. The first stage is consisting of the literature review from past research and finding out research gap. The second stage of the research will highlight the concept formulation of the study. The next stage consists of data collection which is further divided into four phases. The first phase gives construction details required for LLCA and energy modeling. The next phase describes the data required for estimating total operation and maintenance and revenue generation of hostel. The third stage provides the technical specification of advanced construction material required for energy modeling and the last stage of data collection provides historical CPI Inflation rates and risk free rate of return of last 15 years. The fourth stage will be the interpretation of the data .The final stage will represents the results obtained from the research in the form of life cycle saving in electricity consumption through replacing conventional building envelope material with ACM.

5. METHODOLOGY

The project methodology was divided into certain procedure followed such as:

- A construction site has been considered as case study i.e. hostel building (lodging and boarding school)
- Study of energy simulation process in eQuest 3.65 software
- Collection of construction details, zoning details, occupancy behavior, lighting, equipment and occupancy schedules for performing energy simulations
- Collection of technical specification of advanced construction materials in order to select the feasible material in terms of cost and performance requirement
- To compute construction cost, operation and maintenance cost, replacement cost, residual cost in order to evaluate LCCA, Cash flow generation, NPV, Benefit cost ratio and Payback period of both cases
- Result and Analysis
- Comparison of LCCA, Cash flow generation, NPV, Benefit cost ratio and Payback period of both cases
- NPV of GB must be greater than NPV of CB by more than 20%, if yes then adopt the methodology, else change the advanced material selected earlier with the new suitable advanced construction material which will be satisfying the criteria and repeat the above steps.

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5. DATA COLLECTION AND ANALYSIS

To perform life cycle cost analysis of a hostel building using energy efficient approach the key information required are total cost of construction, cost of maintenance and operation , cost of energy and water, cost of replacement, residual value and revenue generation etc. For Case Study work hostel building proposed by Anjuman-I-Islam's Kalsekar Technical Campus is selected. It is located at Panvel in Navi Mumbai. Data Collection is divided into four phases.

The first phase consists of entire Structural details such as GFC drawings, material specification, standard operating procedure etc. required for estimating the construction cost and for performing energy analysis of the building.

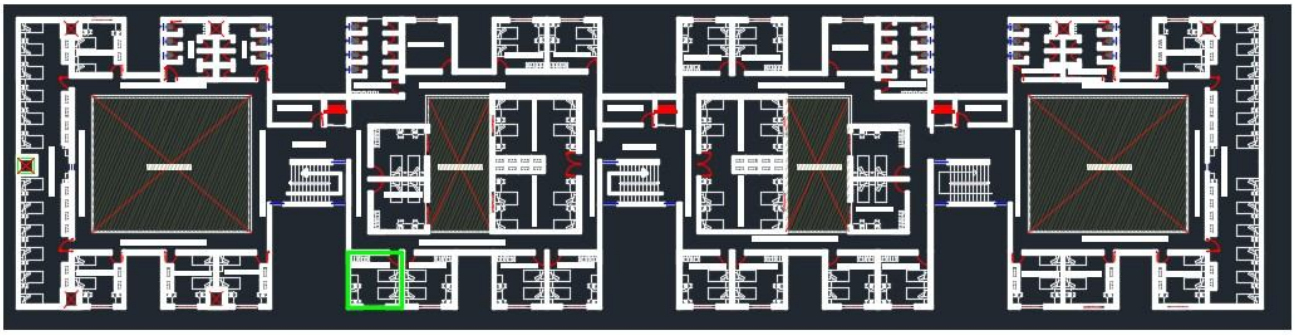

Figure-2: Typical floor plan at 1st, 2nd, 3rd and 4th floor

The building footprint comprises of similar H shaped blocks interconnected by each other having central courtyard in each block. It consists of various units such as admin office, staff room, kitchen, cafeteria, VIP rooms, library, staff rooms, indoor game room etc

Figure 2 shows floor plan of 1st, 2nd, 3rd and 4th floor of the hostel building used for estimating the construction quantities. The total built-up area of the structure is 7623.99 Sqmt and the intakes of students are assumed to be 180.

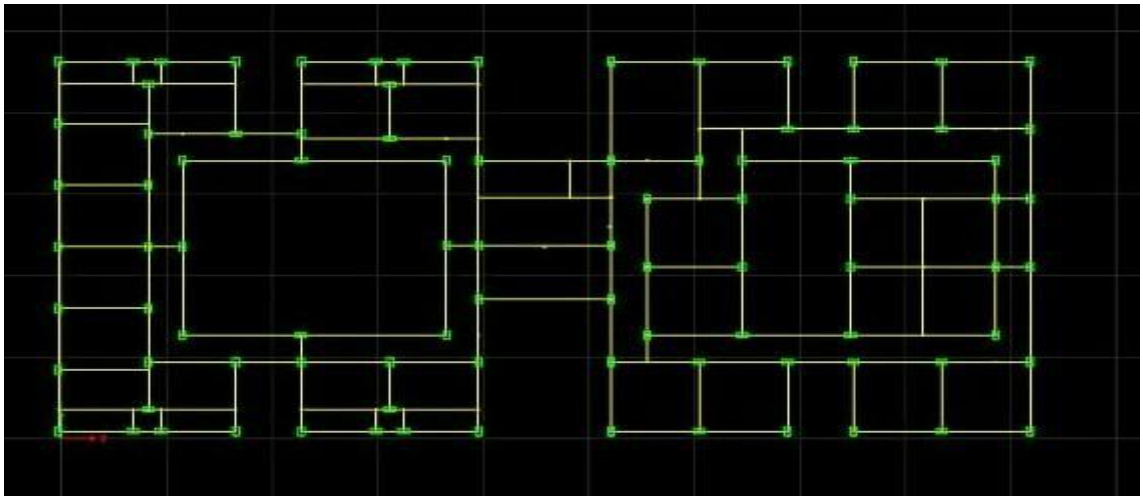

Figure-3: Structure framing plan

Figure 3 shows the framing drawing of the structure prepared in ETABS software and following assumptions are considered. The safe bearing capacity of soil is taken as 20T/m2, beam size is taken as 230x600mm and column size is taken as 300x500mm, footing size is assumed as 2200mmx2200mm having main reinforcement as 20nos 12 mm diameter parallel to length and breadth and PCC size is assumed to be 2400mmx2400mm.

Phase II focuses on collection of data regarding advanced construction material alternatives available for building envelope construction. There are different types of advanced construction material available in India, which are used as an alternative for conventional building materials. The materials which are selected as an alternative will depend on the basis of performance, aesthetics, economic feasibility and site practicability. In this work, XPS Panel is used under deck of concrete roof, Prothermo bricks are used as alternative for light weight block and Double glazing window is used as an alternative for single clear class. The technical properties of the all material is studied and comparison is shown in the following tables

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II a) ACM for Roof used in the work is extruded polystyrene "XPS" Sheet .This It is used as an under deck insulation layers for concrete roofs and ceiling. It can also be used as insulation for concrete walls; it can be used for all types of commercial, educational and residential building. In the below table various technical parameters of the material have been explained in order to understand its effect over building energy performance.

Table-3: Technical specification of XPS and EPS

Properties	Units	FOMULAR 250,XPS	EPS
ASTM C578 Classification		Type IV	Type IX
Thermal resistance	K-m^2/W	5	4.20
Flexural strenght	KPa	50	50
Density (Kg/M3)	Kg/m^2	1.55	1.80
Compressive Strength at 10% Deformation	KPa	25	25

II b) ACC blocks, Clay bricks, prothermo brick are the ACM alternatives available for Exterior walls. Prothermo bricks are also called as Thermal insulating bricks. It is developed by wiener Berger India. It prevents the outside temperature to affect the inside temperature and hence keeping interior rooms cooler in summer and warmer in winter as compared to outside temperature hence reduce the cost of artificial cooling.

Table-4: Technical specification of AAC block, Clay brick and Prothermo brick

Specification	Unit	AAC block	Clay brick	Prothermo brick
Dimension	mm	600 x 200 x (75-300),	230 x 75 x 115	400 x 200 x 200
Comp. Strength	Mpa	3 – 4.5	2.5 to 3.5	>3.5
Normal Dry Density	Kg / m 3	550 – 650	1800	731
Fire Resistance (Depends on thickness)	Hrs.	2 to 6	2	4
Thermal Conductivity "K"	W / m-k	0.16 – 0.18	0.81	0.6
Cost	Rs/no	55-80	15 -20	65-100

II C) Many researchers with gazing have proved that 60% of the heat losses is due to fenestration (Anglian, 2019) hence it has a great influence over electricity consumption. Double low coating glass, Triple coating glass, Passive low e-coating and Solar control low e-coating glass are the types of low e- coating glasses etc. are the ACM alternatives existing for glazing materials

Table-3: Technical properties of Insulated Double Glass and White Triple Glass Window

Properties	Unit	Insulated Double Glazed glass Window	White Triple Glazed Window
Cost	Rs per SFT	350	550
Shape		Rectangular	Rectangular
Thickness	mm	4 to 6	3 to 19
U-value	W/m2K	2.8	0.6

The Table 3 shows comparison of technical properties of Insulated double glass windows and white triple glazed windows. Double glazing window is type of glass window which is economical as well as perfect to use as per the climatic condition in India. It is consist of double glass panel separated by layer of trapped inert gases such as argon or krypton fixed in aluminum frame

III a) For finding the electricity savings in future MSEB Electricity per unit prices records of past years from 2013 to 2019 of category LT II consumer C Commercial type shown in below table 1and future forecasting till 2070 had been done using linear trend line function as shown in fig no

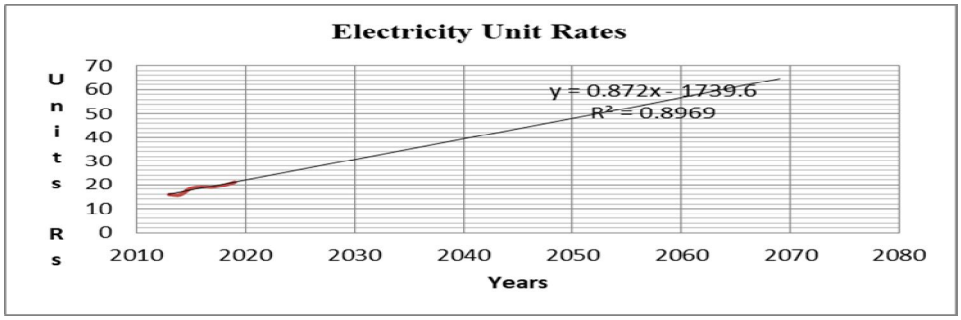

Figure-4: Electric unit cost projection Graph

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In figure.4 the straight line is in the form of y= mx-b .The linear trend line y=0.872x-1739.6 is equation which is used to obtained from the past records. The value of R2 is 0.8969 which is closely near to 1 indicates that the parameters are strongly correlated. The future unit prices is evaluated by substituting progressive year in the value of unknown factor x.

Table-4: Electricity unit cost projection

Year	Unit cost	Year	Unit cost	Year	Unit cost	Year	Unit cost	Year	Unit cost	Year	Unit cost	Year	Unit cost	Year	Unit cost
2013	15.75	2020	21.8	2027	27.9	2034	34	2041	40.2	2048	46.3	2055	52.4	2062	58.5
2014	15.63	2021	22.7	2028	28.8	2035	34.9	2042	41	2049	47.1	2056	53.2	2063	59.3
2015	18.37	2022	23.6	2029	29.7	2036	35.8	2043	41.9	2050	48	2057	54.1	2064	60.2
2016	19.0	2023	24.5	2030	30.6	2037	36.7	2044	42.8	2051	48.9	2058	55	2065	61.1
2017	18.94	2024	25.3	2031	31.4	2038	37.5	2045	43.6	2052	49.7	2059	55.8	2066	62
2018	19.64	2025	26.2	2032	32.3	2039	38.4	2046	44.5	2053	50.6	2060	56.7	2067	62.8
2019	21.03	2026	27.1	2033	33.2	2040	39.3	2047	45.4	2054	51.5	2061	57.6	2068	63.7

The table no 4. list out the projected unit prices from year 2019 to 2068.The table demonstrated that the value of per unit price of electricity is Rs 19.64 in the year 2019 which will be increasing three times the cost as Rs. 63.7 by the year 2068.

III b) It is necessary to understand the total operation & maintenance process of a hostel building as it is the major cost factor contributing to life cycle cost analysis, and better control would mean more savings. Table 4.5 shows the brief classification, detail description and cost incurred in O & M of hostel building. The following data is collected from site visits

Table-5: Total operation and maintenance record

Total Operation & Maintenance record				
Maintenance type	***Description***	***Amount (Rs)***	***Heads***	***yearly basis (Rs)***
Major maintenance	Housekeeping	14,000	4	6,72,000
	admin	20,000	4	9,60,000
	Security	15,000	4	7,20,000
	water charges	50,000	1	60,0000
	lift maintenance	50,000	4	2,00000
	pest Control management	11,000	1	1,32,000
	Solar maintenance	59,330	1	7,11,960
	Messing	4,000	180	48,000
	property tax	39,31,200.00	1	39,31,200.00
	Structure Repair (after 10 years)			18,60,343.49
Minor maintenance	Breakdown repair	21,000	1	2,52,000.00
	Total expenses per year		(Rs)	82,27,160.00

The table 5 demonstrates the total cost of operation and maintenance required to smoothly run the hostel of 180 students. Basically maintenance is divided in to major and minor types. Major maintenance includes housekeeping and messing work on daily basis, admin, security and pest control management on monthly basis, structural repairs and replacement depending upon the life of the structure. Roughly 10 years is considered as an ideal life for waterproofing, Internal and external plaster and its dependent activities etc. Minor maintenance is required for replacing the small mechanical and electrical equipment after its breakdown. Housekeeping services comprise of 4 to 5 heads having monthly salary around Rs 14,000/-each. Admin services comprises of 4 staff having average monthly salary of Rs 20,000.Security services is required on day and night basis having average salary of Rs 15000 per month. Mess charges are of Rs 4000 per month are levied per student. According to property tax guide of Navi Mumbai, property tax will be 20% of revenue generation and it is to be paid on yearly basis. Water bill is paid also on yearly basis. Lift maintenance and solar is taken as 10% of the construction cost on yearly basis

III C) Revenue generation is very essential for the smooth functioning of any commercial building .The total revenue generation expected from the hostel is detailed in table 4.6

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Table-6: Revenue generation record

Revenue Generation record per year in Rs			
Type of Room	***Numbers***	***Per student (Rs)***	***Total (Rs)***
one bed Room	10	2,61,600.00	26,16,000.00
Two bed Room	30	1,53,600.00	46,08,000.00
Four Bed Room	80	94,200.00	75,36,000.00
Ten bed Room	60	81,600.00	48,96,000.00
Total Revenue Generated			(Rs)1,96,56,000.00

Table 6 shows the revenue generation from a hostel building from similar conditions. Fess structure from last 5 years had been collected in order to know the difference in cost. The hostel comprises 10 no's of 1bedded rooms, 30 no's of two bedded rooms, 80 no's of four bedded and 60 no's of ten bedded rooms. From the fees structure is had been found that one bedded/NRI Rooms fees is Rs 2,60,400 per year, two bedded rooms fees is Rs 1,52,400 and four and ten bedded rooms fees is Rs 93,200 and Rs 80,400 respectively.

Phase IV demonstrates the data required for inflation projection and discount factor for NPV. In order to evaluate the monetary value of assets in future annual inflations rates as per Reserve Bank of India records of past year from 1995 to 2018 have been collected and then modeled on "XLSTAL" software for predicting to find the future rates which is 6.97%. For calculating Net Present Value 'r' i.e. discount rate of returns is considered as risk free rate which is collected from returns as per "India Government Bond Generic Yields 10 year's records" of past years from 2015 to 2019 had been collected and the average is found to be 7.358%.

Table-7: Annual Inflation rate

Year	Inflation (%)	Year	Inflation (%)	Year	Inflation (%)
1995	9.69	2003	3.72	2011	6.49
1996	10.41	2004	3.78	2012	11.17
1997	6.29	2005	5.57	2013	9.13
1998	15.32	2006	6.53	2014	5.86
1999	0.47	2007	5.51	2015	6.32
2000	3.48	2008	9.7	2016	2.23
2001	5.16	2009	14.97	2017	4
2002	3.2	2010	9.47	2018	5.24

Table-8: Risk free Rate of Returns

Year	Rates of return (%)
2015	7.88
2016	7.73
2017	6.52
2018	7.29
2019	7.37

The table 7 shows CPI historical Inflation in percentage (Dec v/s Dec) from the year 1995 to 2018 and table 8 provides the rate of returns from India Government Bond Generic Yield 10 years which is used for considering discount rate factor while calculating NPV.

6. RESULTS AND DISCUSSIONS

LCCA is performed using NPV approach for fifty years for two cases. Case I for conventional and case II for energy efficient approach. Comparison of results of case I and case II is evaluated to prove that though the primary construction cost of GB is more than CB however the saving in GB is enormous with respect to the extra cost incurred.

6.1 Construction Cost

The initial land cost is same for energy efficiency approach and conventional approach, hence it is not considered for comparison. In analysis, construction costs of both the cases are estimated using good for construction drawings. The cost for all activities commencing from site clearance to handing over are considered. All the measurement required for quantity estimation are workout using AutoCAD 2010.The District Schedule Rates of the year 2017 and 2018 published by Government of Maharashtra Public Work department are considered for obtaining rates and technical specification of work. The total construction cost estimated for case I of conventional building is Rs 10,10,08,269/-and The total construction cost after changing the conventional building envelope material with ACM the cost estimated to be Rs 10,20,00,000/-

6.2 Electricity and Water cost

The case study building is at conceptual stage so it is very difficult to determine the electric consumption in such cases energy simulation modelling process is used. In the research eQuest 3.65 is used to analyse the electricity consumption of the building. Initially the baseline model is generated considering the conventional building material and then parametric model is run by replacing the technical properties of building envelope material. The material applied in modelling had a very low U-factor which provides a greater resistance to heat

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flow and higher level of insulation. These heat resistance properties of the material assist to protect the inside room temperature of getting affected from surrounding weather effects hence lowering the electricity consumption through HVAC loading.

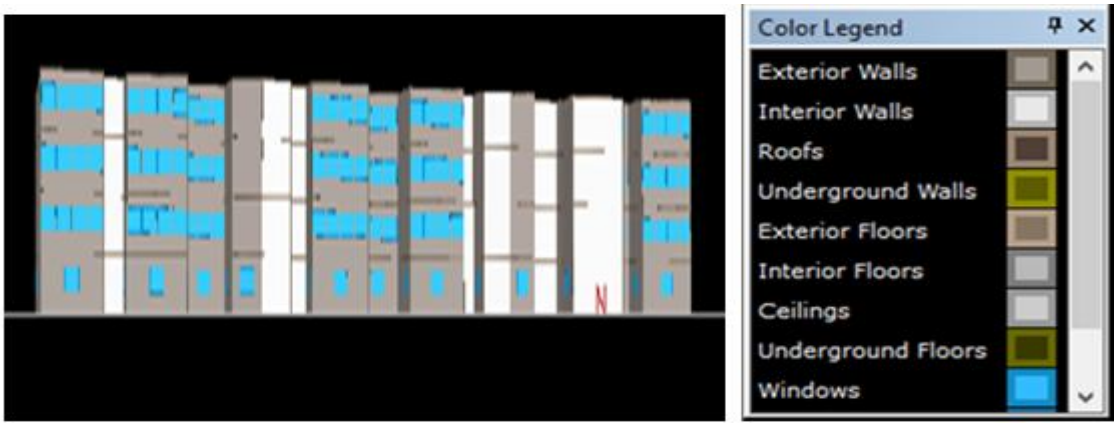

Figure-5: eQuest3.65 rendering of building

The above figure 5 shows eQuest 3.65 rendering of the hostel building. The baseline model of electric consumption found to be 35715 KWh per year and after replacing the materials in the baseline model the result found to be 44692 KWh per year.

6.4 Total Cost of Operation and Maintenance

The total operation and maintenance cost of the structure in both the cases remains the same as no special maintenance required for green building materials. The same amount as described in data collection and analysis chapter is used for calculating the life cycle cost analysis of the building.

6.5 Residual Cost

Residual cost is taken as 10% of the total construction cost. It is an influencing parameter to calculate LCCA of the structure.

From the above cost analysis, it is found that the construction cost for the second case is bound to be higher than the first case. Due to the use of advanced construction material in the second case, the energy savings in terms of electricity has been achieved and hence the part of maintenance cost incurred in paying electricity bills has been reduced for the life span of the building. Hence the operation and maintenance cost of the second case is less than the first case. The solar system cost of equipment with its installation is also derived for both the cases as per the roof area availability and watt requirement and it is found to be same for both the cases. All the calculations are derived using MS EXCEL 2010, XLSTAT and electricity consumption in both the cases is derived using eQuest 3.65.Finally the comparative NPV performance graph for both the cases is produced.

6.6 Comparison of Net present value performance of Case I and Case II

The figure 5.2 shows the comparison graph of CB and GB based on NPV. For the first few years, the NPV of GB is less as compared to CB, but it increases gradually along with the time, as in CB, the electricity and maintenance cost goes on increasing w.r.t time and in GB reduces with time. The NPV of the building with energy approach and without energy efficient approach has been calculated for every year and provided for every five years in the table 5.3. The NPV value are given in lakhs

Table-9: Comparison of both approaches based on NPV

Years	NPV of CB	NPV of GB
2020	-235.21	-240.52
2025	-802.83	-785.69
2030	-811.27	-714.62
2035	-575.29	-414.14
2040	-443.57	-231.07
2045	-977.95	155.00
2050	133.00	417.08
2055	548.94	857.05
2060	842.52	116.89
2065	129.80	163.84
2070	162.84	197.92

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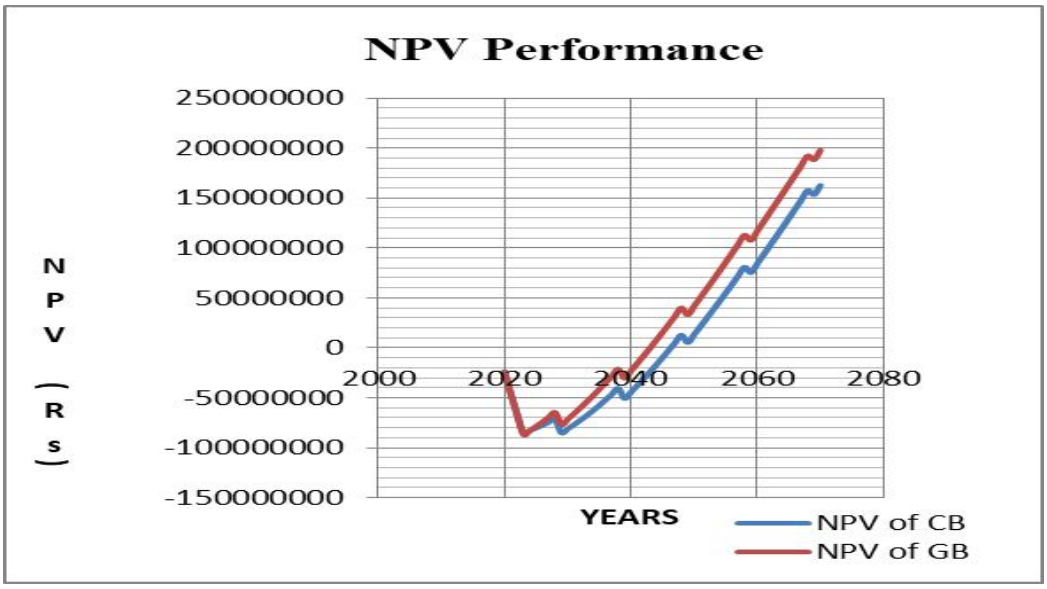

Figure-6: NPV Performance Graph

A brief comparison of results in terms of construction cost, revenue generation, profit margin, Benefit cost ratio, Life cycle cost analysis; Payback and NPV for Case I and Case II are shown below. It is found that the profit margin in the building with energy efficient approach is substantially higher due to the increased energy requirement for using ACM. The maintenance cost of green building material is low as it made from natural recyclable material and thereby contributes towards the wellbeing of the human health and environment.

Table-10: Comparison of Conventional building and Green building

Building Type	Conventional Building (Rs)	Green Building (Rs)	Diff in (%)	Results
Construction cost without DCF	10,10,08,269	102289906	1.27	Increase in C.C of GB
Total revenue without DCF	8,97,81,85,030	8,97,81,85,029	-	Same for both the cases
Scrap value (10% of total revenue)	1,01,00,827	1,02,28,990	1.27	
Total profit after deducting all losses	3,49,38,52,612	3,71,92,93,428	6.45	Increase in Profit margin of GB
life Cycle Costing for 50 years	5,57,52,39,859	5,35,18,52,515	4.17	Saving in LCCA G.B
total investment with DCF	8,48,47,329	8,67,63,913	2.26	Increase in C.C of GB
Total benefit with DCF	24,76,95,846	28,46,93,854	14.94	Increase in Benefit of GB
NPV	16,28,48,516	19,79,29,941	21.54	Increase in NPV of GB
Benefit /Cost ratio	2.92	3.28	0.36	Increased in B/C ration of GB
payback period	23 years	20 years	3	payback period is 3 years earlier in GB

The construction cost considering without discount rate factor of energy efficient approach building is increased by 1.27 per cent as compared to conventional approach. Revenue generation in both the cases remains the same as the occupants occupying the space is similar but GB will provide healthy leaving to the occupant's .The life cycle cost of building with and without energy efficient approach is Rs 535.18 lakhs and Rs 557.52 lakhs respectively. There is a decreased life cycle cost by 4.17 per cent in case II as shown in the table 5.4. Payback period is 3 years earlier in energy efficient building and Benefit cost (B/C) ratio is higher in energy efficient building .NPV for CB Rs 16.28 Cr, whereas the same for GB is Rs 19.79 Cr, which is 21.54% higher. So from the above results, it is suggested for the hostel to adopt energy efficient approach at the conceptual stage, to have a better payback and healthy living atmosphere.

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7. CONCLUSIONS

It is concluded that the green building benefit cost ratio is higher than conventional building. On the other hand, there is no tremendous increase in cost parameter and hence from the results the goal of the research work has been achieved by proving that though the primary cost of GB is more than the CB but the profit margin in GB is enormously paid back throughout the life span. The application of GB codes, compliances, techniques &processes at conceptual stage of the building is more effective and provides the opportunity to select the best alternatives. It is easy to make changes in the design/ drawings when the building is at conceptual stage (i.e. on paper) and hence rework can be avoided. The eQuest 3.65 energy simulation tools are user friendly software, which results in determining building energy efficiency and it is widely accepted throughout the world. The result of energy simulation process is totally dependent on the accuracy of the data availability. In depth data is readily available when the building is at conceptual stage and risk of failure of simulation results can be avoided. When the building is at working phase and results show changes in the orientation for increasing the efficiency, hence such changes become very difficult to incorporate resulting in increased cost, uneasiness to the existing occupants and surrounding. So it is essential to perform the energy simulation process during the conceptual phase itself. From the simulation process, it has been found that the occupancy behavior pattern has large impact over the results and it is very difficult to get accurate data as per the situation requirement. The estimation and costing part is evaluated using "CAD2010" and "MS EXCEL 2010". It can be concluded that the accuracy of results is very high due to lower U values of ACM. The trend line graph in excel are used to predict the future electricity tariff rates for next fifty years and hence the linear function gives the most logical answers. The XLSTAT Software (free student version) is used to predict the future risk free rates of returns from the present set of data. It is used for data analysis, visualization, statistical solution, formulating and hypothesis etc.

There are different types of ACM available in the market, but in the research work the material is selected as per the economic feasibility, energy efficiency requirement and site practicability of the project. The cost parameters of the material used are analyzed and it is found to be economic while selecting the material, a tough is also given to be assume that shall easy and too skilled person are not required.

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LITERATURE REVIEW ON DESIGN A RECUE RAFT FOR FLOODED FLOATING CAR

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ABSTRACT
The raft has a geometry such that it can be positioned around the driven wheels of the vehicle so that the driven wheels can be used to propel the flood rescue raft and vehicle which increases the safety. The flood floating raft can also include inflatable side panel members at the sides of the top and bottom panel members, front and rear inflatable flap members secured to the bottom panel members, and a discrete floatation ballast can be attached to the vehicle floatation raft at the engine end thereof.

The bottom panel member and top panel member hermetically joined to the bottom panel member to form a hermetically sealed air chamber and an air valve is used for filling the air chamber with air. With the help of air compressor, the air is filled in the air chamber. The raft would be multilayer flexible material, with the outer most and inner most layer being rubber plastic based, and a middle layer being a canvas type material.

There is provided an inflatable raft inflated through a single inflation valve. A pair of inflated panels held in place by at least one tie strap connecting the panels rest beneath each end of the bottom of a car to be protected. The cushion has a pair of inflatable end chambers, which when inflated protect the end and side of the car. This is facilitated by internal openings which allow the inflated panel to easily bend underneath the ends of the car and around the corners.

Keywords: Raft, Air Valve, Air Compressor.

INTRODUCTION
The rainy season is one of the worst enemies of the car owner due to flooding we don't want our car to get soaks in flooded water while its running or parked. Flood water causes a lot of car problem that down up long after the vehicle has been submerged. In order to prevent the car from being submerged in this flooded condition we are working on the designing the rescue raft for car under flood condition. Flood effect on different car body styles like, sedan, hatchback, notchback, SUV's etc. but we are making a rescue raft for prototype car.

According to the present invention, a vehicle flotation raft has an inflatable bag which is preferably provided with one or more inflatable Side and end flaps, and a flotation chamber or a ballast for securement to the engine end of the vehicle. The bag is unfolded (except for the end flaps) and slid into position under the car Stationary on the ground or in the water.

A rope attached to the frontend grommets on the bag (and possibly the rear end in moving water) is used to facilitate positioning of the bag under the car or vehicle.

EFFECTS OF FLOOD ON CAR
1. Malfunction in the Electronics and Electrical system.
A vehicle's electronics and electrical parts always sustain most serious damage after flooding. Moisture can cause the short circuit in the electrical system, resulting in malfunction of its critical components, including the following:

- Electrical Control Unit (ECU)
- Headlight, brake lights and other Automotive lights.
- Air conditioning system.
- Power windows, power locks and power seats.
- Fuses
- Anti-lock braking system.

2. Mechanical damage to the engine.
The engine is another critical part of your car that needs atmost attention after its flooded. When flood water reaches engine part like, air intake and cylinder, the piston will try to compress it. Since water doesn't compress it can break the piston rod and lead to engine stalling.

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3. Mold and mildew in the interior.
A strong musty odor means mold is present in a car. Remove these parts in your flooded car:

- Seats
- Carpet and floor mats
- Headliner
- A/C system
- Door panels
- Trunk

4. Mud and Debris in Hard-to-Clean Areas.
Flood water may leave mud and debris on areas of car that aren't easily obvious. These include the engine compartment, wheels, brake, underbody and gap under the hood and between panel in the trunk.

5. Slippery Brakes
After being immersed in flood water brake tend to lose grip because of loss of contact between the brakes pads and the wet brake rotors.

TYPES OF RAFTS

- Solid slab Raft
- Slab beam Raft
- Cellular Raft
- Piled Raft
- Balancing Raft

TYPES OF RAFT MATERIALS

- **Urethane:** Slips nicely over rocks, most durable fabric, lightweight, best puncture and tear resistance, durable. The welding process they use to make these boats is bomber. Cons: Fairly expensive, tough to roll and transport, difficult to field repair
- **Hypalon:** Easy to roll, relatively easy to field repair, and the material has a long life. Cons: Expensive, glued together (instead of welded) so it can come unglued sometimes. More abrasion and puncture resistant than PVC, but less than urethane.
- **PVC:** Inexpensive. Cons: not particularly durable, can crack when rolled in cold temperatures, tend to be mass produced so these boats are known for quality issues.

AIR COMPRESSOR
An air compressor is a device that converts power (using an electric motor, diesel or gasoline engine, etc.) into potential energy stored in pressurized air (i.e., compressed air).By one of several methods, an air compressor forces more and more air into a storage tank, increasing the pressure. When tank pressure reaches its engineered upper limit, the air compressor shuts off. The compressed air, then, is held in the tank until called into use. The energy contained in the compressed air can be used for a variety of applications, utilizing the kinetic energy of the air as it is released and the tank depressurizes.When tank pressure reaches its lower limit, the air compressor turns on again and re-pressurizes the tank. An air compressor must be differentiated from a pump because it works for any gas/air, while pumps work on a liquid.

WATER LEVEL SENSOR
This ultrasonic sensor is IP65 and is made in PVC. Ultrasonic Sensors use high frequency ultrasonic waves to detect the levels of any medium liquid or solid. This sensor/transmitter is mounted at the top of a tank and aimed downward. It transmits waves and measures the time it takes to receive the return signal back from the water to the sensor. The measured time is then used to output a level in terms of a precise voltage from 0-10 volts.

Ultrasonic level transmitter working principle or ultrasonic water level sensor working principle, the diagram above and explanation below should help you understand more about these sensors. The ultrasonic level sensor/transmitter, once installed in your tank, work by sending a high frequency signal to the water/liquid/solid

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material or media and measures the time it takes for the signal to reflect back to the PLC (10ft away or 15ft away etc). That signal is sent back with either a 0-10volt signal or a 4-20ma (4-20ma is the most common). When you pair one of these sensors with our PLC control panels it allows the user to set automatic activation point for devices such valves, pumps and alarms etc.

LITERATURE REVIEW

Mark Allain [1] This study by Mark Allain and Joseph Allain based on safety of the vehicle during adverse climatic situations like floods. The developer says that this method is useful for flooded water by using car flood rescue raft having an uninflated condition and an inflated condition. The method defined that including the step of tethering said vehicle rescue raft to a stationary object. Daniel S. Battle [2] The adverse climatic situations like floods & tsunamis were studied by this author based on the safety of the vehicle. The developer says that this method useful for flooded water by using flood protection containers for vehicle for safety of vehicles. James K. Rodgers [3] The safety of the vehicle during adverse climatic situations like floods were studied by James K. Rodgers. The motor vehicle flood protection apparatus method was used by James K. Rodgers for safety of the vehicles during flooded conditions. Brian K. Farison [4] This invention relates to inflatable packaging cushion and more particularly to inflatable packaging cushions which protect all sides of a car during adverse climatic conditions. The objective of the invention is to provide an inflatable packaging cushion which easily fold around the edges of the car. Lance V. Masters [5] The Inflatable Boat Bra mechanism designed to protect inflatable objects from leakage caused by laceration and abrasion. The second purpose is to furnish a way to organize the equipment used in inflatable boats. The boat bra is made of a fabric that is highly abrasion resistant to cover the air tubes of an inflatable boats. George Hildebrand [6] This study state that automotive vehicles particularly vehicles such as all-terrain and or amphibious vehicles, and has for its objects the provision of such a vehicle capable of moving not only on road but also on loose soil, snow and water, by modification of a conventional automotive vehicles. Edward J. Curran [7] This invention relates to a protective covering for automobile and similar vehicles and, more particularly, as reference to a covering of the type referred to which is adapted to be applied to an removed from an automobile with maximum facility, said cover, when applied to the automobiles, being adapted to overlie the greatest portion of the body thereof to protect the same against dust and the elements. The main object of the invention is to provide a generally improved protective covering of the type referred to, that will be characterized by its ease of application of removal and will be further designed as to permit the same to be manufactured at the minimum cost. Leonard Anthony Curcio [8] The invention relates to a water transportation device for a motor vehicle and has for principal object to provide a buoyant raft on to which a motor vehicle may be run or placed, the raft been so constructed that the power plant of the vehicle may be used to drive the wheels for propelling the raft. Further objective is provision of a raft formed of a plurality of sections, with separate inflatable compartments provided in the several sections. Bruce E. Amrein, [9] This invention described hear in may be manufactured, used and licensed by or for the united states government for governmental purposes without payment to us of any royalty thereon. Typical floatation devices for armored vehicles include a wall like curtain erected about the upper periphery of the vehicle. The device is located along the lower lateral edges or vehicle so as to not interfere with operation of the turret gun or interfere with the vehicle crew's vision from within the vehicles. Device has airbags inflatable by operating switch in the vehicle. Eugen Stehr [10] The invention relates to means for constructing single or multilayer buoyant platforms or raft, from individual buoyant units, preferably made of plastics which can be coupled together edge to edge to form a single layer platform or face to face multilayer platform. In another form of construction, prismatic buoyant units are employed, which are joined together to form a platform. Walter E. Streyckmans [11] The general purpose of the invention is to provide a vehicle enclosure system which anchors a vehicle to the ground thereby preventing it from floating away. It relates to a flood protection system for a vehicle.

CONCLUSION

The data was collected for designing a rescue raft for a flooded floating car. This concept can help a car to float on flood which can automatically save a car and all its components from getting flooded.

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LITERATURE REVIEW ON MEDICAL IMAGING USING MACHINE AND DEEP LEARNING ALGORITHMS

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ABSTRACT
Machine and deep learning algorithms are apace growing in dynamic research of medical imaging. Recently, substantial measures are developed for the enrichment of medical imaging applications to diagnose the errors in disease diagnostic systems which can lead to extraordinarily ambiguous medical treatments. Machine and deep learning algorithms are vital ways in medical imaging for detection of the symptoms in early stages. Deep learning techniques, in specific convolutional networks, have promptly developed a methodology of special for investigating medical images. The supervised or unsupervised algorithms using optimal standard dataset being used to indicate the predictions. We review object detection, image classification, pattern recognition, reasoning etc. concepts in medical imaging. These are used to improve the accuracy through extracting the important features or patterns for the specific disease in medical imaging. These ways also indorse the decision- making procedure. The main aim of this paper is to spotlight the machine learning and deep learning techniques used in medical images. My intention is to provide an outline for researchers to know the existing techniques carried out for medical imaging, spotlight the advantages and disadvantages of these algorithms, and to discuss the future scope. Machine and deep learning are commendable technique for creation of classification and automatic decision making in the study of multi-dimensional medical data. This paper present review of medical imaging in the machine and deep learning methods to analyze distinctive diseases. It carries concern over the suite of these algorithms which can be used for the investigation of diseases and automatic decision- making.

Keywords: Medical imaging; Machine learning; Deep learning; Image enhancement; Information retrieval;

I. INTRODUCTION

Machine and deep learning algorithms play a very important role to train the computer system as a skilled which might be used further for prediction and higher cognitive process. Machine learning is the field of study that provides computers the ability to learn without being explicitly programmed [1]. Deep learning is a kind of machine learning that empowers systems to realize for a fact and comprehend the globe concerning of ideas [2]. These fields bring intelligence into a computer that may extract the patterns according to the particular data and process it for automatic reasoning [3]. Medical imaging is the emerging research area that is used to diagnose any disease for early treatment. The task of image processing in the health domain is relative to the growing position of medical imaging. The digital image processing presents significant effect on decision-making procedure depending on some predictions. It provides better features extraction and accuracy. The procedure of functioning assessment is complex and contains numerous diverse properties [4]. The digital image processing techniques are associated in many different computer systems. The authentication of image processing approaches is very important that gives an implementation of particular procedures which provides influence on the performance of these systems. Therefore, it brings actions and decision based on approaches in medical imaging. It delivers a numerous rudimentary, refined image analysis and visualization tools [5]. The machine learning and deep learning are the integral part of Artificial Intelligence (AI) as shown in *Fig. 1*. The AI is the major field to showcase human intelligence in a machine, machine learning being used to achieve artificial intelligence, while deep learning is a tool used to implement machine learning [6].

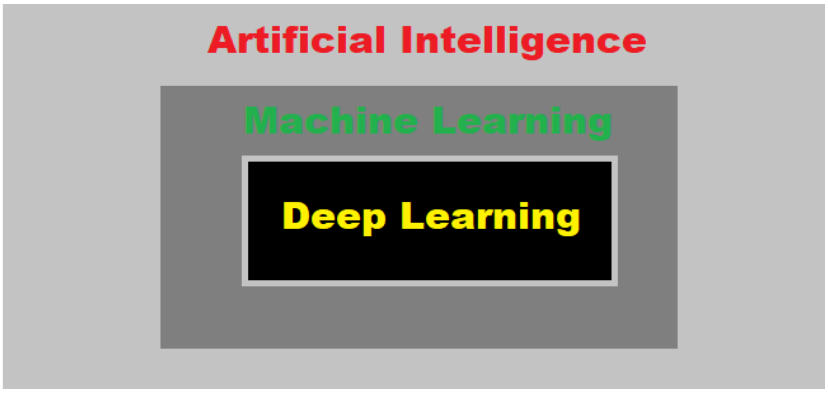

Figure-21: Artificial Intelligence, Machine learning and Deep Learning Domain

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The different steps are performed on medical images before the detection of output. Firstly, the medical image is inserted as input to the machine and deep learning algorithms. After that, the features are extracted from these segments through information retrieval techniques through segmentation process. The appropriate features are selected and the noise is removed.

Then classifier is generally used to distinguish the extracted data and make predictions based on this classification. These steps are used in each experiment of machine learning. The supervised, semi-supervised, unsupervised, reinforcement and active learning algorithms are the major categories of machine learning. Moreover, the deep learning methods are basically advanced phase of machine learning algorithms that classify data and predict outcome more accurately using neural network [7].

A. Supervised learning

It gives a training set of specimens with appropriate objectives to a computer system. Taking this training set system give outcome accurately on given possible inputs. The classification and regression are the categories of Supervised Learning.

The inputs are distributed into various classes using classification methods, and the trained system must generate actions that assign hidden inputs to these classes., known as multi labeling process. The regression is an example of supervised technique in which the outcomes are continuous rather than discrete. The regression predictions are calculated using root mean squared error (RMSE), unlike classification predictions in which accuracy is used as a performance measure.

B. Unsupervised learning

The system will take the decision automatically rather train on the basis of some specific dataset. No labeling is given to the system that might be used for predictions. Unsupervised learning may be used to retrieve the hidden pattern with the help of feature learning of the given data. The clustering is an unsupervised learning approach which is used to divide the inputs into clusters. It builds groups on the basis of similarity.

C. Semi-supervised learning

The system is assumed to be partial training data in Semi-supervised learning. This type of training is used with some trained data that may target some missing results. This type of algorithm is used on untagged data for training commitment. The semi-supervised learning algorithm trained not only on labeled but also unlabeled data. This learning exhibits the features of the unsupervised-learning as well as supervised learning algorithms.

D. Active learning

In Active learning, the system gets that training tags only for a limited set of occurrences. It is used to improve its optimality of substances to gain tags for the goal. Similar to budgets functions in an organization.

E. Reinforcement learning

In Reinforcement learning the trained data is provided only as a response to the program's functionalities in a self-motivated situation, such as to drive a vehicle or playing a video game.

F. Evolutionary Learning

Evolutionary learning is mainly used in the field of biology to learn biological organisms and to predict their survival rate and the casual of the offspring. We can use this model by using the knowledge of fitness, to predict how to correct the outcome.

G. Deep learning

This is the advance phase of machine learning which uses neural networks for learning and prediction of data. It is a combination of different algorithms. These are used to design complicated generalize system that can take any type of problems and give predictions. It uses the deep graph with multiple processing layer, made up of many linear and nonlinear conversion [8].

Presently, in medical disciplines, disease diagnostic assessment is a severe mission. It is the key task to grasp the accurate diagnosis of patients by medical inspection and evaluation. The healthcare domain generates a large amount of data about medical evaluation, a statement concerning the patient, treatment, supplements, prescription etc. The main issue is that the quality of these reports gives an effect of association because of unsuitable management of the data [9]. The improvements of this data are vital to mine and process these medical reports elegantly and efficiently. There are different types of machine learning algorithms are available that are used to use specific classifier for distributing data on the basis of their behavior. The dataset may be separated into two or more than two classes. These types of classifiers are installed for medical data examination and disease discovery. Firstly, machine learning algorithms were proposed and used to notice medical data sets.

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Today, for well-organized investigation of medical data the machine learning provides various techniques. The systems for data gathering and inspection are situated in almost all new hospitals that are used for the collection and sharing of data. It is used for proper diagnosis of different diseases by medical imaging. To use an algorithm, the accurate diagnostic patient documentation is uploaded on a system and outcomes may be spontaneously acquired from the preceding successful cases. The machine learning enabled pattern recognition, which extracts features from medical images about any illness to predict and generate conclusions for diagnosis as well as treatment [10]. There are various steps of machine learning and deep learning algorithms which are used in the medical imaging domain as shown in *Fig. 2.*

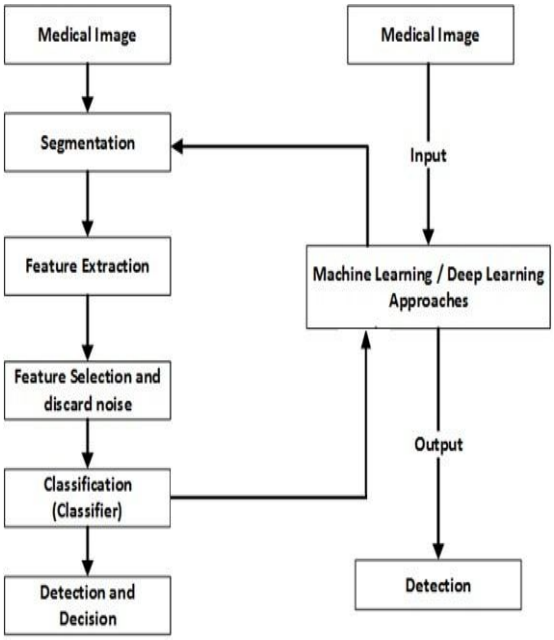

Figure-22: Machine and Deep Learning algorithms workflow in medical image

II. MACHINE LEARNING IN MEDICAL IMAGING

Machine learning algorithms are very useful in medical imaging to study particular diseases. Various types of entities such as lesions and organs in medical image processing can be too complex and cannot be shown correctly by a simple mathematical solution. In [11], the author used the pixel-based investigation to analyze medical images for diseases. Medical image processing includes pixel analysis in machine learning, which uses certain values in images straight away instead of features extraction from chunks as input data. The enactment of this method can possibly be better than that of simple feature-based classifiers for particular problems. The image with poor contrast is a challenging problem in order to identify its properties. The segmentation and feature calculation is not required for pixel-based machine learning, unlike ordinary classifiers which avoid errors resulted from inaccurate segmentation and feature calculation. The pixel analysis uses long training time because of the high dimensionality of data (a large number of pixels in an image) in [12], the author targeted the poor contrast medical images for analysis. The best efficient technique used for contrast improvement is Histogram Equalization (HE). The authors proposed a technique named “Modified Histogram-Based Contrast Enhancement using Homomorphic Filtering" (MH- FIL). It consists of two phases; the first phase is to improve global contrast using histogram modification. The, second phase homomorphic filtering is projected for image sharpening. The poor contrast chest X-ray 10 medical images are investigated in the experiment. The MH-FIL has minimum values in all 10 images computer as compare to other techniques. The medical image clarification is the critical responsibility of radiologists, with the assignments involving equally images with better quality and its analysis for which computer-aided design CAD has developed for several years.

There are various machine learning methods analyzed through medical images, for example, linear discriminant analysis, support vector machines, decision trees, etc. In [13], the author utilized machine learning approaches in medical image evaluation. In particular, they used local binary patterns extensively contemplated among texture descriptors. Furthermore, a study on new trials using multiple low binary patterns descriptors of biomedical images. The dataset of neonatal facial images for classifying pain conditions beginning from facial descriptions. Especially, the output on the extensively premeditated 2D-HeLa dataset and the suggested descriptor gains the highest implementation including all the numerous texture descriptors. A linear support vector machine classifier is used on the 2D-HeLa dataset and in the PAP dataset. The 92.4 % accuracy got which is the highest values among all other descriptors on the same dataset. The neural network technique is

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used in medical images to identify the disease details [14]. The neural network groups are retained for cancer detection. It is used to critic where a cell is normal with excessive assurance where each distinct network has only two outcomes either it will be a normal cell or malignant cell. The predictions of these cells' network are combined by a predominant method, i.e. plurality voting. The outcome showed that the neural network collectively achieves a high rate of accuracy and a low value of false negative analysis.

The machine learning expert systems provide contrivances for the production of premises from patients' information. Different rules are mined from the information of specialists to paradigm an expert system. The group of clinical problems that may be used as examples, knowledge in intelligent systems can achieve by machine learning approaches that may be used to generate a methodical description of clinical characters that specifically describe the clinical circumstances. Therefore, information may be articulated in the arrangement of simple rules, or often as a decision tree. A typical example of this category is KARDIO, which is grown to translate ECGs [15]. In medical image analysis, statistical analysis found to be the good standard for evaluating image feature. The channelized Hoteling observer (CHO), is generally utilized for specifically in nuclear medicine imaging. The channels are enthused by the idea of amenable subjects in the human visual structure. This method is used to identify image quality evaluation and further, the CHO has defensibly and positive influence on the medical imaging. The subsequent algorithm is named a channelized SVM (CSVM). There are two medical researchers assessed the flaw discernibility in 100 noisy images and then the score confidence of a lesion reality contemporary on a six-point scale. A training session is employed to involve an extra 60 images. The human spectators achieved this assignment for six diverse selections of the flattening filter with two different choices of the number of repetitions in the OS-EM rebuilding algorithm [16].

III. DEEP LEARNING IN MEDICAL IMAGING

To guide computers to learn features that may characterize the data for the given issue. This idea lies at the base of several deep learning procedures. The models that comprised of different layers that transmute input images to give outputs about the specific diseases because of cramming gradually high-level features. The convolutional neural networks (CNNs) found to be better type of these models for image analysis. The CNNs comprise different layers that convert the input with convolution filters. The function of employing deep learning methods to the medical field frequently use in familiarizing present architectures in distinctive input formats such as three- dimensional data. Earlier, the purposes of CNNs to big data, full 3D convolutions and the subsequent huge number of constraints are avoided by separating the volume of Interest into portions [17].

A. Classification

1) Image classification

The main task of medical image is the classification in deep learning in order to identify for clinical-related issues for early treatment of the patient. The classification could be classically or multiple images as input with a single diagnostic mutable as output (disease yes or no). In these cases, each diagnostic test is a model and dataset sizes are characteristically minor related to those in computer vision presented in [18]. The fine modification improved feature extraction, attaining 57.6% accuracy in multiclass score evaluation of knee osteoarthritis against 53.4%. But another author shown that by CNN feature retrieval performed fine-tuning in cytopathology image classification accuracy with 70.5% versus 69.1% in [19].

2) Object classification

The object classification targets on the small interested part of the medical image. These small parts can be projected into two or more classes. For better accuracy, the local information of these parts and global conceptual information are very important. In [20], the author used three CNNs methods of deep learning to patch the image at a different scale of objects. The results of these techniques finally reflected the features matrix of the overall image properties.

3) Detection: Organ and region

The object detection and localization are the next phase after classification. It is a crucial step in segmentation where we may extract the importance of each object and focus only the interested object and discard the noise. To challenge this issue, a 3D data parsing approach is utilized using deep learning algorithms. The author utilized three independent groups 2D and 3D MRI chunks in medical image. It is used to locate the regions of various related objects which focus on some specific diseases such heart, aortic arch, descending aorta [21].

4) Segmentation

The segmentation is used to process the organs and substructures of the medical images. It is utilized for quantitative analysis of the clinical features. For example, cardiac or brain examination. It is also used in CAD for functions. It is the identification of specific pixels that make up the object of interest. The U-net is the

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combination of up-sampling and down-sampling layers architectures. It combined the connections of convolution and de-convolution samples of layers [22].

5) Registration

It is the process of transforming different sets of data into single coordinate system. It is an essential step in medical images in order to provide comparison or integration of the data obtained from various viewpoint, time, depth, and sensors etc. This is the iterative process in which we select a particular type of parameters as a standard. It is utilized to calculate the similarity parameters of two images using deep learning algorithms [23]. The registration is used in medicine i.e. NMR data and Computer Tomography (CT). This is quite helpful to attain patient information, observing tumor growth, cure confirmation, and the comparison of the patient's information with anatomical atlases. The mutual information obtained in [24] using Powell's and Brent's method to register CT, MR is different from [25] which is utilized on breast MR images.

CONCLUSION

The machine learning skills are growing rapidly since past few years. Presently, machine learning methods are tremendously vigorous to practical circumstances, and the structures really advantage of the learning process. It previously pertains in the rehearsal of medical imaging, and it will perhaps cultivate at a quick stride in the coming future. The use of machine learning in medical imaging has important role for the medication. It is likely that this research area ensures better care to patients. The possessions of machine learning tackles are serious to confirming that they are applied in the greatest real way. In the medical image analysis, the deep learning algorithms useful in categorize, classify, and enumerate disease patterns from image processing. Moreover, it permits to extend analytical goals and generates prediction models of treatment for patients. The medical imaging researchers considering these challenges, deep learning in health care analysis domain and imaging is enduring to flourish. It's rising enormously, as deep learning is in various alternative applications apart from of health care.

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COMPARSION AND PERFORMANCE OF ROOTED AND SUBMERGED PLANTS FOR MINIMIZATION OF ARSENIC BY PHYTOREMEDIATION TECHNIQUE

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ABSTRACT
Phytoremediation, a green plant-based technology, is a favorable technology for heavy metals pollution caused by inescapable limitations of predictable technologies. The use of some rooted plants and submerged plants in the process of Phytoremediation is more normally known as phyto filtration. The minimization of arsenic (As) by rooted plants, such asColocasia, Cannaindica, and submerged plants such as Pistia stratiotes, Water hyacinths (Eichhorniacrassipes), etc. Thus a hugequantity of water having arsenic can be minimizing of arsenic by this technology by economically. The ornamental plants collect high concentration of arsenic in their roots, trunks and tissues. This work is intended to examine the arsenic based water and to develop the operative and economically low cost method for minimization of arsenic from water. Here the suitability of plants to minimization of arsenic and compared by two types of plants such as rooted plants and submerged plants. In which arsenic contained water is passed through the rooted plants as well as submerged aquatic weeds. The suitability of plants to minimize the arsenic depends upon holding time and velocity of water flow which passes from one end to other end of the container. In India some determinations has been focused to regulate the water pollution and to make minimization of arsenic and free from chronic disease.

INTRODUCTION
The water is a basic necessity of human and animal life. These are the main consumption of human beings well as animals. The water is one which plays important role in metabolism of living body. Water is required for the variation of functions like regulation a body temperature, solvent and vehicle for transportation of nutrients and salts required for body through the vascular system and through the inter and intracellular space and to carry away in the form removal out of body. The nontoxic and drinkable water for the public is major problem all over the world .The U.N had declared the 1980 as the year of international drinking water supply and sanitation decade (IDWSSD) during the U.N. Conference in Mar del Plata, Argentina in1977.Water indented for human consuming should safe and good for human health. W.H.O defined ―health is a state of complete physical, mental and social well-being and not purely an absence of diseases or illness. The nontoxic water is one which cannot harm users when it used for long period. In this trial effort it is to find out that the minimization or eliminate concentration of arsenic by the phytoremediation technique monitoring the performance of rooted as well as submerged plants.

Phytoremediation is a technology, has expected growing helpfulness after the find of hyper accumulating plants which are able to accumulate, translocation, and concentrate high amount of certain toxic contaminants in rooted plants. Phytoremediation includes several processes namely, phytoextraction, phytodegradation, rhizofiltration, phytostabilisation and phytovolatilization. Both rooted and submerged plants have been tried to remediate arsenic based soils and waters, respectively. A number of submerged plant species have been examined for the remediation of toxic heavy metals such as As, Zn, Cd, Cu, Pb, Cr, Hg, etc. Arsenic, is the poisonous toxic element, is commonly spread in the aquatic systems which is produce from earth crushed displacement, volcanic or sedimentary rocks as well as from the dilution of geothermal waters. Some aquatic plants have been reported to accumulate high level of arsenic from contaminated water [1].Water hyacinth (Eichhorniacrassipes), Pistiastratiotes, Colocasia esculenta Canna Indica, have been studied to examine their arsenic uptake ability and mechanisms, and to evaluate their potential in phytoremediation technology [1]. It has been suggested that the aquatic weeds would be possible for arsenic phytoremediation, and this study reviews the knowledge on arsenic phytoremediation by common aquatic weeds.

OBJECTIVES OF WORK
1. To Minimization of arsenic from water by phytoremediation technique.
2. To Comparison between rooted and submerged plants for elimination of arsenic.
3. To understanding of potential of aquatic weeds.
4. To remove the arsenic by economically.

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METHODOLOGY

A. Recognizing of aquetic weeds and rooted plants

The two rooted such as Colocasia esculenta, and Canna indica and two floating plants such as Pistia, Water hyacinth are selected for this work

B. Determination of ability for selection criteria of plant

The following criteria have been recognized for selecting a plant species.

- Flexibility to local environment.
- High high growth rates.
- Tolerance to adverse concentration of pollution
- High toxin element acceptance capability.
- Acceptance to critical climatic conditions
- Struggle to vermin and diseases and easy of management
- High oxygen conveyance expertise

EXPERIMENTAL TECHNIQUE

A. Preparation for experimental work

The four containers are used for rooted and floating plants having a size of each reactor 0.40mX0.28 mX0.15m., two containers are placed in a such manner that water passed under gravity to maintain continuous flow. Each container with an arrangement of tap for controlling the rate of flow of water. The depth of soil media for rooted plant is 0.07m. Similarly the same depth of water in floating plant. Four number of tub container are made in one row the first and second container is plugged with seven numbers of rooted plants and third container and are plugged with fifteen numbers of floating plants. Two elevated tanks of capacity of 30 liters each placed at the top of this system for supplying of arsenic bearing water, for maintaining continuous flow four jars of 15 liters are placed at bottom of each series for recirculation of water. Materials used for experimental setup.

- Step arrangement for placing of container,
- for maintaining under gravity flow
- TwoHigher Elevated tank – Capacity 30 liters each.
- Capacity of small Jar – 15 liters
- Size of each reactor—0.4m X0.28m X 0.15m
- Area of soil media surface -0.4m X 0.28m
- Number of rooted plants-7
- Number of floating plants-15

B. Preparation of arsenic based synthetic water

- First of all for preparation of Stock arsenic solution dissolve 1.320 g arsenic trioxide, As2O3, in 10 ml distilled water containing 4 g NaOH, and dilute to 1000 ml with distilled water, 1.00 ml = 1.00 mg arsenic.
- Then for preparation of intermediate solution take 500 ml of stock solution and dilute in 5liter distilled water. After that for standard arsenic solution 5000 ml of intermediate solution and dilute in 50,000 ml distilled water.
- Then get arsenic concentrated water 1ml=1µg As ie 1mg/liter.Equations

C. Process of horizontal continuous flow

For two month both set up from 30 liters tank plain water with nutrient is distributed to the containers for flourishing the plants, then the actual experimental work start, arsenic bearing water is supply to two series of the containers from elevated tank. The samples are collected at the outlet of container of rooted and floating plants respectively from each container, when treated water is collected in a jar of 15 liters capacity and it is recalculated to inlet of the container of each setup and hence, continuous flow system is maintain, and removal of arsenic is observed at outlet of every containers.

The rate of flow is maintained 0.60 lit/hr, from one end to other end. Due to permeable media, the rooted plants get sufficient time to extract the arsenic from water.

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D. Recirculation of arsenic bearing water

The arsenic bearing water passes through containers and after 24 hrs the sample is collected from outlet of container , than the collected water in jar is recalculated for next 24 hrs at the rate of flow 0.60lit/hrs The 3rd cycle is made after 48 hrs having a rate of flow of 0.30lit /hrs. This process is continued till the concentration of arsenic observed up to permissible limit or the exhausted due to death of plants

Table-1: Comparison between two rooted and submerged plants for Minimization of Arsenic in mg/lit

Time in hrs	Rooted plants		Submerged Plants	
	Minimization of As by Colocasia esculenta	Minimization of As by Canna Indica	Minimization of As by PistiaStratiotes	Minimization of As by Water Hyacinths
0	1	1	1	1
24	0.872	0.901	0.984	0.92
48	0.757	0.894	0.971	0.902
72	0.715	0.871	0.905	0.887
96	0.632	0.824	0.850	0.879
144	0.568	0.781	0.843	0.833
192	0.495	0.771	0.808	0.811
240	0.453	0.709	0.761	0.746
288	0.423	0.659	0.725	0.688
Total As remove in mg/lit	**0.577**	**0.341**	**0.275**	**0.312**

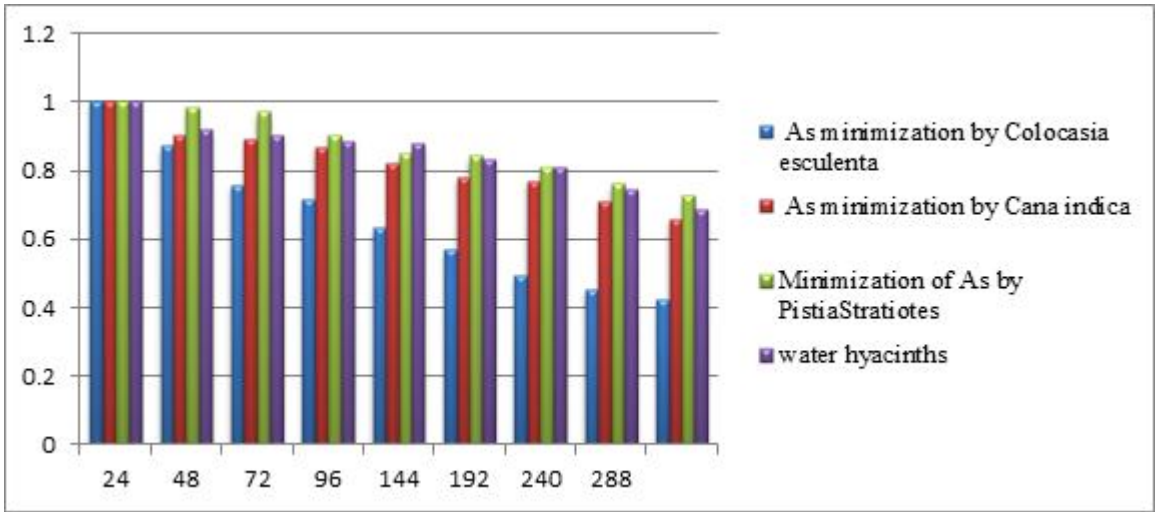

Fig-1: Shows comparatively performance of two rooted plants for minimazation of arsenic concentration mg/lit

Table-2: Comparatively elimanation of Arsenic by two rooted and Submerged plants

Time in hrs	Rooted plants		Submerged Plants	
	% Minimization of As by Colocasia esculenta	% Minimization of As by Canna Indica	% Minimization of As by Pistia Stratiotes	% Minimization of As Water Hyacinths
24	12.8	9.9	1.58	8
48	11.5	0.7	1.3	1.8
72	4.2	2.3	6.6	1.5
96	8.3	4.7	5.5	0.8
144	6.4	4.3	0.7	4.6
192	7.3	10	3.5	2.2
240	4.2	6.2	4.7	6.5
288	3	5	3.6	5.8
Total As remove in %	57.70%	34.10%	27.50%	31.20%

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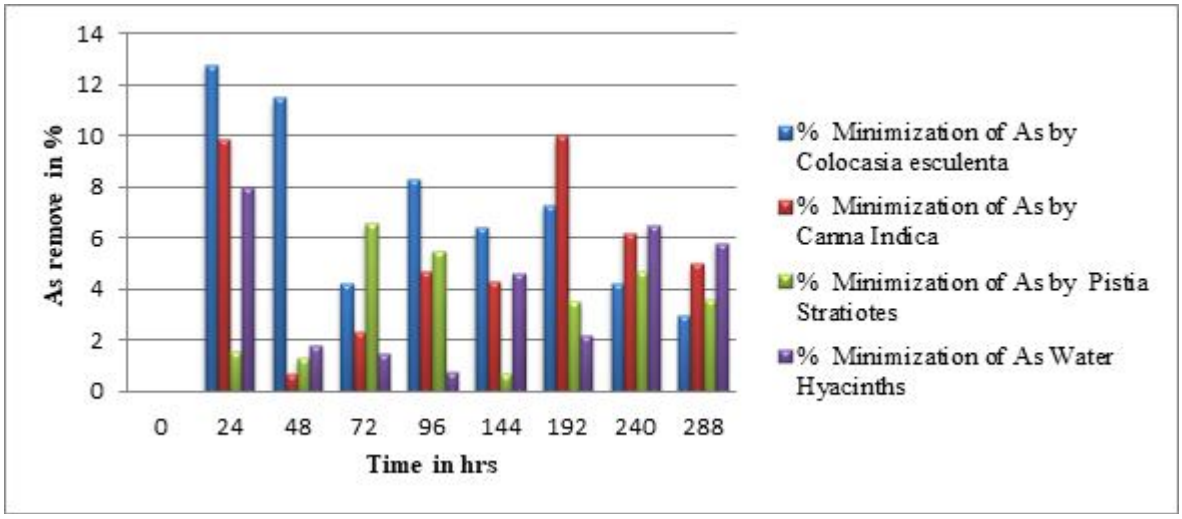

Fig-2: Shows comparatively performance of two rooted plants for minimazation of arsenic concentration mg/lit

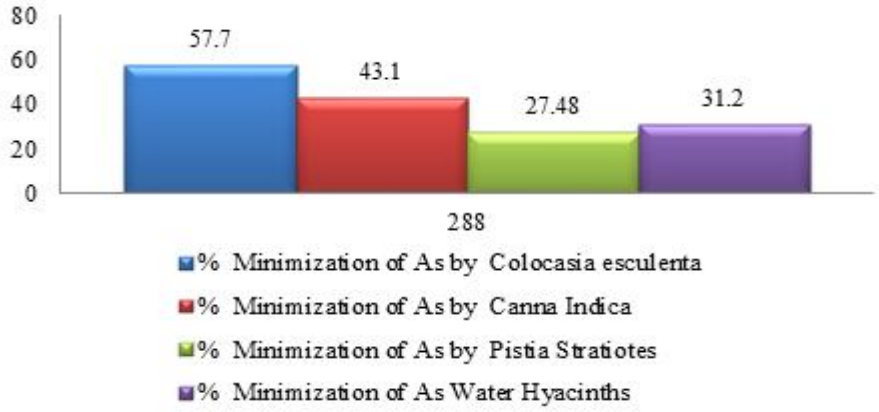

Fig-3: shows individual performance of rooted and submerged plants

OBSERVATION

A. Performance and Comparison between two rooted and submerged plants for Minimization of Arsenic

Comparatively observation among the two rooted and two submerged plants, the colocasia esculanta is removed 0.577 mg/lit arsenic as compare to canna indica which removed 0.341 mg/lit from 1 mg/lit concentration of arsenic in 24 hrs to 288 hrs . Among the both rooted plants the colocasia esculanta gives the good results. Similarly in the two submerged plants water hyacinth removed 0.312mg/lit as compare to Pistia Stratiotes which removed 0.275 mg/lit in 24 hrs to 288 hrs.respectively. as shown in Table I& Fig.1

B. elimination of arsenic by Colocasia esculenta and canna indica

In two rooted plant Colocasia esculenta and Canna indica after 288 hours in which the Colocasia esculent is the best plant tested. It minimizes arsenic from 12.80 % to 57.70% in 24hrs to 288hrs respectively. Similarly canna indica accumulates arsenic from 9.90% to 34.10%.in 24hrs to 288 hrs respectively as shown in Table 2 & Fig.2&3

CONCLUSION

- This work is concentrate on the recognize of suitable rooted and submerged plants for arsenic elimination from water. The arsenic accumulation abilities of Colocasiaesculenta, , Canna indica, Pistiastratiotes , ,Water hyacinth (EichhorniaCrassipes), are tested in this experiment had different growth rates and efficiencies for arsenic removal.

It is concluded that

- Colocasia esculenta is the good arsenic accumulation of arsenic because of it eliminate highest arsenic 57.70 %.as compare to Canna indica which removes arsenic 34.40%
- Water hyacinth is good accumulating plant which is removing highest arsenic 31.3% as compare to Pistiastratiotes which removes arsenic 27.48% respectively.

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- Colocasia esculenta and Water hyacinth had the highest new mass production and the highest ability to remove arsenic when exposed to 1 mg/l arsenate for 15 days.

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RECOVERY OF WASTE HEAT USING HEAT EXCHANGER

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ABSTRACT
The paper considered a review for the design of a shell and tube heat exchanger. Therein, popular analytical techniques such as log mean temperature difference (LMTD) and effectiveness-number of transfer units (ε-NTU) were considered in the analysis. In the design, analysis, performance charts and tables describing the performance of the shell and tube heat exchanger in terms of crucial dimensionless parameters were developed. These fundamental dimensionless parameters account for the thermal & the physical properties of the fluids and the heat exchanger (HX) material. Using the information from the performance charts and tables, a basic design for the shell and tube heat exchanger can be readily formulated. The basic design involves choosing an appropriate number of transfer units (NTU) and capacity rate ratio for a given application. The NTU and capacity rate ratio can then be extrapolated to develop a detailed design for the shell and tube heat exchanger. Since NTU and capacity rate ratio accounts for all the significant physical and thermal properties of the heat exchanger, performance tables and charts would certainly help in maximizing the performance and minimizing the cost of the shell and tube heat exchanger. In the case considered here in, both LMTD and ε- NTU techniques yield the same exact results.

I. INTRODUCTION
Heat exchangers are widely used in manufacturing and process industries for several applications. The choice of heat exchanger for a given application is dependent on several factors such as the application, available floor area, available resources, connections in the field, cost, and many more. In a highly competitive environment, it is essential that the heat exchanger must deliver the required heat transfer, occupy less space, weigh less, and yet be priced competitively. In this project, a shell and tube heat exchanger is designed for and steam is the heating medium. The heat exchanger shall be designed such that the hot oil flows through the tubes and steam through the shell side of the heat exchanger. It is assumed that large steam flow rate is available to provide the required heating for the hot oil in the shell and tube heat exchanger. A conventional ε-NTU approach and LMTD approach shall be used to design the shell and tube heat exchanger. Performance tables and charts describing the variation of shell heating hot oil. Hot oil is used for a certain process heating application and tube heat exchanger's performance with respect to capacity rate ratio and NTU were developed. Dimensionless parameters such as capacity rate ratio and NTU provide concise information on the heat exchanger as they account for material characteristics, flow characteristics, physical and thermal properties, construction and fouling. Likewise, the developed tables and charts can also be employed during the regular working phase of the shell and tube heat exchanger to understand its performance and There are numerous references available in the literature pertaining to heat exchanger performance modelling, and only the most pertinent studies are discussed. There are numerous references available in the literature pertaining to heat exchanger performance modelling, and only the most pertinent studies are discussed in this manuscript.

II. LITERATURE SURVEY
Dawit Bogale-2014 [1] : Dawit Bogale conducted a experiment on shell and tube heat exchangers showing optimization and redesign of the machine is done for both mechanical and thermal designs and the simulation for the heat transfer between the two fluid is analyzed using the concept of CFD (Computational Fluid Dynamics) using Gambit and Fluent software's. The final result of the STHEx in HBSC which is the redesigned STHEX can achieve or efficiently work to achieve the required outlet temperature 340℃ the temp at which the beer is ready for customer for use.

Vindhya Vasiny Prasad Dubey, Raj Rajat Verma-2014 [2]: Dubey and Verma conducted a Performance Analysis of Shell & Tube Type Heat Exchanger under the Effect of Varied Operating Conditions and concluded that It may be said that the insulation is a good tool to increase the rate of heat transfer if used properly well below the level of critical thickness. Amongst the used materials the cotton wool and the tape have given the best values of effectiveness. Moreover the effectiveness of the heat exchanger also depends upon the value of turbulence provided. However it is also seen that there does not exists direct relation between the turbulence and effectiveness and effectiveness attains its peak at some intermediate value. The ambient conditions for which the heat exchanger was tested do not show any significant effect over the heat exchanger's performance.

JAY J. BHAVSAR, V K. MATAWALA-2013 [3]: The previous works carried out by different authors were limited to helical coil heat exchanger and spiral plate heat exchanger. The spiral tube heat exchanger is compact

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in size and more heat transfer can be carried out. The objective of present work is to streamline design methodology of spiral tube heat exchanger. The designed spiral tube heat exchanger is required to be developed and experiments will be performed on it to analyses pressure drop and temperature change in hot and cold fluid on shell side and tube side.

Durgesh Bhatt, Priyanka M Javhar-2012 [4]: Durgesh Bhatt, Priyanka M Javhar conducted a Shell and Tube Heat Exchanger Performance Analysis It is observed that by changing the value of one variable the by keeping the rest variable as constant we can obtain the different results. Based on that result we can optimize the design of the shell and tube type heat exchanger. Higher the thermal conductivity of the tube metallurgy higher the heat transfer rate will be achieved. Less is the baffle spacing , more is the shell side passes, higher the heat transfer but at the cost of the pressure drop.

Kevin M. Lunsford-1998 [5]: Kevin M. Lunsford evaluated the increasing heat exchanger performance through a logical series of steps. The first step considers if the exchanger is initially operating correctly. The second step considers increasing pressure drop if available in exchangers with single-phase heat transfer. Increased velocity results in higher heat transfer coefficients, which may be sufficient to improve performance. Next, a critical evaluation of the estimated fouling factors should be considered. Heat exchanger performance can be increased with periodic cleaning and less conservative fouling factors. Finally, for certain conditions, it may be feasible to consider enhanced heat transfer through the use of finned tubes, inserts, twisted tubes, or modified baffles. Most of these proprietary technologies can not be predicted a priori. However, combined with the enhancement information obtained from the vendors for specific cases along with estimations of heat transfer film coefficients, engineers can perform preliminary evaluations using these new technologies to increase shell-and-tube heat exchanger performance.

III. PROBLEM DEFINITION

In a reaction vessel during a process there is a huge amount of waste of steam from chimney. Around 7-8 tons per day the steam is loss through a chimney. So to reuse that steam and to solve this problem we are designing the heat exchanger.

IV. AIMS & OBJECTIVES

- To use the heat from chimney for indirect heating of charging solution with the help of heat exchanger
- To reduce the outlet temperature of the steam
- To reduce global warming because of hot steam leaving in atmosphere**.**

V. CONSTRUCTION DAIGRAM

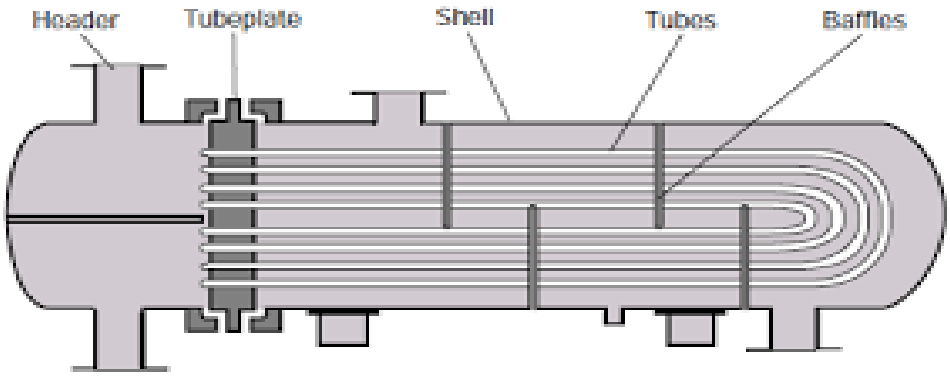

Fig: Shell and tube heat exchanger

❖ ***Specification***

Shell Diameter = 596mm

Material =SS316

Tube Count =32

Tube Length= 6m

Tube Outer Diameter =19.05mm

Temperature of inlet steam = 100^0C

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Temperature of outlet steam= 80^0C

Temperature of inlet cold fluid = 60^0C

Temperature of outlet cold fluid =77.35^0C

Pressure for Steam = 1atm

Log mean Temperature Difference = 11.683

VI .DESIGN CALCULATION

- **Heat available in steam**

Total heat in steam = heat stored + Latent heat of steam

$$(Q_{Total})_{Steam} = \frac{20000 \times 0.48 \times 100}{24} + 539 \times \frac{20000}{24}$$

= 489166.66 kcal/hr

- **Heat available in inlet (Nitrates of Naphthelene Sulphonate)**

$$(Q)_{Net} = Mass\ flow\ rate\ of\ inlet \times Specific\ heat \times Temperature\ of\ inlet$$

$$= 12500 \times 0.5 \times 60$$

= 375000 kcal/hr

- **Difference of heat between steam and inlet =** $(Q_{Total})_{Steam} - (Q)_{Net}$

= 489166.66 – 375000

= 114166.66 kcal/hr

- **Heat balance equation**

Heat loss by steam = Heat gain by inlet

$$114166.66 = 12500 \times 0.5 \times (T_{Out} - 60)$$

$$(T_{Cold})_{Outlet} = 78.26^0\ C$$

Above we get is without considering heat loss of 5% by (convection & radiation)

$(T_{Cold})_{Inlet} = 77.35^0\ C$ (With loss of 5%)

- **Calculation of length of heat exchanger**

$$LMTD = \frac{\theta_1 - \theta_2}{\ln(\frac{\theta_1}{\theta_2})}$$

$$= \frac{22.65 - 20}{\ln(\frac{22.65}{20})}$$

= 11.683

- **No of pass per tube =** $\frac{Number\ of\ tubes}{Number\ of\ pass} = \frac{32}{4} = 8$

- **Area of tube :**

$$A = \frac{q}{U\Delta T} = \frac{477216.63 \times 10^3}{2040 \times 60 \times 60} = 0.2283 m^2$$

- **No of Tube** : = 32

- **Tube Diameter** $(D_o) = \frac{3}{4} \times inches = 19.05mm$

- **Tube pattern** = Triangular pitch

- **Tube Pitch =** 1.25 × $tube\ outside\ dia$

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= 1.25× 19.05

= 23.81mm

- **Shell Diameter (D_s) = 596mm**
- **Baffle spacing** = 0.167 × (D_s)

= 0.167 × 596

= 100mm

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MULTIPLE IMAGES STITCHING FOR PANORAMIC IMAGE BASED ON RANSAC AND HOMOGRAPHY MATRIX

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ABSTRACT
Stitching several images using invariant-local feature is explained. Technique identifies more panoramas in a scattered sequence dataset. RANSAC technique is taken to pick nearest match between the multiple images by parting outliers and inliers. For Image-stitching using inliers, homography matrixes are utilized that needs at least 8 feature points. If homography matrix is evaluated among several images, a panoramic view of the multiple images is observed. The feature-points that kept on corresponding epipolar-lines has chosen to obtain efficient homography matrix. Rectilinear-projections are taken to view panoramic image. In Rectilinear-projections images are visible on 2-D planes. We have also used Harris-Corner Detection technique for detecting-corners in the images. RANSAC gives desirable image stitching.

Keyword: Harris-Detector, RANSAC, Homography and Panoramic Image.

I. INTRODUCTION

Image-stitching is the progression of producing one image by group of over-lapping images. This is utilized in many areas, for example, interactive panoramic-viewing of sequences of image, multi-node movies, modelling 3D scenario captured from the real world.

Basic-geometry problem consist of estimating a homography 3×3 matrix for input sequence of images. Homography-estimation practices an initialization, i.e applied by user's input to evaluate maximum aligns of images. [3] [4].

In the literature survey, procedures for automatic-image alignment. Stitching is characterized into two categories, i.e direct based and feature based. Direct techniques provide very precise registration because it uses input-image data. Feature-based, in this registration which doesn't require any initialization. But it adds systematic ways for feature-matching methods which doesn't require invariance properties. These are important to do enabling dependable matches for input-images [5].

In this work, feature-based category for automatic-panoramic image-stitching is described. 1) Include Harris-Corner Detector technique for invariant-features detection in input sequence of images. 2) By observing feature points detected by Harris-Corner method, it applies RANSAC [1] [2] algorithm for detecting anomalies in the stitched images, after that it applies Homography-Estimation parted inliers and used 3*3 matrix and then finally combined two images to obtain stitched images. 3) It generates high-quality outputs using multi-band warping to render consistent output panorama.

II. LITERATURE SURVEY

This section describes the literature survey of the proposed work based on research carried out by many researches related to stitching of multiple images.

Mingxiu Lin et.al [01] has suggested panoramic-stitching skills are focused of present panoramic-technique, and cylindrical-panoramas are generally utilized because ease of captured and storage. Furthermore it will be an easy way for making panoramic videos. Here, it will be presented as cylindrical panoramic generation scheme for multi-cameras. Initially, they utilized backward-division model that rapidly evaluate distortion of fish-eye lens. To preserve regularization of stitching, use cylindrical-projection. They applied SIFT feature-detection scheme for image mosaicing. To improve accuracy of matching level, used RANSAC algorithm to exact feature detection points. They used an image-fusion technique of Laplace pyramid. The original images taken by fish-eye multiple-camera devices are managed, and then the cylindrical panoramic images are observed.

Mao-sen Wang1 et.al [02] has suggested that the SIFT and SURF are standard schemes in image-stitching. But these are time-consuming. The new image-stitching technique is based on ORB (Oriented FAST and Rotated BRIEF) features. The technique first choose ORB algorithm that added directly to FAST detector for image feature extraction and matching. RANSAC (Random Sample Consensus) procedure was utilized to remove error from matching-points. Weighted-average technique is utilized to do fast image-fusion. Results proved that stitching-effect of algorithm had been same as SIFT technique and SURF algorithm. 2 apparent achievements of

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our algorithm contains: (1) stitching-speed is much higher than that of SIFT and SURF. (2) Technique was adjusted to external components of camera.

Cheng-Ming Huang et.al [03] has presented an effective image-stitching procedure with superior image-quality and having less processing-time for stitching of constant image-groups. Stitching of various frames with symmetric scenes require more time and easily produces contradiction in overlap area among frames. In despite of stitching all captured-frame, only major frames was selected and visual content were dissimilar to that in the earlier stitched result. Though non-dominant frames are not added in mosaicing image, their homography-matrix w.r.t mosaicked image will be roughly-estimated to localize camera viewed on mosaiced image. The particle filter having partitioned samplings were used to separate stitching-label and estimate homography-matrix. After that, for substantially increased quality of offline mosaiced image, a seam-planning algorithm were designed to remove unclear effect in the overlapping region among excepted frames. The purpose is to highly preserve visual content while eliminating inconsistencies in overlapped region. The proposed of stitching technique had been satisfied in various offline and online experiments to show the efficiency of overall system.

Zhong Qu1 et.al [04] has told that image-stitch approaches of feature-point detection required more registration time for apex resolute images. In SIFT-method, it creates Difference-of-Gaussian by a Linear-Gauss expansion filter to obtain appropriate feature. Here, a novel image registration model of image-block has provide to make a rough match for blocked image and fine match in similar blocks by taking benefits of FAST algorithm. By this way, he can escape wasting more time in ineffective area, and improve precision and efficiency of feature-point. Errors avail in process of image-stitching, hence image-stitched by many images has wavelike effects, tilt, or distortion. The camera movement technique is applied to remove tilt-distortion of image. The technique summing optimal-seam and multi-resolution union is accepted to combine stitched image and realized seamless stitch of many images to get a seamless image of more resolution. Simulation results show that stitching scheme could realize seamless stitching and straightening of images.

Julio Zaragoza et.al [05] has proposed an estimation model called Moving Direct-Linear-Transformation (Moving DLT) which is capable of pinching or fine-tune projective warp for deviations of input data, which gives projective-possible image configuration which considerably lessens ghosting without accepting geometric-realism of viewpoint in image-stitching. After that, this method reduces demanding on potentially luxurious post processing techniques. In addition, they describe how multiple as-projective-as-possible warps could be concurrently refined via bundle adjustment to accurately align multiple images for large panorama creation**.**

Weiqing Yan et.al [06] has proposed a hybrid robust model to build stereoscopic image-stitching by grouping projective. 1) Uniform homography method is given to re-warp left-right images, and thus confirm that there will be consistent changes. 2) Content-preserving warping is offered for locally refine alignment and diminish disparities. Finally, a seam-cutting technique utilized to find a blending-seam and multiple-band blending algorithm is utilized to give final stitched image. Experimental effects proves that he offered method can efficiently stitch-stereoscopic images to avoid local distortions.

Xiao-hua Tong et.al [07] has integrates advantages of RANSAC technique and ducks comparing setbacks of unique stage connection strategy dependent on SVD. A pixel-to-pixel thick coordinating plan on premise of proposed calculation is likewise created for down to earth picture enrollment. Trials with both reproduced and genuine information were done to test proposed strategy. In the mimicked case, the near outcomes surveyed from produced engineered picture sets indicates that proposed strategy outflanks other existing strategies within the sight of both commotion and associating, in both strength and precision. Besides, the pixel locking impact that normally happens in sub pixel coordinating was likewise examined. The level of pixel locking impact was seen as altogether debilitated by proposed technique, as contrasted and unique Hoge's strategy. In the genuine information case, tests utilizing various groups of ZY-3 multispectral sensor-amended pictures show the promising presentation and practicality of the proposed technique that can perceive creases of the picture sewing between sub-charge-coupled gadget units.

III. METHODOLOGY

The proposed block diagram of the proposed work is depicted in Figure.1. The architecture is containing various blocks which describe the procedure for the overall process. The work mainly focuses on panorama purpose. Considering the two or more sequence images as input images, to compute nearly matching features and then correlate them. Finally, grouping all matching features to get final panorama image.

I. ***Harris Corner Detection***: Feature-points are also known as key-points. Fundamental concept in image-processing which will be utilize in several algorithms such as object-identification, image-registration, and

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Object-tracing and corner-detection. Harris-Feature detector is the most recognized and used technique to recognize feature-points and also detect corners from input sequence of images. Other methods also present, for example, Harris, SIFT. But assuming that the running time of the Harris-Corner is having more speed than the SIFT.

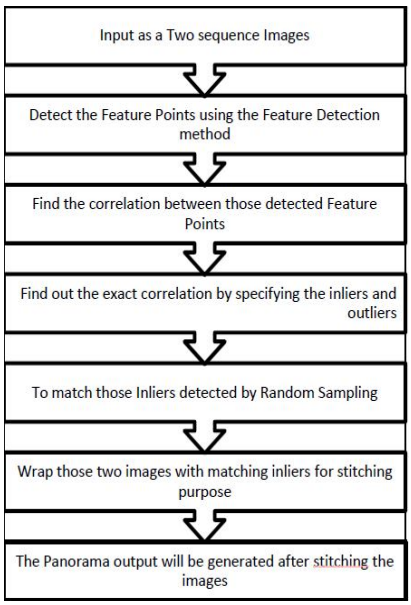

Figure-1: Block diagram of Image Stitching.

In order to get corners as Input-image of Harris-method proceeds at average-intensity. Intensity-variation in small particular areas known as window-around. Firstly, it accept displacement-vector of the (x, y) factor, after that evaluate average-intensity change as shown in Eq. (1).

$$R = \sum (I(u+x, v+y) - I(u,y))^2 \qquad (1)$$

Average-intensity variation can be determined by using the equation 1. Evaluation will be done for input image. At some place, average-intensity intensely is more changing as distinguished with earlier one direction is called as Corner. Harris-Detector technique work the corner-detection, as shown in the Eq. (2), i.e obtained-movement of maximum-average execution time. If intensity-variation is strongly more in bi-directions then required point is a Corner. Taylor series expansion as be utilized for average-intensity. Given as-

$$R \approx \sum \left(I(u,v) + \frac{\partial I}{\partial u}x + \frac{\partial I}{\partial v}x - I(u,v) \right) = \sum \left(\left(\frac{\partial I}{\partial u}x\right)^2 + 2\frac{\partial I}{\partial u}\frac{\partial I}{\partial v}xy \right)$$

$$R \approx [x,y] \left(\frac{\Sigma\left(\left(\frac{\partial I}{\partial u}\right)^2\right)\Sigma\left(\frac{\partial I}{\partial u}\frac{\partial I}{\partial v}\right)}{\Sigma\left(\frac{\partial I}{\partial u}\frac{\partial I}{\partial v}\right)\Sigma\left(\left(\frac{\partial I}{\partial v}\right)^2\right)} \right) \qquad (2)$$

An alternative procedure to depict the Taylor-Expansion in matrix-form and covariance-matrix which specifies the rate of execution time.

After that, network will be very well and but difficult to locate normal power alter in the particular course and particular bearing symmetrical to past explicit heading utilizing Eigen values that are determined from the framework. These qualities additionally is important to perceive situation of point. The point on the edge, area for homogeneous, corner. On the off chance that one Eigen vector value is higher and other Eigen vector value is bring down the point situated on the edge line. On the off chance that the two estimations of Eigen vector are having lower force, at that point is in the homogeneous district. In the event that the two qualities are higher in the area, at that point is corner.

It has no computation of the Eigen values in Harris-Corner technique, total qualities was squared contrasts network by settling for beneath corner metric framework, R as shown in the Eq. (3):

$$R = AB - C^2 - \kappa((A+B)^2) \qquad (3)$$

Where, k is associated to sensitivity-factor, which identifies its value using Sensitivity-factor ($0< \kappa <0.25$) parameter. If the value of κ is lesser, then this method will detect sharp corners.

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This utilizes co-efficient for smoothing channel components utilized for characterizing vector of channel-coefficients. This square increases vector of coefficients by taking its transpose to make a framework of channel coefficients, w.

This requires O (nlogn) time by utilizing a k-d trees to discover estimated closest neighbors. This k-d tree is a hub, adjusted double-space parcel, and recursively-segments component space at the average in the measurement with most variations.

II. ***Feature Points***: At this stage, foremost opinion is to pick all feature-points are matching to all input-image sequences. After that, this should be useful to over-lap sequence of pictures. Feature-points are adjacent features. By joining all sets of key-points for multiple image match will be result of panoramic-image. There are many sequences for panoramic views, after that trouble can happen about important matching input images. Still, requirement is to match every image to over-lap small set of key-points for a good solution of image-geometry.

This component coordinating advance, which takes the numerous information pictures having countless matches among one another. Here one can utilize just a few (3-4 arrangement of successions) pictures, yet while thinking about a steady number of pictures, those have enormous number of highlight guides which matches toward current picture, for potential or thick picture matches it ought to m = 6. It utilizes RANSAC to perceive a lot of inliers, makes similarity with a homography among input pictures. After that, probabilistic model is to apply for confirmation of matching conditions.

III. ***Random Sample Consensus (RANSAC):*** RANSAC strategy is a powerful and broadly utilized that figure a base arrangement of inliers that are correspondences to surmised picture change parameters, and finds an answer that has awesome agreement with information. On account of scene usefulness they select arrangements of 4 methods, r = 4, i.e, highlight parts and figure of homography for example (H) between inliers ascertain and it's utilizing Direct Linear Transformation (DLT) technique. Then, it produces with more times for example n=500 preliminaries. Afterward pick specific arrangement that has greatest number of inliers for example - those projections are steady with (H) inside a resilience E-pixels. Likelihood will be provided an element match between a couple of coordinating pictures that is inliers likelihood, and the likelihood of searching the right change

After 500 preliminaries probability for finding right homography will be more. For instance, pi=0.5 is an inliers and the 1* ⟦10^(- 14)] probability estimated that the right homography isn't found after 500 preliminaries. RANSAC strategy is basically a testing level for computation of evaluating (H).

For each combination of conceivably coordinating pictures, it has a lot of inliers that are highlighted point coordinates which geometrically predictable determined by RANSAC and lots of Outliers are highlighted inside territory of cover however not steady likewise determined by RANSAC. The principle familiarity with confirmation model and it should analyze right probabilities that arrangement of inliers was produced by right picture coordinate or the arrangement of anomalies was created by bogus picture coordinate.

Given image information, demonstrates total numbers of highlight focuses in covering region of informed image, the Outliers as n_f and the Inliers n_i. The particular occasion when these image coordinates accurately or inaccurately, the portrayal is finished by twofold factor mϵ {0, 1}. The occasion that the i^{th} highlight coordinate f (I) ϵ {0, 1} are inliers assumed to be free B, so the total number of inliers will be Binomial appeared in the Eq. (4).

$$p(f^{i=1:nf}|m=1) = B(n_i; n_f, p_1)$$

$$p(f^{i=1:nf}|m=0) = B(n_i; n_f, p_0) \qquad (4)$$

Where, p1 probability of feature-points that matches exactly to inliers, and p0 probability a feature-points is an outlier provide a wrong image match. The set of $(i)(1{:}nf)$ feature-match variables $\{f\text{^}((i)) = 1,2,\ldots,nf\}$ is presented $f\text{^}(1{:}n\_f)$. the .nf number of inliers $n\_i = f\text{^}((i))$ and B (.) is the Binomial i=1 distribution n! Like in Eq. (5).

$$B(x;n,p) = p^x(1-p)^{n-x}x!\,(n-x)! \qquad (5)$$

They pick values p1=0.6 and p0=0.1. So now it can assess back likelihood for a picture coordinate is right once between pictures pair shrewd right matches have been built up, it can without much of a stretch discover all-encompassing groupings utilizing associated sets of highlight purposes of pictures. This enables us to recognize various scenes in a lot of pictures, and reject clamor pictures that match to no different pictures.

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RANSAC utilizes the random testing methods that produces the methodology of component estimation to deal with an extent of non-matched is highlighted [9].

The basic algorithm for RANSAC is as follows,

1. Choose minimum no. of feature-points randomly for model's components.
2. Evaluate elected model components.
3. It extracts matched and un-matched between selected components i.e. group of all the points that f1 with a pre-defined parameter E.
4. If no. of inliers portion on total number focuses in providing a set goes higher than the limit T, which is pre-defined, it calculates the model components utilizing all the recognized inliers and end.
5. If needed, then repeat steps from 1-4 for more number of N = 500.

IV. ***Homography-Matrix:*** This is of 3x3 matrix, i.e, joined to pixel called co-ordinates from 2 input-images. Assigned, 1 co-ordinate x(1)= (u1, v1, 1) from 1 pic and x(2)= (u2, v2, 1) from 2 images then these both pixels are assigned with a matrix M. Matrix showed linear-relation, this assigned component lies between image-points from the 2 images. Required matrix format is as below Eq. (6).

$$\begin{bmatrix} u1 \\ v1 \\ 1 \end{bmatrix} = \begin{bmatrix} m1 & m2 & m3 \\ m4 & m5 & m6 \\ m7 & m8 & m9 \end{bmatrix} \begin{bmatrix} u2 \\ v2 \\ 1 \end{bmatrix} \qquad (6)$$

The arrangement of paths in network having s% coordinating component focuses for example inliers, those are basically great coordinating directions or focuses, and check is 8. Presently settle on no. of decision p from set then probability will be 1-(1-8s)p, having 1 set which contains all great coordinated focuses. To assess the homography network, the arrangement of focuses point on CV, which discovers homography. This capacity chooses 6 no. of contentions and need to convey the directions for example highlight purposes of the two pictures in the first and second contention and afterward network in which the homography grid is put away, and afterward RANSAC limit. RANSAC limit is known as the greatest or most elevated good ways from epipolar line for a point to call the focuses as inliers. In the event that they give all the more great matches, at that point include point set the higher probability that RANSAC gives right homography matrix.

V. ***Image Blending:*** Superlatively every pixel from input picture alongside a beam that would have exactly same force in each picture that it crosses, yet in the truth this won't be the situation [6]. Considerably after addition remuneration there is plausibility that some picture edges will even now noticeable because of a not very much organized impacts, for example less force at the edge of the info picture, parallax impacts because of undesirable movement of the optical focus and non-enlistment mistakes because of wrong or non-demonstrating of the camera and outspread mutilation, etc. In light of this a decent mixing technique is significant in Image stitching in Panorama.

IV. EXPERIMENTAL RESULTS

The experimental results of the proposed model has illustrated here. Panorama image-stitching is required for a best panoramic view of stitched images. Mostly, Harris and SIFT methods are utilized for identifying the features. Harris-Corner detector is having good performance than SIFT because it identifies isolated-points.

These separated focuses are sensibly invariant to rotate, different sampling and quantization. Subsequently Harris-Corner Detector picked for this Panorama Stitching. After this RANSAC strategy is utilized to coordinate the precise inliers. This uses to recognize closest match includes the inliers and outliers. Joining Harris and RANSAC, image stitching turns into the amazing and vigorous apparatus to make the Image Panorama.

Figure-2 Figure-3 and Figure-4 shows the final experimental outcomes. Figures (a), (b), (c), (d) and (e) are the input image sequences, and figure (f) shows the final panorama image.

(a) Image-1

(b) Image-2

(c) Image-3

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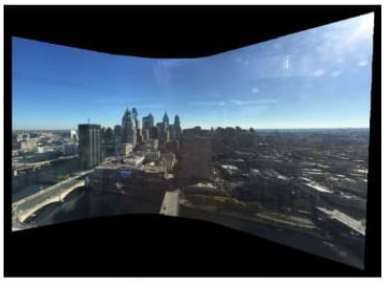
Image-4

(d) Imag-5



(e) Panorama Image-1

Figure.2: Experimental Result 1

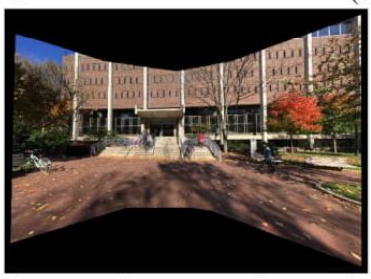
(a) Image-1

(b) Image-2

(c) Image-3

(d) Image-4

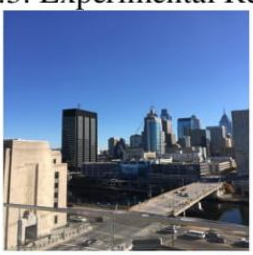
(e) Image-5



(a) Panorama Image-2

Figure.3: Experimental Result 2

(a) Image-1



(b) Image-2

(c) Image-3

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(d) Image-4


(e) Image-5


(f) Panorama Image3

Figure.4: Experimental Result 3

V. CONCLUSION

We depicted model of Multiple Image-Stitching consolidating Harris and RANSAC together which become most useful asset to develop Panorama Images. Our utilization of invariant local abilities in Harris Feature Detection and probabilistic-model in RANSAC to check picture matches gives quick and fine system as contrast with SIFT. This work can enables us to perceive different scenes in un-ordered image-sets and stitched. A multi-band mixing plan guarantees smooth conversion between images in spite of light contrasts, while safeguarding high recurrence details.

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NATURAL LANGUAGE PROCESSING A NEW ACHIEVEMENT IN TECHNOLOGY

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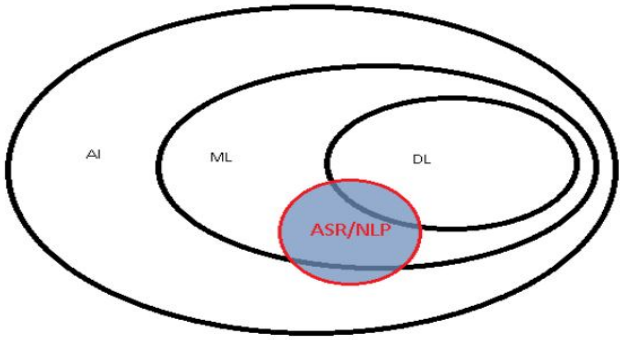
ABSTRACT
The main purpose of this paper is to examine some (potential) applications of Natural Language Processing in our day-to-day life. For the readers who are not familiar with or less known to the world of Natural Language Processing. We hope that this paper will be a useful map for researchers who are going to explore further and deeper connections in Natural Language Processing, although some parts of the map are very rough and other parts are empty, and waiting for the readers to fill in.

Keywords: - Quantum Entanglement, Superposition Principle, Bells Measurement, Bells State

INTRODUCTION
Natural Language Process is understanding the human language. Natural Language Process also shorthand as NLP is a subfield of Artificial Intelligence. As its name implies it is all about processing the natural language that humans use. NLP makes the machine communicate with humans as the way humans communicate with each other using Natural Language. NLP is a way for the device to analyze, understand, and extract meaning from human language. By utilizing NLP, developers can organize and structure knowledge to perform tasks such as automatic summarization, translation, named entity recognition, relationship extraction, sentiment analysis, speech recognition, and topic segmentation. Natural language processing (NLP). NLP draws from many disciplines, including computer science and computational linguistics, in its pursuit to fill the gap between human communication and computer understanding.



HISTORY
The founding idea was to model highly successful psychotherapists. Richard Bandler and John Grinder started this as the basis of NLP around 1972 with modeling Fritz Perls (Gestalt Therapy), Virginia Satir (Systemic Family Therapy) and Milton Erickson (Hypnotherapy). Abraham Maslow already had this founding idea around 1943 when studying “Self-Actualization” and modeling about 60 “Self-Realized” people. The history of natural language processing (NLP) generally started in the 1950s, although work can be found from earlier periods. In 1950, Alan Turing published an article titled "Computing Machinery and Intelligence" which proposed what is now called the Turing test as a criterion of intelligence

During the 1970s, many programmers began to write "conceptual ontologies", which structured real-world information into computer-understandable data. Up to the 1980s, most natural language processing systems were based on complex sets of hand-written rules. Starting in the late 1980s, however, there was a revolution in natural language processing with the introduction of machine learning algorithms for language processing.

In the 2010s, representation learning and deep neural network-style machine learning methods became widespread in natural language processing, due in part to a flurry of results showing that such techniques can achieve state-of-the-art results in many natural language tasks, for example in language modeling, parsing, and many others.

WORKING
NLP has two components one is understanding the natural language and another is to respond using natural language. Formerly called NLU (Natural Language Understanding) and NLG (Natural Language Generation) respectively. NLU takes input and processes the data and generates meaning. After getting meaning machine

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heads to further actions on the basis of generated meaning. Further actions could be any built-in computation or machinery activity or it could be NLG. NLG creates output in natural language. Algorithms and techniques used in NLG follow the natural language rules and make meaningful sentences. Natural language is complex while the machine can't understand anything except 1s(Ones) and Os(Zeros). To make a machine to make the meaning machine need algorithms and techniques along with the database to make meaning of given natural language as input. From taking input to making the meaning out of input, NLP has 5 standard steps.

1. Lexical Analysis
2. Syntactical Analysis
3. Semantical Analysis
4. Discloser Integration
5. Pragmatic Analysis

Lexical Analysis: Lexical is relating to words in the language. lexical analysis is the 1st phase where the sentence is divided as words. It is also called tokenization. Each word in the sentence is the individual tokens. For example - "search restaurants nearby me" here 'search', 'restaurants', 'nearby' and 'me' are 4 tokens.

Syntactical Analysis: this phase does parsing of words and sentences in which grammatically incorrect strings are removed. Such a cleanup helps in building a relationship between the subject and object in a better context. Syntactic analysis is defined as an analysis that tells us the logical meaning of certainly given sentences or parts of those sentences.

Semantical Analysis: Semantic analysis is the process of understanding natural language the way that humans communicate based on meaning and context. It is an extension of syntactic analysis that helps in checking meaningfulness in text.

Disclosure Integration: disclosure integration builds the relationship and meaningfulness between two consecutive sentences.

Pragmatic Analysis: it focuses on taking a structure set of text and figuring out the actual meaning. It actually comes from the field of linguistics where the context is considered from the text.

APPLICATIONS OF NLP

1. Sentiment Analysis

Sentimental analysis is the process where AI identifies the mood of the texts group or paragraphs like facebook post or twitter tweets. Mostly used on the web & social media monitoring, Natural Language Processing is a great tool to analyse the responses to the business messages published on social media platforms. It helps to analyse the attitude and emotional state of the writer. It is implemented through a combination of Natural Language Processing and statistics by assigning values to the text (positive, negative or neutral) and in turn making efforts to identify the underlying mood of the context (happy, sad, angry, annoyed, etc.

This application of NLP helps business organisations gain insights on consumers and do a competitive comparison and make necessary adjustments in business strategies, whenever required. Such data is also useful in designing a better customer experience and enhancing the product. Furthermore, sentiment analysis or emotion exploration is a great way to know about brand perception.

2. Chatbots with NLP

Chatbots are the solution for consumer frustration regarding customer care call assistance. They provide virtual assistance for simple problems of the customer. Intelligent Chatbots are going to offer personalised assistance to the customer in the near future.

Chatbots are an emergent trend which will offer real-time solutions for simple customer service problems. They are gaining a lot of trust and popularity from the consumer as well as engineers. They are useful in providing

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standard solutions to common problems. Chatbots help saving time, human efforts, cost and provide efficient solutions from time to time.

3. NLP in Voice Recognition

Voice recognition requires NLP to make reply accordingly with meaningful output. There are techniques which are powered by Natural Language Processing that allow companies to develop smart voice-driven services. To narrow the communication gap between the machines and humans are the most critical and necessary step to increase the grip on Artificial Intelligence. It can be achieved by only and only Voice Recognition which is possible by Natural Language Understanding a sub-process of Natural Language Processing.

4. NLP and AI

AI is the study, design and creation of intelligent agents. An intelligent agent is a natural or artificial system with perceptual abilities that allows it to act in a given environment to satisfy its desires or successfully achieve the planned objective. Work in AI is generally classified into several sub-disciplines or branches, such as knowledge representation, planning, perception and learning. All these branches are directly related to NLP. This gives the relationship between AI and NLP a very important dimension. Many consider NLP to be a branch of AI while some prefer to consider NLP a more independent discipline. In the field of AI, planning involves finding the steps to follow to achieve a given goal. This is achieved based on a description of the initial states and possible actions. In the case of an NLP system, planning is necessary to perform complex tasks involving several sources of knowledge that must cooperate to achieve the final goal. Knowledge representation is important for an NLP system at two levels. On the one hand, it can provide a framework to represent the linguistic knowledge necessary for the smooth functioning of the whole NLP system, even if the size and the quantity of the declarative pieces of information in the system vary considerably according to the approach chosen. On the other hand, some NLP systems require extralinguistic information to make decisions, especially in ambiguous cases. Therefore, certain NLP systems are paired with ontologies or with knowledge bases in the form of a semantic network, a frame or conceptual graphs.In theory, perception and language seem far from one another, but in reality, this is not the case, especially when we are talking about spoken language where the linguistic message is conveyed by sound waves produced by the vocal folds. Making the connection between perception and voice recognitions.

5. NLP and Data Science

With the availability of more and more digital input data, a new discipline has recently emerged, data science. It involves extracting, quantifying and visualizing knowledge, primarily from textual and spoken data. Since these data are found in natural language in many cases, the role of NLP in the extraction and treatment process is obvious. Currently, given the countless industrial uses for this kind of knowledge, especially within the fields of marketing and decision-making, data science has become extremely important, even since the beginning of the Internet in the 1990s. This shows that NLP is as useful when applied as it is when considered as a research field.

CONCLUSION

NLP is made to makes the job easier but still demands human interference and interactivity. People and the industry unknown of NLP would start a trend of job snatching which is true to a certain sense but it certainly cannot function the way it does without human inputs and impact. The will to work and cater to the loopholes or bugs in a machine is the task of a human who is handling it. Notwithstanding, the advantages of NLP may anger in the field of jobs but right now it is the soldiers in the shining suites of the industry.

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NEED OF HUMAN VALUES FOR THE EMPLOYEES IN THE WORKPLACE

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ABSTRACT
The present paper focuses on the employment ability skills among the students of Engineering and Management.To stay with this present scenario one has to cope with the business abilities. One has to depend on one or the other earnings as it has become hectic to get his or her bread and butter.It is not an easy task to earn bread and butter.For these only being physically strong is not enough, one should have any kind of profession in hand so that the life can be easily led forward.To fit in today's world one has to follow some skills in their workplaces which are very much required.Some abilities are must to have in business field. The abilities and skills that are to be followed in the work premises are called Employability skills.In this paper, we will discuss on the communicative english,one of the employment skills for the students of Engineering and Management.Communicative english plays a vital role in every field of life.These skills are to be taught to the students in their academics, so that it helps to get them good jobs and to retain the job that is already in their hands.The confidence level how they carry themselves along the status should become habitual. To make it habitual one has to practice in their academic learning process.

INTRODUCTION
In this contemporary global arena communication skills plays a key role.There is a lot of demand in work places.There are four important skills which can lead to achieve the key of success.They are-Listening, Speaking , Reading, and Writing. Most of the companies prefer candidates who are good in these skills.The managers of the companies always look for employees who have a manner of appealing in english. The employees should have good written communication.they have to maintain documentation without any grammatical mistakes.They also prefer a person one who has an ability to cope with his colleagues.There are so many other skills that are to be acquired by the employers to generate a positive environment.Let us see one by one the essentials is communication skills in the workplace,which is nothing but employability skills.

ENGLISH COMMUNICATION SKILLS
Every living being tends to communicate using verbal or non verbal cues.Most of the people make mistakes while communicating eachother.Now a days people communicate to explore innovative things implementing new ideas.Still the importance of this skill is not clear in the minds of the illiterate parents what their wards need in future.English language is a borrower, it never stands on its own.Everyday new words are getting added to the dictionary. The person specialized in this field also should upgrade to reach to the particular level.Even in workplace we should follow some concepts.Some highlighted concepts are as follows:

OPEN MINDEDNESS
One should always think positive.The culture of positive communication leads to resolve some misunderstandings among the employees.It also helps to resolve some conflicts by positive approach.One should be ready to accept the feedback and move forward.The open mindedness leads to bring forth the productivity. It also builds a creative mind to think divergently.It strengthens the bondage among each other.Team work always leads to implement innovative ideas to progress.The project work assigned will be completed in the stipulated time given.

CLARITY
While communicating with each other, one should be more conscious about the words they use.Poor communication may lead to misunderstanding.Do not swallow or express the words in low voice.The words used should be simple, so that the person communicating with you should easily grab the message that you want to transmit.Be clear in expressing your thoughts and ideas.Analyse your words whether the word used is proper according to that particular situation.Always pay attention to the words that you choose.Sometimes you have repeat the messages to make your communication clear.

SELF ESTEEM
Give respect to the co-workers and obviously you gain respect.One should know how to handle his/her qualities.The behaviour of a person carries their own personality.Mutual respect leads to good working environment. Today's generation people are highly aggressive and adopt negative way of approach.Being calm makes the work to go on in a very smooth manner.One should lead as a leader,and make others to follow him/her.For that the qualities that we possess should be admired.One should be a role model.Respect comes

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when you have some special good qualities.Showing courtesy,being one among co-workers, irrespective of the Age,caste and creed.Always have a successful approach.

HONESTY

One should be honest to his colleagues.He has to maintain his level and status in his working environment.One has to be honest to exhibit leadership qualities to gain trust among employees.As a leader, trusting employees is required value ,if not the culture of the company may be distructive.If a person is not honest then the whole environment is spoiled and the confidence level of all the employees is lost.Once the trust and confidence is lost, no hopes of being good and will be ignored and will be ill-treated by employees. Even the subordinates does not care, though you are right.Honesty always makes you trustworthy, loyal, faithful, sincere and fair.

RESPECTABLE

The policy of "Give respect and take respect"should be followed in the workplace. Always respect your subordinates so that they get inspired and motivated to work.The productivity of the company depends and increases by team work.The members of the team should stand for each other, shoulder to shoulder by respecting each other.The work environment depends on the efficiency of the employees.The calibre of an employee should be appreciated.The ability, achievements, innovative ideas, quality of work must be valued and rewarded.The work of an employee should be recognized and treated in a good manner.There should not be place for conflicts or misunderstanding among the employees.that can be resolved by loving and respecting one another at workplace. Respectfulness reduces stress of work and makes place for success.There should not be any sort of discrimination among men and women.Each one share their immense knowledge and definitely the trust increases and the company leads towards success.

CONCLUSION

Human values thus play very important role in everyone's life.It lays a good foundation in the field of profession.One should be familiarized with the features of successful professional communication along with human values.Each and every person must be aware of the human values how to get settled in proper position. Every situation has various purposes for which communication is used, it depends totally on the way how one behaves and reacts according to the situation.One should get acquainted with values in an organisation. Professionalism includes human values.

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