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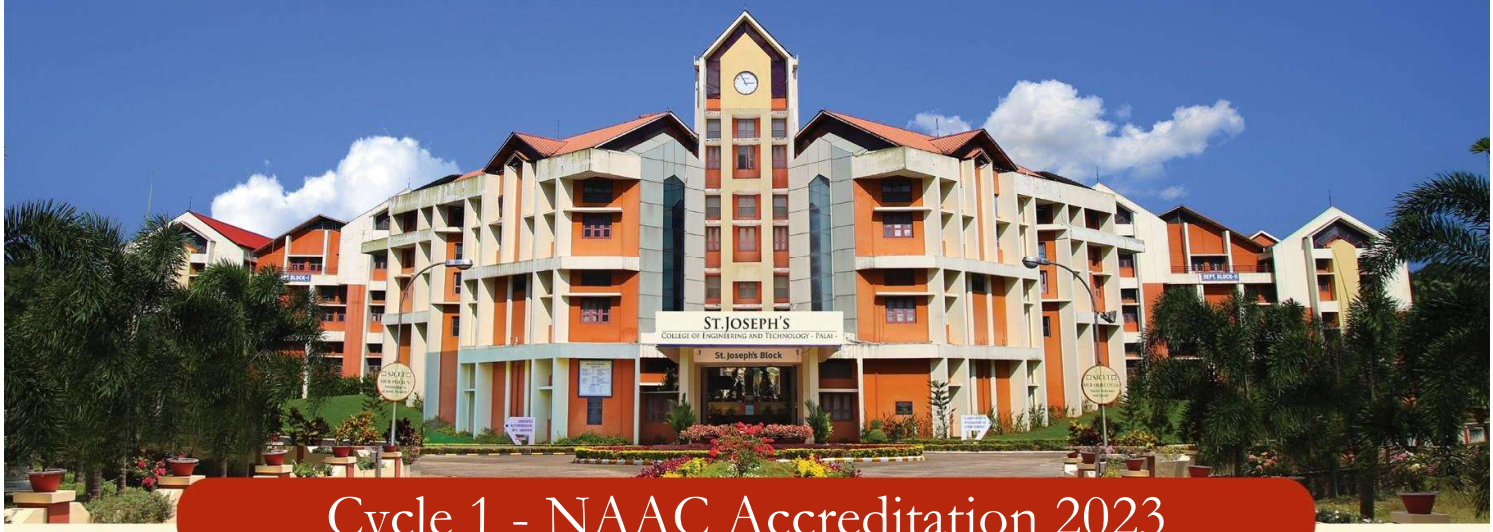

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A Systematic Study on Cyber Attacks on Medical Data

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Abstract: Since users' lives are made easier by new technology and digital opportunities, healthcare is gradually becoming more digital. On the one hand, this offers a great potential, but it also exposes healthcare organizations to a number of risks (both digital and non-digital) that might allow an attacker to compromise the security of medical processes and even the safety of patients. Technical cybersecurity countermeasures are being utilized, particularly in the healthcare sector, to ensure the privacy, accuracy, and accessibility of data and information systems. Digital data breaches in the healthcare industry have been said to cause particularly sensitive harm due to the unauthorized use of private and sensitive information. In the face of such a hazardous threat, medical institutions must evaluate the financial ramifications of a prospective cyber-attack that results in a compromise of patient data. The study's findings demonstrate that estimates of overall digital data breach expenses vary greatly between reports and analyses. The major causes are the use of various estimating methodologies and a lack of full and accurate databases as a result of inadequate disclosure of cyber events. Furthermore, the paper's most crucial conclusion is that there is an urgent need to do study on potential data breaches. This is a review article developed by evaluating numerous research publications on the topic "cyber assault on medical data".

Keywords: Medical data, Health care, Patient data

I.INTRODUCTION

The healthcare industries are going towards digitalization as new technology and digital opportunities can make users' life easier. The usage of electronic health records has greatly enhanced medical procedures as well as patient care, disease diagnosis, and information accessibility. The potential attack surface has grown due to the increased accessibility of healthcare applications and data. The privacy of the data for patients, workers, and facilities could be compromised by a number of security breaches because medical records are a large source of crucial data.

Information security or privacy breaches in the healthcare industry could have a negative impact on patient care and overall health. When a legitimate transaction reads a group of data items and updates additional data items based on the value received, the damage caused by an attacker propagates throughout the database. This will influence how decisions are made. Therefore, the harm must be effectively and swiftly repaired. Financial costs are associated with how cyberattacks on medical data are felt. In order to take steps to lessen the financial effects, medical entities must estimate them.

II.IMPORTANCE OF MEDICAL DATA

Health care professionals can deliver more effective, higher-quality, safer, and more individualized care and care coordination when they have access to a patient's most recent health information. Patients who examine their own health information get knowledge about how their health changes over time. As a result of their enhanced health knowledge and empowerment, the quality of their treatment and their quality of life will both improve, making it easier for them to modify their lifestyle .They will also be able to communicate with their healthcare professionals more successfully .Scientific research using health data can hasten the creation of new medical devices and therapies for those who require them.

Organizations can Determine risk variables to hasten diagnosis, identify disease transmission channels to stop the spread of illnesses and other problems, predict results and make treatments more successful, enhance the effectiveness and security of therapies, make knowledge available, improve public health policy.

Health data can be used by distinct health and care specialists as well as provider organizations to improve the care pathways, boost patient care, obtain information for strategic planning and enhancing organizational quality, make better use of the resources available for healthcare and to become more active in clinical research.

III.HEALTH CARE CYBER ATTACKS

Threats can take the form of incorrect use, loss, unauthorized disclosure, or alteration. Four new subcategories of network security hazards were produced as a result of further specialization: interruption, interception, modification, and fabrication.

The three assault surfaces mentioned by the authors are displayed all around the patient in a concentric circle arrangement. Any holes in a healthcare facility that, if utilized maliciously, could have an instant negative impact on the patient are the principal assault surfaces. The secondary assault surface does not instantly cause harm to the patient, but it may be used to support more harmful attacks. The tertiary attack surface, which also includes financial and administrative systems, inventory systems, electrical infrastructure, etc., might have a substantial impact on the hospital or business as a whole.

In 2021, there were a considerable number of healthcare-related data breaches, with over 40 million patient records compromised in the USA. As a result of the threat of cybercrime to the healthcare sector, the FBI released numerous advisories. In the wake of Russia's invasion of Ukraine, the FBI has released additional warnings on Russian hacks on US healthcare organizations. According to a Protenus investigation on the effects of healthcare-related data breaches, which found that 905 incidents were recorded, over 50 million patient records were compromised last year. This was brought on by a 44% rise in hacking attempts against healthcare organizations. Healthcare-related data breaches affected more than 22.6 million patients in 2021, with the largest revealed breach involving more than 3 million people. In the USA, nearly 600 healthcare security incidents were reported last year. In accordance with the HITECH legislation, the US government publishes a list of all alleged healthcare breaches involving 500 or more

A Systematic Review of Threats in Data Sharing

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Abstract: With the development of technology and the internet, data sharing has become more widespread, but it also comes with a number of risks. First of all, unlawful access to private data can result in data breaches, which can cause a lossof secrecy and privacy. This can be particularly troublesome in fields where the dissemination of private data, like financialor medical records, is widespread. Second, the loss or theft of private or confidential information is another consequence ofdata sharing. This can happen when data is sent to unapproved third-party organisations, when it is kept on unsecured systems, or when it is stored in the cloud. Thirdly, data sharing can lead to the misuse of personal data for illegal activities like fraud or identity theft.

Keywords: Data, Privacy, Sharing

I. INTRODUCTION

Data sharing has become an essential aspect of the modern world, enabling the efficient exchange of information and promoting innovation. However, it also poses several threats to the privacy and security of individuals and organizations. One of the primary threats is the risk of data breaches, which can lead to the exposure of sensitive information to unauthorized parties. Such breaches can result in severe consequences, including identity theft, financial loss, and reputational damage. Another threat is the risk of data misuse, where the shared data is used for purposes other than what it was intended for, such as targeted advertising or surveillance. Additionally, there is the possibility of data theft, where hackers gain unauthorized access to shared data, putting the privacy and security of individuals and organizations at risk. Moreover, data sharing can lead to the creation of data silos, where large organizations and powerful individuals can accumulate a vast amount of data, giving them an unfair advantage over their compe titors. Finally, the lack of transparency and accountability in data sharing practices can also lead to ethical concerns, including the possibility of discrimination and unfair treatment. To mitigate these threats, it is necessary to adopt strict data privacy and security measures, including the use of encryption, access controls, and secure data sharing agreements. Additionally, it is essential to promote transparency and accountability in data sharing practices to ensure that data is used ethically and fairly. By addressing these threats, we can ensure that the benefits of data sharing can be realized while minimizing the risks.

II. THREATS IN DATA SHARING

The first and most significant risk of data sharing is the loss of privacy. Sharing sensitive personal information such as social security numbers, health records, or financial data can lead to identity theft, fraud, and other forms of cybercrime. Additionally, sharing data with third-party service providers can lead to data breaches if adequate security measures are not in place. For instance, in 2019, Capital One bank suffered a data breach in which over 100 million customers' personal information was compromised due to inadequate security measures. Another potential threat is the misuse of data, in which companies may use shared data to target individuals with ads or to manipulate their behavior. Facebook's Cambridge Analytica scandal is an example of this threat, in which the company obtained data from millions of Facebook users without their consent and used it for political campaigning. Finally, there is the risk of data sharing leading to the creation of biased algorithms that perpetuate discriminatory practices. For instance, Amazon's AI recruitment tool was found to discriminate against female candidates due to biased training data. These examples illustrate the potential threats that data sharing can pose, emphasizing the need for effective security measures and ethical standards to ensure the protection of individuals' privacy and prevent abuse of data. There are numerous threats to personal, confidential, and organizational data. One of the most significant threats to personal data is identity theft. Hackers may steal personal information such as social security numbers, credit card numbers, and other sensitive information, which can be used to commit identity theft, fraud, and other forms of cybercrime. Confidential data such as trade secrets, proprietary information, and intellectual property is also at risk. Competitors or hackers may try to steal confidential data to gain a competitive advantage or sell it on the black market. Another threat to organizational data is ransomware attacks, where hackers encrypt data and demand a ransom to restore access. This can lead to significant financial losses and damage to the company's reputation. Phishing attacks, where hackers use social engineering to trick employees into giving away login credentials or other sensitive information, are also a significant threat. Finally, employees themselves can pose a threat to organizational data through accidental or intentional data breaches. Negligent behavior, such as leaving passwords written down or using unsecured Wi-Fi networks, can also pose a risk to personal and organizational data. Overall, these examples illustrate the wide range of threats to personal, confidential, and organizational data and the importance of effective security measures to protect against them.

III. LITERATURE REVIEW

Human factors in information leakage**:** mitigation strategies for information sharing integrity: The paper begins by discussing the human factors that contribute to information leakage, including employee behavior, organizational culture, and external factors. It notes that employees can unintentionally or deliberately leak information, and that organizational culture can either promote or discourage information leakage. Additionally, external factors such as social engineering attacks and malware can also contribute toinformation leakage. The paper then examines various mitigation strategies that organizations can employ to reduce the risk of information leakage. These strategies include employee training and awareness programs, access control, data classification, incident response plans, monitoring and auditing, and organizational culture. The paper provides detailed explanations of each strategy and

Deep Learning to Identify Plant Species

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Abstract: Deep learning is the method that has the ability to develop precise models for recognizing images. Deep learning has shown potential for automating the process of identifying various plant species from images of their leaves, flowers, and fruits. To reduce noise and improve the plant features, the input images undergo pre-processing. The deep learning model is then trained using a sizable labelled dataset of plant images. Once trained, the model can accurately recognize the plant species from new images. While automated plant classification systems typically rely on leaf shape as the main feature for identification, leaves also have other characteristics that can contribute to more precise classification, such as their texture, vein patterns, and color. This technology has the potential to be applied in various fields, such as agriculture, botany, and environmental conservation, to help identify and monitor different plant species in their natural surroundings. However, as with any deep learning application, the quality of the training data and the neural network architecture design are essential factors that can have a significant impact on the system's performance.

Index Terms: Deep learning, Species, Architecture *(key words)*

I. INTRODUCTION (HEADING 1)

Identifying and classifying the vast array of vascular plant species, estimated at 391,000, presents a challenging task for botanists and experts. To address this issue, there is an increasing demand for computerized systems to aid in plant identification and classification. Deep learning has emerged as a promising solution to recognize plant species based on their visual characteristics. Deep learning, which is a subfield of artificial intelligence, is presently a prevalent and widely utilized approach across numerous domains, such as biology, computer vision, medicine, and speech recognition. The advancement of deep learning technology in computer vision has extended its application to plant species identification, with significant implications for biodiversity preservation and natural resource management. Accurate identification of plant species is crucial in plant breeding, conservation, and ecological research. Historically, features were created through manual engineering or crafting. Nevertheless, a recent development in machine learning has shown that learned representations are more efficient and effective. Conventional methods for plant species identification rely on the manual inspection of physical traits like leaves, flowers, and fruits, which can be time-consuming, subjective, and errorprone, especially for large datasets. Deep learning provides an automated and precise alternative to identify plant species by analyzing a large volume of plant images. The topic will cover various deep learning model architectures, such as convolutional neural networks (CNNs), and the techniques used to train and fine-tune these models. It will also address the challenges faced in the application of deep learning to plant species identification, including data labelling, data augmentation, and model architecture selection. The objective is to establish a convolutional neural network (CNN) algorithm that can identify various types of plants and to determine the most effective means to enhance the speed and precision of this system. Deep learning, a contemporary AI methodology, offers a resilient structure for supervised learning that can adeptly map input vectors to output vectors, even in extensive datasets. The deep learning architecture can be categorized into various types, such as Convolutional Neural Network. Unlike conventional machine learning methods, deep learning can extract more detailed information.

II. LITERATURE REVIEW

Deep Learning for Plant Species Classification Using Leaf Vein Morphometric [1]: This study utilized a deep learning approach for the purpose of classifying plant species using data from leaf vein morphometry. To obtain the desired results, leaf images were first pre-processed, and then features were extracted using three distinct CNN models such as D-Leaf, fine-tuned AlexNet and pretrained AlexNet. The features that were obtained were subjected to classification using five different techniques, namely: k-NearestNeighbor (k-NN), CNN, ANN, Support Vector Machine (SVM) and Naïve-Bayes (NB). The testing accuracy of D-Leaf was determined to be 94.88 percent, while the accuracies of AlexNet and fine-tuned AlexNet were 93.26 percent and 95.54 percent, respectively. These findings suggest that D-Leaf may be a successful method for identifying different plant species.

Fine-tuning Deep Convolutional Networks for Plant Recognition [2]: Using a convolutional neural network (CNN), the scientists created a plant recognition system through deep learning techniques. In order to accomplish this, the CNN was pre-trained using a vast dataset with 1.8 million of images, and then a fine-tuning approach was utilized to transfer the acquired recognition abilities to the plant identification task. The CNN architecture included 2 fully-connected and 5 convolutional layers, along with an added prediction layer to derive classification scores. Firstly, a network was trained and fine-tuned using this architecture. Then, after identifying the appropriate validation set parameters, the same system was fine-tuned again using all available images According to the study, fine-tuning was found to be a successful method for transferring recognition skills learned from general domains to the particular task of identifying plants. These findings offer a promising approach for designing automated plant identification systems using deep learning techniques.

Research on Artificial Intelligence: Deep Learning to Identify Plant Species [3]: This research investigates the use of deep learning techniques to identify plant species. The study aims to test whether increasing the learning epochs or extending the learning image amount could improve the ML test speed and recognition accuracy, and determine the best method to improve the convolutional neural network (CNN) in real life. The researchers utilized Pycharm, Tensorflow, Numpy, Keras, and other tools to implement the

Systematic Study of Sentiment Analysis for Customer Reviews

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Abstract: Sentiment analysis, often known as opinion mining, is a technique for natural language processing (NLP) that determines the emotional undertone of a body of text. This is a typical strategy used by businesses to gauge consumer opinion on a certain good, service, or concept. As more people used online consumer reviews to assist them in making decisions, they became more popular. Hence, we may classify customer reviews as either positive or negative using sentiment analysis. This particular paper surveys different research papers that uses Sentiment Analysis.

Index Terms: Sentiment Analysis, Machine Learning, Opinion Mining, Natural Language Processing, Consumer Reviews.

I. INTRODUCTION

Natural Language Processing is utilized in sentiment analysis to ascertain whether an individual's feelings are pleased, negative, or neutral.

It helps to identify the genuine emotion behind the text or interaction. A machine learning tool is sentiment analysis. This analysis helps the business to understand the success and failure of their product and also the needs of the customer. So, by understanding the sentiments of customer the company can develop the product based on customer's needs. Sentiment analysis comes in three types. They are Knowledge-Based, Statistical and Hybrid. In keyword-based sentiment analysis, the text is categorized based on words that indicate emotion. In statistical sentiment analysis, numerous machine learning techniques and deep learning techniques are utilized for classification. Also, Hybrid is a fusion of both knowledge-based and statistical, Hybrid classification provides more accurate results. There is no need for someone to consult ten papers in order to acquire an overview of this topic; they can receive such overview by consulting this paper.

II. LITERATURE REVIEW

Sentiment Analysis of Customer Product Reviews Using Machine Learning [1]: In this four Lakh Mobile Phone Reviews taken from Amazon website is considered as data. Utilizing sentiment analysis, reviews are segregated into favorable and unfavorable categories. The three algorithms used in this paper are SVM, Naive Bayes, and Decision Tree. Naive Bayes accuracy is 66.95, SVM accuracy is 81.77, and Decision Tree accuracy is 74.75. SVM is the most accurate. A Proposed System for Understanding The Consumer Opinion of a Product Using Sentiment Analysis [2]: Reviews from Amazon customers are used as data. Random Forest, SVM, and Logistic Regression are the algorithms used. In contrast to random forest, logistic regression and SVM have a better F1 score of 0.84, making them the best. Twitter Sentiment Analysis Using Ensemble Techniques [3]: Twitter sentiment analysis is the main focus of this study. In order to comprehend how consumers are reacting to the new product, tweets are taken into consideration as data. In this paper, many ensemble techniques are used. Both Random Forest + XGBoost and Random Forest + AdaBoost fall under this category. Random Forest + XG Boost accuracy is 93.2, whereas Random Forest + Ada Boost accuracy is 95.7. The best accuracy is thought to be achieved with Random Forest + Ada Boost. Sentiment Analysis for Customer Reviews Using Hybrid Approach [4]: Both the customer's textual and audio content was taken into consideration for this study. As a result, this hybrid approach's accuracy will be higher because it takes both speech and text into account. This paper uses SVM as its algorithm. Here, the first attempt at speech emotion classification has an accuracy of 57.1. Second, the text emotion classification has been completed with a 76 percent accuracy rate. Next, a hybrid strategy that takes into account both text and audio is used to achieve an accuracy of 90%. Among them, hybrid approach accuracy is thought to be the best. Sentiment Analysis of Customer Feedback and Reviews for Airline Services [5]: The dataset of airline reviews used in this study was obtained from Kaggle. Here, they employed the BERT text classification approaches accompanied by a multitude of machine learning techniques, including AdaBoost, Decision Tree, Logistic Regression, SVM, KNN, and Random Forest. Random Forest has the best accuracy of these machine learning techniques, with an accuracy of 77. Google developed the BERT algorithm, which only requires a small amount of training data. After BERT classification, they obtained an accuracy of 83. The accuracy of BERT classification is found to be the best when they compare the results to the Random Forest. This leads us to the conclusion that for sentiment analysis, BERT architecture is superior to machine learning techniques. Sentiment Analysis of Product Reviews [6]: The intention of this paper is to appraise the comments based on customers. The comments can be positive or negative. The comments will be in sentence format, divided into words, adjectives, and adverbs, and processed using the Parts of Speech system (POST). They created a sample website as a means of gathering data, and from that website they gathered data in the form of feedback. The obtained accuracy will be 90.47. Customer Sentiment Analysis Through Social Media Feedback: A Case Study On Telecommunication Company [7]:

Tweets are used as data in this paper. The tweets are from 15 March to 20 April 2022. The algorithms used are Naïve Bayes, SVM and Random Forest. SVM, Random Forest, and Naïve Bayes have accuracy values of 0.8, 0.6, and 0.7, respectively. The best accuracy comes from SVM. Amazon Product Reviews Using Word2vec [8]: Here, customer ratings and reviews of products on Amazon are taken into account. It uses the Word2vec model. First, reviews are converted into vector representations, and then

Does EV can sustain the Equilibrium of Environment

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Abstract: Electric vehicles have become increasingly popular in recent years as a more environmentally friendly alternative to traditional gasoline-powered vehicles. However, the sustainability of electric vehicles as a solution for reducing emissions and preserving the environment is still a topic of debate. This seminar will present a study on the impact of electric vehicles on the environment and whether they are capable of sustaining environmental equilibrium. The study will examine the lifecycle of electric vehicles, including the extraction of raw materials for batteries, production processes, and end-of-life disposal, and assess the environmental impact of each stage. Additionally, the seminar will explore the potential of electric vehicles to reduce emissions from the transportation sector and their potential to support renewable energy sources. By providing a comprehensive evaluation of the sustainability of electric vehicles, this seminar will contribute to a better understanding of the role they can play in preserving the environment.

Keywords: Sustainability, Environment, Equilibrium, pollution, Renewable energy

I. INTRODUCTION

Electric Vehicles (EVs) have been increasingly hailed as a more sustainable and eco-friendly alternative to traditional gas- powered vehicles. As concerns over pollution and climate change continue to grow, the potential for EVs to sustain the equilibrium of the environment has become an area of intense interest and research. This study aims to explore the impact of EVs on the environment and the role they play in maintaining the equilibrium of our planet.

In this study, we will examine the environmental benefits of EVs, such as reduced carbon emissions, lower air pollution, and increased energy efficiency. We will also explore the challenges facing the widespread adoption of EVs, such as high upfront costs and limited charging infrastructure.

Furthermore, we will investigate the potential for EVs to integrate with renewable energy sources, such as solar and wind power, and how this can contribute to a more sustainable energy system. Ultimately, this study aims to shed light on the potential of EVs to sustain the equilibrium of our environment and pave the way for a greener, cleaner future.

II.STUDY ON DOES EV CAN SUSTAIN THE EQUILIBRIUM OF ENVIRONMENT

The study on whether Electric Vehicles (EVs) can sustain the equilibrium of the environment is an important and timely topic. EVs have the potential to reduce greenhouse gas emissions and improve air quality, but they also have some challenges that need to be addressed.

To assess the impact of EVs on the environment, researchers typically analyze factors such as the life cycle emissions of the vehicle, the source of electricity used to charge the vehicle, and the environmental impact of battery production and disposal.

While the current research indicates that EVs have a lower carbon footprint compared to traditional gasoline-powered vehicles, there are still challenges that need to be addressed to ensure that they can sustain the equilibrium of the environment. For example, the production of EVs requires rare and expensive materials, which can create supply chain challenges and increase the cost of EVs. The limited driving range and lack of charging infrastructure are also issues that need to be addressed.

Overall, the study on whether EVs can sustain the equilibrium of the environment is an important area of research that will help to inform policies and practices related to sustainable transportation. Continued research and development, as well as policy measures and incentives, can help to address the challenges and support the adoption and impact of EVs on the environment.

FEATURES

Here are some key features of Electric Vehicles (EVs) that are relevant to their potential to sustain the equilibrium of the environment:

[1]Zero tailpipe emissions: Unlike traditional gas-powered vehicles, EVs produce no tailpipe emissions, which helps to reduce air pollution and improve air quality in urban areas.

Energy efficiency: EVs are more energy-efficient than gas-powered vehicles, meaning that they can travel further on the same amount of energy.

[2]Regenerative braking: Many EVs have regenerative braking systems that capture energy that is normally lost during braking and convert it into usable energy, increasing overall energy efficiency.

[1] Limited driving range: Most EVs have a limited driving range on a single charge compared to traditional gasoline-powered vehicles. While the range is improving with advances in battery technology, it may still be a barrier for some drivers who need to travel long distances.

[2] Charging infrastructure: The lack of a robust charging infrastructure is another challenge for EVs. While the number of charging stations is increasing, there may be limited charging options in some areas, which could limit the adoption of EVs.

A Survey on Diabetes Prediction Using Machine Learning

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Abstract: Machine learning techniques, which teach computers to learn via experience, are used to analyze large databases. In the field of medical forecasting, ML approaches are currently used to estimate the probability that a patient will contract a disease in the future. One of the medical predictions that makes use of machine learning is in the situation of diabetes. This study's objective is to provide a comparative analysis of 10 papers through an examination of algorithm performance using various metrics.

Index Terms: Diabetes Prediction, Machine Learning (ML), Comparative Analysis

I. INTRODUCTION

Millions of individuals throughout the world struggle with diabetes mellitus, a chronic illness. It is brought on by the body's inability to create enough insulin or utilize it effectively, which leads to elevated blood glucose levels. The practise of training computers to learn from information and predict the future is described as machine learning, a branch of artificial intelligence. Machine learning techniques were utilized to forecast diabetes more and more lately. Type 1, type 2, and gestational diabetes are only a few of the several varieties of the disease. When the body's immune system assaults and kills the cells in the pancreas that make insulin, type 1 diabetes develops. When the body develops an insulin resistance or cannot create enough insulin to fulfil the body's needs, type 2 diabetes results.

II. LITERATURE REVIEW

Detecting diabetes using machine learning techniques and python GUI [1]: This model has been built using the SVM algorithm to forecast a patient's early-stage risk of developing diabetes.The UESD data set is A well-known dataset that is frequently utilised to generate models to forecast the onset of diabetes is the Pima Indians Diabetes dataset. It provides details on several facets of Pima Indian women's health, including their age, BMI, and blood sugar levels, among other aspects..Support Vector Machines are a powerful machine learning algorithm that is commonly utilised for classification tasks.SVMs segregate data into several groupings by locating the optimal hyperplane.It's also impressive that the model has achieved an accuracy of 80.5 . Diabetes prediction using supervised machine learning [2]: This study compares the performance of two popular machine learning algorithms, K-Nearest Neighbor and Naive Bayes, on the task of predicting diabetes utilizing the Pima Indians Diabetes Dataset.It suggests that Naive Bayes was better at correctly predicting cases of diabetes and non-diabetes in the test data. It's is a positive result for Naive Bayes and indicates that it may be a better choice for this particular task. A comparison of machine learning algorithms for diabetes prediction [3]: The effectiveness of several machine learning algorithms on a challenge to predict diabetes is examined in this article.. The authors found that combining logistic regression and support vector machine resulted in good prediction performance, and that a neural network model with two hidden layers achieved an accuracy of 88.6 percent.. A comparative analysis of early stage diabetes prediction using machine learning and deep learning approach [4]: In order to predict early diabetes disease, this paper compared and analyzed several ML and DL methods. Additionally, this model makes use of a diabetes data set with 17 attributes from the UCI repository, and it assesses the model's performance using a range of performance metrics.It is impressive that the XGBoost classifier algorithm achieved an accuracy of approximately 100% in predicting early diabetes disease, while the other algorithms had an accuracy of 90 percent .Classification and prediction of diabetes disease using machine learning paradigm [5]: This study was able to achieve a high accuracy rate in predicting diabetes disease. The use of multiple classifiers like decision tree, NB, adaboost, and random forest can help improve the overall performance of the machine learning system. Additionally, using logistic regression to pinpoint the peril factors for diabetes can provide valuable insights into the disease's underlying causes.The amalgamation of RF-based classifier and LR-based feature selection resulted in an even higher accuracy rate of 94.25 percent. This suggests that the two techniques complement each other well and may be effective in identifying important risk factors for diabetes.Prediction of onset diabetes using machine learning techniques [6]: This study compares several different types of classification algorithms, including SVM, Naive Bayes, and Logistic Regression. Among those Logistic Regression gives an accuracy of 78.01 percent. Analysis and prediction of diabetes mellitus using machine learning algorithm [7]: Proposed system includes four divergent machine learning algorithms: Naive net, Support Vector Machine, Decision Stump, and a proposed Ensemble method (PEM). The system has been tested on the data set, and the outcomes indicate that SVM has the highest accuracy at 88.8%, followed by Bayes Net at 88.54%, Adaboost M1 at 85.68%, and Decision Stump at 83.72%.However, the collaborative model (Ensemble) appears to offer the highest accuracy of 90.36%. This suggests that combining the outputs of multiple models can result in higher overall accuracy than any individual model alone. . Machine learning based diabetes prediction and development of smart web applications [8]: In this framework, numerous data sets are used to train machine learning algorithms such as k-nearest neighbour, decision tree, Naive Bayes, Random Forest, Logistic Regression, Support Vector Machine, and Gradient Boosting. Based on the given accuracy scores, SVM outperforms the other methods as it has the highest accuracy score of 80.26 percent. Random Forest also has a relatively high accuracy score of 80.25 percent, but SVM has a slightly better accuracy score, making it the best-performing model among the given methods.. A novel diabetes health care disease prediction using machine learning techniques [9]: Predictive analysis in the health care industry is examined in this study. This article analyzed the Pima Indian Diabetes Database and employed a variety of machine learning methodologies to anticipate diabetes. The study found that K Nearest

Survey Of Neuromorphic Computing and Neural Networks in Hardware

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Abstract: A biologically inspired method of computing known as "neuromorphic computing" promises to give computers the capacity to learn and adapt in a manner similar to the human brain. With the help of highly connected synthetic neurons and synapses, this technology has the ability to solve difficult machine learning issues and model neuroscientific theories. These systems were developed to address the limitations of traditional von Neumann computers, which rely on sequential processing and are inappropriate for tasks requiring parallelism, low power consumption, and real-time computing. In recent years, the field has made great progress with the emergence of various hardware platforms that use spiking neural networks (SNNs) to perform complex computations. The goal of the field of neuromorphic computing is to create machines that function similarly to the human brain.

Index Terms: Neuromorphic computing, machine learning, neurons, human brain, spiking neural networks, materials science *(key words)*

I. INTRODUCTION (HEADING 1)

Neuromorphic computing is a new computing paradigm that mimics the structure and function of the human brain. In 1980's the term "neuromorphic engineering" was first used by Carver Mead. Who has dedicated more than 40 years to creating analysis systems that imitate the senses and thought processes of the human body, including hearing, seeing, touching, and thinking. A branch of neuromorphic engineering known as 'neuromorphic computing' focuses on the "processing" and "thinking" aspects of th human-like structure. Neuromorphic computing is the method of computer engineering that models both the hardware and software after the nervous system and human brain. The goal of topic is to give computer systems the power of the human brain. These system can carry out the difficult work more easily than the convolutional computing systems because they mimics the structure and operation of the human brain. Then the attendees will learn about the latest developments in neuromorphic hardware , including new chips and processors designed specifically for the neural networks. And the aim is to create more efficient, versatile and scalable for computing system and also it creates bio-inspired computer systems and hardware. Artificial intelligence (AI) is a term for the development of intelligent computers that are capable of carrying out tasks that typically call for human-like intelligence. The structure and operation of the human brain are mimicked in neural networks, a particular type of AI that is useful for tasks like image identification and natural language processing. Neurons are considered the fundamental units of the brain by neuroscientists.

Then by the study of papers which shows the importance of neuromorphic computing in neuroscience, AI, and robotics. In these papers, different aspects of neuromorphic computing, such as unsupervised feature learning, binary tasks, and hardware platforms, are discussed. The performance and uses of neuromorphic computing should be improved and enhanced, according to the authors, who suggest more study and development in the area. Neural network hardware and neuromorphic computing are fields that are quickly developing and have a wide range of possible applications. These systems offer many benefits over conventional computer systems, including low-power devices, real-time computation, and scalability. The continuing advancement of this technology has the potential to transform computing and result in fresh discoveries across a variety of sectors. Overall, these works advance our awareness of and use of neuromorphic computing across a variety of fields and areas.

II. LITERATURE REVIEW

[3]An STDP-based unsupervised feature learning approach for Convolutional SNN-based neuromorphic computing is presented in a study by Srinivasan, Panda, and Roy in 2018. The technique minimizes the number of storage needed while achieving accurate feature learning with less training patterns. Convolutional SNNs present a promising way to mimic the effective processing capacity of the brain.

[4]James S. Plank, Catherine D. Schuman, and Christopher Dean present networks for 24 different binary operation and encoding implementations in their paper "Spiking Neuromorphic Networks for Binary Tasks", 2021. These networks can serve as the building

[1] The Human Brain Project uses neuromorphic computing (2013) to provide feedback on neural models through two different computing paradigms, making it an essential instrument in neuroscience. The Human Brain Project aims to understand the brain's neural network and develop neuromorphic computing systems by shifting from current computing models to techniques that exploit the random behavior of low-power computing devices embedded in recursive architectures.

[2] "Neuromorphic computing refers to brain-inspired computers, devices, and models that contrast the traditional computer architecture. The technology aims to create a brain-like ability to learn and adapt, but requires significant advances in neuroscience models, materials, engineering, programming, and applications. A comprehensive survey of the field, including its history and motivations, has been conducted by Catherine D. Schuman et al. in their preprint at 2017. The goal of their work is to review the field and highlight areas for future research."

A Study on Current Trends in Deep Learning for Autonomous Driving

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Abstract: Recent developments in autonomous driving technology have been largely driven by deep learning. Deep neural networks are now the preferred approach for tackling challenging problems in autonomous driving, such as vision, control, and decision-making, thanks to the quick rise in processing power and the accessibility of vast amounts of data. The creation of end-to-end deep learning frameworks, which allow the optimization of the complete system in a single training procedure, is one of the very latest trends in deep learning for autonomous driving. The systems' accuracy and robustness have increased as a result. The adoption of reinforcement learning methods, which enable autonomous cars to learn from their own mistakes and improve their decision-making over time, is another development. The use of generative adversarial networks (GANs) for various autonomous driving tasks, such as picture synthesis and domain adaption, has also seen a substantial growth in research. Powerful generative models known as GANs can be trained to produce new data that closely matches existing data. In general, deep learning continues to be essential to the creation of autonomous vehicle systems. It is anticipated that deep learning will continue to drive innovation in this field and result in more advanced and secure autonomous driving systems in the future as more data becomes available and computing power increases. *(Abstract)*

Index Terms: Deep learning, GAN, reinforcement, perception.

I. INTRODUCTION

Artificial neural networks are used in deep learning, a sort of machine learning, to learn from huge and complicated data sets and predict the future. Deep learning algorithms are used to assess sensor data from cameras, lidars, and radars in the context of autonomous driving in order to comprehend the environment and make choices regarding driving behavior.

The development of autonomous driving systems has relied heavily on deep learning technology, which enables cars to understand their surroundings and respond to shifting road conditions instantly. AI has made it possible for automobiles to recognize and categorize many objects, including pedestrians, other automobiles, and traffic signs, and to make decisions regarding how to drive, brake, and accelerate. Convolutional Neural Networks are one of the most widely utilized deep learning architectures in autonomous vehicle technology (CNN). CNNs have been utilized to analyze camera and lidar data in autonomous driving applications since they are made to identify patterns in picture data. Radar sensor data and other types of sensor data have both been processed using recurrent neural networks (RNNs).

The idea of self-driving cars, or autonomous driving, has been under study for many years. Engineers who created radio-controlled cars that could follow a wire buried in the road made the initial attempts to produce selfdriving cars in the 1920s. Researchers started creating electronic systems for steering and accelerating vehicles in the 1950s. The first prototypes of autonomous vehicles, which employed computer vision and other sensors to navigate and avoid obstacles, were created in the 1980s. Commercial uses for autonomous driving technologies were created in the 1990s, including robotic warehouse vehicles and automated farming equipment. In the 2010s, major automakers and tech firms started making significant investments in autonomous driving technologies. Although completely driverless vehicles won't be widely available for several years, autonomous vehicles are continuously being developed and tested. The advancement of autonomous driving technology has generally been gradual, starting with early experiments and prototypes and ending with the current emphasis on commercialization and implementation.

The advantages of autonomous driving technology and the need for its development have been the subject of numerous studies. Self-driving cars have the potential to cut highway deaths brought on by human error by up to 94%, according to a 2017 research by the National Highway Traffic Safety Administration (NHTSA). According to the study, the widespread use of driverless vehicles might prevent the loss of more than 30,000 lives annually in the United States alone. According to a different McKinsey & Company analysis, the annual economic advantages of autonomous driving technology might range from $1.1 to $1.9 trillion worldwide. These advantages include decreased fuel use, enhanced traffic flow, and increased productivity as a result of shorter travel distances. Another factor boosting the demand for autonomous driving technology is demographic shifts. As the world's population ages, there will be more people with physical and mental impairments, making driving more difficult for them. For these people, autonomous driving technologies can boost their independence and mobility. In conclusion, research has shown that autonomous driving technology has the potential to drastically lower traffic deaths brought on by human error, produce substantial economic benefits, and expand mobility for individuals who are unable to drive. These results show that this breakthrough technology need more research and funding.

II. LITERATURE REVIEW

Self-Driving Car using Deep Learning Technique [1]: The primary goal of this study is to clone drives for enhanced efficiency of the autonomous vehicle considering autonomous lateral motion is the toughest obstacle for a self-driving automobile. Which we are doing utilizing deep learning and multilayer neural networks. We'll concentrate on getting autonomous vehicles to drive in simulated environments. Pre-processing the image from the in-car camera used in the simulator simulates the driver's vision,

A Review on Relation between Environmental Performance with Firm Performance and Its Various Impacts

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ABSTRACT

In the current era of green-consciousness, improving environmental performance has been recognized as a useful tool to assist firms in incorporating performance and competitive advantage (Chiou et al., 2011). The eco- centric theory proposes that corporations should not limit their objectives to maximise profits, revenues, or competitiveness. Instead, corporations or companies with proactive orientation strategies have improvedenvironmental performance.The betterment will appear by using environmental performanceindicators which extend the goals to address the activities and their impacts on the environment (Shrivastava, 1995b). These issues affect all levels of a company's operations (Buzzelli,1991). United Nations (1997) considered environmental performance indicators as an information tool that summarises data on complex environmental issues that show the overall statusandtrendsofthose issuesthatcanbe accessed.The present conceptual paper focused on environmental performance, its various indicators, relation between environmental performance and firm performance with various impacts.

Keywords: Environmental Management, EnvironmentalPerformance, Environmental PerformanceIndicators Firm Performance.

1. Introduction

Since companies vary in their operations comparing companies from different industries might not be appropriate. However, when comparing companies' sample groups, it is essential to confirm that the firms are comparable and that there is data available.The choice and use of environmental indicators by companies dependon the type of firms, their sector, size, proximity to environmentally sensitive consumer markets, the time horizon involved, the organisations' corporate culture and degree of external environmental regulation. The core theoretical underpinning of ecological modernisation theory is that green management serves as an innovative mechanism

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Experimental investigation of thermal stratification in cryogenic tank subjected to multi-species bubbling

Sutheesh Puthettu Muraleedharan, Jeswin Joseph, Alex Chollackal, Jophy Peter & Deepak K. Agarwal

Journal of Thermal Analysis and Calorimetry **148**, 2949–2959 (2023)

Abstract

Liquid oxygen and liquid hydrogen are used as oxidizer and fuel, respectively, in cryogenic stage of a typical heavy lift launch vehicle. In order to ensure optimum propellant loading and suppress cavitation in the pump, the propellants have to be stored at subcooled condition and this is achieved by increasing the ullage pressure above the saturation pressure. Also, due to low temperature of cryogenic propellants, significant amount of heat penetrates into the system. These factors contribute to the development of thermal stratification, wherein low-density liquid propellant, driven by buoyancy effects, gets accumulated at the vapor–liquid interface. The thickness of this stratum of liquid increases with time

and plays a vital role in mass budgeting of propellants. Multi-species bubbling is one of the destratification techniques used in flight missions. Quantification of stratified mass in cryogenic stage and the estimation of time for destratification at different flow rate of bubbling gas are essential for the optimum loading of bubbling gas. In the present work, experimental studies were conducted with water-GN2 and liquid nitrogen (LN2)-GHe combination to investigate the development and destruction of thermal stratification of liquid in a sub-scale cylindrical tank of 90 L capacity. Tests with water at 305 K were conducted in open tank and heated using an external source. Tests with LN2 at 77 K, 2.8 bar was carried out using enclosed tank. Development of stratified mass was quantified in both cases based on stratified temperature limit, 311 K and 83 K, for water and LN2, respectively, using closely spaced *T* type thermocouples. Subsequently, destratification was carried out using gaseous nitrogen (GN2) and gaseous helium (GHe) for water and LN2, respectively. Experiments were conducted for bubbling flow rates in the range of 0.1–0.4 g s^{-1}. The time required for destratification was found to decrease significantly with increase in bubbling rate. 66.6% difference in destratification time is observed between bubbling gas flow rate of 0.1 and 0.4 g s^{-1}. The results obtained in the study can be used in the design and payload estimation of actual propellant tanks.

Abbreviations

GN2: Gaseous nitrogen

GHe: Gaseous helium

LN2: Liquid nitrogen

DM: De-mineralized

LOX: Liquid oxygen

LH2: Liquid hydrogen

LV: Liquid–Vapor

PRV: Pressure Relief Valve

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Review

An overview on state-of-the-art electrocardiogram signal processing methods: Traditional to AI-based approaches

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Highlights

- Presented an extensive overview on different stages of electrocardiogram analysis.
- Summarized the most notable developments of smart health monitoring systems.
- Discussed the latest hardware implementations of real-time ECG monitoring systems.
- Identified challenges and limitations for various automatic ECG diagnosis systems.
- Outlines the future vision of next generation ECG monitoring systems for healthcare.

Abstract

Over the last decade, cardiovascular diseases (CVD's) are the leading cause of death globally. Early prediction of CVD's can help in reducing the complications of high-risk patients. The electrocardiogram (ECG) is an efficient aiding tool, provides accurate information about various cardiac conditions of the human heart. Evaluation and interpretation of ECG signal has become the major goal in current research to identify and mitigate risky cardiovascular conditions. The ECG signal is efficiently analysed and classified using signal processing techniques, ranging from traditional to machine learning approaches and its subbranches, such as deep learning are used for the early detection and diagnosis of cardiac conditions and arrhythmias. The development of novel types of body sensors increases the need for automated, low-cost, real-time,

Zn- *trans*-1,2-diaminocyclohexane Complex for the Synthesis of Substituted Diaryl Acetylenes and Benzofuran

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Abstract:

The cross-coupling reactions *via* transition metal catalysis represent one of the most important protocol for C-C bond formation. An efficient strategy for C(sp^2)–C(sp) cross-coupling reaction using Zn-TDCH is explored. Here the coupling reaction progress by an *in situ* formed Et_2Zn–TDCH complex in 1,4-dioxane at 125°C using K_3PO_4 as base.

Keywords: *C-C coupling, Sonogashira coupling, Zinc catalysis, diaryl acetylene*

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Introduction

The conjugated carbon skeletons and their derivatives constitute one of the vital reactive intermediates in organic chemistry [1]. One important method for the construction of conjugated frameworks is the transition metal catalyzed cross-coupling reactions. It has wide applications in the synthesis of natural products, heterocycles, polymers, dyes, pharmaceuticals, sensors, electronics guest-host systems, and electroopticals [2]. Due to the great significance of acetylenic moieties, copious tactics have been developed, and still modifications are done for their synthesis. Among the diverse approaches, the Sonogashira type cross-coupling reactions of aryl halides with terminal acetylenes are the highly admired one [3].

The traditional Sonogashira reactions are mostly carried out with palladium (0) catalyst and copper (I) co-catalyst in suitable organic solvents in the presence of appropriate base and ligand, the use of ligands actually helps to generate the *in situ* formation of the reactive catalytic complex required for the reaction [4]. But the reduction during the homocoupling of alkynes is the most exigent crisis faced by Sonogashira reactions. Even though a number of such challenges exist, abundant mutations have been introduced in Sonogashira-type cross-coupling reactions for the last few years [5]. Among these, the Sonogashira-type cross-coupling reaction under palladium-free conditions [6] and the same under copper-free conditions [7] emerged as the two promising protocols. There were some organometallic reagents that also served as effective catalytic species for this type of reactions. In continuation of our persistent interest in developing potent Zn-catalytic complexes for cross-coupling reactions, we recently published a successful strategy for the zinc-DMEDA catalyzed protocol for the Sonogashira-type cross-coupling reaction [8]. Herein we wish to explore the catalytic ability of Et_2Zn with other ligands systems for similar reactions.

Materials and Methods

In continuation of our last study based on zinc-DMEDA catalytic system for Sonogashira type cross-coupling reactions [9], we anticipated that zinc with other ligands can also effectively catalyze the same cross-coupling reactions. In this perspective, we tried diethyl zinc in the presence of L-proline **La** and other generally accessible ligands **Lb-Le** for testing. We commenced our studies on zinc-catalyzed Sonogashira type reaction using phenyl-acetylene and 4-iodoacetophenone as reactants under a variety of catalytic conditions. The reactions were conducted in a dried sealed tube

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Effect of double-side welding on the microstructural characteristics and mechanical performance of dissimilar AA6061-AA5052 aluminium alloys

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Abstract

In this study, cold metal transfer (CMT) based double-side welding process was employed to weld AA5052-H32 and AA6061-T6 plates having a thickness of 6mm. The microstructure and mechanical integrity of the weldment was examined systematically. Symmetric and defect free joint with full penetration was achieved. The multiple heating and cooling cycles during CMT welding did not affect the weldment while the

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Abstract

Weld overlaying is a promising and economical solution for repairing stainless steel structures. The present work deals with the deposition of ER-308L weld overlays on AISI 321 plate with Robotic gas metal arc welding setup. Microstructural examination depicts the presence of dendritic structures (equiaxed and columnar) and ferritic stringers. Energy-dispersive X-ray analysis confirmed the absence of precipitates and phases susceptible to corrosion in the as-deposited weld overlays. Specimens from ER-308L (weld overlay) and ER-308L&321-SS (interface) regions were subjected to electrochemical analysis using the Potentiodynamic polarization and double-loop electrochemical potentiokinetic reactivation measurements. Both overlay and interface sections exhibited comparable corrosion rate – 3.30 and 3.62 mils penetration per year, respectively with different passivation behaviour. The improved passivation behaviour of the ER-308L weld overlay authenticates the presence of δ-ferrite stringers. Double-loop electrochemical potentiokinetic reactivation tests highlighted the absence of sensitization on both weld overlay and interface specimens. This study presents the initial assessment results for repairing structural steel components subjected to corrosion damage.

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A STUDY ON BRAND AWARENESS AND INVESTOR PERCEPTION ABOUT VARIOUS FINANCIAL PRODUCTS: WITH REFERENCE TO HEDGE WEALTH MANAGEMENT SERVICES, KOCHI

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***Abstract*:** The stock market and financial products are gaining more popularity today and more and more people are considering them as an option to invest their money. This trend can be attributed to various factors like high returns, ease of use, etc. But still, various misconceptions about the stock market and stories about losing money still prevent the general public from entering the stock market. But as the knowledge and awareness of people are growing more people are getting involved with the stock market. And it is being considered an investment option by many. The project's main objective is to understand the perception of customers regarding various financial products with reference to Hedge wealth management services in Kochi. It makes an effort to provide a view of the perception customers have of the brand as well as financial products. This would help stock brokers in answering the queries of customers and put clients at ease. From a sample of hundred customers of Hedge, responses were collected through questionnaires and information gained by interacting with stock brokers of the firm. The Chi-square test and frequency analysis are used in the project to test the hypothesis and make inferences respectively. Through the project, we conclude that customers have a base knowledge of the stock market and the gender and education level of customers is also directly related to brand awareness.

Keywords: *Brand awareness, customer perception*

1. INTRODUCTION

Liberalization and deregulation of the financial industry have created several chances for expansion for financial service providers, while also giving investors more lucrative ways to invest their money in a wider variety of goods. The availability of complex information at an ever-increasing speed thanks to communication technologies like Internet services, mobile banking, online trading, etc. has altered investors' behaviour about their financial investments. Indians' ability to invest has also increased as a result of better earning potential and rising household income. Therefore, new sets of products, services, and business processes must be developed by financial service providers like broking firms. Additionally, the effectiveness of service delivery to several products on a personalized basis is the primary differentiating feature in the provision of financial services. This includes individualised advice and solutions to problems related to the investments and financial planning concerns of certain investors. While customers typically have a long-term connection with the brokerage firm, the stock brokerage sector places a strong emphasis on the value of the client. Clients repeatedly send trading instructions to a brokerage whenever they come across promising investment opportunities, which is why. Therefore, it is quite important to comprehend customer service and gauge consumer satisfaction in an environment where brand loyalty is declining. Customer retention and customer satisfaction are undoubtedly closely related. The success of a product or service in the market will be determined by how customers perceive the service and the quality of the product. One of the most reliable indicators of long-term customer retention is still customer satisfaction. Every business enterprise must make sure that its clients are satisfied in the current competitive atmosphere. One poll revealed that acquiring new customers is five times more expensive than keeping the ones you already have. Therefore, regardless of the industry or size of the business in which a firm is operating, it is very vital to supply

INCLUSIVE INNOVATION: FRAMEWORK TO UNDERSTAND INTENTION TO USE UNIFIED PAYMENT INTERFACE AMONG LOW INCOME CONSUMERS IN INDIA

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Abstract
The paper aims to identify the factors that lead to adoption of UPI among low income consumers. A total of 450 questionnaires were distributed to consumers having monthly household income below INR 20000 and have used UPI at least once to make a financial transaction. The study revealed significant positive effect of performance expectancy, effort expectancy and facilitating conditions on intention to use UPI. Perceived risk is found to have a significant negative effect on intention to use while social influence does not have significant impact among low income consumers. The respondents represent a small group of the Indian population. A large and varied sample could produce different findings. A longitudinal study would allow us to verify the robustness of the established relationships. This is the first study that analysed intention to adopt UPI among low income consumers. From a practical point of view, this study provides empirical evidence on key dimensions to be considered by application developers, designers and marketers of UPI apps. The research contributes to the academic community of knowledge by investigating UPI adoption for low income consumers by extending Unified Theory of Acceptance and Use of Technology with perceived risk.
Key Words : Unified Payment Interface, Performance Expectancy, Effort Expectancy, Social Influence, facilitating conditions, Perceived Risk

1.Introduction

Digital payments in India have seen extraordinary growth rate driven by multiple factors such as new and innovative payment products, increasing smartphone adoption, growing need for faster payment modes, and strong push from Government and regulators towards adoption of digital channels. Mobile phones have become an essential product for daily activities, with a high proliferation of mobile phone subscription. According to ICEA report on "Contribution of Smart Phones to Digital Governance in India", there were 500 million smartphone users in India at the end of 2019 and is expected to rise to 820 million by 2022.The report states that India records the highest monthly data consumption in the world with 9.8GB in 2018 and is expected to double to 18GB by 2024. Unified Payment Interface (UPI), an innovative initiative of Government of India, was launched in 2016 with a view to provide a platform for digitalization of payment services for everyone in the country (Rastogi, Panse, Sharma, & Bhimavarapu, 2021). This mobile centric, real time, interbank payment system has the potential to transform the digital payments in India (Gochhwal, 2017). According to PWC report (2020), the compounded annual growth rate of UPI is 414% from 2016-2020 and has become the most preferred payment product in terms of volume. UPI can be a case study for both developing and developed countries to enable universal, low cost digital payment system.

The Covid 19 pandemic has resulted in accelerated shift towards digitization of financial services. The unprecedented concern of people on Covid 19 pandemic has increased the usage of contactless payments like UPI (C.C & Prathap, 2020). However, there is risk of further widening the divide between those already capable of accessing digital financial services and those who might not be able to such as rural people, women, the ultra-poor, migrants and refugees, indigenous people, the elderly, and the scarcely literate people. The Bottom of the Pyramid (BoP) is a socio-economic concept that classifies the world's four billion poorest citizens as a large but under-served market blocked by challenging barriers that prevent them from realizing their human potential for their own benefit, those of their families, and that of society's at large. McKinsey Report on The Rise of India's Consumer Market defines BoP as people living with an annual household income of less than INR 200000 per

Open Access Article

Multi-Response Optimization during the High-Speed Drilling of Composite Laminate Using the Grey Entropy Fuzzy Method (GEF)

by

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An overview on the parachute recovery systems with additive manufacturing for UAV safe landing

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Abstract

Unmanned Air Vehicles (UAV's) also known as drones have a wide range of applications in different fields like agriculture, industries, surveying and military applications. Since the number of UAV's and their applications are booming, their safety is becoming a serious concern nowadays. Damages of drones could cost the loss of the robot and information. Hence the safe landing of drones and development of recovery systems are points of discussion over past years. There are different methods and techniques used for UAV recovery like Parachute recovery system, AI based obstacle avoidance, vision based safe landing etc. Out of all, the most effective method is the simple parachute. This study aims to provide a review on Parachute Recovery Systems (PRS) used for UAV recovery.

Introduction

Unmanned Ariel Vehicles (UAV), also known as drones are aircrafts piloted using on board computers or remote controllers. Drones are used for multiple purposes from using as a toy to military applications. They can be used for surveying, remote sensing, agriculture applications etc. UAV's are prone to accidents compared with piloted aircrafts. During the fight, the drones may face internal (e.g., an electrical circuit failure, broken connection, or mechanical damage) and external (interference of an external obstacle such as birds or hostile force). These problems can make drones become unmanageable, fall down, and land on hard surface and damage not only the drone and its carrying equipment, but also people and properties below which may cause financial loss along with the damage to data and equipment. The parachute recovery system should be able to provide a safe landing during emergency situations and could be a standardized solution for landing despite the weather and geographical conditions [5]. Since the large use of UAVs near human population areas have safety issues, many governments prohibit flying drones directly over humans and as a result many organisations started to develop emergency landing and recovery systems using parachutes (see Fig. 1).

A parachute recovery system (PRS) is a technique used for the aircrafts safe landing which depends on the deployment of a parachute to aerodynamically slow down the aircraft[2]. It is important for the rescue system to have the ability to safely recover the UAVs in the failure of the flight operation or during autopilot integration. This work is determined to know whether a PRS can safely recover a small UAV within a proper altitude[1]and to study different parachute deployment systems that are available. Since many drones operate at low heights it is obscure if a parachute can open fast enough to save the aircraft. PRSs are not a new perception, and there has been crucial research take up

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Review article

Phase change material based thermal management of lithium ion batteries: A review on thermal performance of various thermal conductivity enhancers

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Abstract

World is slowly moving away from the conventional energy sources to renewable and sustainable energy alternatives. Introduction of electric vehicles in the market is a step in the right direction for the forward march towards energy security and reduction of carbon footprint. Lithium ion (Li-ion) batteries are popular for the use in electric vehicles, because of their high energy density, long cycle life and so on. The cell temperature has a significant impact on the reliability, safety and lifespan of these batteries, making thermal assessment of battery inevitable for its use in various applications. Phase change material (PCM) based thermal management is highly promising in this regard. Overcoming the low thermal conductivity of these materials is the key challenge in the development of a PCM-based battery thermal management system (BTMS). Apart from focussing on various aspects of Li-ion battery and PCM, the main thrust of this review paper is on providing necessary details of various thermal conductivity enhancing techniques used in tandem with PCMs. The thermal conductivity enhancers discussed are: metal fins, metal foams, metal mesh, carbon fibre, carbon nanotubes, graphene and expanded graphite. Machine learning techniques employed for multi - scale modelling of PCM based Li-ion battery thermal management were also discussed. This review mainly focusses on the literature published in the last five years in order to provide new insights to the development of Li-ion battery thermal management using various PCM-thermal conductivity enhancer combinations. Finally, conclusions are drawn and recommendations are presented to highlight the research gap in this area.

Introduction

The global demand for fossil fuels is ever increasing due to the growing levels of economic progress and the increase in vehicular traffic associated with it. Around 80% worldwide energy utilization is fuelled by fossil fuels [1]. There are growing concerns word over about the depleting levels of traditional energy sources. The emissions and the consequent irreversible environmental damages due to the burning of fossil fuels necessitated the searches for cleaner and renewable sources of energy. For more than a century, IC engines are powering a plethora of transport vehicles, on land, water and in the sky as well.

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Implementation of an origami inspired gripper robot for picking objects of variable geometry

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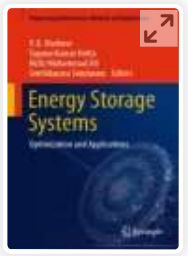
Abstract

An origami-based reconfigurable gripper soft robot, capable of replacing the current grippers in the market for pick and place application of fragile objects was designed, fabricated and tested. The device is made by integrating a six-crease water-bomb origami pattern gripper on the robotic arm. The origami inspired gripper robot is based on origami silicone rubber skeleton which is enclosed in latex skin with grasping motion obtained through a negative pressure. The primary aim of the gripper is to grasp objects of different sizes, shapes, geometry and loads without damaging the object. Current grippers are not capable of handling objects properly because of the irregularities in textures and uneven shapes. Origami based robots require lesser degrees of freedom and movement than traditional robots to achieve the gripping. Gripper's adaptability to handle objects of different shapes and sizes brings high flexibility to manipulation. Designing soft grippers with substantial grasping strength while remaining compliant and gentle is one of the most important challenges in this field. The present work describes the design and fabrication of the gripper, integration of robotic arm and testing of the gripper robot for diverse applications.

Introduction

Rigid joints and links are an inevitable part of traditional robotic grippers. Gripper designs range from two-fingered grippers to anthropomorphic hands with articulated fingers and palms. To achieve speed, flexibility and capability to handle fragile objects, the present form of grippers needs further modifications. In order to design simple and lighter universal grippers, many studies are carried out on advanced materials and soft components. Generation of shock is often an issue and it can damage the object in case of conventional grippers. A representation of conventional gripper is given in Fig. 1. In order to pick and place a wide variety of materials with various size and shape without any damage to even very fragile materials, an origami-inspired soft robot is of great potential. The origami-inspired soft robot can be modified with high precision and speed robots that can be used in industrial sorting facilities.

The term “origami“ has been associated primarily with the art of folding paper. The term origami has the Japanese roots, “ori” meaning “folded“, and “kami” meaning “paper“. The traditional water bomb origami, produced from a pattern consisting of a series of vertices where six creases meet, is one of the most widely used origami patterns. From a rigid origami viewpoint, it generally has multiple degrees of freedom, but when the pattern is folded symmetrically, the mobility reduces to one. Fig. 2 represents an origami flying dove and Fig. 3 represent an origami bird.



Energy Storage Systems pp 115–133

A Review on Phase Change Material–metal Foam Combinations for Li-Ion Battery Thermal Management Systems

S. Babu Sanker & Rajesh Baby

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Abstract

The development of Lithium-ion (Li-ion) batteries has led to progress in the electronics, automobile and space applications sectors. At present lithium-ion battery is an essential part of Electric Vehicles (EVs) because of its inherent advantages such as high specific power, long battery life, low auto discharge rate, no memory effect and high nominal voltage. Most of the batteries generate large amount of heat during discharge phase and the operational

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Wireless Control of Swarm Robotics for Industrial Automation

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Abstract

In the modern world, robots and robotic technologies are engaged extensively in industrial automation. The performance of the collaborative robots has resulted in utilizing them as primary forces in industries. In this paper, we propose the concept of swarm robotics to address the drawbacks of industrial automation. Wireless communication established in the robots and the control systems enabling automation. Swarm robotics is a technology where multiple robots together solve issues by developing advantageous structures and behaviors replicating nature like swarms of bees, fish or birds. Wireless technologies (4G, 5G and Wi-Fi) are employed that aids in controlling of multiple robots in distributed locations.

Keywords: Swarm robotics, wireless communication, industry 4.0, ROS, e-Puck.

1. Introduction

Today, Industry 4.0 has evolved towards mass customization from mass production as the market demands increase to manufacture personalized goods [1]. The conventional industries employ robotics to manufacture goods but the ability to change the production process was a big question. This challenged the industry to produce customized products, as customers or end users most preferred. This drew the attention of research people to the concept of Swarms which is regarded as a type of quasi-organism adapting to environmental changes by engaging in certain behaviors [2]. Thus, Swarm robotics resulted to be an enabling technology as they are capable of performing multiple activities and processing number of parts which increases efficiency and flexibility.

However, the individual robots embed the capability to process, communicate, sense, interact internally with each other and react to the environment. To establish the integration of the robots, wireless technologies take on a crucial role. In order to effectively integrate

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International Journal of Telecommunications & Emerging Technologies

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Using LapSRN (Image Resolution Deep Learning Model) with Transfer Learning

Athirasree Das, K.S Angel Viji, Linda Sebastian

Abstract

In order to create high-resolution photographs, Super Resolution (SR) tries to transform low-resolution photos. SR methods can be categorized into two categories: Single Image Super Resolution (SISR) and Video Super Resolution (VSR). SISR initially needs to upscale low-resolution photos to high-definition images. VSR, which stands for "image super resolution," is used to transform low-quality videos into ones with higher resolution. Deep learning techniques use Convolutional Neural Networks (CNN), a special sort of deep neural network. Super-resolution images and videos can be processed using a variety of deep learning algorithms. For high-quality image super-resolution reconstruction, CNN are used. Deep Laplacian Pyramid Super-Resolution Network (LapSRN), the current strategy, is based on the CNN SR model. It requires many network parameters and heavy computational loads at run time for generating high-accuracy super resolution results so LapSRN with transfer learning (LapSRN-TL) is proposed. We have analyzed and compared the quantitative and qualitative results of LapSRN-TL with LapSRN deep learning model.

Full Text:

PDF

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Advancements in abrasive electrical discharge grinding (AEDG): A review

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Abstract

A hybrid machining process that combines the working principles of conventional abrasive grinder and an electrical discharge machine, mentioned as Abrasive Electrical Discharge Grinding (AEDG) is being studied. It exploits the benefit of both the machining process Abrasive Grinding (AG) and Electrical Discharge Machining (EDM). The review understands the need of such a machining process, its working principles, basic designs and more importantly, how different process parameters affect the machining performance. In this paper, three different designs of the tool is understood. Later, based on different experimental and study reports, effects of process parameters on the machining is learned.

Introduction

Advancements in technology demands need to machine materials which are hard and brittle, with great precision and zero tolerance. The non-conventional machining process developed serves these purposes, but either lacks in surface finish or the Material Removal Rate (MRR) [1], [2]. MRR is rate at which a material is removed. Hence hybridization of machines is made to obtain a high MRR with good surface finish. Studies and development of these machines are being conducted from the early 80s till today. They utilization electricity, fluidic pressure, chemical reaction, and hybridization of these techniques for machining are being researched [2].

The focus of this literature review is on hybridizing electrical erosion technique with the conventional Abrasive grinding (AG). The machining processes that rely on electrical erosion is called Electrical Discharge Machining (EDM). It has several variants [3] like, Wire Electrical Discharge Machining (W-EDM), Electrical Discharge Grinding (EDG), Micro Electrical Discharge Machining (μEDM), and hybrids like, Ultrasonic Assisted EDM, Vibration Assisted EDM, Laser Assisted EDM, Electrochemical Discharge Machining (ECDM), etc. Variants and hybrids of the EDM process are being developed to meet machining requirements of different workpiece material types, according to their machinability. Their machinability is determined by their properties like hardness, ductility, thermal and electrical conductivity, etc. Hybridizing the EDM process also depends on the required machining quality to be obtained like, surface finish, amount of residual stress, etc.

E. Ya. Grodzinskii conducted experiments around Electrical discharge machining along abrasive grinding around, as cited by P. Koshy, et al. [4], which Grodzinskii called Electrical Discharge Diamond Grinding (EDDG). Koshy et al. explains the mechanism of the hybrid EDDG process, and how this mechanism improved the machining quality and rate through hybridization. Similarly, H. J. Zhang et al. [5], studied the same hybrid process under the name Electro Discharge Diamond wheel Grinding Machine (EDGM), to improve the machining of ceramic materials. S. K.

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Web Crippling Capacity of Cold Formed Steel Channel Sections With and Without Openings

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Abstract - *Steel is an important construction material since ancient days. Among steel, Cold Formed Steel (CFS) are getting more popular due to its advantages including light weight, high strength to weight ratio, resistance to fire etc. These are the sections which are shaped near room temperature. CFS channel sections are commonly used nowadays as bearing and non- load bearing walls, partition walls, in multi-rise buildings, framings. In this channel sections the holes are provided in the web portion for plumbing services and installation of ducts. However such opening made the section more vulnerable to failures including web crippling and web buckling. In this paper various parameters which affect the web crippling capacity of the channel sections are analyzed and the analysis is also done to find the optimum location of web holes in the channel sections.*

Key Words: Cold Formed Steel Sections, Web Crippling, Web Buckling

1. INTRODUCTION

Advanced structures are quite common in nowadays due to growth in construction industry, Due to this advancement many industries are looking forward to develop and use sustainable building materials. Steel is an important construction material using nowadays due to its innumerable advantages which make it as a perfect option for modern building construction. There are mainly 2 types of steel used for the construction purposes. 1) Hot Rolled Steel Sections 2) Cold Formed Steel Sections. As the name indicates, CFS sections are the sections which are rolled, bended, pressed or shaped at near room temperature. We do not need to provide extra heat for shaping them as it is required in hot rolled steel sections. In hot rolling process steel is rolled by providing high temperature which is more than 1700 Fahrenheit. But such hot rolled steel have a tendency to shrink when cool off, thus giving less control on size and shape. Advantages of CFS sections over Hot Rolled Steel Sections includes CFS does not shrink, no heat is required to form shape, light weight, non- combustible, won't absorb moisture, resist fire and termites and high strength to weight ratio. Nowadays openings are provided in the web portion of channel section for ease of installation of electrical or plumbing devices. Such holes result in the sections becoming more vulnerable to failures especially under concentrated loads applied near the web holes. Two common type of failures in CFS sections include 1) Crippling Failure 2) Buckling Failure. Web crippling failure occurred in CFS members at the web flange junction. This failure is mainly seen in the web elements due to the concentrated loads which are delivered through flange of the channel sections. The main reason for this failure is due to the application of static and dynamic loads transversally which causes direct crushing of web. Buckling is another failure mode in CFS sections due to its thin walled cross section causing loss of stability. This failure occurs when the critical buckling stress in web is less than the compressive stress acting vertically. It occurs before yielding.

Fig -1: CFS in Construction Industries

1.1 Aim

To perform the analysis on web crippling capacity of cold formed channel sections with and without opening

1.2 Objective

To understand effect of bearing length, inside bent radius, web depth and flange width on web crippling capacity of channel sections.

To study effect of web opening and web opening locations in the web crippling and buckling capacity of the channel sections

1.3 Methodology

1) Modeling and analysis of channel sections with and without hole in ANSYS Workbench by varying parameters

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CONCRETE-ENCASED CFST BEAM-COLUMN JOINTS: A REVIEW

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Abstract - *Beam- column joints are the most seismically affected element in a framed structure, hence seismic performance of joint is of great importance for overall structural safety. In order to make appropriate design decisions for joints, it is necessary to know how joints behave.*

Concrete-encased concrete-filled steel tubular (CFST) beam-column joints consist of CFST inside and reinforced concrete outside. Several investigations have been conducted on joints with steel beams and RC columns and with steel beams and CFST columns. This paper reviews the present state of knowledge of properties and performance of concrete-encased CFST beam-column joints.

Key Words: Beam-column joints, CFST, seismic performance.

1. INTRODUCTION

Earthquakes are violent tremors in the earth's crust that generate shock waves in all directions from its point of origin which is caused by a sudden release of energy in the earth's crust that causes seismic waves. The intersections of beams and columns at reinforced concrete structures are called beam-column joints. Beam-column joints are the most seismically affected element in a framed structure, hence seismic performance of joint is of great importance for overall structural safety. The connection between beam and column in a frame structure is most likely to sustain damage during a seismic disaster. In order to make necessary design decisions for joints, you need to know how joints behave.

A composite member is a structural member made up of two or more materials having dissimilar properties. [6] As they are made of multiple materials, they exhibit properties of both and have superior properties to the individual ones. One of the most popularly used composite members in the structural engineering industry is steel-concrete composite. As we all know concrete is good in taking compressive load and weak in taking tensile load. Also, steel is strong in tension loading. By combining both, it utilizes concrete's compressive strength and steel's resistance to tension and making it more efficient in construction. Concrete-filled steel tubular structures are one among these types of concrete-steel composite.

Concrete-filled steel tubular (CFST) structures have great structural benefits, including increased strength and resistance to fire attack, high ductility and energy absorption. In some recent buildings, concrete-encased steel-tube columns (CFST) have been used to connect with reinforced concrete (RC) or steel beams. The concrete-encased concrete-filled steel tubular (CFST) beam-column joint is made up of core CFST and reinforced concrete (RC) outside. As the composite column is more fire-resistant and structurally durable than a typical CFST one due to the outer RC part. Fig 1 shows typical cross section of concrete-encased CFST columns. Concrete-encased CFST beam-column joints are stronger, more ductile, and can carry more weight than ordinary RC beam-column joints due to the performance of their embedded steel tube. Moreover, the composite joints demonstrated favourable seismic behaviour and could be used in earthquake-prone areas. Concrete-encased concrete-filled steel tubular (CFST) beam-column joints consist of CFST inside and reinforced concrete outside. This method has certain advantages over conventional reinforced concrete (RC) columns, such as higher ductility due to the contribution of the CFST, and faster construction speed because the CFST can be constructed first to carry the entire construction load by itself and concrete and reinforcing bars for the outer walls can be poured or installed later.

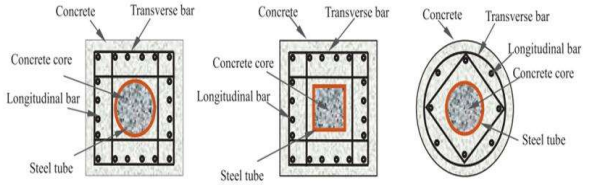

Fig-1: Commonly used cross sections of concrete-encased CFST columns.

2. COMPONENT BEHAVIOUR OF CFST

The widespread application of concrete-filled steel tubes in engineering has led to large-diameter steel tube columns being used in the ground floors of high-rise and super high-rise buildings. By decreasing the cross-sectional dimensions of the upper columns as the number of floors increases, the dead weight of the structure will be reduced and engineering costs will be saved. The column connections where the cross-sectional sizes change become the crucial area that affects the seismic performance of the whole structure. Typical sections of steel used for CFST for filling concrete are circular hollow section (CHS), a square hollow section (SHS) or a rectangular hollow section (RHS). It is found that circular cross sections provide the strongest locked up to the core concrete, whereas

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Cost Forecasting of Construction Materials: In India

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Abstract – *In India the demand of construction sector is increasing day by day. Within 20 years we can expect a growth of 30% in the construction sector in India. The major reason for it may be the increased population and demand for industrial spaces. Now in India the Construction Cost Index (CCI) are widely used to forecast the construction costs. This research aims to forecast the construction material prices directly using ARIMA modeling followed by an Expert survey. So, it will be very beneficial for construction stakeholders, project owners, Engineers etc.*

Key Words: ARIMA, Cement, Steel, Brick, M sand.

1.INTRODUCTION

Cost management is an important aspect in construction project management. Recently the construction material prices are subjected to large type of fluctuations depending on different factors. If the construction stake holders, project owners, contractors and engineers get an estimate regarding the future building material prices, it may be very beneficial for them in preparing future budgets. The modeling is done using IBM SPSS Statistics.

1.1 ARIMA Modeling

ARIMA (Auto Regressive Integrated Moving Average) method is an efficient time series analysis method especially used for forecasting univariate time series data. This method is an integration of Auto Regression model and Moving Average model. This modeling method has been selected based on the advice from the experts.

1.2 Expert Survey

An expert survey has been conducted to determine the future prices of building materials and the underlying causes. The survey was conducted all over India among the manufacturers, suppliers, cost analysts, purchase managers, project managers etc. The sample size is determined based on Cochran's formula.

2. RESEARCH METHODOLOGY

Different approaches have been analyzed to determine the best fitting model for forecasting construction costs. ARIMA modeling was selected based on the advice from the experts. And an expert survey also conducted and finally the results are compared.

2.1 Auto Regressive Integrated Moving Average method

ARIMA (Auto Regressive Integrated Moving Average) method is an integration of Auto Regression model and Moving Average model. ARIMA model is represented as ARIMA (p, d, q). p represents number of auto regressive terms. q is the number of moving average terms. d is the order of differentiation to make the non-stationary series stationary. For modeling the historical data regarding material prices for past 15 years has been utilized. For cement, it was found that ARIMA (1,1,1) is the best fitting model and forecasting has been done with this model. Best ARIMA model is identified using following table.

Table 1: Criteria for best ARIMA model

Model fit statistic	Remarks
R-squared	Should be close to 1
RMSE (Root Mean Squared Error)	Lowest value indicates good model fit
MAPE (Mean Absolute Percentage Error)	Lowest value indicates good model fit
Normalized BIC	Least is the best
Model significance (P-Value) Ljung BOX	Greater than 0.05 to accept HO: residuals are white noise

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ANALYSIS OF HYBRID SANDWICH PLATE STRUCTURES

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Abstract – Honeycomb sandwich structures are those structures which are mainly in the shape of a honeycomb . These structures are of high strength in addition to its weight therefore the applications of honeycomb structure plate are very important. Due to its high strength to weight ratio and high stiffness it can be used in automobile, aerospace and space structures. The honeycomb structures mainly consist of three parts they are of two face plates and a core. By using different shapes of core and combining them gives a hybrid core with special characteristics. This paper mainly focuses on the hybrid sandwich plate structures and their properties and also to compare the in-plane and out-of-plane compression of honeycomb structures and to conduct the behaviour prediction of honeycomb structure and hybrid structure. In this study buckling analysis, bending analysis and dynamic analysis are done in the hybrid sandwich plate structures and the analysis are done in the finite element analysis software ANSYS.

Key Words: **Honeycomb structures , Hybrid structures, Corrugated sandwich structures, Cross supports.**

1. INTRODUCTION

A honeycomb sandwich plate structure is formed by mainly of three members they are of two face plates and a core. The face plates are made up of material like thin composite laminates of glass, aramid, carbon, aluminium and steel plates etc. and the core is made up of either metal or thin plate like materials. The most commonly used core material is aluminum [5][11]. The core is placed in between the two face plates in order to achieve high stiffness-to-weight and strength-to-weight ratios [1]. For improving the properities of honeycomb sandwich structures the hybrid structures are to be used. The hybrid structures give comprehensive thermal and mechanical advantages and also have high strength and specific energy absorption [13]. The unique character of honeycomb sandwich structure are of high stiffness to weight ratio, elimination of welding, superior insulation quality and design versatility[11]. The main aim and objective of this paper is to compare the in-plane and out-of-plane compression of the structure and to conduct the behaviour prediction of honeycomb structure and hybrid structure. The fig-1 shows a honeycomb sandwich structure.

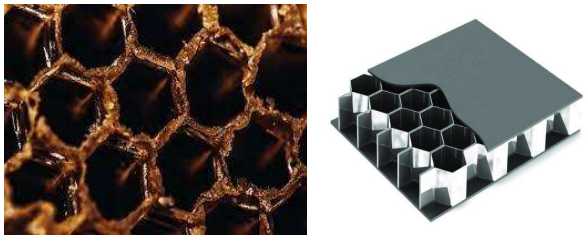

Fig -1: Honeycomb structure

1.1 Honey comb Sandwich structures

The honeycomb structures are mainly of natural or manmade structures which are in the shape of honeycomb which use minimal material to reduce the weight and cost of the material[1]. The arrangement of honeycomb sandwich structure is in such a way like a sandwich . The honeycomb structure have of two face plates and a core. The core is mainly situated in between the two face plates like a sandwich. The commonly used face plates are of carbon fibre, glass fibre etc. and the most commonly used core material is aluminum [1][5][12][14]. The core gives high compressive strength. The compressive strength of sandwich panel is depends upon the foil thickness of honeycomb core, cell size, thickness of core and face sheet thickness. The core is made up of different cells and it is of different shapes like hexagonal cells, square and flex core. For adhesively bonded honeycomb hexagonal cell shape is commonly used and square cells are used mostly for resistance welded and brazed cores [11]. Typically a sandwich panel is comprised of a low stiffness, low density inner core enclosed by two stiff outer skins, as shown in Figure 2 where the whole assembly is held together by some sort of structural adhesive (Figure 3). The outer skins are typically made from stiff carbon fibre or aerospace grade aluminium. The inner core is typically a Nomex or metal honeycomb, or an open or closed cell foam. Nomex is an aramid polymer similar to Nylon that is flame-resistant and can be manufactured in paper sheet form. Nomex is a great choice for the interior of aircraft cabins such as the floor panels due to its high safety in the event of fire. Multiple sheets of Nomex paper can be placed on top of each other and glued together at the node locations by lines of adhesive, which are offset spatially between different layers. This large stack of Nomex can then be cut into smaller strips and expanded to form a sheet of Nomex honeycomb. Alternatively closed cell foams such as Rohacell® are commonly used for the core, which are denser then there

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FINITE ELEMENT ANALYSIS OF BEAM-BEAM BOLTED CONNECTION UNDER PURE MOMENT

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Abstract - *In structural engineering, the main purpose is to maintain structural stability against the effect of various forces acting on the structure. Also, when comparing steel and RC structures, the design of the steel structure focuses primarily on the joints. Proper and effective connections play an inevitable role in maintaining the structural stability of the steel structure. Currently, bolts are widely used fastener to connect steel connections. This project is an attempt to determine the influence of shear capacity by gauge distance on bolted connection. In order to achieve this objective, Finite Element Analysis were carried out in Ansys workbench 2021 r2. The analysis consists of 24 parametric studies that are carried out on 24 models. Each models are differ by the types of bolt hole clearance, bolt diameter, gauge distance and cleat angle used. The entire parametric study is mainly followed by using 10.9 High Yield Friction Grip (HYFG) bolt of diameter 16 mm and 20 mm.*

Key Words: **Bolted connection, Finite Element Analysis**

1. INTRODUCTION

Any steel structure is made up of various members, such as beam, columns, and tension members, which are fastened or connected to one another, usually at the member ends. Many members in a steel structure may themselves be made of different components such as plates, angles, I-beams, or channels. These different components have to be connected properly by means of fasteners, so that they will act together as a single composite unit. The advantages of prefabricated steel structures include rapid construction, less environmental pollution and better-quality control than the conventional on-site built structures. The use of prefabricated steel structures helps to achieve the industrialization of construction.

Any structure's connections are a crucial component and are constructed more conservatively than its members. This is due to the fact that connections are more difficult to analyse than members, and there is a significant gap between analysis and real behaviour. Design and details are crucial for the economy of the structure because it makes up majority of the cost for structural work. Prior to designing the structural system and its members, the type of connection to be used must be chosen because it affects member design. For instance, the net area is estimated when designing fastened tension members by assuming an appropriate no. of bolts and bolt diameter, based on experience.

Steel constructions' connections go into one of three categories: 1) riveted, 2) bolted, or 3) welded connections. Bolted connections will progressively take the role of riveted connections, which are still utilised in some situations. This is brought on by the connection's intrinsic inefficiency, the expensive cost of installation, and the weak rivet strength. Because no holes need to be bored in the member, welded connections have the advantage of being more efficient. But field welding having their own challenges and time-consuming. Welded connections are also prone to failure by cracking when subjected to repeated cyclic loads from fatigue, which may be brought on by working loads like trains crossing a bridge (high-cycle fatigue) or earthquakes (low-cycle Fatigue). It has been discovered that a particular kind of fastened connection using High Strength Friction Grip (HSFG) bolts performs better under such circumstances than the traditional black bolts meant to resist primarily static pressure. The alloy steel used to create HSFG bolts ranges in grade from 8.8, 10.9, and 12.9. The most typical contain a medium carbon concentration and a so-called general grade of 8.8, which makes them less ductile. Bolted connections are also easy to inspect and replace. The choice of using a particular type of connection is entirely that of the designer and he should take his decision based on a good understanding of the connection behaviour, economy and speed of construction.

Bolted joints are one of the most common elements in construction and machine design. They consist of fasteners such as, bolt. Bolt is a metal pin with a head at one end and a shank threaded at another end to receive a nut.to prevent the treaded area of the bolt from bearing on the connecting pieces and to evenly distribute the clamping strain on the fastened member, steel washers are often placed under the bolt head and nuts. End connections in tension and compression members can be made using a bolt connection. By creating an appropriate balance between the joint and bolt stiffness, the bolt and clamped components of the tension joint are designed to pass an applied tension load through the joint via the clamped components.

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ANALYSIS OF CONCRETE FILLED HYBRID FOUNDATION

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Abstract – *wind power industry has the higher stability and low civil complaints contrast with inland wind farms and also consider as a reliable energy source rather than sustainable energy. These energy systems demand more robust design and execution than the onshore turbine. In this project I am presenting a new concept, i.e. Concrete Filled Hybrid Foundation (CFHF). The CFHF is an improved version of hybrid foundation. The main components of the foundation are double skin monopile, wide shallow bucket and radial stiffeners. The double skin monopile is filled with concrete. The parametric study of various parameters of CFHF is carried out and their maximum horizontal displacement and moment bearing capacity of CFHF is studied in detail. The all parameters will reduce the maximum horizontal displacement and increase the moment bearing capacity.*

Key Words: **Wind Power, Concrete Filled Hybrid Foundation, , Hybrid Foundation ,Double Skin Monopile, Wide Shallow Bucket And Radial Stiffeners.**

1. INTRODUCTION

The Offshore Wind Power (OWP) industry is one of the fastest growing energy systems in this era. This industry has the higher stability and low civil complaints contrast with inland wind farms and also consider as a reliable energy source rather than sustainable energy. These energy systems demand more robust design and execution than the onshore turbine. Wind is a secondary source of sustainable energy dependents on the sun. The wind velocity and its direction are influence by topographical features, temperature gradient and revolution of the earth.

Currently Europe is the global leader in offshore wind energy sector. The first offshore wind farm (i.e. Vindeby) was installed in Denmark in 1991. According to the Global Wind Energy Council's (GWEC) report the global OWP market capacity grown from 29.2 gigawatt (in 2019) to 35 gigawatt (GW) and the current OWP capacity is 35.3 GW where United Kingdom has 29% of the global installation capacity. "Hornsea Project One" is one of the largest offshore wind projects in United Kingdom which has the capacity of 1.2 GW. According to the statistics the global OWP installation capacity will exceed two thousand gigawatt in 2050. Currently our India has no operational OWP plant but the first one gigawat OWP project was planned in Gujarat. Fig 1 shows the development of the development of wind turbine.

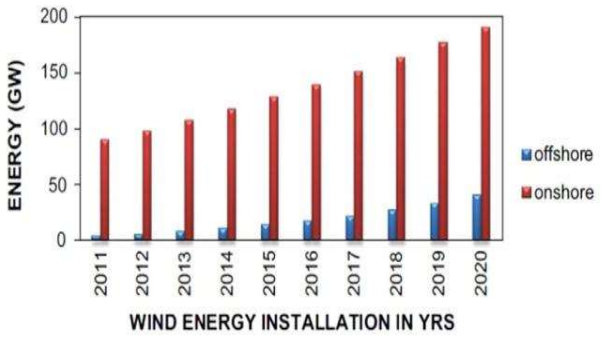

Fig -1: Wind Energy Installations in Years[7]

Selection and design of the foundation control the financial soundness of the project. The investment in installation and design of foundations constitutes 20–30% of the total cost of a typical OWP. The harsh wave and wind environment results higher cost of offshore wind turbine projects than of onshore ones. The selection of suitable foundation depends on type of seabed, installation methods, oceanic climatic condition, water depths, economics, loading characteristics and type of installation equipments etc. Monopile is the most common used foundation in offshore wind industry. It is a simple type foundation consists of large diameter steel tube. Gravity based foundation, monopoles and bucket foundations (known as shallow foundations) used for water depth up to 30m. Jacket foundations are used for water depth up to 60m.These foundations are fixed in seabed and classified into grounded systems. For deeper waters or water depth more than 60m floating system will adopt. Different innovative foundations for offshore wind turbines have been proposed in recent years.

2. FINITE ELEMENT MODELING

Finite Element Analysis is a methods used to obtain numerical solutions of real practical problems. The soil domain is created as continuum model in the software. The dimension of the soil domain is fixed with respect to the dimension of the CFHF. The continuum model is a material model, which contains infinite particle with continuous variation of the material properties. FEA software will solve continuum mechanics problems by subdividing the model into finite elements.

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Strengthening of masonry wallette with opening using geotextile

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Abstract -*The out -of -plane performance and in-plane behaviour of masonry wallettes with opening strengthened with non- woven geotextile was studied. The wallettes were strengthened on both sides. The patterns used were vertical and cross. Finite element analysis using ANSYS is carried out to find the out-of-plane performance and in-plane behaviour of the masonry wallettes. The results showed less brittle behaviour compared to the un-strengthened wallette. Also, the strengthening using geotextile enhanced the load carrying capacity and cross pattern was found more effective. Therefore, geotextile can be ideally used to strengthen masonry buildings in seismic prone areas.*

Key Words: Out- of -plane, In- plane, Masonry wallettes, Geotextile.

1.INTRODUCTION

Masonry is one of the oldest forms of construction. It is widely used due to its low cost, availability, thermal insulation, ease of construction etc. But masonry buildings have performed the worst in the history of past earthquakes. This not only leads to maximum structural damage but also leads to loss of life. Here comes the necessity of strengthening of masonry structures. Since a lot of historic structures too are made of masonry, it is really important to address the remediation, retrofit and seismic upgrading of such structures. It is also important to consider techniques that are less invasive in order to preserve the architectural and heritage values of the historic structures. A masonry wall experiences out-of-plane bending and in-plane shear during an earthquake. In out-of-plane, flexural bending of the plane is caused as a result of the load acting on the walls in the perpendicular direction where as in plane failure mechanisms includes shear failure, sliding failure, rocking failure and toe crushing failure. Various studies have been done over a number of years to develop strengthening techniques which will improve the performance of masonry. Strengthening methods such as the addition of new structural elements, steel plate bonding, external post tensioning, steel bracing, Fibre Reinforced Polymer (FRP) and many more have been applied with some degree of success. However, an innovative retrofitting technique using geotextile has recently gained recognition and acceptance.

The present study was conducted on masonry wallettes with opening. Both un- strengthened and strengthened wallettes were analysed. The in-plane and out-of-plane performance of the wallettes with opening strengthened using geotextile was studied. The wallettes were strengthened using two different patterns that is vertical and cross. Also, the strengthening was done on both sides of the wallettes.

1.1 Model definition

The dimension of the brick was 250mmX 125mmX 75mm.The dimension of the opening was 140mmX 125mmX 75mm.The mortar head joint and bed joint dimensions are 10mm and 12.5mm respectively. Seven courses of clay bricks were used to construct each wallette. The mortar is modelled in the Drucker-Prager formulation. For mortar the mesh size is 10mm and for brick the mesh size is kept 25mm.Perfect bond was assumed between mortar joint and brick unit. The in-plane behaviour is simulated under diagonal compression test whereas the out-of-plane performance is simulated under the four-point bending test. The properties of the masonry and geotextile are shown in the table below.

Table -1: Properties of the constituents of masonry

Properties	Brick	Mortar
Density, (kg/m^3)	1800	2200
Elasticity modulus, E (MPa)	2000	4000
Poisson's ratio	0.16	0.21
Ultimate tensile strength, f_t (MPa)	1.46	0.66
Ultimate compressive strength, f_c (MPa)	9.43	4.46

Table -2: Mechanical properties of non-woven geotextiles

Properties	Value
Tensile strength (MPa)	0.16
Young's modulus (MPa)	15700
Poisson's ratio	0.3
Thickness (mm)	2.1

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Analysis on foundations reinforced with geocell

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Abstract - *Most residential buildings are constructed of shallow footing. If soil shows low bearing capacity, deep foundations are adopted. But it is uneconomical to construct a deep foundation for residential purpose. So, in order to reduce the construction cost and strengthen the soil, soil reinforcement methods are adopted. Geocell reinforcement is one of the effective ways to reduce the soil settlement. In this paper, the possibility and effects of providing geocell reinforcement on conical shell footing, isolated footing and strip footing are determined. A comparison on single and multilayer geocell reinforcement on these foundations are analyzed. Also, the effect of varying cohesion value of soil and friction angle value of soil on these foundations reinforced with geocell is determined.*

Key Words: **Geocell, Conical shell footing, Isolated footing, Strip footing, Settlement, Bearing capacity**

1.INTRODUCTION

Soil reinforcement techniques is the means of giving strength to the soil. If the soil is having low bearing capacity and high settlement, the only way to reduce this condition is soil reinforcement. Several soil reinforcement methods are available nowadays. In the beginning, the soil is reinforced using bamboos, straws, reeds etc. But due to the innovations in construction field and difference in construction techniques, the natural reinforcement method was unable to take heavy loads and cause higher settlement. So, the natural reinforcement technique is replaced with modern technique. One of the most commonly adopted reinforcement methods nowadays is geocell reinforcement. Geocell is a three-dimensional polymer membrane used to strengthen the weak soil. It is a mesh like structure, the pockets or cell like shape is filled with locally available soil. Mostly they are used for enhancing the strength of road, embankments, protection of slope etc. The fig below shows the geocell filled with soil.

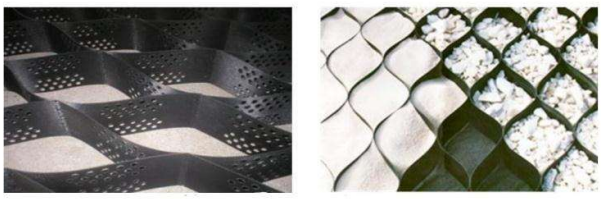

Fig -1 Geocell

The main aim and objective of this project is to analyze the settlement behavior and bearing capacity of conical shell footing reinforced with single and multiple geocell. And to compare these footing with isolated footing and strip footing. A parametric study on varying the cohesion and friction angle has been conducted to find the effect of these footings on different soil and to determine their settlement and bearing capacity.

1.1 Geocell reinforcement

Geocell reinforcement is one of the soil reinforcement techniques used to strengthen the weak soil. Several reinforcement methods are available nowadays. But this technique is unique is because they are very cost effective and can even be used for foundation purpose. Geocells are three-dimensional in shape and cells or the pockets of geocell are filled with sand, gravel or locally available materials. Due to its mesh like, the pockets encase the soil and provide enrich support to weak soil. This will help in spreading the vertical forces to a much wider area. This is developed by U. S. Army to strengthen the weak soil material. Providing multilayers of geocell give additional strength to the soil. Providing multilayers of geocell to the soil give additional strength to the soil.

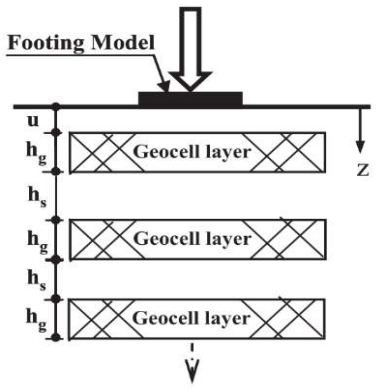

Fig -2 Multilayer geocell reinforcement

Where u is the height of the soil from the footing base to the top of the geocell, h_g is the height of the geocell and h_s is the height of the soil layer between the geocells. Multilayers of geocells helps in reducing the stress developed inside the soil to a great extent. Therefore, the settlement or the deformation thereby reduces.

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NONLINEAR BUCKLING ANALYSIS OF STIFFENED PLATE

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Abstract - *A stiffened plate is an extension of the beam-column in which an effective width is added to the beam. Stiffeners are used to resist lateral loading of a plate & are usually made from the rolled shapes integrally welded to the plate. They are used as structural part of ships, submarines & bridges. This project deals with the nonlinear and linear analysis of stiffened plate using ANSYS. A stiffened plate has been analyzed to find out its ultimate strength. An experimental determination of ultimate strength of stiffened plate has also been done in this project. It also includes the linear buckling of stiffened plate without stiffener. The stiffened plate has been analyzed with and without stiffener to get to know about the importance of stiffener. Stiffeners are secondary plates or sections which are used to stiffen the primary elements. The economical design of plate can be obtained by using stiffeners instead of increasing thickness of plate. Also, plates with varying number of stiffeners and stiffened plate under transverse loading condition have also been considered in this project.*

Key Words: Stiffened plate, Stiffeners, Lateral loading, Ultimate strength, Linear buckling, Transverse loading.

1.INTRODUCTION

The widespread usage of stiffened parts in engineering began in the nineteenth century and it was used in steel plates for the hull of ships, steel bridges and also in aircraft structures. Stiffeners are used to withstand the extremely directional loads, and it introduce different load ways which may provide protection against harm and crack growth beneath both the tensile and compressive loads. The greatest advantage of using stiffeners are the increased bending stiffness of the stiffened panel with a minimum of extra material which makes the structures perfect for out-of-plane loads and also for destabilizing the compressive loads. Usage of stiffened plate gives more benefits like less material usage, low cost, better performance etc. Nowadays, the importance for structures with high stiffness is increasing day by day. One amongst the easiest way of achieving it is by using the stiffeners. Innumerous mechanical structures are manufactured from stiffened plates. These structural parts may be outlined as the plates strengthened by one or a group of beams or ribs on one side or both aspects of the plate. Therefore the stiffened plate units are manufactured from plate parts, on to which the loadings area have been applied. The beam parts are connected to a distinct spacing in one or both directions. The fabric of the plate and also the filler may be same or totally different. Compared to the unstiffened plates, the advantage of using stiffened plate is their high stiffness to weight quantitative relation. Because of the rise in overall stiffness of the system, stability characteristics have been increased. Thus these structurally economical elements have the additional benefit of fabric savings as well as they are economic too.

Another advantage of exploitation of stiffened plate is that they can be manufactured through an easy and simple process. Hence, it's not a surprise that such structural elements found a wide-spread utilization within the trendy branches of civil, mechanical, structural and construction engineering. Stiffened plates are subjected to many forms of loading conditions in their operating surroundings. For instance, the stiffened plate is subjected to lateral or cross load within the case of bridge decks. On the opposite hand, the longitudinal bending of the ship hull exert a longitudinal in-plane axial compression on the plates. The loading conditions on an element may be of 2 types: static and dynamic. Static masses are invariant of time and dynamic masses varies with the time. So the designers should keep in mind these 2 aspects of loading while the designing process.

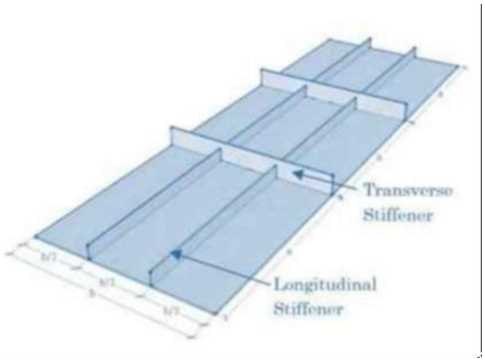

Fig -1: Stiffened plate

1.1 OBJECTIVES

The main objective of this study is:

- To analyze the stiffened plate.

BEHAVIOUR OF COLD-FORMED BUILT-UP COLUMNS UNDER COMPRESSION

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ABSTRACT

Cold-formed steel sections are widely used due to their high strength, durability and resistance. In this paper, the non-linear behaviour of cold-formed steel battened columns placed back-to-back is considered. The channels are placed in four series with a back-to-back spacing of 25,50,75,100 mm. The behaviour of built-up columns under the effect of axial, eccentric and loading under temperature from ambient to 700 ℃ are considered. About 65 models are generated in ABAQUS 2019 with 2 models as validation. The effect of parameters like channel spacing, batten width, B1/D ratio, varying column length etc. was taken into consideration. The column strength, failure modes, deformed shapes, load vs. displacement, and ultimate loads at different temperature conditions were obtained. Furthermore, the column strengths obtained from the analysis were compared and obtained to a conclusion.

Keywords: - *Built-up columns, Cold formed, Finite model*

1. INTRODUCTION

Cold-formed steels are used widely nowadays due to their high strength, corrosion resistance, easy installation, economic design etc. It was found that various investigations were reported on cold-formed steel single columns with symmetrical and asymmetrical cross-sections. Also, the majority of the experimental studies were carried out in hot-rolled steel sections. Muthuraman et al. [2], examined the axial loading of pin-jointed cold-formed steel column sections by numerical and theoretical analysis. About 44 models were modelled in Abaqus and were analyzed under axial compression. By considering different batten numbers and slenderness ratios numerical and theoretical studies were done. The ultimate loads for the lipped channels were analyzed using two methodologies for the lipped channel sections and were compared to obtain the effective section proposed. While considering the slenderness ratio from 20 to 60 from the direct strength method the buckling mode and the failure load were approximately showing good agreement with the FEM results. Thus, to study the behaviour of cold-formed built-up columns with battens experimental study was conducted by Dabaon et al. [8]. From the study, the effect of channel spacing, and local buckling length on the column strength was estimated. The study is conducted to develop a finite parametric study that considered column length, batten width, local buckling length and channel spacing to find out the effects on column strength. The behaviour of the column under the temperature loading condition by Gunalan et al. [10] was considered. The model was validated and studied the effect of the built-up columns under the temperature loading by adopting the properties, imperfections and boundary conditions. The parametric study was carried out to find the effect of channel spacing, local buckling length and column length on the ultimate load of columns. The behaviour of the column under eccentric loading was considered along with the parametric study on varying column length, channel spacing and batten width. The main objective is to find the behaviour of built-up columns under axial

ANALYSIS OF DELAY IN CONSTRUCTION PROJECT IN INDIA

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ABSTRACT

The building industry in India is an important sector because of its tremendous contribution to the country's economic development. However, due to the country's geographical, political, social, and financial status, many building projects are prone to delays. These delay causes can only be prevented by first recognizing the issues and their sources. The primary goal of this research was to identify the major reasons of construction project delays in India. The study design was quantitative, with data collected from clients, consultants, and contractors via questionnaires. The questionnaire, created with Google form technology, included a list of delay-causing elements that respondents were asked to score on a 5-point Likert scale. The collected data were analyzed with the Statistical Program for Social Scientists (SPSS). According to the findings, the top primary reasons of delay were material shortages, erroneous time calculation, and building faults. Furthermore, the top major consequences of delay were cost overruns, time overruns, bad social consequences, and lawsuits. Furthermore, the top major hazards connected with construction delays were: excessive pressure on project stakeholders, disagreements among project participants, project abandonment, total cost rise, and income reduction.

Keyword: - *Causes of delay, Construction Project, Construction Industry*

1. INTRODUCTION

A construction project is essentially a short-term endeavor with a set time and budget that is started to produce a special good, service, or outcome and usually comes in restricted quantities. To produce that one-of-a-kind development on a specific location under circumstances that will never be duplicated, the project team gets together. Construction can start despite numerous uncertainties, but they may be complex and require high levels of coordination of permissions, people, products, plant, and materials. As a result, delays are frequent. Additionally, the use of cutting-edge technologies and owner-requested alterations makes it even harder to maintain a project on schedule. Inherent uncertainties and sophistication in the physical, financial, and economic environments in which most projects are carried out go hand in hand with this state. Such circumstances have made it challenging to complete projects on time and under budget, frequently resulting in requests for cost reimbursements and time extensions. Construction delays are defined as a time difference between the start and finish of an activity relative to the baseline timetable, or as a late start or late completion of an activity, directly affecting the stipulated cost.

Construction delays are frequently the result of poorly managed event(s) and can be seen as a risk for the projects if identified, analyzed, and managed in a systematic process at inception. This would allow for the management, minimization, sharing, mitigation, or acceptance of the risk to produce some positive results and reduce the likelihood of further delay. In terms of the development of antagonistic relationships, mistrust, litigation, arbitration, and cash-flow issues, delays in construction projects have a detrimental impact on clients, contractors, and consultants. Until a building project meets the financial, time, and quality constraints imposed on it, it cannot be considered a successful undertaking. However, it happens frequently for a construction project to fall short of completing its task within the required budget, timeframe, and level of quality. The field of "Project management" is used to oppose the unanticipated delays in advance, which aids in mitigating the delays. Application of knowledge,

Blockchain In Agriculture

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***Abstract*-**Agriculture is one of the most influential industries in the world. Agricultural productivity benefitsarural's economy, privacy, nutrition, and health. Agronomists have used various technologies such as IoT and Blockchain to promote better farming crops. Blockchain technology has been used to address a variety of problems in fields such as economics, health, and energy. Block chain is being used in agricultural supply chain management structures to provide accountability, protection, neutrality, and efficiency for all processes in the supply chain .It aids in the deciphering of many of the internet's stability and security complexities. Block chain technology has numerous applications in agriculture. Food safety through traceability of provenance, data system, agro-trade, finance, crop certification, and insurance are examples of block chain applications in agriculture. Despite the fact that the study demonstrates there are many block chain-based applications in agriculture, but only a few countries have grasp edit, with China leading the way, followed by the United States, Italy, India, and Spain. Here we review a comparative study of block chain applications in agriculture, as well as the benefits, challenges, and current trends in block chain research in agriculture, and then provide future research directions.

Keywords: Agriculture, Blockchain, Traceability

1. INTRODUCTION

Agriculture may be necessary for the majority of people worldwide to survive. Agriculture growth requires increased productivity and quality, adequate marketing infrastructure and assistance , and efficient food management. Food safety appears to be a major concern shared by both producers and consumers. Transparency in supply chains aids in the improvement of manufacturing procedures .Traceability is also important because it allows us to see where the product came from, including information such as the producer, harvesting and production dates, and so on. Advanced agricultural technologies are being developed to address complex

A SURVEY ON THE IMPLEMENTATION OF ARTIFITIAL INTELLIGENCE IN AGRICULTURE

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Abstract-Agriculture plays an important role in the financial sector. The advancement in technology have affected the agricultural enterprise in various ways. The demand for food and employment is increasing day by day. Conventional methods used by farmers were no longer sufficient to fulfil these requirements. Thus new automated technologies have developed. These advanced technologies helps to satisfy the meal requirements and employment probabilities to billions of people. Artificial Intelligence not only enable farmers to enhance efficiency and also it improves the quality and accuracy of the harvest.AI technology helps in detecting diseases in plants ,pests and terrible nutrition of farms.AI sensors helps to find out damaged weeds and then determine which herbicide to apply within the region. The paper discuses functions of Artificial Intelligence in agriculture such as irrigation, weeding, spraying with the aid of sensors and distinctive ability embedded in robots and drones. These automated technologies helps to reduce the usage of water resources, pesticides, herbicides, continues the fertility of the soil, also helps in making environment friendly and improves the productivity and enhance the quality. This paper surveys the work of many researchers to get a brief overview about the present day implementation of automation in agriculture, the weeding systems through the robots and drones.

Keywords:AI,Agriculture, Irrigation, Automation

INTRODUCTION

The world's population is assumed to be almost 10 billion by means of 2050,boosting agricultural order-in a scenario of humble monetary development with the aid of somewhere in the vary of 50% contrasted with 2013. At present, about 37.7% of total land floor is used for crop production. From employment technology to contribution to National Income, agriculture is

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Research Article

Diagnostic feasibility of time domain features for detecting and characterizing cry cause factors - an investigation

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ABSTRACT

The very first cry of an infant gives vital information about the health of infant, and as they grow the acoustics change with the development of their vocal tract system. This reflects the learning mechanism of infant cry-cause factors, which upon solving will give a huge impact in the areas of medical and household. The behaviour of infant cry records is frequently used for non-invasive infant health inspection and monitoring.

Automated approaches for forecasting health status, on the other hand, are highly dependent on the features extracted. In this paper, the diagnostic feasibility of the