PROCEEDINGS OF

International Conference on Veracity Research in Scientific Computation and Engineering Trends

ICVRSCET 2022

Organized by

V.R.S.

COLLEGE OF ENGINEERING AND TECHNOLOGY

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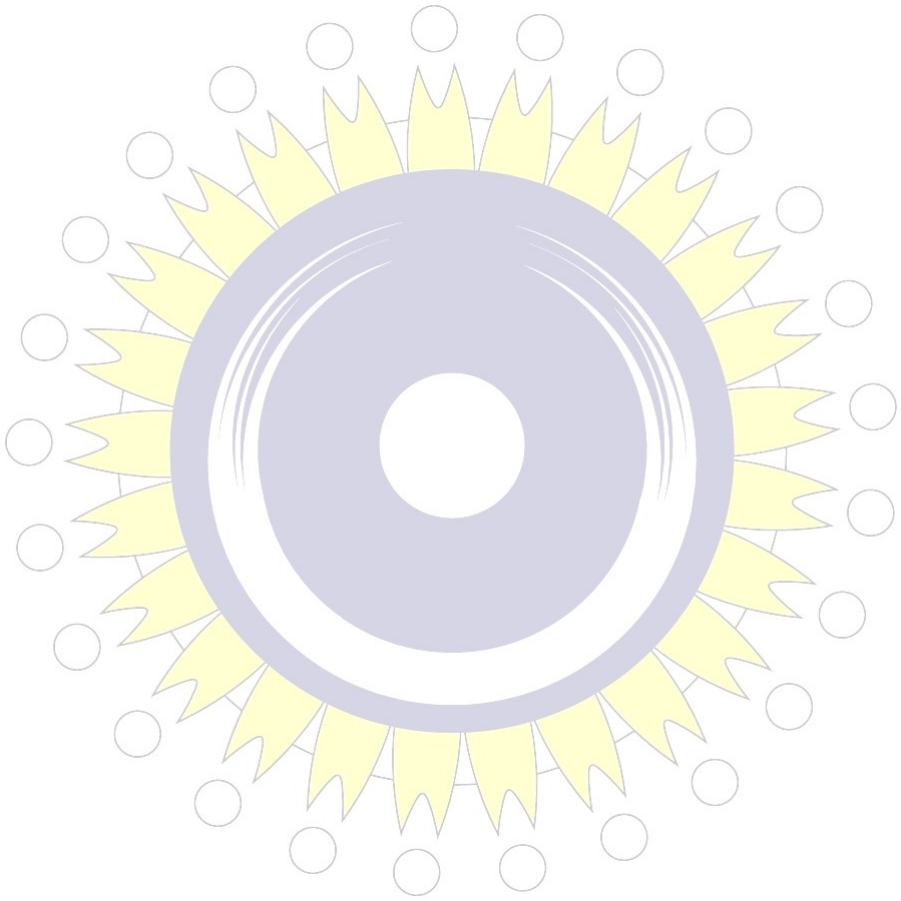
Arasur - 607 107, Villupuram District, Tamilnadu, India.

PROCEEDINGS OF INTERNATIONAL CONFERENCE ON VERACITY RESEARCH IN SCIENTIFIC COMPUTATION AND ENGINEERING TRENDS (ICVRSCET-2022)

22nd February 2022



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Arasur - 607 107, Villupuram District,

Tamil Nadu, India.

MESSAGE FROM

V. R. S COLLEGE OF ENGINEERING AND TECHNOLOGY

Dear Colleagues and Guests,

It gives us immense pleasure to extend our heartfelt greetings to all participants of the **International Conference on Veracity Research in Scientific Computation and Engineering Trends (ICVRSCET-2022)**, organized by **V.R.S. College of Engineering & Technology**, Arasur, Villupuram District, Tamil Nadu, India. This conference stands as a testament to our institution's continued commitment to fostering innovation, critical thinking, and collaborative research in the fields of science, computation, and engineering.

We are delighted to witness the presence of distinguished researchers, academicians, industry experts, and students from around the globe, whose participation has already begun to enrich the scientific discourse and energize the spirit of collaboration and innovation. The insightful presentations, engaging discussions, and vibrant exchanges are creating a truly rewarding and intellectually stimulating experience for all.

The **ICVRSCET Conference series was initiated in 2019 with its first successful edition**. **Though the second edition could not take place due to the challenges posed by the COVID-19 pandemic**, we are proud to host **ICVRSCET-2022 as the 3rd edition** of the conference. This event marks a significant step forward in reviving our commitment to academic excellence and fostering international research collaboration.

ICVRSCET-2022 offers participants a platform to explore emerging trends in scientific computation and engineering, present and publish research findings, and connect with peers and leaders in the field. The conference also encourages the development of new professional relationships and collaborations that extend beyond its duration. The presence of eminent keynote speakers and the diversity of sessions further enhance the depth and scope of the academic experience.

In addition to scholarly enrichment, participants have the opportunity to enjoy cultural exchanges and the warm, inclusive atmosphere that our institution proudly fosters. This conference is not only a celebration of ideas and innovation, but also of global unity through knowledge. We extend our sincere thanks to all contributors, participants, and supporters who made this event possible. We look forward to the continued success of ICVRSCET in the years to come and to welcoming you again in future editions.

V.R.S. College of Engineering & Technology takes great pride in hosting this prestigious event and expresses heartfelt appreciation for your honorable presence and enthusiastic participation.

V.R.S College of Engineering and Technology

Arasur, Villupuram District, Tamil Nadu, India.

ABOUT THE CONFERENCE

The **International Conference on Veracity Research in Scientific Computation and Engineering Trends (ICVRSCET-2022)** serves as a premier academic platform dedicated to promoting integrity, innovation, and collaboration in scientific and engineering research. This international forum unites eminent academicians, researchers, industry professionals, and students from across the globe to exchange knowledge and showcase advancements in areas such as scientific computation, artificial intelligence, data science, emerging technologies, and engineering education.

Designed to foster the presentation of original research and encourage interdisciplinary exploration, the conference features keynote addresses by distinguished experts, technical paper presentations, and interactive sessions that stimulate insightful dialogue. **ICVRSCET- 2022** aims to cultivate groundbreaking ideas and forge enduring professional networks within the global scientific and engineering communities.

Reflecting a deep commitment to academic excellence, this event aspires to serve as a catalyst for transformative research, thought leadership, and continuous learning in the ever- evolving landscape of science and technology.

SCOPE OF CONFERENCE

ICVRSCET-2022 focuses on cutting-edge research across a broad spectrum of disciplines, including computational science, artificial intelligence, machine learning, data analytics, smart systems, cybersecurity, renewable energy, and engineering education. The conference aims to tackle complex real-world challenges by fostering interdisciplinary collaboration and promoting innovative technological solutions.

ABOUT VRSCET

V.R.S. College of Engineering and Technology was established in the year 1994 under the aegis of S.P.S. Educational Trust with the mission to provide quality, career-oriented technical education to students, especially from rural and semi-urban areas. The institution is approved by the Government of Tamil Nadu and the All-India Council for Technical Education (AICTE), New Delhi, and is affiliated with Anna University, Chennai. It is accredited by NAAC, earlier by NBA, and recertified under ISO 9001:2008 by TÜV SÜD South Asia, reflecting its strong commitment to academic quality and continuous improvement. The college is managed by a dedicated Board of Governors with Mrs. Vijaya Muthuvannan as Chairperson, Mr. S.R. Ramanathan as Secretary & Correspondent, Mr. N. Muthuvannan as Director–Board of Governors, and Er. M. Saravanan overseeing the administration. As of 2022, the college has completed 28 years of dedicated service in technical education, offering five undergraduate and one postgraduate program. With state-of-the-art infrastructure including well-equipped classrooms, modern laboratories, advanced computing facilities, comprehensive sports and hostel amenities, medical and transport services, and high-speed Wi-Fi (200 Mbps), the college provides a conducive learning environment. Its Central Library spans 8,800 sq ft and holds 31,718 volumes across 14,079 titles, along with subscriptions to 56 national journals, 5 magazines, and access to 587 national and international journals through DELNET. Recognized by Anna University for its infrastructure and staff strength, the college received ratings such as 92.0% for Mechanical Engineering and over 80% in most other departments. Through a blend of rigorous academics, applied research, and a strong emphasis on innovation and ethics, V.R.S. College of Engineering and Technology continues to shape competent, socially responsible engineers and technologists equipped to meet the evolving challenges of the modern world.

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TABLE OF CONTENT

IC22-013: AN EXAMINATION SMART SYSTEM HALL ALLOCATION AND PREPARATION OF THE DATA CHART

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ABSTRACT

Educational institutions conducting examinations often face challenges in manually allocating examination halls to students due to large student strength. The traditional manual process is time-consuming, prone to errors, and delays communication of hall assignments to students. To address these challenges, we propose a web-based application that automates the examination hall allocation process, making it more efficient and accurate. This system will enable administrators to allocate halls systematically through an admin panel connected to a database containing student and staff details. The allocation will be based on departments, with each hall accommodating students from multiple departments and subject codes. Once the allocation is completed, the results can be exported to an Excel sheet for record-keeping. Additionally, staff members will be provided with login credentials to access their supervising hall allocations through a staff module, while students can retrieve their exam hall details using their roll numbers through a student module. By eliminating manual processes, this system reduces paperwork, minimizes human errors, and ensures timely communication of seating arrangements. Ultimately, it enhances efficiency while reducing costs and manpower required for the hall allocation process.

Keywords: Seating arrangement, automation, student database, hall allocation, examination management.

IC22-147: PERFORMANCE EVALUATION OF NORMAL AND HIGH STRENGTH BEAMS USING ARTIFICIAL NEURAL NETWORK-BASED MODELING WITH MICRO-REINFORCEMENT

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ABSTRACT

This study focuses on developing an artificial neural network (ANN) model to predict the performance of normal and high-strength concrete beams with micro reinforcement. The dataset used for ANN modeling was collected from relevant literature. A backpropagation network with the Levenberg-Marquardt algorithm was selected for the proposed model, implemented using MATLAB. A comparative analysis was conducted between experimental results, ANN predictions, and regression modeling. Statistical indicators such as Root Mean Square Error (RMSE), Coefficient of Determination (R^2), and Mean Absolute Percentage Error (MAPE) were used to evaluate the accuracy of the predictions. The obtained R^2 values were within an acceptable range, demonstrating a strong correlation between the ANN model and experimental results. Additionally, the proposed regression equations exhibited high accuracy in predicting the performance parameters of normal and high-strength concrete beams with micro reinforcement. The regression modeling results also showed good convergence with the experimental data.

Keywords: ANN, FRC, Concrete Beams, Regression Modeling, Statistical Analysis.

IC22-099: AN EXTENSIVE NEURAL NETWORK ALGORITHM FOR TWITTER DATA SPAM DETECTION

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ABSTRACT

With the increasing popularity of online social networking, platforms like Twitter have become prime targets for spammers who spread malicious content. Most existing spam filtering techniques focus on detecting and blocking spammers. However, spammers can easily create new accounts and continue posting spam tweets. Therefore, there is a critical need for robust spam detection methods at the tweet level to prevent spam in real-time. To achieve this, various machine learning algorithms have been explored in literature for spam detection. Recently, deep learning techniques have shown promising results in natural language processing (NLP) tasks. This study leverages the strengths of both traditional feature-based models and deep learning models to develop an ensemble-based spam detection approach for Twitter. The proposed system consists of five Convolutional Neural Networks (CNNs) trained using different word embeddings (GloVe, Word2Vec), along with a feature-based model that incorporates content-based, user-based, and n-gram features. These models are combined using a multilayer neural network, acting as a meta-classifier, to enhance spam detection accuracy. This hybrid approach ensures effective real-time spam identification at the tweet level.

Keywords: Classification, Social Media, Spam Detection, Twitter, Deep Learning, Ensemble Model.

IC22-204: USING A DIGITALIZATION STRATEGY, THE QUALITY OF SERVICE-BASED NUTRITION ALLOCATION

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ABSTRACT

Food is essential for human survival and a primary source of energy. However, in recent times, the presence of chemical substances and contaminants in food has led to serious health concerns, affecting both adults and children. Ensuring food quality has become a critical issue, requiring effective monitoring and detection techniques. This study proposes a food quality detection system using a pH sensor to measure the pH value of food and detect bacterial contamination. The proposed system can be utilized by government authorities to monitor food quality in restaurants. The results of the food analysis will be stored on a server and can be accessed remotely. Additionally, a GSM-based messaging system will notify users of the food's pH value and contamination status. Furthermore, the system allows for restaurant location sharing, enhancing transparency and public awareness regarding food safety standards.

Keywords: Food Quality, pH Sensor, Bacterial Contamination, GSM Notification, Restaurant Monitoring.

IC22-056: MONITORING AND EVALUATING DUMB PEOPLE'S GESTURES WITH SENSOR-BASED TECHNOLOGY

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ABSTRACT

One of the major challenges faced by people with disabilities is adapting to rapidly evolving technology. Access to communication technologies is crucial for individuals with hearing and speech impairments. Generally, deaf and mute individuals rely on sign language to communicate, but a barrier exists when interacting with people who do not understand it. To bridge this communication gap, this study proposes a sign language translation system that facilitates seamless interaction between hearing-impaired and non-disabled individuals. The system utilizes IoT-based technology to translate sign language, making communication more accessible and efficient. Additionally, a mobile application is integrated to assist in monitoring and improving user interactions. This approach eliminates the need for a human translator and enhances accessibility for people with disabilities in their daily lives.

Keywords: Sign Language, Communication Technology, IoT, Accessibility, Speech Impairment.

IC22-188: USING VIDEO ANALYSIS TO IDENTIFY UNETHICAL BEHAVIOR IN CLASSROOM ASSESSMENTS

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ABSTRACT

One of the major challenges in the examination system is the occurrence of malpractices, primarily due to the absence of a reliable identity verification system for both offline and online examinations. To address this issue, researchers have explored the use of artificial intelligence techniques and biometric authentication to enhance security and prevent fraudulent activities. This study focuses on image quality assessment-based liveness detection techniques to identify and prevent malpractice in examination halls. The proposed system ensures uniqueness, stability, collectability, performance, acceptability, and resistance to forgery in biometric verification. By distinguishing between real and fake users through image quality measurements, the system enhances examination security and ensures credible identity verification.

Keywords: Examination Security, Malpractice Detection, Biometrics, Liveness Detection, Identity Verification.

IC22-072: SENTIMENTAL ANALYSIS SURVEY USING DEEP LEARNING METHODS

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ABSTRACT

The field of opinion mining and sentiment analysis (SA) has witnessed rapid growth, aiming to extract and analyze opinions from various social media platforms using machine learning (ML) techniques. These techniques involve polarity detection, sentiment classification, and subjectivity analysis to determine expressed emotions such as positive, negative, or neutral sentiments. Sentiment analysis is a complex and critical task that integrates natural language processing (NLP), web mining, and ML. To enhance accuracy and efficiency, deep learning (DL) techniques have been incorporated due to their ability to automatically learn patterns from data. This study reviews recent advancements in DL-based sentiment analysis, focusing on models such as Deep Neural Networks (DNN), Deep Belief Networks (DBN), Convolutional Neural Networks (CNN), and Recurrent Neural Networks (RNN). Additionally, this paper explores various classification methods in SA, including Rule-Based Classifiers (RBC), K-Nearest Neighbors (KNN), and Support Vector Machines (SVM). Finally, the performance of these classification techniques is compared based on accuracy, highlighting their strengths and limitations in sentiment analysis tasks.

Keywords: Sentiment Analysis, Opinion Mining, Deep Learning, NLP, Machine Learning.

IC22-139: A MECHANICAL FAILURE PREDICTION AND EFFECTIVE REPLACEMENT IOT DESIGN

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ABSTRACT

The increasing demand for vehicle safety and reliability has led to the development of advanced monitoring systems to detect mechanical failures before they result in accidents. Many vehicle failures occur due to various factors, such as engine malfunctions, overheating, brake failures, and sensor errors, which can be difficult to predict and prevent using conventional methods. To address this issue, researchers have explored the use of Internet of Things (IoT)-based solutions to enhance real-time vehicle monitoring and failure prediction. This study proposes an IoT-based framework that integrates sensors and microcontrollers (MCs) to continuously monitor the critical parameters of vehicles, such as engine temperature, tire pressure, fuel efficiency, and braking system performance. The collected sensor data is analysed using data mining techniques to detect patterns and predict potential failures before they occur. The proposed system enables early detection of mechanical issues, allowing drivers and fleet operators to take preventive measures and avoid costly repairs or accidents. The research findings indicate that the proposed IoT-based monitoring system significantly improves the accuracy of failure prediction, providing a proactive approach to vehicle maintenance. By integrating real-time data collection, processing, and predictive analytics, this system enhances vehicle safety, efficiency, and reliability. Additionally, the implementation of automated alerts can notify users about possible failures, ensuring timely maintenance and reducing unexpected breakdowns. Overall, this study demonstrates that IoT and data mining techniques offer a cost-effective and efficient solution for vehicle failure prediction and monitoring. Future research can further optimize the system by incorporating machine learning algorithms to improve prediction accuracy and adaptability to different vehicle models.

Keywords: Failure Prediction, Vehicle Monitoring, Internet of Things (IoT), Data Mining, Predictive Analytics.

IC22-231: IMPROVING MANET COMPETENCE BY USING AN ARPRP PRINCIPLE TO DIPPING ROUTING OVERHEAD

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ABSTRACT

A Mobile Ad Hoc Network (MANET) is a dynamic and self-configuring network formed by mobile nodes without the need for a fixed infrastructure. Due to the continuous movement of nodes, frequent connection breakages occur, leading to route failures and repeated route discoveries. Traditional broadcasting techniques used for route discovery often result in broadcast storm problems, which increase network overhead and reduce efficiency. To address this issue, the Adjacent Rebroadcast Probabilistic Rebroadcast Protocol (ARPRP) is utilized, which optimizes route discovery by minimizing unnecessary retransmissions and reducing routing overhead. In MANETs, nodes continuously join and leave the network, leading to frequent topology changes. Since MANETs rely on intermediate nodes to forward packets using a multi-hop communication approach, any failure in these nodes can cause path breakdowns, disrupting data transmission and degrading overall network performance. To mitigate this problem, the proposed system employs a path revamping mechanism using the AMRIS (Ad Hoc Multicast Routing Protocol using Increased ID Numbers) protocol. AMRIS enhances the network by minimizing retransmissions, reducing delays, improving packet delivery ratio, and increasing throughput. By integrating the ARPRP protocol for efficient route discovery and the AMRIS protocol for fault-tolerant path recovery, the proposed system significantly enhances network performance and reliability. The results demonstrate a substantial improvement in packet delivery, reduced routing overhead, and optimized network efficiency. The integration of these protocols ensures a more stable and efficient MANET, addressing critical challenges in routing, link failures, and data transmission reliability.

Keywords: AMRIS Protocol, MANET, ARPRP Protocol, Routing Overhead, Path Failure, Path Repair, Multicast Routing.

IC22-044: DETECTION OF HUMAN PRESENCE USING REMOTE SENSING IN A PROHIBITED AREA

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ABSTRACT

With the increasing shift toward internet-based technologies and the growing accumulation of valuable assets, the incidence of manmade disasters has also escalated. Crimes such as theft, smuggling, human trafficking, murder for financial gain, and terrorist activities like bomb blasts often involve organized groups rather than individual perpetrators. These illegal activities are frequently planned and executed in remote or forested areas, where human presence is minimal or absent, making manual surveillance challenging and resource-intensive. Deploying human personnel for continuous monitoring in such regions is impractical and costly, and since criminal groups frequently change locations, it is difficult to predict and track their movements effectively. To address this challenge, it is essential to develop an automated mechanism that enables real-time human presence detection in remote areas without manual intervention. Such a system should ensure efficient monitoring, reduce implementation costs, and provide timely alerts to authorities to prevent potential disasters. This study explores various human presence detection techniques and proposes a model based on Microwave Doppler Radar technology sensors. This technology leverages Doppler radar principles to detect motion and human activity in a given area. The proposed system can effectively monitor restricted or vulnerable areas, sending automated alerts to concerned authorities for swift action. By integrating Doppler radar, Passive Infrared (PIR) sensors, Ultra-Wideband (UWB) sensors, and remote sensing techniques, the proposed model ensures accurate, real-time, and cost-effective surveillance. The system can be deployed in high-risk areas, enhancing security and crime prevention efforts without requiring continuous human supervision. This research contributes to advancing automated surveillance systems, improving public safety, and mitigating manmade disasters.

Keywords: Human Presence Detection, Doppler Radar, Remote Sensing, PIR Sensor, UWB Sensor, Remote Monitoring, Automated Surveillance.

IC22-111: REAL TIME AND INTELLIGENT CROPS WASTAGE ASSESSMENT USING GEOSPATIAL DATA FOR EARLY FLOOD DETECTION

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ABSTRACT

The agriculture sector is significantly impacted by climate change, affecting India's food economy and posing risks to both national and global populations. Climate variations can threaten economic development and food security, particularly in agrarian-dependent economies like India. Given the country's vast land and water resources, a substantial portion of its economy is reliant on agriculture. Among various crops, banana cultivation is widely preferred by farmers due to its cost-effectiveness compared to other crops. However, banana farmers suffer severe financial losses due to climate fluctuations—excessive rainfall and extreme temperatures can reduce productivity, while low rainfall and poor humidity can also result in low yields. This study aims to analyze the impact of climate change on banana crop cultivation using historical data from 2012 to 2018, collected through geographical mapping and remote sensing images. By leveraging machine learning models, a trained predictive model will be developed to assess the risk levels associated with banana cultivation under different climatic conditions. The proposed model will use historical climate data to forecast potential risks and provide actionable insights to help farmers minimize losses and improve crop yield stability. By integrating geospatial analysis with predictive modelling, this research contributes to agricultural sustainability and helps farmers adapt to climate-induced risks. The findings aim to support decision-making processes in agriculture planning and climate resilience strategies, ensuring better preparedness for climate variability.

Keywords: Agriculture, Climate Change, Banana Cultivation, Remote Sensing, Geographical Mapping, Risk Prediction, Machine Learning.

IC22-085: WATER BUDGET AND WATER CONSUMPTION LEVEL PROJECTIONS FOR ILALUR

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ABSTRACT

Water is a fundamental resource for the survival of all living beings, making its conservation and efficient use crucial for ensuring sustainability for future generations. This study focuses on forecasting groundwater levels using extrapolation techniques based on rainfall data to predict the potential depletion timeline for a village heavily reliant on groundwater. The village in focus supplies nearly 70% of the water for the Old Mahabalipuram Road (OMR) stretch in Chennai through water tankers, making it a critical water source. Previously, Injambakkam on the East Coast Road (ECR) supplied water, but over-extraction led to seawater intrusion, rendering groundwater unsuitable for consumption. To prevent a similar water crisis in the current village, this study aims to identify a safe extraction period, beyond which groundwater usage must be restricted or regulated. By analysing historical groundwater and rainfall data, this research provides an estimate for when the village may face severe water shortages. The findings were submitted to the village Panchayat, along with precautionary recommendations to ensure sustainable water management and prevent over-extraction. The study highlights the importance of proactive measures in safeguarding critical water resources and maintaining long-term water security for dependent communities.

Keywords: Groundwater Depletion, Water Conservation, Rainfall Forecasting, Sustainability, Chennai, Water Management, Seawater Intrusion.

IC22-067: AN INTELLIGENT ANDROID APP FOR EDUCATIONAL INSTITUTIONS' STUDENT ASSISTANT SYSTEMS

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ABSTRACT

The objective of this study is to leverage emerging technologies to enhance and enrich the education system, given the rapid growth of educational technology in India. This research focuses on developing an Android-based mobile application designed to streamline various academic and administrative tasks for students and educational institutions. The proposed Android application incorporates features such as profile management, attendance tracking, notes storage, CGPA calculation, and class scheduling. By integrating these functionalities into a single platform, the application aims to simplify academic record management, improve efficiency, and enhance the learning experience for students. The implementation of this application will enable educational institutions to digitally manage student details, reducing manual efforts and improving data accessibility. The study highlights the impact of mobile technology in revolutionizing traditional educational practices, making academic processes more efficient, user-friendly, and accessible.

Keywords: Education Technology, Android Application, Student Management, Attendance Tracking, CGPA Calculation, Class Scheduling, Digital Learning.

IC22-175: DESIGN OF A HIGH-SPEED MULTIPLIER USING A KOGGE STONE ADDER

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ABSTRACT

Multipliers are fundamental components in high-speed computational devices, primarily built using combinational circuits. These circuits have high gate and transistor density, leading to significant power dissipation, making power efficiency a critical concern. This study aims to design a high-speed multiplier by incorporating a fast-parallel prefix adder, specifically the Kogge-Stone Adder (KSA), to enhance computational performance. A comparative analysis of adders such as Carry Skip Adder (CSKA), Carry Look-Ahead Adder (CLA), Carry Save Adder (CSA), and Carry Select Adder (CSLA) reveals that Kogge-Stone Adder (KSA) offers superior speed. Since the Vedic Multiplier (VM) is considered one of the fastest multipliers, this research proposes a hybrid high-speed Vedic Multiplier by replacing its conventional adder with KSA. The proposed hybrid multiplier achieves lower power consumption, reduced delay, and improved Power Delay Product (PDP). The combination of Vedic mathematics and Kogge-Stone Adder enhances speed, making this multiplier an efficient choice for high-performance applications in digital signal processing, artificial intelligence, and embedded systems.

Keywords: High-Speed Multiplier, Vedic Multiplier (VM), Kogge-Stone Adder (KSA), Power Delay Product (PDP), Carry Skip Adder (CSKA), Carry Look-Ahead Adder (CLA), Carry Save Adder (CSA), Carry Select Adder (CSLA).

IC22-029: QUALITY INDEX CALCULATOR AND AUTOMATIC QUESTION PAPER

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ABSTRACT

Student assessment plays a vital role in the learning process, primarily conducted through examinations. The generation of question papers from a question bank is a key task in learning management systems and educational institutions. Currently, manual question paper generation is time-consuming and requires significant effort from teachers. Additionally, calculating the quality index of a question paper using Bloom's Taxonomy is also done manually, requiring considerable time and manpower. To address these challenges, we propose an automated question paper generation system integrated with an automatic quality index calculator. This system significantly reduces manual effort by allowing users to log in, upload questions, and generate structured question papers efficiently. The generated question paper is then stored as a document file for future use. Furthermore, the system evaluates the quality index of the paper based on Bloom's Taxonomy, ensuring a balanced assessment of cognitive levels. This automation enhances the efficiency, accuracy, and fairness of the question paper generation process while minimizing human intervention. The proposed system provides a user-friendly interface, streamlines question selection, and improves overall exam management in educational institutions.

Keywords: Automated Question Paper Generation, Learning Management System, Bloom's Taxonomy, Quality Index Calculation, Educational Technology.

IC22-220: AI-ASSISTED ANOMALY DETECTION IN CLOUD-HOSTED ELECTRONIC HEALTH RECORDS USING AUTOENCODERS AND ISOLATION FORESTS OPTIMIZED WITH FIREFLY ALGORITHM

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ABSTRACT

Detecting anomalies in cloud-based Electronic Health Records that are important for protecting patient information is tackled. Conventional techniques, including statistical models and rule-based systems, fail to address the complexity and size of healthcare information, leading to excessive false positives and a lack of scalability. Our approach combines Autoencoders and Isolation Forests with a Firefly Algorithm-based optimization for enhancing detection efficiency and accuracy. This is a new approach because of the hybrid application of these techniques, allowing for greater scalability as well as fewer false positives in cloud environments. The results indicate that the model attains 98.91% accuracy, 82.50% precision, 90.32% recall, 86.33% F1-score, and 96.20% AUC, proving its better performance. In comparison to existing models, it performs better compared to previous approaches, e.g., using SVM or LSTM, where their accuracy was reported at a lower level (e.g., 93.98%). This method significantly improves anomaly detection for cloud-hosted EHR systems, enhancing security, data integrity, and efficiency in real-time processing, thus being an extremely influential tool for healthcare purposes.

Keywords: Anomaly Detection, Cloud-Hosted Electronic Health Records, Autoencoders, Isolation Forests.

IC22-120: SOCIAL INTERACTION-BASED STRESS DETECTION OF PEOPLE

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ABSTRACT

Psychological stress is a significant threat to human health, arising from emotional and mental reactions to stressful situations. Research indicates that an individual's stress levels are closely linked to their social interactions on social media platforms. This paper presents a model that analyses user-generated data from social media to detect stress levels. By leveraging a dataset, we establish correlations between user stress and their online interactions. Our proposed system employs graph-based analysis to visualize stress levels dynamically. If a user exhibits signs of high stress, the system sends an alert message and suggests relaxation techniques to mitigate stress. Unlike existing models that rely on static data inputs, our approach dynamically evaluates the volume and nature of user posts, leading to more accurate stress detection. Experimental results indicate that our proposed model improves stress detection performance by 10-13% compared to traditional methods. This research demonstrates how social media analytics can be effectively utilized to assess and manage psychological stress, promoting mental well-being through early detection and intervention.

Keywords: Stress Detection, Social Media, Social Interaction, Graph-Based Model, Mental Well-being.

IC22-054: A SMART CIVILIZATION APPROACH USING AN ONLINE APPLICATION PORTAL TO COMPLAIN AND RECTIFY

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ABSTRACT

Reporting road and community issues has traditionally been a complex and time-consuming process for citizens. People must navigate lengthy procedures and bureaucratic formalities to report problems such as road damage, potholes, overflowing trash bins, malfunctioning streetlights, and other municipal concerns. Despite these efforts, there is no assurance that complaints will be addressed by the relevant authorities, leading to many issues remaining unresolved. To simplify this process, we propose an online complaint management system in the form of a mobile application. This platform enables users to report infrastructure defects, transportation issues, environmental cleanliness concerns, and other community problems directly to the responsible authorities. By using location-based services, the system ensures that complaints are routed to the appropriate department for quicker resolution. Through this online portal, citizens can not only report issues but also track progress, discuss concerns, and engage with their community, fostering a more efficient and transparent governance system. This initiative aims to improve civic engagement and ensure a cleaner, safer, and well-maintained urban environment.

Keywords: Community Issues, Complaint Management System, Smart Governance, Public Infrastructure, Mobile Application.

IC22-093: SMART CAR AUTOMATION AND ACCIDENT ALERT SYSTEMS BASED ON THE INTERNET OF THINGS

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ABSTRACT

With increasing vehicle speeds, road accidents have become a major concern, often resulting in loss of life due to minor driving mistakes, especially in school zones, hilly areas, and highways. To prevent such accidents and alert drivers, highway departments place signboards indicating speed limits and accident-prone areas. However, these signs may be overlooked, or drivers may ignore them, leading to fatal consequences, especially in high-traffic zones. To address this issue, we propose an automatic speed control system that detects accident-prone zones and alerts drivers in real time. This system is designed as a Smart Vehicle Security Controller, utilizing IoT, embedded systems, and multiple sensors such as IR sensors, ultrasonic sensors, alcohol sensors, and vibratory sensors to monitor driving behaviour and road conditions. When a vehicle approaches a controlled zone, the system automatically reduces speed and sends alerts to the driver, ensuring improved road safety. The proposed solution aims to minimize human error, enforce speed regulations, and enhance overall vehicle safety in hazardous areas. With IoT-based real-time monitoring, authorities can track high-risk zones and take necessary actions, leading to a safer and smarter transportation system.

Keywords: Smart Vehicle Control, IoT, Embedded System, Speed Regulation, Road Safety, Traffic Monitoring.

IC22-162: RESEARCH ON THE USE OF POLYURETHANE LINING FOR WASTE REDUCTION IN RCC SILOS

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ABSTRACT

Elevated reinforced concrete (RC) silos play a crucial role in industrial production, particularly in thermal power plants, where large quantities of fly ash are generated as waste. Efficient storage solutions are essential to meet the growing demand for power production, ensuring safe and effective containment of fly ash. The design and structural analysis of silos require special attention due to their height and heavy load-bearing capacity. This study examines the structural performance of RC silos, comparing partially tapered and fully tapered designs under wind, seismic, and temperature effects. Findings indicate that fully tapered silos experience minimal displacement, making them more stable compared to partially tapered silos. Additionally, the use of polyurethane lining enhances operational efficiency by reducing material wastage and abrasion, thereby increasing the durability of the storage system. The application of polyurethane sheets and fixing chemicals further improves the performance and longevity of silos. By optimizing design and material selection, this study aims to improve storage efficiency, structural stability, and overall performance of RC silos used in thermal power plants.

Keywords: RC Silos, Structural Analysis, Fly Ash Storage, Polyurethane Lining, Seismic Effects, Industrial Storage.

IC22-006: A LIVE SESSION AUTOMATIC LEARNER FOCUS DETECTION SYSTEM

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ABSTRACT

The shift from traditional seminars to webinars has revolutionized education and professional training, making online learning more accessible. However, one major challenge in virtual sessions is ensuring viewer attentiveness. Unlike physical classrooms, where engagement can be easily observed, online settings lack direct interaction, making it difficult for presenters to gauge audience focus. This paper introduces a real-time eye gaze detection system that monitors participant attentiveness during webinars. The system utilizes computer vision and machine learning techniques to track eye movements via a webcam-based gaze detection model. By analyzing viewer focus patterns, the system determines whether a participant is actively engaged or distracted. The gathered insights are then relayed to the presenter, helping them adjust their delivery style and improve engagement levels. The proposed method provides a non-intrusive, automated solution to monitor webinar effectiveness. It allows educators, trainers, and speakers to receive real-time feedback on audience attention, enabling them to enhance the quality and impact of online sessions. Additionally, the system can be extended to various domains, such as corporate training, e-learning platforms, and virtual meetings, improving overall online communication dynamics. By integrating eye-tracking technology into online education, this system aims to bridge the gap between physical and virtual learning environments, ensuring a more interactive and engaging experience.

Keywords: Webinars, Eye Gaze Detection, Viewer Engagement, Computer Vision, Focus Analysis, Online Learning.

IC22-183: AN EXPERIMENTAL INVESTIGATION ON THE PROPERTIES OF BENDABLE CONCRETE

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ABSTRACT

Bendable concrete, also known as Engineered Cementitious Composites (ECC), is an advanced material designed to exhibit superior flexibility and durability compared to traditional concrete. ECC has a strain capacity exceeding 3%, making it behave more like a ductile metal rather than a brittle material. This study focuses on evaluating the mechanical properties of ECC by incorporating supplementary cementitious materials. Unlike conventional concrete, ECC eliminates coarse aggregate, replacing it with specially designed microfibers that enhance its flexibility and crack resistance. The research involves conducting various tests, including the slump test, compression test, split tensile test, and flexural test, to assess its performance. Experimental results indicate that even at a low fiber volume fraction (~2%), ECC exhibits strain-hardening behaviour, achieving a strain capacity of 3-5%, compared to 0.01% in standard concrete. Additionally, flexural tests demonstrate that ECC beams can withstand high loads and large deformations without experiencing brittle fracture, even in the absence of steel reinforcement. The findings confirm that ECC offers significant improvements in strength, ductility, and durability, making it an ideal choice for seismic-resistant structures, bridges, and infrastructure projects requiring enhanced flexibility and crack resistance.

Keywords: Engineered Cementitious Composites, Bendable Concrete, Flexibility, Strain-Hardening, Brittle Fracture, Microfibers, Structural Durability.

IC22-134: THE APPLICATION OF POLYALUMINUM CHLORIDE FOR THE TREATMENT OF HOUSEHOLD WASTE

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ABSTRACT

This project focuses on the sewage treatment and effluent treatment process to ensure compliance with regulatory guidelines and environmental standards. The primary objective of sewage and effluent treatment is to remove various pollutants, including solids, organic carbon, nutrients, inorganic salts, metals, and pathogens, thereby minimizing their impact on public health and the environment. Effective wastewater collection and treatment play a crucial role in environmental protection and public safety. Different treatment methods are employed to reduce water contamination and organic waste content, ensuring the safe disposal or reuse of treated water. The ultimate goal of wastewater management is to protect the ecosystem while addressing public health and socio-economic concerns. This paper discusses sewage and effluent treatment techniques, the factors influencing their selection and design, and the benefits of advanced treatment technologies. Poly-aluminium chloride (PAC) is used as a coagulant in effluent treatment plants (ETPs) to effectively remove bacteria, sludge particles, odor, and color from wastewater. ETPs play a key role in dust suppression, while treated water from sewage treatment plants (STPs) is often reused for agriculture and irrigation. The study highlights the significance of adopting efficient wastewater treatment strategies to promote sustainability and resource conservation while mitigating the adverse effects of wastewater discharge on the environment.

Keywords: Sewage Treatment, Effluent Treatment, Poly-Aluminium Chloride (PAC), Wastewater Management, Sludge Reduction, Environmental Protection.

IC22-049: A STUDY EXAMINING THE PARTIAL REPLACEMENT OF FINE AGGREGATE IN CONCRETE WITH FOUNDRY SAND, M-SAND, AND COARSE AGGREGATE USING STEEL SLAG

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ABSTRACT

The construction industry in India primarily relies on natural river sand as fine aggregate in cement concrete. However, the excessive extraction of river sand has led to environmental degradation and depletion of natural resources. To address this issue, alternative materials such as foundry sand, manufactured sand (M-sand), and steel slag have been explored for partial replacement of fine and coarse aggregates in concrete. This study investigates the feasibility of utilizing these industrial by-products to produce sustainable concrete while reducing disposal and pollution concerns. The experimental work focuses on M25-grade concrete with varying proportions of replacement materials. Foundry sand and M-sand are used as substitutes for fine aggregate at 50% and 100%, while steel slag replaces 40% of coarse aggregate. Concrete cubes of dimensions 150mm × 150mm × 150mm were cast and tested for compressive strength after 28 days of curing. The results of this study aim to evaluate the mechanical properties and durability of concrete incorporating these waste materials in comparison to conventional concrete. The findings highlight the potential of using foundry sand, M-sand, and steel slag in concrete production, offering a cost-effective and environmentally friendly solution. By utilizing these alternative materials, the construction industry can promote sustainable practices while mitigating the negative environmental impact of traditional sand mining. This research contributes to the advancement of green construction technologies, supporting the development of high-performance and eco-friendly concrete.

Keywords: Foundry Sand, M-Sand, Steel Slag, Compressive Strength, Sustainable Concrete, Industrial Waste Utilization.

IC22-201: SCHEME FOR EFFECTIVE AND PRIVATE ONLINE FINGERPRINT AUTHENTICATION OVER OUTSOURCED DATA

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ABSTRACT

With the rapid advancement of biometric technology, authentication systems have become increasingly reliant on personal characteristics for identification. However, the sensitivity of biometric data raises significant privacy concerns, necessitating the development of secure authentication methods. To address these issues, this study proposes a privacy-preserving system that enables secure authentication using encrypted outsourced fingerprint data. The system employs fingerprint recognition as an authentication factor to ensure secure data transmission to authorized individuals. Euclidean distance calculation is utilized as a tool for authentication, as it effectively measures the similarity between biometric traits, making the system highly resistant to security threats. Additionally, the implementation of an online fingerprint authentication system across multiple outsourced servers enhances both efficiency and accuracy. This approach ensures that fingerprint authentication remains both secure and reliable while mitigating risks associated with biometric data exposure. By integrating encryption techniques with biometric authentication, this system provides a robust security framework suitable for applications requiring high levels of data protection.

Keywords: Privacy-Preserving, Online Authentication, Fingerprint Recognition, Secure Data Transmission, Biometric Security.

IC22-078: INVESTIGATING THE BEHAVIOR OF CONCRETE REINFORCED WITH BRISTLE COIL FIBERS EXPERIMENTALLY

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ABSTRACT

Concrete is widely recognized for its high compressive strength but low tensile strength due to its brittle nature. This limitation has led to the development of fiber-reinforced concrete, where small, discrete, and uniformly distributed fibers enhance structural integrity, tensile strength, and reduce porosity. Recent advancements in fiber-reinforced concrete emphasize the use of naturally available fibers such as nylon, polypropylene, coir, and even human hair. Unlike steel fibers, natural fibers offer advantages such as lower cost and resistance to corrosion. Among these, coir fibers have demonstrated significant improvements in both mechanical and durability properties of concrete. Various types of coir are used across industries, including in mattresses, mats, and brushes. A specialized form, Bristle coir fiber, derived from coconut husks, is known for its superior strength and stiffness compared to regular coir fibers. Since coir is a natural material, its use in concrete has minimal environmental impact. Moreover, incorporating coir fibers reduces cement consumption, further promoting environmental sustainability. This study explores the potential of Bristle coir fibers as a reinforcing material in concrete and aims to determine the optimal fiber content to maximize mechanical performance.

Keywords: Fiber Reinforced Concrete, Coir Fiber, Bristle Coir Fiber.

IC22-165: THE EFFECTIVENESS OF PRE-STRESSED CONCRETE BRIDGES AND STEEL-CONCRETE COMPOSITES WITH INTERLOADING

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ABSTRACT

Bridges are crucial infrastructure components that facilitate transportation, with their performance and behaviour varying based on structural type. This study focuses on Prestressed Post-Tensioned Bridges and Composite Bridges, analyzing their unique characteristics through both analytical and experimental methods. The structural analysis considers the construction sequence, and live load analysis follows IRC loading standards. The analytical method involves modeling the bridge using STAAD Pro software, generating outputs in terms of bending moments and shear forces, which further assist in stress and deflection calculations. The experimental method involves casting a scaled girder that represents actual bridge properties, followed by testing under scaled loads based on T-beam and L-beam distribution. Finally, the experimental results are compared with analytical results to evaluate the bridge's actual performance. This phase of the study presents the analytical findings, tabulated for discussion.

Keywords: Post-Tensioned Bridges, Software Analysis, Bending Moment, Shear Force, IRC Loading.

IC22-038: A SMART ANDROID TV NOTICE BOARD TO IMPROVE THE SPEED OF DATA PROCESSING

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ABSTRACT

Traditional notice board systems rely on physical circulars and bulletins, requiring manual effort for updating and maintenance. This process involves printing notices, distributing them across multiple locations, and ensuring they remain up to date. Managing these tasks daily is time-consuming and inefficient. To overcome these limitations, we propose an Android-based digital notice board system that utilizes the internet for remote content updates. Unlike microcontroller-based digital notice boards that require local network connectivity, our system enables administrators to update notices from any location using a smartphone or computer with internet access. An Android Television serves as the digital notice board, where the "Android Television Notice Board" application is installed. The television must maintain an active internet connection to fetch updates from a database managed by the administrator. This system facilitates instant, paperless communication, reducing manual effort while ensuring efficient and modernized information dissemination.

Keywords: Liquid Crystal Display, Notification, Global System for Mobile, Short Message Service, Graphical User Interface, Wireless Fidelity, Network, Display, Application.

IC22-116: SMART AGRICULTURE CONTROL AND DIRECT MARKETING SYSTEM BASED ON THE INTERNET OF THINGS

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ABSTRACT

Agriculture remains the primary occupation in our country, but challenges such as population growth, uncertain monsoons, inadequate irrigation, and exploitation by middlemen limit its efficiency. To address these issues, we propose a smart agricultural system using IoT technology. This system integrates GPS and GSM-based remote monitoring, moisture and pest detection, temperature sensing, intrusion alerts, automated irrigation, and direct marketing. Various sensor nodes are deployed across the farm to monitor critical parameters, which can be controlled remotely through the internet. The system utilizes sensors, Wi-Fi, cameras, and microcontrollers to collect and transmit real-time data, allowing farmers to make informed decisions. By leveraging IoT technology, this smart agriculture approach enhances productivity, reduces losses, and ensures better market access, ultimately improving farmers' welfare.

Keywords: IoT, Sensors, GPS, Microcontroller, Wi-Fi, Cloud.

IC22-023: PRODUCTION OF PAVEMENT TILES USING HIGH-DENSITY POLYETHYLENE PLASTIC WASTE

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ABSTRACT

This study investigates the improvement of flexural and compressive strength in tiles by incorporating high-density polyethylene (HDPE) plastic. The flexural and compressive strength of these tiles is evaluated using a compression testing machine. M-sand is introduced as a filler material to enhance the bonding strength between HDPE and the sand, which potentially provides superior strength compared to conventional ceramic tiles. The tiles can be manufactured either manually or using machinery, with their density distributed in three layers during compaction. This layering ensures a strong bond between the tile's bottom layer and the underlying concrete, improving durability. Given that plastic waste is non-biodegradable and its accumulation is increasing at an alarming rate, this study offers a sustainable alternative by repurposing plastic waste for tile manufacturing. Utilizing plastic waste in construction materials not only addresses environmental concerns but also provides an innovative solution for the civil engineering sector.

Keywords: HDPE, M-sand, Flexural Strength, Compressive Strength, Plastic Waste, Sustainable Construction.

IC22-190: ASSESSING THE QUALITY OF GROUNDWATER AND ITS SUITABILITY FOR RESIDENTIAL AND IRRIGATION USES IN THE CUDDALORE DISTRICT

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ABSTRACT

This study focuses on assessing the quality of groundwater in Cuddalore district and evaluating its suitability for domestic and irrigation purposes. The study area was selected based on its vulnerability to seawater intrusion, and specific locations were identified for sample collection. Groundwater samples were obtained from various sources, including bore wells, hand pumps, dug wells, and irrigation water. The collected samples were analyzed to determine the presence of salts, acids, fluoride, chloride, total dissolved solids, total hardness, pH, calcium, and other chemical parameters. Some samples were found to be suitable for drinking, while others were more appropriate for agricultural use. The water samples were collected at different locations, times, and sources, stored in polythene cans, and tested under controlled conditions. The physical and chemical analyses were conducted within a specific time frame to ensure accuracy. The study also examines the impact of groundwater contamination, the influence of seawater intrusion, and the variation in water quality for different purposes. Laboratory testing provided insights into the stability of salt content in the samples, and a comparison was made between their suitability for domestic and agricultural applications. This research highlights the characteristics, impact, and usability of groundwater, providing valuable insights for water resource management in the region.

Keywords: Groundwater quality, Seawater intrusion, Water analysis, Irrigation suitability, Water contamination.

IC22-150: AN EXPERIMENTAL INVESTIGATION INTO THE PARTIAL SUBSTITUTION OF FINE AGGREGATE AND BAGASSE ASH FOR CEMENT IN CONCRETE USING PRESS MUD

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ABSTRACT

Environmental degradation is a significant concern in today's world, directly impacting the living standards of human beings. One of the major contributors to environmental pollution is the release of carbon dioxide (CO_2) during cement manufacturing. To address this issue, this study explores the partial replacement of cement with bagasse ash, which significantly reduces CO_2 emissions. The research focuses on the compressive strength of concrete when cement is replaced with 10%, 20%, and 30% bagasse ash. Despite the reduction in cement usage, the sustainability of concrete production remains a challenge due to the high demand for sand. To mitigate this, fine aggregate is partially replaced with press mud in varying proportions of 5%, 10%, and 15%. The results indicate an improvement in both workability and compressive strength of concrete. Thus, the partial replacement of both press mud and bagasse ash in concrete enhances strength while simultaneously reducing environmental impact. This study demonstrates a sustainable approach to concrete production, balancing strength, durability, and eco-friendliness.

Keywords: Bagasse ash, Press mud, Sustainable concrete, Workability, Compressive strength, Environmental impact.

IC22-002: A PROXIMITY SENSOR-BASED SMART HIDDEN SPY CAMERA DETECTION METHODS FOR CCTV CAMERA

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ABSTRACT

In modern times, CCTV cameras play a crucial role in enhancing safety and security across various locations. This paper aims to improve security measures in theatres by implementing a system capable of detecting spy cameras and unauthorized recording devices. The proposed system utilizes CCTV cameras to identify recording devices such as mobile phones, nano cameras, and micro cameras. Additionally, a night vision camera is employed to detect hidden cameras through image processing techniques. A proximity sensor further enhances detection by identifying individuals attempting to record movies within the theatre. Once an unauthorized recording is detected, the system immediately alerts the control room. The proximity sensor operates without physical contact by emitting an electromagnetic field or infrared signals and detecting disturbances caused by hidden recording devices. By implementing this real-time security system, theatres can prevent illegal recordings, ensuring better compliance with copyright protection laws and enhancing overall safety measures.

Keywords: CCTV camera, Proximity sensor, Image processing, Spy camera detection, Theatre security.

IC22-141: INVESTIGATING AND TESTING FERROCEMENT SLABS AND DOMES EXPERIMENTALLY

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ABSTRACT

Ferrocement is a composite material consisting of a cement matrix reinforced with multiple layers of mesh. These structures are known for their durability and strength, primarily due to their thin profile and widely distributed steel reinforcement. This study focuses on analyzing the flexural behavior of a ferrocement dome. The construction process is labor-intensive, as the mortar is usually applied by hand, though spray application is also possible. Ferrocement is predominantly used in developing countries where labor costs are lower, while in Western regions, its primary applications include boat hulls, roof shells, and decorative structures. In this research, a model was developed and tested for flexural behavior. High-strength mortar was produced by partially replacing cement with Ground Granulated Blast Furnace Slag (GGBS) and adding silica fume in specific proportions. Compressive testing was conducted to determine the properties of this high-strength mortar before incorporating it into ferrocement elements. Ferrocement slabs were cast and subjected to flexural and impact behavior testing. A four-point loading flexural test revealed pure shear failure, while impact tests indicated pure punching failure in the slabs. Additionally, a ferrocement dome model was created and analyzed using software, with experimental and analytical results compared to assess performance.

Keywords: Ferrocement, GGBS, Roof shells, Composite material, Flexural behavior, High-strength mortar, Silica fume, Shear failure, Punching failure, Impact behavior.

IC22-086: LICENSE AND HELMET DETECTING ANTI-THEFT MECHANISM BASED ON FINGER PRINTS

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ABSTRACT

To reduce the number of unauthorized drivers and minimize accidents, a new system is proposed that utilizes human identification techniques for vehicle operation and verification. Fingerprint recognition is one of the most widely used security systems, providing enhanced authentication through biometrics. Vehicles, such as cars and motorcycles, should be equipped with a fingerprint scanner capable of reading and storing fingerprints for authorization checks. Additionally, the system ensures that the driver wears a helmet before starting the vehicle. A sensor-based switch detects the presence of the helmet, and only upon successful verification of both fingerprint authentication and helmet usage will the ignition system activate. This dual-layer security approach enhances road safety and prevents unauthorized vehicle access.

Keywords: Ignition system, Biometric authentication, Fingerprint recognition, Helmet detection, Road safety.

IC22-198: INVESTIGATION OF STEEL FIBRE REINFORCED CONCRETE'S EXPERIMENTAL BEHAVIOR USING MAGNETIC AND NORMAL

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ABSTRACT

One of the key challenges for concrete technologists is enhancing the properties of concrete. In the past two decades, Russia and China have introduced a new technique known as Magnetic Water Technology in the concrete industry. This method involves passing water through a magnetic field, altering its physical properties, and reducing the number of molecules in a water cluster from 13 to 5 or 6. Consequently, this decreases water surface tension, leading to improved workability and strength in concrete mixtures. Magnetic treatment of water increases ion solubility and pH levels, altering the precipitation behavior of calcium carbonate. Instead of dendritic (tree-like) formations, circular disc-shaped particles are formed, which improves the overall composition of concrete. Traditionally used for water softening, this technique has now been explored for concrete production. Some studies suggest that magnetic treatment modifies hydrogen bonding between water molecules, enhancing hydration reactions. Concrete mixed with magnetized water exhibits higher slump values, better workability, and, in some cases, increased compressive strength compared to conventional concrete. Additionally, the cement content required for similar performance can be reduced by up to 28%, making this an effective and sustainable approach in construction.

Keywords: Magnetic Water, pH, Concrete Strength, Workability, Cement Reduction.

IC22-071: EFFECTIVE PREDICTION OF PARKINSON DISEASE THROUGH ANALYTICAL TOOLS AND DATA MINING

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ABSTRACT

Data mining is the process of extracting meaningful knowledge from databases by identifying patterns and structures that aid in data interpretation. It is widely utilized for discovering valuable insights from large datasets. Data mining techniques can be categorized into supervised learning, unsupervised learning, and semi-supervised learning methods. Machine learning-based expert systems play a significant role in assisting physicians with disease diagnosis and prediction. Due to the critical importance of accurate disease classification, numerous studies have been conducted to develop effective diagnostic models. Traditional methods like K-means clustering and standard supervised techniques often struggle with incremental learning, requiring a complete retraining of the model with new data. This study proposes an optimized approach for disease diagnosis, evaluated using publicly available datasets from the UCI Machine Learning Repository. These datasets include input and output parameters specifically for Parkinson's Disease (PD) diagnosis. The proposed method integrates Bacterial Foraging Optimization (BFO) and Support Vector Machines (SVM) to enhance classification accuracy and optimize parameters for better medical diagnostics.

Keywords: Data Mining, Machine Learning, Disease Diagnosis, Support Vector Machines (SVM), Bacterial Foraging Optimization (BFO), Medical Prediction.

IC22-127: AN EXPERIMENTAL STUDY ON CRACK SELF-HEALING USING HYDRATED LIME AND FLY ASH AS SELF-HEALING AGENTS

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ABSTRACT

Cracks in concrete are a common issue due to its relatively low tensile strength. These cracks compromise the durability of concrete by allowing the penetration of liquids and gases, which may carry harmful substances. If microcracks expand and reach the reinforcement, both the concrete structure and the steel reinforcement are at risk of damage and corrosion. Hence, controlling crack width and facilitating self-healing is crucial. Given the high maintenance and repair costs associated with concrete structures, this study focuses on developing self-healing concrete. The research investigates the selection of self-healing materials and their effectiveness. Fly ash and hydrated lime are used as healing agents in varying proportions (20%, 40%, and 60%) to determine their impact on crack healing. Concrete beam specimens (125×125×375 mm) are cast, artificially cracked, and cured. Each specimen is monitored for its healing process, and the time required for crack closure is recorded and analyzed. The study aims to evaluate the efficiency of self-healing concrete by comparing the crack closure time across different material compositions. The findings contribute to the development of sustainable and durable concrete structures.

Keywords: Self-healing concrete, Crack repair, Fly ash, Hydrated lime, Durability.

IC22-034: MANY-BIOMETRIC SYSTEM FOR APPLICATIONS NEEDING HIGH SECURITY

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ABSTRACT

Iris recognition and face recognition are among the most reliable and accurate biometric authentication systems available today. These technologies offer several advantages, including security, speed, accuracy, scalability, and stability. This paper focuses on enhancing security in crowded areas (such as malls, airports, schools, and colleges) as well as high-security zones (such as research centres and border security checkpoints) using a contactless biometric recognition system. Traditional security systems often suffer from inaccuracy and delays, making verification a time-consuming and frustrating process. The proposed system aims to be more efficient and effective by combining iris and face recognition to compensate for errors caused by occlusions, pose variations, and illumination changes. We utilize Histogram of Oriented Gradients (HOG) descriptors extracted from a structured grid to enhance feature detection accuracy. Additionally, feature selection techniques are implemented to remove redundant data and prevent overfitting during classification. Once an individual enters the secured zone, continuous snapshots are taken using a camera, and the captured data is compared with an existing database of authorized individuals. This ensures real-time verification with improved accuracy and security.

Keywords: Iris recognition, Face recognition, Biometric authentication, HOG descriptors, Contactless security, High-security zones.

IC22-169: DEVELOPING AND DEPLOYING A PDP MULTIPLIER AND OPTIMIZED AREA FOR HIGH-SPEED DIGITAL CIRCUIT APPLICATIONS

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ABSTRACT

Low-power, high-speed multipliers are crucial for high-speed switching applications such as Digital Signal Processing (DSP), microprocessors, and filters. Various multiplier architectures have been proposed to enhance performance. In a conventional 8-bit array multiplier, partial products are generated using AND gates and added sequentially through Full Adders (FA) and Half Adders (HA), resulting in higher computational delay. The proposed architecture addresses this issue by adding partial products in parallel, significantly reducing computation time. Additionally, power dissipation in the full adder is minimized using CMOS technology, leading to improved efficiency. The designed 8-bit multiplier is implemented and simulated using the Cadence Virtuoso tool in 90nm technology, and its power, speed, and area are analyzed to evaluate performance.

Keywords: Full Adder, Half Adder, Multiplier, Low Power, CMOS Technology, Cadence Virtuoso, High-Speed Arithmetic.

IC22-057: ENHANCEMENT OF WIRELESS APPLICATION ANTIPODAL VIVALDI ANTENNA PERFORMANCE

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ABSTRACT

This paper presents a miniaturized Antipodal Vivaldi Antenna design utilizing triangular slots to achieve size reduction and performance enhancement. A conventional Antipodal Vivaldi Antenna is designed using an FR4 epoxy substrate with a dielectric constant of 4.4 and a thickness of 1.6mm. To improve antenna performance, triangular and circular slots are introduced on the upper layer. The triangular slot plays a crucial role in reducing antenna size while also enhancing return loss, gain, and bandwidth within the 3GHz to 25GHz frequency range. The circular slot, placed at the exponential part of the antenna, effectively minimizes mutual coupling between different slots. A microstrip feedline is used as the feeding technique for the antenna design. The proposed antenna demonstrates versatile application potential by varying the operating frequency. Simulations are conducted using HFSS 13.0, a high-frequency structural simulator, and the results are compared between the fabricated antennas and the simulated models. The return loss response and gain of the fabricated antennas are evaluated and validated against simulation results.

Keywords: Voltage Standing Wave Ratio (VSWR), Antipodal Vivaldi Antenna, Patch, Dielectric Substrate, Microstrip Feedline, HFSS Simulation.

IC22-124: MONITORING OF ALCOHOLIC INDIVIDUALS AND VEHICLES IN REAL TIME USING GSM/GPRS ON AN ARDUINO-BASED SYSTEM

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ABSTRACT

The Internet of Things (IoT) is a network of interconnected devices that can collect, transfer, and analyze data without requiring direct human intervention. This paper proposes an IoT-based alcohol detection and vehicle monitoring system aimed at enhancing road safety and preventing accidents caused by drunk driving. The system features an alcohol detection sensor (MQ-3) mounted on the vehicle's steering wheel to measure alcohol concentration in the driver's breath. If alcohol is detected beyond a permissible level, the system notifies the admin and driver in real time, preventing potential hazards. Additionally, the system monitors fuel levels, detects engine faults and gas leaks, and sends automated alerts via GSM/GPRS to the owner or administrator for proactive action. This smart transportation solution is particularly beneficial for travel and cargo agencies, ensuring driver accountability, fuel management, and real-time vehicle tracking. The implementation of this system significantly reduces drunk-driving incidents, enhances vehicle security, and improves transportation efficiency through cloud-based data storage and monitoring.

Keywords: IoT, Alcohol Detection, ATmega328, MQ-3 Sensor, GSM/GPRS, Cloud Storage, Vehicle Monitoring

IC22-010: INDUSTRIAL CHIMNEY LINER MADE OF GLASS BLOCKS THAT ARE RESISTANT TO HEAT

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ABSTRACT

Thermal resistance glass blocks are a specialized type of glass composed primarily of silica and boric trioxide, serving as essential lining materials to protect flue canes from thermal heat exposure up to 300°C. This lining significantly enhances the longevity and durability of flue canes by preventing thermal degradation. The outer concrete shell is further safeguarded using bitumen paints, which provide additional protection. The blocks possess a porous structure that prevents the penetration of liquids while also trapping dust particles emitted through the flue cane. Additionally, these blocks contribute to desulphurization, absorbing sulfur content from industrial gases, effectively reducing emissions. This method achieves approximately 30% dust collection efficiency, improving environmental sustainability in industrial chimney operations.

Keywords: Industrial Chimney, Lining Work, Thermal Resistance Block, Thermal Stress, Desulphurization.

IC22-209: SMART POWER VITALITY READING BASED ON IOT USING CIRCUIT CONTROLLER

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ABSTRACT

Monitoring and continuously tracking power consumption manually is a tedious task, as it requires visiting the meter reading room and recording the values. It is crucial to ensure accurate billing, making automation highly necessary. Our proposed system automates this process by allowing users to monitor energy meter readings remotely via the internet. The system integrates an energy meter with a microcontroller to track energy consumption in real time. The meter records units consumed and transmits both the usage and corresponding cost over a Wi-Fi connection to a web application. This enables consumers to easily access their electricity consumption and billing details online. Additionally, the system features circuit protection, where controllers act as a circuit breaker to automatically disconnect power supply in case of sudden voltage surges, preventing damage and electrical hazards.

Keywords: Smart Reading, Bridge Rectifier, Transformer, Arduino UNO, Relay, Cost-efficient, Web-based Monitoring.

IC22-142: MACHINING PARAMETER ANALYSIS IN CNC MILLING OPERATION WITH RSM

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ABSTRACT

In this project deals with the machining of AA6063 .it is a heat treatable alloy, easy to available and low cost. Here, we consider machining process method done with the help of response surface methodology. In our process carry out machining of AA6063 with suitable parameter. The parameters are Feed rate, Speed, Depth of cut, Material removal rate. From the above parameter we get the output response improvement of machining property in AA6063.In our paper we conclude the solution from the above response surface methodology get the output of increase the strength and to optimize the other machining parameters of AA6063.

Keywords: RSM, AA6063 Property, Machining parameter ‘s (MRR, DOC, F, S).

IC22-095: FATIGUE LIFE AND STRESS ANALYSIS OF A FUSELAGE PANEL USING FINITE ELEMENT APPROACH

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ABSTRACT

The fuselage is the central structure of an aircraft that accommodates passengers and cargo. It is typically designed as a thin-walled tube reinforced with transverse frames, bulkheads, and longerons to efficiently withstand various loads. The structural design must balance load-bearing capacity with minimal weight to ensure optimal performance. Aircraft fuselages contain stress concentration regions, making it crucial to analyze stress distribution accurately. Instead of manually performing complex stress calculations, which is highly labor-intensive, Finite Element Analysis (FEA) tools can be utilized for efficient and precise computation. In this study, MSC NASTRAN is employed as the solver, while HyperMesh and MSC PATRAN are used for pre- and post-processing. Additionally, fatigue analysis is conducted to assess material degradation under cyclic loading. The fatigue life of the fuselage panel is estimated using Miner's Rule with the aid of an S-N curve, ensuring durability and structural integrity.

Keywords: Airframe, Fuselage, Fatigue Analysis, Stress Concentration, Finite Element Analysis (FEA), Miner's Rule, Structural Optimization.

IC22-061: FACIAL RECOGNITION FEEDBACK SYSTEM IN SEMINAR

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ABSTRACT

The human face conveys a wealth of information and plays a crucial role in daily communication, particularly in expressing emotions. Facial expressions vary in intensity and duration, making them a valuable indicator of engagement and interest. Significant progress has been made in developing computer systems capable of recognizing facial expressions for human-computer interaction. The Visual Feedback Generation (VFG) system is designed to detect and analyze facial expressions of seminar participants to assess their level of interest based on the seminar subject and presentation quality. This model focuses on expression-based feedback generation combined with live tracking of participant attentiveness throughout the session. By analyzing facial expressions and engagement levels, the system predicts seminar quality and generates a rating accordingly.

Keywords: Facial Expressions, Visual Feedback Generation, Human-Computer Interaction, Seminar Engagement, Real-Time Analysis.

IC22-177: THE FUZZY FINGERPRINT METHOD FOR PRESERVING PRIVACY

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ABSTRACT

The number of data leaks has increased significantly in recent years, with human errors being a major cause of data loss. Various solutions exist to detect inadvertent sensitive data leaks and provide alerts to organizations. A common approach involves screening content in storage and transmission for exposed sensitive information. The MapReduce framework has been widely used for detecting sensitive content leaks in a distributed data-intensive environment. However, this method has several limitations. In this paper, I proposed a data-leak detection (DLD) solution that can be outsourced and deployed in a semi-honest detection environment. I designed, implemented, and evaluated a fuzzy fingerprint technique that enhances data privacy during data-leak detection operations. My approach relies on a fast and practical one-way computation on sensitive data (such as SSN records, classified documents, and sensitive emails), allowing the data owner to securely delegate content inspection to DLD providers without exposing the sensitive information. With this method, the DLD provider, modeled as an honest-but-curious adversary, gains only limited knowledge about the sensitive data from either the released digests or the inspected content. Additionally, Internet Service Providers (ISPs) can leverage our technique to perform secure detection on customer traffic and offer data-leak detection as an add-on service.

Keywords: Data-Leak Detection, Fuzzy Fingerprint Technique, Internet Service Provider (ISP), Semi-Honest Adversary, MapReduce.

IC22-028: AN INVESTIGATION ON THE FEASIBILITY OF USING LUNAR CONCRETE IN CONSTRUCTION

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ABSTRACT

The prospect of constructing structures on the Moon is gaining momentum due to the growing need for astronomical research facilities and the exploration of human survival possibilities beyond Earth. One of the most significant challenges faced by modern civil engineers is establishing a structural foundation on the lunar surface. This challenge arises primarily due to limited knowledge of how building materials behave in extraterrestrial environments like the Moon's atmosphere. Transporting construction materials from Earth is neither practical nor cost-effective, making Lunarcrete a viable alternative. The concept of Lunarcrete dates back to 1985 and involves utilizing lunar surface materials to create a durable and sustainable construction material. This paper presents comprehensive information and findings on Lunarcrete, detailing the experiments conducted on its constituent materials and its potential applications in extraterrestrial construction.

Keywords: Lunarcrete, Extraterrestrial Construction, Moon Surface, Space Infrastructure, Astronomy.

IC22-213: THE FOUR TANK PROCESS'S OBSERVER-BASED FEEDBACK CONTROLLER DESIGN

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ABSTRACT

Many industrial processes, including manufacturing and refining, are inherently nonlinear, time-variant, and highly sensitive to disturbances, making them complex and challenging to control. The four-tank system serves as a benchmark for industrial process control due to its dynamic behavior, which poses significant difficulties in controller design. Understanding the system's dynamic characteristics is crucial for effective controller implementation. With increasing process complexity, industries require more reliable, robust, and precise control systems. The Proportional-Integral-Derivative (PID) controller is widely used for regulating industrial parameters, but its tuning is critical for optimal performance. Traditional tuning methods are limited to open-loop, linear, stable, and single-input single-output (SISO) systems. Therefore, a simplex controller tailored for the nonlinear four-tank system is necessary. This study presents the design and implementation of an observer-based feedback controller to enhance the accuracy and stability of the four-tank system.

Keywords: Four-Tank System (4TS), Process Control, Mathematical Modeling, Observer-Based Feedback Controller, PID Tuning.

IC22-104: EFFECTIVE HOSPITAL INTERCONNECTION VIA MOBILE APPLICATIONS

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ABSTRACT

The primary objective of this application is to help users locate the nearest hospital and compare the available facilities with the required medical specialists. Using the built-in Global Positioning System (GPS) feature on smartphones, the application calculates the user's current location and provides a route to the nearest hospital through Google Maps Application Programming Interface (API). This functionality assists users in selecting the most suitable hospital for their treatment needs. Additionally, the system enhances the real-time update of available free surgeries and medical treatments, including tablet descriptions for specific conditions and blood availability. An informative survey of various hospitals is used to compile an accurate list of doctors at each location. With this application, patients can easily find the nearest hospital based on the availability of the necessary specialists.

Keywords: Medicine Available, Blood Availability, GPS, Specialist, Free Surgery.

IC22-080: SMART CAR AUTOMATION AND ACCIDENT ALERT SYSTEM BASED ON THE INTERNET OF THINGS

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ABSTRACT

In today's fast-paced world, speeding and frequent accidents are major concerns, especially in high-risk areas like school zones, hilly terrains, and highways. These accidents often result from minor mistakes or a lack of awareness about speed limits and hazardous zones. While signboards are placed by the highway department to alert drivers, they are not always visible or heeded, leading to accidents in traffic-heavy areas. To address this issue, it is essential to provide drivers with real-time information about speed limits and accident-prone zones. This can be achieved using advanced technologies such as embedded systems and sensors. This project focuses on "automatic speed control of vehicles" by detecting accident-prone zones. The goal is to design a smart vehicle security system that enhances safety by monitoring these hazardous zones. The system is built using embedded technology and sensors, including IR sensors, ultrasonic sensors, alcohol sensors, and vibrator sensors. The driver will receive alerts via IoT, ensuring better control and prevention of accidents in critical areas.

Keywords: Smart Vehicle, IoT System, Embedded System, Microcontroller, WIFI Module.

IC22-163: SECURE DATA SHARING THROUGH ENCRYPTION AND PROXY RE-ENCRYPTION USING THE BBS ALGORITHM

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ABSTRACT

Information plays a crucial role in the Internet of Things (IoT) ecosystem. Many existing IoT frameworks rely on centralized cloud-based data sharing systems, which may struggle to scale to meet the demands of future IoT networks. The involvement of third-party service providers requires increased trust from both sensor owners and data users, as well as payment for their services. To address scalability, trust, and automate payments, this paper proposes a proxy re-encryption scheme. The system encrypts IoT data before storing it in a distributed cloud. To facilitate data sharing, dynamic smart contracts are established in real-time between the sensor and data users, without requiring a trusted intermediary. The system also incorporates an efficient proxy re-encryption scheme, ensuring that data is visible only to the owner and participants in the smart contract. This innovative combination of smart contracts and proxy re-encryption provides an efficient, fast, and secure platform for storing, sharing, and managing sensor data. The proposed framework is implemented on an Ethereum-based testbed to analyze performance and security properties.

Keywords: IoT, Proxy Re-encryption, Smart Contracts, Distributed Cloud, Ethereum, Data Sharing, Security.

IC22-015: A TOPICAL ARCHITECTURE FOR THE BEST MULTIPHATH ROUTING

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ABSTRACT

Traditional networks are often designed for simple single-path routing, such as the shortest path, which is known to be suboptimal in terms of throughput. In contrast, previously proposed throughput-optimal policies, such as backpressure, require all devices in the network to make dynamic routing decisions. This project explores an overlay architecture for dynamic routing, where only a subset of devices (overlay nodes) is responsible for making routing decisions. The aim is to identify the essential set of nodes required to bifurcate traffic and achieve maximum multi-commodity network throughput. The project applies an optimal node placement algorithm to various graphs, demonstrating that only a small fraction of overlay nodes are necessary to achieve optimal throughput. Additionally, the project introduces two policies: a threshold-based policy (BP-T) and a heuristic policy (OBP), which dynamically control traffic bifurcation at overlay nodes. The BP-T policy aims to maximize throughput when underlay paths do not overlap, while OBP seeks to achieve full throughput and reduce delay compared to the throughput-optimal backpressure routing.

Keywords: Legacy Networks, Dynamic Routing, Overlay Architecture, Throughput Optimization, Node Placement, Traffic Bifurcation, Backpressure, BP-T Policy, OBP Policy.

IC22-195: INVESTIGATION OF MACHINE LEARNING ALGORITHMS IN BREAST CANCER DIAGNOSIS ANALYSIS AND DEVELOPMENT OF A HYBRID METHOD BASED ON FEATURE SELECTION

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ABSTRACT

Breast cancer is one of the most dangerous types of cancer, leading to numerous deaths among women. However, it is highly treatable if detected early. Several machine learning algorithms are available to diagnose breast cancer, including Support Vector Machine (SVM), K-means, neural network-based classifiers, and decision trees. This paper aims to compare the performance of these algorithms to determine which provides the highest accuracy. Support Vector Machine is a machine learning algorithm based on statistical learning theory, which performs pattern recognition and regression. It takes five features as input for feature selection and is widely used in breast cancer diagnosis due to its high prediction accuracy. In comparison, decision tree algorithms like ID3, C5, and CART predict breast cancer by dividing the data into multiple levels of nodes, producing a decision tree. These methods tend to offer lower accuracy than SVM. While the K-means algorithm is less effective for classification, it is useful for exploring hidden patterns in data. Based on these findings, a hybrid approach combining these algorithms is proposed to achieve higher accuracy in breast cancer diagnosis.

Keywords: Breast Cancer, Machine Learning, Support Vector Machine (SVM), K-means, Decision Tree, Feature Selection, Hybrid Approach, Diagnosis Prediction.

IC22-130: A COMPARISON OF DESIGN RESULTS BETWEEN E-TABS AND SAP2000 SOFTWARE

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ABSTRACT

Structural analysis is a critical discipline aimed at assessing the behavior of structures to predict their response under real-world conditions, such as load applications and environmental influences during their service lifespan. This study focuses on the comparative evaluation of two widely used software tools, ETABS (Extended 3D Analysis of Building Systems) and SAP2000 (Structural Analysis Program), for analyzing and designing multi-story structures like buildings, bridges, and trusses. The objective is to analyze a 20-story residential building under varying seismic zones and soil types, considering parameters such as bending moments, shear forces, base shear, and axial forces across different sections. Static wind analysis and earthquake load combinations are incorporated to obtain results for comparison. By examining displacement, story shear, moments, and base forces for different load combinations, the study identifies the software that provides the most economical and safe structural solutions. ETABS is a specialized software designed for the analysis and design of multi-story structures using grid-like geometry and advanced solution techniques. It is equipped to handle various load combinations and is known for its user-friendly interface. SAP2000, on the other hand, is a versatile finite element program suitable for static or dynamic, linear or nonlinear structural analysis, making it ideal for general-purpose applications. In this analysis, ETABS and SAP2000 are utilized to investigate a 20-story residential structure. Results from both software are compared using tables and graphs to identify the optimal design approach. Key metrics include ease of use, safety, and cost-efficiency. The findings provide insights into the strengths of each software, and conclusions are drawn based on the comparative analysis and tabulated results.

Keywords: Structural Analysis, Load Cases, ETABS, SAP2000, Multi-Story Structures, Seismic Zones, Wind Analysis.

IC22-048: VOICE INTERROGATION FOR RESOURCEFUL POWER ECONOMY UTILIZING SMART SENSE ALGORITHM AND IOT-BASED AI FOR CONTROLLED SMART BIKES

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ABSTRACT

This project aims to develop an artificial intelligence (AI)-powered system for bikes, transforming existing electric bikes into smart vehicles equipped with advanced features. The system integrates voice interrogation, an IoT-enabled navigation system, and safety mechanisms to ensure the security of both the bike and its riders. In 2017 alone, road traffic injuries caused 1.25 million deaths worldwide and over 50 million injuries. Studies of British and American crash reports indicate that 87% of accidents are due to driver carelessness. Despite regulations enforced by traffic authorities, such as mandatory helmet use and prohibitions against driving under the influence, many users continue to violate these rules. Existing bikes often lack robust navigation systems with real-time traffic updates and are costly. Additionally, battery-operated bikes typically have limited fuel efficiency, offering a range of only about 80 km per full charge. To address these issues, this project introduces an AI-driven system featuring direct voice interaction with the bike, smart navigation with real-time traffic updates, and a Smart Helmet. The helmet ensures compliance with safety protocols by checking if the rider is wearing the helmet and has not consumed alcohol. The system also verifies the presence of a valid driving license. Powered by SENSE technology, the solution supports Internet of Things (IoT), over-the-air updates, and artificial intelligence, delivering a comprehensive and innovative approach to enhancing bike functionality and safety.

Keywords: Speech Interrogation, Accident Prevention, Live Traffic, Smart Fuel-Saving System, Intruder Detection, Automated Navigation System.

IC22-174: MODELING, ANALYZING, AND DESIGNING TRADITIONAL MASONRY UNITS USING NATURAL FIBRES FOR WALLS

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ABSTRACT

Straw, an agricultural by-product, is derived from the dry stalks of cereal plants after the grain and chaff are removed, accounting for nearly half the yield of crops like barley, oats, rice, rye, and wheat. Chrysopogon zizanioides, commonly known as vetiver, is a perennial grass native to India. Natural fibers, such as straw and vetiver, have increasingly been utilized as reinforcement materials in construction due to their beneficial properties. These fibers are often used in lime to control cracking caused by plastic and drying shrinkage. Additionally, they reduce the permeability of lime, thereby minimizing water bleeding. Some fibers also enhance impact resistance, abrasion durability, and shatter resistance in lime. Lime has been a fundamental construction material for millennia, with its significance in conservation architecture being rediscovered in recent years. Lime mortars harden through carbonation, a process studied extensively in this project. The growing interest in natural fibers as reinforcement materials has resulted in thousands of related studies since 1995. This project investigates the behavior of straw and Chrysopogon zizanioides (vetiver) when used as fiber reinforcement in walls. Key properties such as modulus of elasticity, Poisson's ratio, Young's modulus, water content, and dry density were observed by casting walls using lime with straw (1%) and vetiver (0.45%) fibers. The compressive strength of the walls was also analyzed to evaluate their structural performance. The project emphasizes realistic constraints, including health and safety, environmental impact, and ethical considerations, ensuring sustainable and responsible application.

Keywords: Natural Fibers, Lime, Fiber Reinforcement in Walls, Chrysopogon zizanioides, Straw.

IC22-019: RANDOM FOREST ALGORITHM USING EVOLUTIONARY COMPUTING

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ABSTRACT

The Random Forest algorithm is an ensemble learning method used for classification and regression tasks, operating by constructing a large number of decision trees during training. While Random Forest offers high accuracy for medical datasets, its runtime performance has been observed to be suboptimal. The accuracy of Random Forest can be further enhanced by optimizing its parameters effectively. This study addresses the challenge of optimal parameter tuning in Random Forest by employing Particle Swarm Optimization (PSO). By applying the optimized Random Forest algorithm using the PSO method on a heart disease dataset, significant improvements in performance and accuracy were achieved. Furthermore, the study highlights that Fuzzy Particle Swarm Optimization (FPSO) outperforms traditional PSO in terms of efficiency. The use of FPSO successfully reduced the mining ratio, demonstrating its effectiveness as a superior optimization approach.

Keywords: Random Forest, Ensemble Learning, Classification, Regression, Particle Swarm Optimization (PSO), Fuzzy Particle Swarm Optimization (FPSO)

IC22-219: ANALYSIS OF METAL MATRIX COMPOSITE WEAR PROPERTIES FOR AIRCRAFT WING

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ABSTRACT

A hybrid composite of LM24 aluminium alloy reinforced with silicate and fly ash was fabricated using the vortex technique. The composite contained 4 wt.% fly ash particles along with 8, 16, and 24 wt.% silicate. Tribological properties were evaluated under varying loads (15, 45, and 60 N) and sliding velocities (0.75, 1.5, and 3 m/s) using a pin-on-disc apparatus. Additionally, the mechanical properties, including hardness and tensile strength, were analyzed. The incorporation of silicate and fly ash into the aluminium matrix aimed to enhance mechanical performance while reducing wear resistance. Optimizing tribological and machining parameters is crucial for achieving the desired surface quality and minimizing wear. The study employed the Taguchi L9 orthogonal array to determine optimal processing conditions, while Analysis of Variance (ANOVA) was utilized to identify significant factors influencing wear rate and surface roughness during drilling operations.

Keywords: LM24 Aluminium Alloy, Silicate, Fly Ash, Mechanical Properties, Wear Resistance, Drilling, Taguchi Method, ANOVA

IC22-136: USING SILICA FUME AND ROBOT SAND, AN EXPERIMENTAL INVESTIGATION OF HIGH-PERFORMANCE CONCRETE

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ABSTRACT

Concrete is one of the most widely used construction materials globally. The incorporation of mineral admixtures in cement has gained significant attention in the concrete industry due to its benefits, including cost reduction, energy efficiency, environmental sustainability, and resource conservation. High-Performance Concrete (HPC) represents a major advancement in concrete technology and is increasingly utilized in high-profile projects. Mineral admixtures such as Ground Granulated Blast Furnace Slag (GGBS) and silica fume are commonly used in HPC mixtures to enhance strength and durability. This study investigates the characteristics of M40-grade concrete with partial replacement of cement by silica fume and natural river sand by Robo sand. The concrete specimens, including cubes, cylinders, and prisms, were tested for mechanical and durability properties. Strength parameters such as compressive, tensile, and flexural strength were evaluated, while durability assessments included Rapid Chloride Permeability Test (RCPT) and acid attack resistance. The results indicate that the partial replacement of cement with silica fume and sand with Robo sand significantly improves the strength and durability of concrete compared to conventional mixes. Additionally, HPC mixes demonstrated superior resistance to chemical attacks, particularly against hydrochloric acid (HCl), when exposed for 30 days.

Keywords: High-Performance Concrete (HPC), Silica Fume, Robo Sand, Compressive Strength, Tensile Strength, Flexural Strength, Rapid Chloride Permeability Test (RCPT), Acid Attack Resistance.

IC22-022: A VISION TO THE VISUALLY IMPAIRED PEOPLE: SWIPE TO CALL

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ABSTRACT

Visually impaired individuals encounter numerous challenges in their daily lives, including mobility, communication, and object recognition. This project proposes a solution designed to assist blind individuals, enabling them to navigate and interact more independently. The solution is implemented as an Android application with full voice recognition, providing a seamless interface between the user and their surroundings through Tamil voice commands. Using machine learning algorithms, the app identifies and audibly describes objects and people nearby. Additionally, it includes features such as voice-activated phone calls, call log reading, battery status updates, and GPS-based navigation, all conveyed through Tamil voice output, ensuring accessibility and ease of use for visually impaired users.

Keywords: Visually Impaired Assistance, Voice Commands, Machine Learning, GPS Navigation, Object Recognition, Tamil Voice Interface.

IC22-043: PLANNING A TOWNSHIP FOR AGRICULTURAL TENANTS

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ABSTRACT

This project focuses on planning a township layout in the RC Centre, ensuring that it meets the needs of the residents while preserving their livelihoods. Various socio-economic surveys from Mine-I, Mine-IA, Mine-III, and Mine-II were analyzed and compared. Based on this assessment, land acquired by NLCIL for Mine-II was selected as the foundation for planning the resettlement layout. The township design incorporates essential amenities by aligning with welfare norms practiced in India. A social impact assessment was conducted to develop a layout accommodating families from two villages. The structural components include M20-grade concrete and Fe415-grade steel, with the layout designed using CAD software. Additionally, cost-effective and sustainable construction methods were implemented by utilizing fly ash bricks for superstructures and a combination of bottom ash and fly ash concrete for medium-traffic roads. This approach significantly reduces costs compared to conventional brickwork in CM 1:5 and sand filling for concrete roads.

Keywords: Township Planning, Socio-Economic Survey, Social Impact Assessment, Fly Ash Bricks, Bottom Ash, Sustainable Construction.