Advancing Engineering Frontiers: Innovations, Challenges and Solutions
(AEFICS 2024)

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Track 1

Network Technologies in Computer Science

AEFICS005

IDENTIFYING ANOMALIES IN VEHICULAR ADHOC NETWORKS

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ABSTRACT

Vehicular Ad Hoc Networks (VANETs) have emerged as a critical component of intelligent transportation systems, enhancing road safety and traffic efficiency. However, the dynamic and open nature of VANETs makes them susceptible to various security threats, including anomalies that can disrupt normal network operation. This study focuses on a comprehensive study and evaluation of different anomaly detection algorithms within the context of VANETs. Vehicular ad hoc networks (VANETs) facilitate wireless communication between vehicles and vehicle-to-infrastructure systems. The primary goal of VANETs is to enhance safety, comfort, and convenience on the roads. Unlike ad-hoc networks, VANETs possess unique characteristics. However, the absence of infrastructure and centralized administration makes them susceptible to misbehaviors, posing a significant threat to various aspects of VANETs. Given its importance, this valuable network must incorporate robust security measures to ensure secure communication. Various types of anomalies that can occur in VANETs, such as malicious attacks, communication disruptions, or unexpected behaviour from vehicles. The proposed Detection of Anomalies algorithm in VANETs enhance effectively by selecting verifiers to detect malicious nodes, thereby improving network performance.

Keywords—Vehicular Adhoc Network, Intelligent Transport System, Vehicle to Vehicle, Vehicle to Infrastructure.

INTERCONNECTED INTELLIGENCE: EXPLORING THE NEXUS OF IOT IN MODERN SOCIETY

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ABSTRACT

The Internet of Things (IoT) has emerged as a transformative paradigm, interweaving physical devices with connectivity and intelligence. This abstract delves into the multifaceted landscape of IoT, highlighting its pervasive impact across various domains. From smart homes to industrial automation, IoT facilitates seamless communication and data exchange, fostering efficiency, convenience, and innovation. However, as IoT proliferates, challenges such as privacy, security, and interoperability arise, necessitating robust solutions. Through a comprehensive examination, this abstract elucidates the evolving role of IoT in shaping our interconnected future, emphasizing its potential to revolutionize how we live, work, and interact with the world around us.

Keywords: IOT, automation, intelligence, security, smart home

AEFICS018

REVOLUTIONIZING FOOD SAFETY AND QUALITY: THE IMPACT OF BLOCK CHAIN ON TRACEABILITY AND SUPPLY CHAIN MANAGEMENT

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ABSTRACT

The global food industry faces significant challenges in ensuring the safety and quality of products throughout the supply chain. Traditional methods of traceability and supply chain management often lack transparency, efficiency, and accuracy, leading to risks such as food borne illnesses, counterfeit products, and supply chain disruptions. In recent years, block chain technology has developed as a capable solution to address these challenges by providing a transparent, immutable, and distributed system for tracking and verifying the flow of food products from farm to fork.

Keywords— Food safety and quality, Block chain for food, Food.

AEFICS021

ADVANCEMENTS IN MULTI-MODAL 3D OBJECT DETECTION FOR ENHANCED SAFETY IN AUTONOMOUS DRIVING SYSTEMS: A COMPREHENSIVE SURVEY

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ABSTRACT

The relentless evolution of autonomous driving systems demands robust and reliable methods for detecting objects in three-dimensional space. This survey paper systematically examines the advancements in multi-modal approaches tailored to enhance safety within autonomous driving environments. Through an exhaustive review of current literature, we explore techniques leveraging diverse sensor modalities such as LiDAR, camera, and radar data to achieve precise and comprehensive 3D object detection. Key topics covered include feature fusion, sensor calibration, deep learning architectures, and probabilistic frameworks. Our analysis highlights the strengths and limitations of various methodologies and their practical applications in real-world scenarios. By providing a comprehensive overview, this paper aims to guide future research endeavors and foster innovation in the realm of multi-modal 3D object detection for autonomous driving.

Keywords: autonomous driving, 3D object detection, multi-modal fusion, sensor calibration, deep learning, safety.

AEFICS022

Deciphering Human Speech: Computational Approaches to Speech Recognition Technology

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ABSTRACT

Speech recognition is a cross-disciplinary field that uses the voice as its research subject. Natural voice communication is made possible by speech recognition, which also allows the machine to translate audio signal into text or commands through the identification and understanding process. Searchability is voice recognition's main benefit. It is possible for computers to recognize spoken language and convert it into text thanks to the interdisciplinary field of speech recognition in computer science and computational linguistics. Speech recognition, which integrates a variety of fields including physiology, psychology, linguistics, computer science, signal processing, and body language analysis, has as its ultimate objective the creation of natural language interaction between humans and machines. The human machine interface's primary technology is evolving from speech recognition to IT (INFORMATION TECHNOLOGY). The paper reviews the classification of speech recognition systems and voice recognition technology, discusses the evolution of speech recognition technology, and analyses the challenges faced by speech recognition.

Keywords: Speech Recognition; Phonetics; Linguistics; Language model; Algorithms; Pattern Recognition

PHARMNEST - AN ONLINE PRESCRIPTION BASED PHARMACEUTICAL STORE

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ABSTRACT

Traditional methods of obtaining prescribed medications often involve physical visits to a healthcare provider to obtain a prescription and then visiting a pharmacy to get them. This process can be time-consuming and inconvenient, particularly for individuals with mobility issues or busy schedules. The proposed system is a web-based application where patients can upload their prescriptions securely, and the system will automatically analyze the document using optical character recognition (OCR), identify prescribed medications, and provide real-time availability and pricing information. It also offers features such as medication reminders and comprehensive drug information to enhance user experience. Furthermore, it will include a user-friendly interface for browsing a wide range of medications, and secure payment options. The application will provide a user-friendly platform for purchasing medications and healthcare products.

Keywords: Optical character recognition (OCR), Medications, Healthcare.

AEFICS024

ENHANCING DECISION-MAKING IN EDUCATION SECTOR BY APPLYING MULTIPLE CRITERIA DECISION-MAKING (MCDM) TECHNIQUES

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ABSTRACT

In the dynamic landscape of education, decision-making processes are becoming increasingly complex due to various stakeholders, limited resources, and conflicting priorities. In this context, the importance of robust decision-making procedures cannot be overstated as they significantly impact outcomes for students, educators, and institutions alike. In such scenarios, Multiple Criteria Decision-Making (MCDM) techniques offer a structured framework to navigate the intricate educational landscape where multiple objectives require simultaneous consideration. This paper aims to explore the transformative potential of MCDM techniques in enabling informed and data-driven decisions, thereby enhancing the quality and effectiveness of education systems. The review encompasses several aspects. Firstly, it discusses the application of MCDM techniques within the education sector, emphasizing their significance in addressing a range of challenges such as curriculum development, resource allocation, student assessment, and strategic planning. Additionally, it sheds light on various MCDM methodologies, including Analytic Hierarchy Process (AHP), Fuzzy-AHP Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), and ELECTRE, among others, along with their advantages and limitations in educational contexts. Furthermore, the paper explores emerging trends and future directions in the integration of MCDM techniques with cutting-edge technologies like artificial intelligence and machine learning to further refine educational decision-making processes. Ultimately, this summary underscores the transformative potential of MCDM techniques in facilitating informed and data-driven decisions, thus advancing the quality and efficacy of education systems.

Keywords: MCDM, TOPSIS, AHP.

AEFICS030

QUANTUM COMPUTING: RECENT ADVANCES AND APPLICATIONS

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ABSTRACT

Quantum computing is the latest innovation in technical field and it is assumed to play the same role which was played by computer and internet earlier. With the advent of computer and internet, the way of information storage and processing as well as of information transmission around the globe, the each and every aspect of life has been changed. Similarly it is expected that quantum computing will revolutionize the way the information is processed. With its exponential speedup and ability to solve complex problems the possibilities are endless. In this paper the overview of recent advances in quantum computing technologies and its applications across various domains is provided. The milestones in quantum computing achieved such as quantum supremacy, improvements in the stability of qubit and error correction, along with the development of quantum algorithms with potential implications for cryptography, networking are discussed. The potential applications of quantum computing such as optimization, quantum machine learning and their impact on materials discovery, drug design, and simulation are also discussed.

Keywords: Quantum machine learning, quantum computing, artificial intelligence, optimization

AEFICS034

CHALLENGES AND OPPORTUNITIES OF IOT TECHNOLOGY FOR SMART CITIES

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ABSTRACT

The advent of the Internet of Things (IoT) has sparked a transformative wave in urban development, leading to the emergence of smart cities. This paper provides a comprehensive overview of the role of IoT technology in shaping the landscape of smart cities. By seamlessly interconnecting devices, sensors, and systems, IoT facilitates the collection, analysis, and utilization of vast amounts of data to enhance urban operations and improve quality of life.

This paper examines the multifaceted applications of IoT in smart cities, encompassing various domains such as transportation, energy management, public safety, healthcare, and environmental monitoring. Through real-time data acquisition and analytics, IoT enables cities to optimize traffic flow, reduce energy consumption, enhance security measures, and provide timely responses to emergencies, this paper also discusses the challenges and opportunities associated with the implementation of IoT in smart cities, including issues of privacy, security, interoperability, and scalability. It underscores the importance of robust cybersecurity measures and data governance frameworks to safeguard sensitive information and ensure the reliability of IoT-enabled systems.

Keywords: Internet of Things, Healthcare, Cyber-security, Energy consumption, Energy management

REVEALING THE IMPACT: MALWARE ATTACKS AND CONFIDENTIAL DATA LEAKAGE IN INDIA'S HEALTHCARE SECTOR

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ABSTRACT

The Internet of medical things, web, mobile based applications and automated equipments has digitized the healthcare industry. In India the digitization of healthcare has paved the way for better and quick treatments, eventually increasing the longevity of life. However these advancements have also exposed the healthcare industry to different types of internal and external threats. Malware is one of the external threats which are costing healthcare industry a huge loss in terms of data. Different types of medical data breaches have led to huge monetary losses. This study provides an insight into the data loss born by healthcare industry due to different malware attacks in the recent years. Different malware techniques are used by the attackers to steal the healthcare industry data; amongst them ransom ware and phishing are the most frequently used techniques. This paper investigates the correlation between malware attacks and the leakage of healthcare confidential data in India. By analyzing various case studies and statistical data, it aims to shed light on the extent to which malware compromises data security and the implications for organizations in India.

Keywords: Malware, Data Leakage, Cyber Security, Health care.

AEFICS044

SURVEY PAPER: VARIOUS ROUTING ALGORITHM FOR FANET

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ABSTRACT

With the advent of UAVs over defense and civil applications in recent years, have focused on FANETs, or (Flying Ad-Hoc Networks) built of many UAVs. The particularities of FANETs, as a new type of aerial self-organizing network, such as time-dependent network architecture and dynamic connection, make it difficult to sustain continuous communication when executing tasks. It is difficult to create a protocol for routing for FANETs that ensures data transmission quality and improves the efficiency of communication. FANET is a new sort of autonomous system that connects small drones in an ad hoc method. These networks' features comprise 3D movement, quick movement, rapid structural changes, limited resources, and low density. These features make developing a proper routing strategy for these networks very challenging.

Keywords: UAV, Routing Algorithm, FANET, Energy Efficient, Routing Strategy.

AEFICS045

ANALYSIS AND IMPLEMENTATION OF NEW TECHNIQUE COLLABORATED WITH HUFFMAN ENCODING AND DNA

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ABSTRACT

Security of information has become a key research area due to the enhancement in online data transfer rate. Data security can be employed using various ways such as cryptography, encryption, watermarking and stenography etc. Image stenography hides the secret message under a cover image to enhance the security. There are number of techniques have been proposed which are used to implement the methodology of hiding data. This paper represented, analyzed and implemented a new technique collaborated with two another techniques such as Huffman encoding and DNA. Initially, data is encrypted, compressed and then hided under an image for advanced level of security. The experimental analysis has performed using two different formats of images such as JPEG and BMP of three images. The message bits are varying from 50 to 1000 for the evaluation. The results acquired from the evaluation concluded that proposed technique outperforms the traditional technique in terms of PSNR and MSE.

Keywords: Transfer rate, Data security, Image stenography, PSNR, MSE

LAYER WISE SECURITY THREATS AND HYBRID TECHNIQUES TO SECURE IOT ENVIRONMENT

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ABSTRACT

IoT devices have become one of the most growing technologies and research areas in the last decade, and this technology is covering more and more areas day by day. IoT technology covers devices like cellphones, household cleaning devices, smart watches, automobiles, body diagnostic systems, etc. These devices are termed smart devices because with the help of sensors and actuators they can transmit and process the surrounding data and make smart decisions. The security and protection of IoT devices and the transmitting data should maintain international security standards to protect the user's data from the outside environment. The architecture of IoT devices must be integrated with advanced applications to support basic security principles like availability, integrity, and confidentiality to increase device dependability.

Keywords—IoT, IoT Security, IoT Security Threats, IoT Architecture,

Track 2

Frontiers in Computer Science

ENHANCING SECURITY AND EFFICIENCY IN DECENTRALIZED SYSTEMS: THE INTEGRATION OF BLOCKCHAIN WITH EDGE COMPUTING

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ABSTRACT

The paper delves into the main points, discoveries, and new developments around combining blockchain and edge computing. The use of federated learning with Blockchain in uncrewed aerial vehicle (UAV) air quality monitoring, incentive systems for trustworthy federated learning, Blockchain-based dynamic anti-poisoning techniques, and federated learning in vehicular Internet of Things are essential areas of attention. We look at the privacy issues of federated learning that uses Blockchain technology for intelligent edge computing. This study explores the use of Blockchain technology for distributed learning in a safe environment and semi-asynchronous protocols for fast-federated learning using Blockchain and Edge Computing. Improved intelligent 5G networks with Blockchain and deep reinforcement learning are also included in the survey, as are asynchronous online federated learning for edge devices with non-IID data. Finally, the study highlights essential research questions and obstacles by examining how intelligent cities use Blockchain technology. This abstract summarises the many areas where Blockchain and Edge Computing integration occurs and highlights its potential and importance.

Keywords: Blockchain, Edge Computing, Federated Learning, Privacy and Security

AEFICS062

A SYSTEMATIC APPROACH OF BLOCKCHAIN PLATFORM FOR INTERNET OF THINGS

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ABSTRACT

The growth of Internet of Things (IoT) and blockchain technology are growing rapidly. The world view of Internet of Things (IoT) is getting ready for an existence where a considerable number of our everyday items will be interconnected. The blockchain technology is capable of transferring the value at a lower cost which makes it feasible for the data from the smart devices to make economic value. The blockchain technology has various innovative features like high security, decentralization and sealing properties which gives all members the right to accept linkage and transmission at an extremely low cost. The usage of peer-to-peer communication between the IoT devices will enhance the security of transactions and make it convenient for the users while being fully precise. This paper proposed a model about how blockchain can be adapted for specific needs of IoT devices for developing blockchain-based IoT applications and make them secure enough at the end.

Keywords: Blockchain technology, Internet of Things (IoT), Blockchain security, IoT security, Thread prevention

AEFICS066

DESIGN AND DEVELOPMENT OF 'TRAVEL WORLD': A DJANGO-BASED TRAVEL WEBSITE FOR EXPLORING DESTINATIONS ACROSS INDIA

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ABSTRACT

"Travel World" is a comprehensive travel website developed using Django, Python, HTML, CSS, and JavaScript, aimed at providing users with a seamless platform to explore travel destinations across India. The website features an intuitive user interface that guides visitors through various regions, states, and cities in India, allowing them to learn about unique attractions, local culture, and popular activities. In this research paper, we delve into the design and development of "Travel World," highlighting the technical architecture and the framework choices that support its functionality. Django, as a high-level Python web framework, serves as the backbone, offering a robust and scalable environment for building the website's backend. The paper discusses how Django's built-in features like ORM (Object-Relational Mapping), routing, and user authentication were utilized to create a secure and efficient platform. The front-end design, developed using HTML, CSS, and JavaScript, is explored in detail, with an emphasis on responsive design and user experience. We outline the use of CSS frameworks to ensure a consistent look and feel, while JavaScript enhances interactivity and dynamic content loading, allowing users to navigate the website smoothly.

Keywords – Django Framework ,Python Development .Travel Website Design ,Travel Guides and Itineraries, Responsive Design

APPLICATION OF IOT IN WILDLIFE MONITORING

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ABSTRACT

The Internet of Things, or IoT, has a lot of uses in the monitoring of wildlife. It gives scientists and environmentalists important information that helps them comprehend and safeguard different species and habitats. Animals can be equipped with IoT devices, such as GPS collars, tags, and sensors, to track their whereabouts, behaviours, and preferred habitats in real time. Researchers can use this data to monitor endangered species, identify key habitats, and investigate migration patterns. Remote locations can have their temperature, humidity, water quality, and air pollution levels measured by IoT devices. This information is useful for evaluating ecosystem health and identifying changes that could have an impact on animals. Wildlife reserves and national parks can use IoT-based surveillance systems, such as cameras, drones, and motion sensors, to identify illicit activities like poaching and habitat degradation. Quick action is made possible by these technologies' real-time alerting of authorities. Early warning systems that notify communities of the presence of wildlife close to human settlements can be developed using IoT technology. This lessens human-animal conflict and makes it possible to act quickly to stop things like livestock assaults and crop raids. Animals can have IoT sensors inserted or affixed to them to track various health metrics, including heart rate, body temperature, and activity level. By identifying early warning indicators of disease outbreaks or specific health problems, this data can facilitate prompt veterinarian intervention. IoT helps with well-informed decision-making in species conservation initiatives by gathering and evaluating data on population trends, habitat degradation, and the effects of climate change. Creating efficient conservation plans and setting resource priorities for optimal effect are part of this. Researchers and educators may now access enormous volumes of data on the behaviour, ecology, and protection of wildlife through IoT technologies. This information can be utilised for environmental awareness campaigns, scientific research, and teaching. In conclusion it can be said that real-time data, proactive interventions, and stakeholder engagement are just a few of the ways that the IoT is driving forward wildlife monitoring and conservation activities.

Keywords: wildlife, internet, monitoring, conservation, environment

A COMPREHENSIVE REVIEW AND FUTURE DIRECTIONS IN BIG DATA ANALYTICS IN COMPUTER SCIENCE AND ENGINEERING

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ABSTRACT

Big data is becoming more and more popular as the next global currency in this highly technologically advanced day. Big data is not a concept, language, or technological term. Big data is really just a description of the problem or large volume of data grow exponential day by day. Many IOT-enabled gadgets are consuming large amounts of data in the modern era. The vast majority of the data originates from many databases. Every year, the amount of data grows exponentially, making the old systems used to store and process it not easy to manageable. The large data cannot be handled by the technology now in use. The online interactions of big data apps generate data automatically in our digital age.

Compared to the previous few years, data has grown at a very faster rate in the last few years. Human life in the modern day is entirely dependent on data. Enterprise data collection, including the growth of IOT and multimedia, has resulted in an abundance of data in both structured and unstructured formats. It is a known truth that data that is too large to handle is also too large to send anyplace.

The way data is processed, analyzed, and used is being revolutionized by big data analytics, which has become a transformational used across many areas. Big Data's arrival offers opportunities and difficulties for computer science and engineering, for creative approaches to data administration, analysis, and decision-making. This study offers a thorough analysis of the state-of-the-art in computer science and engineering for big data analytics at this time.

Keywords: Big Data Hadoop, massive Big Data Analytics, Big Data Processing, Big Data Research High Performance Computing, Data Mining, structured and unstructured data

IMPACTS OF CLOUD COMPUTING IN INDIA ON E-COMMERCE BUSINESS

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ABSTRACT

One of the newest technologies in the field of information technology is cloud computing. Cloud computing has evolved over the past few years from a purely theoretical idea to actual applications in sectors like telecommunications and healthcare. To manage user data and applications, cloud computing employs the Internet and remote servers. Customers and enterprises can access their personal files, data, and information from anywhere in the globe using the internet and use programmes without installing them. Different kinds of software programmes are currently operating in the cloud computing environment. One of the key services of cloud computing is e-commerce. To satisfy them, small and medium-sized businesses must offer superior e-commerce services. In this essay, we addressed how cloud computing has an impact on e-commerce businesses. In addition to this, it examined the factors that influenced how E-commerce changed during the cloud computing age. By building a framework for an e-commerce application based on a cloud computing environment and understanding how cloud computing affects e-commerce services and applications, this article addresses the issue of e-commerce and the lack of resources.

Keywords: Cloud Computing, E-Commerce, Network Security, Business Models

AEFICS082

A REVIEW ON EXPLORING SECURITY VULNERABILITIES AND MITIGATION STRATEGIES IN INTERNET OF THINGS (IOT) DEVICES

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ABSTRACT

The Integration of Internet of Things (IoT) into Society is ahead of its time. As the IoT landscape expands, maintaining the Safety and Security of interconnected devices becomes most crucial. This rapid progress threatens security issues that call for urgent remedies to secure the Internet of Things ecosystems. This paper explores the greater challenges posed to IoT systems such as obsolete practices and user education on safety measures. It delves into fundamental concepts like designing a secure model, using strong encryption methods and authentication systems. Methods such as IOT integrated blockchain technology, consist of blockchain contribution in futuristic IoT hardware, allowing them to be more resistant to cyber threats. Using the same tools as hackers, but this time to prevent the security problem of IoT devices, and getting thoroughly tested first to see if it works should be a top priority. In essence, this paper delves into proactive strategies for fortifying IoT devices as well as looking for future advancements to further enhance IoT Security.

Keywords*: Internet of Things (IoT), Cybersecurity, Interconnected devices, Blockchain, IoT Security.

ANALYSIS OF CRYPTOGRAPHY IN NETWORK SECURITY

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ABSTRACT

To ensure the security of wireless network data transmission, cryptography and network encryption play a vital role. Safeguarding data is a fundamental aspect of wireless network communication, especially given the presence of sensors connected to base stations. The protection of these wireless network sensors is of utmost importance, necessitating robust encryption and network security measures. Network security encompasses the security of individual terminal systems and the overall network infrastructure. As the world increasingly embraces the digital era, network security becomes a primary concern. It not only safeguards data managed by administrators but also supports secure communication in a rapidly advancing technological landscape. This security is achieved through a variety of encryption techniques, including cryptography, digital signatures, watermarking, steganography, and other relevant applications. Cryptography, as an encryption technique, is employed to fortify network security, particularly because various networks are susceptible to attacks and intrusions. In this paper, we delve into cryptography, exploring its objectives, variations, and algorithms. Additionally, we address intrusion detection and computer protection technologies, which are essential for countering various forms of attacks.

Keywords: Cryptography, AES, IoT, Cybersecurity, Intrusion Detection System

DIGITAL FORENSICS: COLLECTION AND ANALYSIS OF DIGITAL EVIDENCE TO CREATE STRONGER SECURITY MEASURES.

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ABSTRACT

Digital forensics (DF) or computer forensics is important when discussing and examining cyber surveillance. Nowadays, with the great advancement and progress of technology, cyber crimes are becoming more serious and our dependence on it is increasing. This is especially true during epidemics. At the end of 2020, the number of patients increased by 31 people. More people moving from offline to online has made connectivity worse. Criminals have used the opportunity to target the lack of influence and potential impact resulting from the control environment. Systems and processes that lead to cybersecurity issues. Cybercrime incidents, such as cyberattacks, can lead to the loss of important data or information, resulting in financial losses in the form of subsidies or fines or insurance from non-profit organizations.

Digital fraud, money laundering by wealthy individuals, terrorist financing and other cybercrimes are common in banks and other financial institutions. The non-regulatory body has set standards and recommendations to ensure that banks develop and maintain appropriate controls and procedures to help prevent the spread of cybercrime and other illegal activities. At this point, the need for digital forensics becomes very important. Digital forensics is performed by a group of experts and professionals who follow the analysis of digital data and understand the investigative process and digital bias to investigate the data and evidence of cybercrime. The document stored or sent in two formats and entered into the court is called a digital certificate. They can be in places such as computer hard disks and mobile phones. Electronic crime, sometimes called cybercrime, is similar to child pornography or credit card fraud and is often linked to digital evidence. However, the use of digital evidence to achieve justice is not just about crime; The same applies to other crimes.

In one case, important information about the suspect's behavior can be set in his email or mobile phone.

Digital substantiation can be altered by unhappy running since it's brittle and unpredictable. Protocols must be followed to guarantee that data isn't altered while being handled (i.e., during its access, gathering, packaging, transport, and storehouse), given its volatility and fragility. Original operation of digital substantiation involves four way identification, collection, accession, and preservation. Prior to collection, implicit data sources may have their attributes and contents reviewed to reduce the quantum of data acquired, avoid acquiring inapplicable information, or misbehave with hunt authority restrictions. During the review or analysis stage data is analysed, events are reconstructed, and digital substantiation is taken from the device. The conception of secure digital chains of substantiation is introduced in this study, along with a high-position armature for systems that can produce them. Last but not least, implicit structure pieces for the consummation of a miscellaneous, distributed system that supports safe digital body of evidence.

Keywords: Digital Forensics, Cybercrimes, Chain of Custody, Digital evidences, Data Breach.

AEFICS087

PREVENTION OF PHISHING ATTACKS USING AI-BASED CYBER SECURITY

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ABSTRACT

The development of artificial intelligence has made significant contributions to improving computer security, particularly in countering various cyber threats, including phishing attacks. Phishing attacks represent a substantial danger, but they can be effectively mitigated through intelligent approaches. The incorporation of mindfulness into this domain can further fortify defences against such attacks. The research paper elucidates the efficacy of AI-driven cybersecurity mindfulness in reducing the impact of phishing attacks. This innovative approach harnesses the power of AI and automation to address the evolving landscape of cybersecurity challenges. It offers distinct advantages, such as real-time threat detection, scalability, and adaptability. Artificial Intelligence (AI) stands as a pivotal tool in both detecting and preventing phishing attacks. By employing data analysis and machine learning techniques to scrutinize metadata, content, contextual information, and typical user behaviour, AI enables rapid and precise identification of potential threats, safeguarding sensitive data from unauthorized access."

Keywords: Phishing Attack, Cybersecurity, Metadata,IoT

AEFICS090

DECENTRALIZED FINANCE (DEFI): THE ROLE OF SMART CONTRACTS IN TRANSFORMING FINANCIAL SERVICES

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ABSTRACT

Decentralized Finance (DeFi) has emerged as a groundbreaking development in the financial services sector, primarily driven by the innovative use of smart contracts on blockchain platforms. This paper explores how DeFi is redefining the landscape of financial services, focusing on the pivotal role of smart contracts in facilitating this transformation. DeFi signifies a shift from traditional, centralized financial systems to a decentralized model, characterized by open access, transparency, and disintermediation. Central to this paradigm shift are smart contracts – self-executing contracts with the terms of agreements directly written into code, executed automatically on blockchain networks. These contracts have revolutionized financial transactions, enhancing efficiency, reducing costs, and increasing security and transparency. The paper delves into various DeFi applications, such as lending and borrowing platforms, decentralized exchanges (DEXs), and yield farming, highlighting how smart contracts automate and secure these processes. It examines the impact of smart contracts in reducing the reliance on traditional intermediaries, thereby democratizing access to financial services. The implications of this shift extend beyond mere convenience, offering broader inclusion and participation in the global financial system.

However, the DeFi ecosystem is not without challenges. The paper addresses technical concerns, including smart contract vulnerabilities, scalability issues, and the regulatory landscape's ongoing evolution. Despite these hurdles, the potential of DeFi to bring about a more inclusive and efficient financial system is evident.

Keywords: Decentralized Finance, DeFi, DApp, Smart Contracts, Blockchain, Financial Services, Lending Platforms, Decentralized Exchanges, Yield Farming, Financial Inclusion, Disintermediation.

AEFICS091

ENHANCING DATA SECURITY IN SOCIAL MEDIA PLATFORMS: CHALLENGES AND SOLUTIONS

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ABSTRACT

Data security in social media platforms has become a critical concern due to the proliferation of user-generated content, personal information sharing, and cyber threats. This paper presents an overview of the challenges faced by social media platforms in ensuring robust data security and explores potential solutions to mitigate risks and protect user information. The paper begins by examining the unique data security challenges posed by social media platforms, including unauthorized access, data breaches, identity theft, fake profiles, and privacy violations. It analyzes the impact of these challenges on user trust, platform reputation, and regulatory compliance, highlighting the need for comprehensive data security strategies. The paper explores the role of machine learning and artificial intelligence in bolstering data security in social media platforms. It discusses how these technologies can be leveraged for real-time threat detection, content moderation, user behavior analysis, and predictive analytics to mitigate risks and proactively address security incidents. By implementing robust data security measures, leveraging advanced technologies, and fostering a culture of cybersecurity awareness, social media platforms can mitigate data security risks and safeguard user trust and privacy.

Keywords: Data Security, Social Media Platforms, Cyber Threats, Encryption, Access Control, Machine Learning, Privacy, User Awareness

AEFICS092

INTEGRATING NATURAL LANGUAGE PROCESSING WITH IMAGE DOCUMENT ANALYSIS : A REVIEW

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ABSTRACT

There are numerous uses for automatically retrieving data from unconstrained image documents in government and commercial settings. These practical uses usually integrate language and information technologies, including machine translation (MT) and keyword spotting, with optical character recognition (OCR). OCR output is erroneous and poses special difficulties for post-processing. Two of these issues are addressed in this paper: (1) translating the Arabic handwriting OCR output, which is devoid of trustworthy sentence boundary indicators; and (2) searching for named entities that are entirely absent from the Arabic handwriting OCR output because they do not exist in the OCR vocabulary. We utilize natural language processing tools, particularly conditional random field-based sentence boundary detection and out-of-vocabulary (OOV) name detection, to tackle these difficulties.

Keywords: Image Document Analysis, Machine Translation ,Keyword Search ,Natural Language Processing ,Optical Handwriting Recognition

Track 3

Applications of Machine Learning

AEFICS001

PATTERN RECOGNITION TECHNIQUES USING MACHINE LEARNING IN TOURISM INDUSTRY

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ABSTRACT

Pattern recognition has gained tremendous momentum for all researchers for a decade because of its widespread application areas. The recent trends have shown that the tourism industry which is considered one of the biggest industries can be highly benefitted if the proper study is done with pattern recognition techniques. Since it uses machine learning algorithms many interesting patterns can be generated for the tourism industry which might be very beneficial to the tourism stakeholders. It might be in the case of holidays, seasonality, tourist choices and preferences, and so on. This survey/review shows the different pattern recognition techniques that can be used in the tourism industry and the same can be applied in context to the tourism industry. Their relevant uses in different fields have been discussed. This paper provides an overview of pattern recognition and how the researchers and industry experts can work in the field of tourism industry making it more convenient for the tourism industry to boom with different application areas and also giving the better opportunity to work in different fields related to the tourism industry.

AEFICS002

REVIEW OF LANGUAGE MODELS FOR CONVERSATIONAL AI IN CHATGPT

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ABSTRACT

New developments in machine learning and natural language processing (NLP) have been extremely beneficial to conversational AI systems. The GPT-3.5 architecture is the foundation of one very noteworthy model that has attracted a lot of attention: ChatGPT. ChatGPT's ability to produce responses that are human-like in a conversational setting is what makes it stand out. This innovative technology creates natural language responses in response to inputs or cues by applying cutting-edge artificial intelligence techniques. It has numerous uses in a variety of industries, including as content production, customer support, and natural language processing.

The history and technology of GPT are explored in this study, which also highlights the model's generative pre-trained transformer and shows off how adaptable it is to different language-based applications. Furthermore, it delves into how ChatGPT utilizes this technology to operate as a smart chatbot that can hold complicated discussions.

In this study, we present a thorough analysis of ChatGPT, looking at its training methods, architecture, advantages, disadvantages, and uses. We also talk about the possible difficulties and ethical issues that come with using ChatGPT in real-world settings.

Keywords: ChatGPT, AI, Libraries, Natural Language, Chatbot, OpenAI, GPT, GPT-3.5, Generative Pre-Trained Transformer

DEEP LEARNING TECHNIQUES FOR HATE SPEECH IDENTIFICATION: A COMPREHENSIVE ANALYSIS

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ABSTRACT

Hate speech detection has emerged as a critical task in the field of natural language processing, driven by the increasing prevalence of online hate speech and its negative impact on individuals and communities. Deep learning algorithms have shown promise for reliably detecting and suppressing hate speech by effectively capturing complicated language patterns and semantic complexities. This study investigates the most advanced deep learning approaches for detecting hate speech. The research focuses on several deep learning architectures used to detect hate speech. These models include RNNs, CNNs, and transformer-based models like BERT and GPT.

The strengths, weaknesses, and applicability of each design are evaluated in terms of their effectiveness in hate speech detection tasks. Furthermore, the paper investigates the many datasets that can be utilized for hate speech research, including publicly available corpora and domain-specific datasets that have been annotated to identify hate speech material. The paper examines the role of data preparation, feature engineering, and model evaluation procedures in ensuring the resilience and application of hate speech detection algorithms.

The paper also looking at prospective topics for future research and issues in the hate speech detection industry. These include developing multilingual models, using more precise categorization of hate speech, and incorporating contextual information to improve model performance. The paper provides a comprehensive overview of the current state of hate speech detection using deep learning approaches. It provides useful insights into the primary approaches, challenges, and opportunities for future growth in this field.

Keywords – Hate Speech, Recurrent Neural Network, Convolutional Neural Network, BERT, Natural Language Processing, Feature Engineering, Deep Learning.

A REVIEW AND ANALYSIS OF EXTRACTIVE AND ABSTRACTIVE TEXT SUMMARIZATION TECHNIQUES

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ABSTRACT

The gigantic amount of electronic data gathered and analyzed has contributed to useful information sources that human beings need to manage easily. To make important decisions very quickly, the Automatic Text Summarization (ATS) method enables users to get relevance and expertise in a very small amount of time. ATS systems are notably extractive and abstractive, or by combining these two approaches, it is also used as a hybrid. The extractive technique involves extracting the most important sentences from the input document(s), then assembling these sentences to produce the summary. In the abstractive technique, a summary is produced by creating new sentences instead of picking sentences to convey the meaning of input text. A hybrid method intermingles of Abstractive and Extractive methods. In spite of many suggested techniques, the created summaries still don't convey the actual meaning of text as compared to the man-made summaries. In this paper, the authors reviewed different techniques of text summarization and identified the present issues and research challenges in text summarization and proposed an Ensemble Learning Model for Text Summarization Using machine learning algorithms to enhance the quality of the summary. The proposed model is an ensemble of four models, i.e., Sentence2BERT (S2B), Auto Encoder (AE), Variational Auto Encoder (VAE), and Multilayer Extreme Learning Machine Auto Encoder (MLELM-AE).

Keywords: Automatic Text Summarization (ATS), Deep neural networks (DNNs), Word Embedding, Multilayer Extreme Learning Machine Auto Encoder (MLELM-AE), Word2vec, BERT.

AEFICS011

A LITERATURE REVIEW ON CHRONIC LIVER DISEASE DETECTION AND DIAGNOSIS SYSTEM USING MACHINE LEARNING

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ABSTRACT

The most common cause of death worldwide, chronic liver disease affects a lot of individuals. The development of this illness is determined by a number of liver-related factors. In India, liver illnesses account for more than 2.4% of all annual deaths. It is quite difficult to diagnose liver disease in its early stages because of its mild symptoms. It is usually too late when the warning signs are recognized. Considering liver-related disorders increasingly affect more people, it is more important than ever to understanding their causes and start the identification process. The condition has minor symptoms in the early stages, presenting a challenge for medical professionals to diagnose patients. Symptoms frequently appear after it is too late. Machine learning is used in the research to identify and improve the diagnosis of liver disease. In order to identify liver disorders early, this study compares and contrasts the performances of various machine learning methods. Decision Tree, Naive Bayes, Support Vector Machine, Logistic Regression, and K Nearest Neighbors are the six algorithms used in this investigation.

Keywords: Machine Learning (ML), Naive Bayes, Support Vector Machine, Decision Tree (DT), K Nearest Neighbors, Random Forest (RF), and Logistic Regression.

A REVIEW ON EARLY CHRONIC LIVER DISEASE DETECTION BY USING MACHINE LEARNING TECHNIQUES

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ABSTRACT

Chronic liver disease (CLD) is a significant global health concern, affecting millions of people worldwide. Early detection and intervention are crucial for improving patient outcomes and reducing the burden on healthcare systems. Machine learning (ML) has emerged as a promising tool for the detection and diagnosis of CLD, offering the potential for more accurate, efficient, and cost-effective solutions. In this article, we provide a comprehensive overview of the current state of ML-based approaches for CLD detection, focusing on the various techniques, and performance metrics used in the literature. We also discuss the challenges and future directions for the development and implementation of ML-based CLD detection systems.

Keywords: Chronic liver disease, Machine learning , Health Care, CLD Detection,

AN EFFICIENT HEART DISEASE PREDICTION AND MONITORING TECHNIQUE USING MACHINE LEARNING

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ABSTRACT

Globally, cardiovascular diseases (CVDs) are a frequent factor in heart failure. This study was required to investigate potential approaches to treating the condition. A machine learning model for predicting the risk of cardiovascular disease was developed in the study. Cholesterol level, blood pressure, smoking or drinking habits, pulse rate, age, diabetes, and many other factors all play a role in heart disease. Ischemic heart disease is world's dangerous disease, 60% of the world's death are due to this disease. Many covid affected people also died due to heart disease. Ischemic heart disease will cause due to blood clot in an artery and lead to severe heart attack. Numerous machine learning, data mining, and neural network approaches have been used to identify the disease over the past few years. Different AI models like K-Nearest Neighbour, Naive Bayes, Decision Tree, Support Vector Machines are acquainted with decide the danger level these illnesses have yet the information from the most recent couple of many years characterize that numerous individuals are having illness at a beginning phase and indeed, even a few new conceived youngsters are experiencing or passed on a coronary illness. Predicting these diseases and their threat level can be greatly aided by machine learning aspects.

Keywords: Machine learning, Heart disease, Decision Tree, Naïve Bayes, Support Vector Machine.

BUILDING AN INTERACTIVE TOOL FOR REAL VS SYNTHETIC IMAGE IDENTIFICATION USING TENSOR FLOW & TENSOR FLOW.JS

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ABSTRACT

In an era, rife with digital manipulation, synthetic media and image processing techniques, the need for robust image authentication tools has become paramount. This paper presents an innovative approach to image authenticity verification through the development of a Convolutional Neural Network (CNN) utilizing the TensorFlow framework. Our objective is to distinguish between genuine real-world images and computer-generated or synthetic counterparts, addressing concerns surrounding the proliferation of manipulated visual content.

Leveraging the deep learning capabilities of TensorFlow, our model is trained on a large dataset encompassing both authentic and synthetic images. This project proposes a solution to the limitations of existing manual inspection methods and rudimentary image processing techniques, offering a highly automated and efficient approach to identifying manipulated or synthetic images with high accuracy using a CNN.

This Convolutional neural network, uses 4x4 convolutions for feature extraction, pooling for dimensionality reduction, and dense layers with activation function ReLu and the last layer is dense layer with 1 neuron using sigmoid function for final prediction.

We have used CIFAKE as dataset, which contained images from 10 classes, the real images of CIFAKE dataset are taken from CIFAR-10 data set and the fake images are created using Stable Diffusion Model (SDM), this dataset contained images that were 32x32 we improved

upon this dataset by increasing the number of real images and generating captions for it, those captions were used in the stable diffusion model that was used to create images in CIFAKE dataset.

Key components of our solution include a CNN built using Tensorflow which is then converted to a JavaScript model using Tensorflow.js which allows us to run the model in browser and a front-end using React.js having an authentication system, which can be used by the user to classify images.

Keyword: CNN, Image Identification, tensor Flow, Machine Learning, Stable Diffusion Model.

USES OF MACHINE LEARNING ALGORITHMS SUPPORT VECTOR MACHINE AND DECISION TREE FOR IDENTIFYING CRITICALNESS IN DIABETES

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ABSTRACT

Diabetes is a critical and become more complicated disease that can cause serious health problems if it is not adequately managed. The early diagnosis and treatment of diabetes is a critical component of the condition that can be greatly aided by data analysis and predictive algorithms. Through the use of data mining techniques, such as classification and prediction models, it is possible to analyse various elements of diabetes data and extract useful information that can be used for the early detection and prediction of the condition. One machine learning technique that can effectively and highly precisely predict diabetes is the XGBoost classifier. This method makes use of the gradient-boosting architecture and can handle large and intricate datasets with independent high-dimensional feature sets. Conversely, it is crucial to remember that the choice of the best algorithm for diabetes prediction could depend on the specifics of the data as well as the area of study being investigated. Data analysis and prediction methods can be applied not only to anticipate diabetes but also to monitor the disease's progression, find risk factors for diabetes and its complications, and assess the effectiveness of treatment. By using these techniques, medical professionals can obtain important insights into the disease's underlying causes, which helps them make informed decisions about patient management. The early detection and management of diabetes, a chronic disease that is rapidly expanding and poses major health risks, has the potential to be significantly improved through the application of data analysis and prediction algorithms. An accuracy rate of 89% was achieved by the XGBoost classifier, which demonstrated the highest level of performance.

Keywords: Diabetes Criticalness and complications, Predictive Modelling, Machine Learning Algorithms, Decision Tree, SVM, Artificial Intelligence

AEFICS025

A COMPREHENSIVE SURVEY OF MACHINE LEARNING BASED HEALTHCARE MONITORING & DISEASE PREDICTION SYSTEMS

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ABSTRACT

This paper presents a comprehensive review of the usage of machine learning tools, methods, and approaches in medical diagnosis and disease prediction. It explores the fundamental concepts of machine learning and examines various approaches commonly employed in healthcare. The paper discusses the diverse medical data sources utilized, such as electronic health records, medical imaging data, genomic data, and wearable sensor data, along with preprocessing techniques for handling these data modalities. It investigates machine learning applications in diagnosing conditions like cancer, cardiovascular diseases, infectious diseases, and neurological disorders, covering image-based diagnosis, risk stratification, prognostic modelling, and treatment recommendation systems. Ethical considerations, including data privacy and algorithm bias, are addressed. The paper concludes by summarizing key findings and suggesting future research directions. Overall, it highlights the transformative potential of machine learning in improving medical diagnosis and disease prediction, emphasizing the need for collaborative efforts and responsible implementation for better patient outcomes.

Keyword: Machine Learning, Health Care Monitoring, Disease Prediction , Image-based Diagnosis

AEFICS026

A REVIEW ON LANGUAGE LEARNING AND TRANSLATION SUPPORT WITH ARTIFICIAL INTELLIGENCE (AI)

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ABSTRACT

Language learning and translation plays a very important role in global communication and social exchange. AI based language learning helps in making learning more interesting and keeps learners motivated. With the help of AI, language translation is much faster and more reliable. The larger part of the colleges and private teachings have started to utilize AI and machine translation (MT) in educating field. Earlier the interpreters used to learn through traditional structured education program, but now they have started utilizing AI for language learning. This paper explores the utilization of AI in dialect learning and interpretation, with an essential objective of surveying the progressions and challenges inside the space. Furthermore, it emphasizes the significance of guaranteeing inclusivity and social affectability in these AI frameworks. By looking at different points of view, it gets to be apparent that there are various uncertain issues which are unresolved in this field. In substance, the paper looks for to understand the overview of AI driven language translation, highlighting both its accomplishments and zones for advancement.

Keywords: Artificial Intelligence (AI), Machine Translation (MT), Language Translation, NLP Algorithm, Data Protection, Computer Assisted Translation (CAT).

AEFICS028

TRANSFER LEARNING TECHNIQUES FOR DOMAIN ADAPTATION IN NATURAL LANGUAGE PROCESSING

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ABSTRACT

Although Natural Language Processing (NLP) models have demonstrated impressive results across a range of tasks, the distributional disparities between the training and target domains typically cause these models to lose some of their efficacy when applied to new domains. Domain adaptation has been a key field of NLP research, with the goal of adapting models trained on a source domain to perform well on a target domain. The use of transfer learning techniques to improve performance in target domains by utilizing information from source domains has drawn a lot of attention as a solution to domain adaptation problems. An overview of the transfer learning strategies used for domain adaptation in NLP tasks is given in this study. We go through the essential ideas of transfer learning and how they apply to domain adaptability. In addition, we examine many transfer learning paradigms, including feature-based, instance-based, and parameter-based techniques, outlining the benefits and drawbacks of each in relation to domain adaptation. Furthermore, we examine current developments and cutting-edge approaches in transfer learning for domain adaptation in natural language processing (NLP), such as fine-tuning pretrained language models, multi-task learning, and domain adversarial training. We investigate how these methods, which involve learning domain-invariant representations or modifying model parameters to target domains, facilitate efficient knowledge transfer across domains and alleviate the domain shift issue.

Keywords: Transfer Learning, Domain Adaptation, Natural Language Processing (NLP), Pre-trained, Language Models, Multi-task Learning, Domain Shift, Feature-based Transfer, Instance-based Transfer, Parameter-based Transfer, Domain-invariant Representations

AEFICS029

LEVERAGING MACHINE LEARNING FOR DENGUE PREVALENCE PREDICTION

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ABSTRACT

Dengue fever is a significant global health concern, especially prevalent in warm regions. Diagnosis relies on recognizing symptoms like fever, headache, joint pain, and rash, confirmed through lab tests. Studies show that dengue cases are often underreported, stressing the need for better tracking. This study looks at dengue rates and risks in both urban and rural parts of India. Data came from hospitals, surveys, and labs. Analysis shows high dengue rates, especially among urban children, linked to factors like poor sanitation and high population density. Peak infections usually happen during the rainy season. Targeted efforts like better waste management and education are crucial for controlling dengue. Further research is needed to understand more factors affecting dengue spread. This study helps improve strategies for preventing and managing dengue fever.

Keywords—Dengue, Fever, Machine Learning, data.

AEFICS032

UTILIZING MACHINE LEARNING TO IDENTIFY APT: CONTRARY PERFORMANCE ANALYSIS USING SUGGESTED MODEL

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ABSTRACT

This study investigates how well machine learning algorithms detect Advanced Persistent Threats (APTs), which are crucial to modern cybersecurity. Based on a dataset that was carefully examined using Gradient Boosting, MLP Classifier, Random Forest, and a Proposed Model, this study carefully examines the accuracy, precision, recall, and F1-score metrics to determine how well each model performs. The analysis demonstrates the superiority of the proposed model with an F1- score, accuracy, precision, and recall respectively. The Comparative Performance Analysis highlights the crucial role that precision and recall play in APT detection by illuminating the subtle strengths and limitations within each model.

Keywords: APT, Machine Learning, Cyber Attack, RF, MLP Classifier, Gradient Boosting.

Track 4

Advances in Artificial Intelligence

AEFICS033

AN IN-DEPTH STUDY OF RAINFALL PREDICTION ANALYSIS USING MACHINE LEARNING TECHNIQUES

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ABSTRACT

Rainfall prediction is important as heavy rainfall can lead to many disasters. The prediction helps people to take preventive measures and moreover the prediction should be accurate. Heavy precipitation prediction could be a major drawback for earth science department because it is closely associated with the economy and lifetime of human. It's a cause for natural disasters like flood and drought that square measure encountered by individuals across the world each year. Accuracy of rainfall statement has nice importance for countries like India whose economy is basically dependent on agriculture. The dynamic nature of atmosphere applied mathematics techniques fail to provide sensible accuracy for precipitation statement. The prediction of precipitation using machine learning techniques may use regression. Intention of this project is to offer non-experts' easy access to the techniques, approaches utilized in the sector of precipitation prediction and provide a comparative study among the various machine learning techniques

Keywords: Rainfall Prediction, Machine Learning, Accuracy Prediction.

AEFICS035

PREDICTION-BASED LEARNING TO ENHANCE ARTIFICIAL INTELLIGENCE ESSENTIALITIES ON THE STEPS OF CROP FRAMING

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ABSTRACT

Artificial Intelligence (AI) is currently providing various solutions to the world's service sectors. AI helps sectors are as Mechanical Engineering for the Production Cycle, Civil Engineering for Structure Design, Aeronautical Engineering for the Advancement in Real-Time Decisions, Instrumentation Engineering for decision-based devices, Electronics and Communication Engineering for Robotics circuits design, and Automation and Computer Science in Neural Network programming for desire outcomes of the targeted problems. Even though in the Management and Education field the AI is also having mandatory AI tools that are supporting the human being for prediction-based selflearnings. The paper helps in comparing the AI methods with the technology advancement in the sector of Agriculture. Agriculture is the area where many types of machinery use Integrated Circuits (IC) based on self-learning programs and execute the work according to the problems. The paper elaborates on the algorithm-based models that facilitate the steps of farming. The objectives that provide the solution for the prediction of soil moisture, appropriate environment for sowing crops, System model for the irrigations, Size and necessary prediction steps for weeding and pesticide sprays, and harvesting time of crop for getting yield in productions. The model is a prediction-based essential model named the Farming Supportive Learning System (FSLS). The FSLS prediction model that based on the selflearning method of the unsupervised learning system of AI. FSLS elaborates the desired facts and mathematical figures based on real images and helps in predicting the current decision for the Ploughing soil, Sowing seed, Irrigation of water, weeding the unwanted plants, and harvesting the crops. The Farming Supportive Learning System (FSLS) concluded the learning model based on unsupervised learning to enrich the essentialities of AI in the steps of farming crops.

Keywords: Artificial Intelligence (AI), Integrated Circuits (IC), Learning System (LS)

ARTIFICIAL INTELLIGENCE IMPACT ON STUDENT AUTONOMY AND AGENCY IN THE LEARNING PROCESS

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ABSTRACT

Artificial intelligence (AI) in the field of education, technology can help make education much more interesting and give impressive results with smart classrooms, offering interesting opportunities for learning better and improved educational outcomes. Problems like what one is going to do in a classroom, the lack of focus on critical thinking, and concerns about keeping the secure data need to be looked at. This paper explores how education is evolving with technology, which transforms classrooms into smart and AI-based ones that improve teaching and learning experience. It also talks about the essential parts of smart classrooms, like how the AI works with students and teachers also learning materials. Even though utilizing AI in education can be useful, there are some things we need to think about, like making sure students' data is private and considering the ethical issues. AI in the field of education mainly brings forward lots of opportunities although we have to find the right balance and ensure that everything is fine for the students to learn effectively.

Keywords: Education, Learning Analytics, Smart Classroom, Digital Learning, Virtual Assistant

AEFICS038

ENHANCED ACCURACY IN BLAST DISEASE PREDICTION FOR RICE CROPS: A SUPPORT VECTOR MACHINE VS. K-NEAREST NEIGHBOR ALGORITHM STUDY

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ABSTRACT

The purpose of this study is to compare the K-Nearest Neighbour Algorithm with Support Vector Machine in order to increase the accuracy of blast disease detection in rice crops. Supplies and Procedures: Using various training and testing splits, the Support Vector Machine and K-Nearest Neighbour Algorithm are utilised to predict the rice blast sickness. In this case, the analysis was conducted using two groups, each consisting of 169 samples, for a total of 10 iterations. The ClinCalc software is a tool for determining the accuracy of the setup for supervised learning. Approximately 80% of the Gpower exam is used. (Power=0.05 and =0.80 are the g power setting values). The efficacy of Novel Support Vector Machine and K-Nearest Neighbour's performance in identifying Blast Disease in rice crops will be determined by the effectiveness of the chosen dataset. A statistically not significant Independent Sample T-test value of $p = 0.284$ indicates that Support Vector Machine (90.9370%) performs better than the K-Nearest Neighbour method (88.5950%) in terms of both accuracy and loss. In conclusion, Support Vector Machine method (88.59%) has superior accuracy when compared to K nearest neighbour method (90.93%). When there is an obvious distinction between the afflicted and healthy crop, Support Vector Machines can be useful; however, K-Nearest Neighbours may perform better in situations when the dataset being used has a lot of variation and no clear decision boundary.

Keywords: K-Nearest Neighbour Algorithm, OpenCV, Significance value, Plants, Crops, Diseases, Novel Support Vector Machine

AEFICS039

PHISHING WEBSITE DETECTION USING MACHINE LEARNING AND DEEP LEARNING

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ABSTRACT

Phishing is a kind of worldwide spread cybercrime it has also prompted the birth of more harmful and challenging websites in the device of information systems, and electronics. Currently, numerous types of cybercrime are organized through the internet. Despite the fact that several techniques for identifying phishing websites have been presented, phishers strategies have evolved to circumvent detection. Phishing websites are counterfeit web pages created by hackers to replicate the web pages of legitimate websites in order to deceive users and steal personal information such as usernames and passwords. In the end, the stolen personal information is used to defraud the trust of regular websites or financial institutions to obtain illegal benefits. Different studies have presented their work on the precaution, identification, and knowledge of phishing attacks, however, there is currently no complete and proper solution for frustrating them. One of the most efficient approaches for identifying these harmful behaviors is machine learning. This is due to the fact that most phishing attacks exhibit features that machine learning algorithms can recognize. This paper we propose the Machine Learning and Deep Learning algorithms in features-based approaches by utilizing contemporary techniques. Finding an appropriate classification model for the prediction of phishing websites is the primary objective of this study. Two machine learning models (Naïve Bayes and Support Vector Machine) and two deep learning models (Neural Networks algorithm and Convolutional Neural Network) were taken into consideration in the classification analysis

Keywords: Phishing Website Detection, Machine Learning, Deep Learning, Navies Bayes, CNN, Neural Networks, SVM.

TEACHER TRAINING AND PROFESSIONAL DEVELOPMENT FOR EFFECTIVE UTILIZATION OF AI

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ABSTRACT

Artificial Intelligence (AI) in today's world has become a very powerful tool because it has the ability to understand, verify and examine a large amount of data and based on this it can make prediction and accomplish works that would require a long time for humans to finish. AI devices and supercomputers are great additions to these tools as they help teachers to use a wide range of teaching ideas, individualize learning for every student, and especially change some recurring activities that teachers have to do constantly. Instructor must command AI awareness, new usage possibilities and assessments to get the most out of this intelligent resource. Such a design should not only be dedicated to technology skills but a wide scope of purposes which impact on education should be emphasized accordingly. Educators ought to understand the AI ability, find new conduit to apply this technology into the teaching process, and think about ways for teachers to do tasks respectively to given AI directions. This paper discusses the contribution of machine learning in assisting training and development for teachers and will also advise its prospects of giving more qualified teaching aids and aid continuous learning.

Keywords: Artificial Intelligence (AI), Education, Teacher training, Technology integration, Classroom implementation.

AEFICS047

OBJECT DETECTION WITH DEEP LEARNING

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ABSTRACT

Object Discovery is one of the most important and grueling branches of computer vision, which has been extensively applied in people's life, similar as covering security, autonomous driving, medical imaging and so on, with the purpose of locating cases of semantic objects of a certain class. Object detection in videos and images has become a hot research topic because it's useful for understanding what's going on. Recent advancements in deep learning have provided powerful new tools. These tools can "learn" more complex features from data, which helps them solve problems that older methods couldn't handle. In this paper, we provide a review on deep learning based object detection and its frameworks. Firstly we introduce the history of deep learning and then its representative tool, namely Convolutional Neural Network (CNN). Then note advantages of CNN over traditional methods. Then we look toward the application of object detection. And we look how object detection help in future research.

Keywords: Deep Learning, Object Detection, Neural Network, Localization, Convolutional

ARTIFICIAL INTELLIGENCE (AI) AT THE NEXUS OF CHEMISTRY: ADVANCEMENTS, APPLICATIONS AND ETHICAL CONSIDERATIONS

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ABSTRACT

Artificial Intelligence (AI) finds application in various areas of chemistry, enhancing research, development, operational processes, drug delivery, material design, reaction optimization, spectroscopy, analysis, process control, optimization, computational chemistry with improved efficiency, less time and accuracy. AI systems are designed to utilize data-driven models for making predictions. For instance, predicting solubility can be achieved by AI programs trained on a multitude of compounds, developing structure-solubility relationships. In the healthcare industry, AI and chemistry applications are primarily focused on drug discovery and development. AI aids in molecule synthesis, molecular property identification and more. AI facilitates molecule design and prediction of properties like melting point, solubility, stability, HOMO and LUMO. It assists in understanding the effects of chemicals and determining structural patterns of molecules. The integration of AI and IoT has been employed in combating SARS-CoV-2. During lockdowns due to Covid-19, AI systems were utilized to disseminate national policies, collect data to formulate vaccine, educate people and regulate health protocols. AI can predict reaction outcomes based on available data and plays a crucial role in retrosynthesis. Algorithms are used in wastewater treatment plants for intelligent analysis and pollutant removal. Combining AI with nanotechnology offers new tools for impactful information and communication technology. AI can resolve the complex chemistry problem by Hyper Write's Chemistry Assistant. This article is aimed at chemists interested in AI's potential in chemistry and new researchers entering the field.

Alpha Fold, a protein structure prediction tool is a notable AI application in chemistry, utilizing graph representation approaches. AI developers can train models using real and

simulated data to predict optical properties and molecule colours. AI encompasses various techniques like Machine Learning (ML), Deep Learning (DL) and Natural Language Processing (NLP). In chemistry, these techniques are utilized to analyse chemical data, stimulate chemical processes, design new molecules and materials. AI aids in drug discovery, material science, chemical synthesis, molecular design, enzyme creation, protein secondary structure prediction, retrosynthesis, nanotechnology and analysing experimental results. Ethical and responsible use of AI in chemistry is paramount focusing on improving human health and well-being. Ensuring accessibility and inclusivity is crucial as biased data can perpetuate inequalities. AI has the potential to revolutionize chemistry from drug discovery to material science and beyond. High-quality data, interpretability of models, ethical considerations, accessibility are vital factors in AI development and implementation in chemistry. The future potential of AI in chemistry is vast promising, more innovations and developments is required which will play a pivotal role in scientific discovery.

Keyword: Artificial Intelligence (AI), Chemistry, Drug Discovery, Material Design, Reaction Optimization, Retrosynthesis, Machine Learning (ML), Deep Learning (DL), Natural Language Processing (NLP).

RETRIEVAL-AUGMENTED GENERATION (RAG) – A NOVEL GENAI

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ABSTRACT

Retrieval-Augmented Generation (RAG) is revolutionizing the way we leverage generative AI for handling information, both at the individual and team levels. It serves as a knowledge system that can tailor a personal ChatGPT for your company's data, simplifying the process of accessing and utilizing the necessary knowledge. It enables swift and efficient interaction with vast amounts of information. The process of RAG operates in two key phases: "retrieval" in which the system shifts through your data to locate valuable pieces of information and "generation" in which a generative AI model utilizes the retrieved data to craft clear and precise responses to your inquiries. In comparison to LLM systems, RAG offers several advantages for knowledge systems like accuracy, transparency and customization. Accuracy is achieved due to the fact that the RAG minimizes illusion and hence ensuring reliability. The transparency is attained through Robust RAG systems which can furnish references, allowing users to verify the sources of information, thus enhancing trust and accountability in the provided answers. Finally, customization can also be achieved through RAG systems as they can leverage specific data from any company or field, such as naming conventions, making them adaptable and ensuring that responses remain relevant to your unique context. Finally, it can be said that Retrieval-Augmented Generation (RAG) is a novel knowledge system that can transform the generative AI field.

Keywords: Artificial Intelligence (AI), ChatGPT, Generative AI, Large Language Models (LLMs), Retrieval-Augmented Generation (RAG).

DEVELOPING AN ANN GROUNDED DETECTION SYSTEM (IDS) FOR CYBERSECURITY

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ABSTRACT

In the current digital age, the sheer volume of data presents a significant challenge to cybersecurity. The complication of cyber-attacks makes it delicate to develop effective tools for detecting them. Conventional hand- grounded intrusion discovery has been extensively used for detecting attacks and securing systems. Still, with the arrival of Artificial Intelligence (AI), particularly Machine literacy, Deep Learning, and ensemble literacy, promising results have been demonstrated in detecting attacks more efficiently. This review highlights the use of AI- grounded ways in detecting attacks effectively grounded on affiliated exploration. The study offers a comprehensive perspective by presenting a taxonomy of being exploration literature on Machine literacy (ML), Deep Learning(DL), and ensemble literacy. It incorporates 72 exploration papers and examines factors like the algorithms and performance criteria used for discovery. The exploration uncovers that AI-grounded intrusion discovery ways ameliorate delicacy, but experimenters have substantially concentrated on enhancing performance for relating attacks rather than classifying individual attacks. The main ideal of the study is to offer a thorough understanding of colourful AI-grounded approaches in intrusion discovery and give deeper perceptivity to help unborn experimenters in comprehending the complications of multi-classification of attacks.

Keywords: Intrusion Detection System (IDS), Machine Learning, Deep Learning, Artificial Intelligence, Ensemble Learning

OFFLINE WRITER INDEPENDENT HANDWRITTEN SIGNATURE VERIFICATION SYSTEM

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ABSTRACT

The signature stands as a pivotal trait of an individual, serving not only as a means of identification but also as a cornerstone for validating official documents. This study aims to explore the potential of geometric features in crafting a robust offline signature verification system employing multiple classifiers with a writer-independent approach. In this endeavour, a writer-independent offline handwritten signature verification model, termed as the global model, is introduced. Utilizing Support Vector Machine with a polynomial kernel, the global model is constructed. Two distinct signature databases are employed to assess the classifier's performance, gauged by the Average Error Rate. The findings reveal the efficacy of the Support Vector Machine with geometric features model in effectively discerning between genuine and forged handwritten signatures of the writer.

Keywords: Handwritten Signature, Writer Independent Approach, Writer Dependent Approach, Geometric Features, Support Vector Machine

AEFICS071

A COMPARISON ANALYSIS OF CLASSIFICATION ALGORITHMS FOR SPAM EMAIL DATA ANALYSIS

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ABSTRACT

In recent years email has become one of the fastest and most economical means of communication. Spam email is unsolicited and unwanted junk email sent out in bulk to an indiscriminate recipient list. However increase of email users has resulted in the dramatic increase of spam emails during the past few years. Data mining -classification algorithms are used to categorize the email as spam or non-spam. In this paper, we conducted experiment in the WEKA environment by using four algorithms namely ID3, J48, Simple CART and Alternating Decision Tree on the spam email dataset and later the four algorithms were compared in terms of classification accuracy. According to our simulation results the J48 classifier outperforms the ID3, CART and ADTree in terms of classification accuracy. Email has emerged as one of the most affordable and quick ways to communicate in recent years. Unwanted and unsolicited junk email sent in large quantities to a list of recipients without any filter is known as spam. But during the past few years, a sharp rise in spam emails has been caused by an increase in email users. The email is classified as spam or non-spam using data mining-classification algorithms. In this paper, we used the spam email dataset to test four algorithms—ID3, J48, Simple CART, and Alternating Decision Tree—in the WEKA environment. The classification accuracy of the four algorithms was then compared. Our simulation findings show that the J48 classifier performs better in terms of classification accuracy than the ID3, CART, and ADTree.

Keywords: Spam email, ID3, CART, ADTree, J48, WEKA environment.

A REVIEW PAPER ON INTERACTION BASED SEGMENTATION AND RECOGNITION FRAMEWORK USING DEEP LEARNING

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ABSTRACT

According to a human perception image segmentation is the process of dividing the image into non- overlapping meaningful regions. The main objective of image segmentation is to divide an image into many sections for the further analysis, so we can get the only necessary or a segment of information. The partitioning the image will be based on some image features like color, texture, pixel intensity value etc. There are several techniques of image segmentation like thresholding method, region based method, edge based method, clustering methods and the watershed method etc. In this paper we will see some segmentation methods and what are the necessary things we should know while doing segmentation. We will also check some papers and analyse which method is best for image segmentation.

Keywords: perception, segmentation, texture, edge, clustering.

EXTRACTING POWERFUL FEATURES: A STACKED MODEL APPROACH FOR EARLY LUNG CANCER IDENTIFICATION

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ABSTRACT

Lung cancer is a significant global health concern, responsible for numerous cancer-related deaths. While smoking remains the primary risk factor, even non-smokers can develop this malignancy. Recognizing the symptoms early is crucial for timely intervention. This research paper focuses on early lung cancer detection. By analyzing previous symptoms, machine learning and deep learning algorithms (such as Linear Regression, Logistic Regression, Support Vector Machine, Binary Classification, Random Forest, and Deep Learning) achieve impressive accuracy levels (between 80% to 95%) when tested against lung cancer datasets. To further enhance accuracy, the study proposes a combination model.

Keywords- Lung Cancer, Linear Regression, Logistic Regression, Binary Classification, Random Forest Classification, Support Vector Machine

FEDERATED LEARNING: A COMPREHENSIVE REVIEW

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ABSTRACT

Federated Learning (FL) has emerged as a groundbreaking paradigm in machine learning, enabling collaborative model training across distributed data sources while preserving data privacy. The paper begins by elucidating the fundamental principles of Federated Learning, highlighting its decentralized approach to model training, data aggregation techniques, and privacy-preserving mechanisms such as differential privacy and secure aggregation protocols. It then delves into the technological advancements and frameworks that have accelerated the adoption of Federated Learning, including TensorFlow Federated, PySyft, and FLAML, among others. Despite its promising prospects, Federated Learning also faces several challenges and limitations, ranging from communication overhead and heterogeneity of data sources to model fairness and security vulnerabilities. In conclusion, this paper provides a comprehensive overview of Federated Learning, highlighting its applications, challenges, and ethical implications.

Keywords: Federated Learning, Decentralized Learning, TensorFlow Federated, Applications of Federated Learning

UTILIZING COMPUTER VISION AND DEEP LEARNING FOR CRIME DETECTION IN SURVEILLANCE VIDEOS

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ABSTRACT

There are growing concerns about the accuracy and effectiveness of neural networks due to the application of deep learning techniques to video surveillance. Still, it is a difficult effort to identify abnormal events quickly and accurately. Because smart surveillance directly affects people's safety, it has become very popular. Many indoor and outdoor surveillance systems are used in modern metropolitan areas and smart cities. To aid in decision-making, these collected features are then processed through fully connected layers. Numerous assessments have been carried out using both real-world circumstances and the UCF50 dataset to validate the effectiveness of the suggested framework. The model that is being presented uses an LSTM CNN architecture that was trained on the UCF dataset to categorize scenes and differentiate between "Normal" and "Abnormal" states. TensorFlow, OpenCV, and Matplotlib have been the main contributors to the development of this framework.

Keywords: Image processing, computer vision, convolution, neural networks, and criminal detection.

Track 5

Advances in Electrical and Electronics Engineering

AEFICS003

INNOVATIONS IN ANONYMIZATION AND PSEUDONYMIZATION TECHNIQUES FOR ADAS

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ABSTRACT

As the world is moving towards autonomous vehicle we are more relied on the data protection. As data, manipulation can lead to loss and breach of confidentiality. It is important to prevent data from easy access. This paper examines the critical role of data Anonymization and Pseudonymization in preserving privacy within Advanced Driver Assistance Systems (ADAS). We explore the challenges and opportunities of implementing these techniques in the context of real-time data processing in ADAS environments. Drawing on recent advancements and regulatory considerations, we discuss practical strategies for effectively balancing data privacy and utility. Through examples, we highlight the importance of interdisciplinary collaboration in advancing privacy-preserving technologies for ADAS innovation.

Keywords: ADAS, Real time, Security, Anonymization

VARIOUS POWER ELECTRONICS TOPOLOGIES OF INDUCTIVE WIRELESS CHARGING OF ELECTRIC VEHICLES

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ABSTRACT

This paper is about the various power electronics topologies of inductive wireless power transfer charging of electric vehicles. IGBT-based three-phase multilevel inverter, Buck-Boost chopper and Series-series, series-parallel, parallel-series & parallel-parallel topologies of compensation circuits are discussed. PSIM software simulations are done.

Keywords: Power electronics topologies, Inductive wireless power transfer, EV

AEFICS042

COMPARISON AND ANALYSIS BETWEEN CNTFET AND FinFET TECHNOLOGY

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ABSTRACT

Carbon Nanotube Field-Effect Transistors (CNTFETs) and Fin Field-Effect Transistors (FinFETs) are two emerging technologies poised to revolutionize semiconductor device design and performance. This abstract provides a comprehensive comparative analysis of these two transistor types, highlighting their similarities, differences, advantages, and limitations. CNTFETs utilize carbon nanotubes as the conducting channel, offering exceptional electrical properties such as high carrier mobility and ballistic transport. On the other hand, FinFETs feature a three-dimensional fin-like structure, providing better electrostatic control and reduced leakage currents compared to traditional planar MOSFETs. One of the primary similarities between CNTFETs and FinFETs is their potential to overcome the limitations of conventional silicon-based transistors, such as scaling challenges and power efficiency issues. Both technologies offer superior performance in terms of speed, power consumption, and integration density, making them promising candidates for future semiconductor applications. However, there are notable differences between CNTFETs and FinFETs in terms of fabrication complexity, scalability, and material compatibility. CNTFET fabrication involves intricate processes for synthesizing and aligning carbon nanotubes, which can be challenging to integrate into existing semiconductor manufacturing workflows. In contrast, FinFET fabrication leverages established silicon processing techniques with relatively minor modifications, making it more compatible with current industry practices.

Keywords: FinFET, CNTFET, Fabrication, Comparision

AEFICS049

DEVELOPMENT OF POLYANILINE (PANI)-NANOCOMPOSITES FOR TOXIC GAS SENSOR

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ABSTRACT

This research is to synthesis a polyaniline (PANI)-nanocomposite and find its applications for the development of a toxic gas sensor. The polyaniline and its composite with nanoparticles are the most promising applicants for detection of the most dangerous and hazardous environmental and industrial toxic gases, like NO_2, CO, NH_3, H_2S and many more. In this research paper we find that polyaniline composite is the most promising detection element for the monitoring of NH_3 and CO. This paper includes the synthesis process and applications of polyaniline-nanocomposite. It also enlightens the development of polyaniline thin film along with the mechanism by which polyaniline-nanocomposite senses the toxic gases. It discusses the influence of deposition techniques, film morphologies, doping strategies, and surface modifications on the sensor performance. Furthermore, this review highlights recent advancements and challenges in the field, providing insights into future directions for PANI-based thin film gas sensors.

Keyword: Polyaniline (PANI)-nanocomposite, Toxic Gas Sensor, Polymer Nanocomposite

AEFICS053

STUDY AND INVESTIGATION ON 5G TECHNOLOGY: A SYSTEMATIC REVIEW

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ABSTRACT

In the near future, i.e., beyond 4G, some of the prime objectives or demands that need to be addressed are increased capacity, improved data rate, decreased latency, and better quality of service. The design of cellular networks must be drastically improved in order to satisfy these needs. The fifth generation (5G) cellular network architecture and some of the most important new technologies that can help to improve the design and satisfy user requests are presented in this paper together with the findings of a thorough survey on the subject. The design of the 5G cellular network and device-to-device (D2D) communication are the main topics of this thorough review. In-depth information about ongoing research initiatives being carried out by organizations and research teams focused on 5G technologies across several nations is also presented.

Keywords: 4G,5G, IoT, cybersecurity

REVIEW OF NON-ORTHOGONAL MULTIPLE ACCESS (NOMA) TECHNIQUES IN IRS-ASSISTED COMMUNICATION SYSTEM

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ABSTRACT

Non-Orthogonal Multiple Access (NOMA) has emerged as a promising technology to enhance the spectral efficiency and user fairness in wireless communication systems. With the advent of Intelligent Reflecting Surfaces (IRS), NOMA has found a new dimension for optimization and deployment. This paper presents a comprehensive review of the integration of NOMA with IRS in wireless communication networks. This paper begins by elucidating the fundamental principles of NOMA and IRS technologies individually, highlighting their respective advantages and challenges. Subsequently, it delves into the synergistic benefits accrued from their combined application, elucidating how NOMA leverages the passive beam forming capabilities of IRS to enhance spectral efficiency, mitigate interference, and extend coverage. Furthermore, the abstract explores the latest advancements and research trends in NOMA-IRS systems, encompassing various aspects such as resource allocation, power control, and user grouping strategies.

Keywords: NOMA, IRS, user fairness, spectral efficiency, passive beam forming.

OPTIMIZATION BANDWIDTH OF MICROSTRIP PATCH ANTENNA FOR MILLIMETER WAVE COMMUNICATION

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ABSTRACT

A significant attention has been received by microstrip antenna in the area of micro and millimetre wave communication because of its many unique and smart properties such as having light weight, easy fabrication, low profile and appropriateness of mass production. It is found apposite due to affinity with solid state devices as well as diversified applications in wireless communication, satellite communication, radar, missile and other strategic defense equipment's. The entire investigations for the multi band microstrip patch antennas have been made employing circuit theory concept which is derived from the cavity model. Therefore, only cavity model is described in detail along with network presentation and radiation characteristics of the patch antenna. In the present undertaking, in this manner, the author has made an effort to design and analyze the diverse shape geometries of MSA for bandwidth upgrade. The suggested is antenna parameters such as return loss, gain and directivity.

Keywords:-Microstrip Antenna, Partial ground plane,Ultra-wide band.

DESIGNING OF MICROSTRIP BANDPASS FILTER FOR HIGH SPEED COMMUNICATION

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ABSTRACT

The objective of this design is to create a UWB bandpass filter that adheres to the FCC spectral mask for UWB systems. The filter should allow signals within the specified frequency range (from 3.1GHz to 10.6 GHz) while rejecting unwanted frequencies. The design approach involves using quarter-wavelength shunt stub transmission lines implemented with microstrip technology. The design is simulated and optimized using Ansys HFSS simulation software. Simulated result of proposed filter shows a tri-pass band and two notch band. Tri-pass bands are at 2.1GHz to 4.7 GHz, having FBW 76.47% at 3.4 GHz center frequency, 5.3GHz to 6.4GHz having 18.8% FBW at 5.85 center frequency 7.65 GHz to 8.65 GHz having FBW 12.27% at 8.15 central frequency, respectively. The proposed filter has two notch bands to remove the interference of existing frequencies at 5GHz and 6.67 GHz. The measured results are then presented. Applications of this prototype filter include UWB communications (high-speed data transfer over short distances) and localization systems (precise positioning and tracking of objects or devices).Fr4 substrate is used for designing bandpass filter with dielectric constant 4.4 and substrate height is 1.6mm.

Keywords: Microstrip filter, Bandpass, UWB, Tri pass band

CELL-FREE MASSIVE MIMO TECHNOLOGY FOR 6G COMMUNICATION NETWORKS

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ABSTRACT

Massive MIMO (Multiple-Input Multiple-Output) is a key technology being considered for 6G networks. It builds upon the MIMO technology used in 4G and 5G networks but to a new level by significantly increasing the number of antennas. In Massive MIMO, a base station is equipped with a large number of antennas, often in the order of hundreds or even thousands. These antennas can simultaneously serve multiple user devices by forming multiple independent beams and employing advanced signal processing techniques. This allows for increased spatial multiplexing, improved spectral efficiency, and enhanced capacity. The benefits of massive MIMO in 6G include Increased Capacity, Improved Spectral Efficiency, and Enhanced Coverage and Reliability, Energy Efficiency, Advanced Beamforming, Support for IoT and Massive connectivity. Cellular wireless networks are based on cellular topology. An area is then divided into multiple cells according to the topology, and each cell is served by one base station. The drawback of the cell-based wireless network is that if the device is at the edge the cell, its signal is pretty weak. By tackling the low communication ability at the edge of the cell, the cell-free massive multiple-input-multiple output (CFmMM) concept is proposed, which removes the cells of the network. The idea of CFmMM means that one device is no longer attached to a single base station; instead, all base stations coherently serve the device in an area. This paper presents an insight into Cell free massive MIMO Technology.

Keywords: 6G, Massive MIMO, mm Wave, Beamforming. Cell free, TeraHetz

REVIEW OF DETECTION AND CLASSIFICATION OF HEART ARRHYTHMIA USING SIGNAL PROCESSING AND ARTIFICIAL INTELLIGENCE TECHNIQUES

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ABSTRACT

This paper analyzing heart conditions through ECG data has indeed become an essential aspect of medical diagnosis. The ability to detect and classify arrhythmias accurately can significantly aid in timely intervention and treatment. Advances in signal processing and artificial intelligence have revolutionized the field, allowing for the development of automatic detection and classification systems that can assist healthcare professionals in diagnosing heart conditions more efficiently. These systems typically involve processing ECG signals to extract relevant features that can indicate the presence of arrhythmias. Machine learning algorithms, such as neural networks, decision trees, or support vector machines, are then employed to classify the extracted features into different arrhythmia categories. These algorithms can learn from large datasets of labeled ECG recordings, enabling them to accurately identify patterns associated with specific heart conditions. One of the key challenges in developing these systems is ensuring robustness and accuracy across diverse patient populations and recording conditions. Additionally, there is a need for interpretability, as healthcare professionals must understand and trust the decisions made by these automated systems. Despite these challenges, the progress made in this field holds great promise for improving the diagnosis and management of heart disease. By leveraging the power of signal processing and artificial intelligence, we can enhance the efficiency and accuracy of arrhythmia detection, ultimately leading to better patient outcomes.

Keywords: ECG (Electrocardiogram), arrhythmia, Deep learning, Machine learning, and Artificial Intelligence

Track 6

Progressions in Mechanical and Civil Engineering

AEFICS041

PERFORMANCE OF HYBRID FIBER REINFORCED CONCRETE

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ABSTRACT

Concrete manufactured with Portland cement is the most commonly used for materials in building construction in the world. The material concrete is a relatively inelastic material when normal stresses and impact loads are applied. If discrete fibers are incorporated into concrete, it improves ductility and energy absorption during post-yielding phases. The incorporation of fibers causes the concrete material to become ductile rather than brittle, which increases the concrete's properties. Therefore, researchers are working on concrete that combines the advantages of 2 types of fibers in a single medium. In this paper compressive strength test for M-25 grade concrete having hooked steel fibers and crimped steel fibers is performed using CTM at the age of 7 days, 28 days, 56 days and 90 days. Result indicates that the use of fiber increases the final strength of concrete.

Keywords: Fiber Reinforced Concrete, Hooked Steel Fibers, Crimped Steel Fibers, Compressive Strength.

EFFECT OF MILL SCALE ON MECHANICAL AND DURABILITY PROPERTIES OF SELF COMPACTING CONCRETE

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ABSTRACT

In this paper we are investigating the effect of waste generated from steel manufacturing industry mill scale in self-compacting concrete with fine aggregate. The mill scale is a waste product which is obtained from steel industry different mechanical property and durability properties of concrete is being investigated by performing various test on fresh and hardened concrete. M-35 grade of concrete is used in the study and partial replacement of fine aggregates was done by mill scale from 0% to 100%. Compressive strength and durability tests were carried out to ensure proper strength. Based on the studies, it is possible to draw the conclusion that mill scale functions as filler and can successfully replace sand up to 40% of the cement weight in concrete.

Keywords: Mill-Scale, Aggregates, Concrete, Durability, Mechanical Properties.

LOCAL CALIBRATION AND EXPERIMENTAL INVESTIGATION OF RIGID PAVEMENT PERFORMANCE MODELS USING RE SAMPLING METHODS

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Abstract

Pavement allows vehicle load transfer from layer to layer. Failure may occur in the individual layer of pavement structures. It is necessary to justify the load action and carrying capacity of pavement. The composition of pavement may vary as per the site condition and material available. While designing the pavement structure, the prediction model is improved with respect to design practice and parameter involved in it. Pavement prediction gives judgment about the distress, smoothness, errors, models accuracy and design reliability.

Keywords; Cracking Model, High Performance Rigid Pavement Model, Pavement Evaluation, Pavement Management System, Rigid Pavement

AEFICS052

SOLAR PANELS AS A BUILDING COMPONENT: REDUCTION IN ENERGY BILLS

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ABSTRACT

Energy from fossil is a threat for sustainability. In sustainable construction solar energy is used as one of the alternatives to traditional fossil energy. Use of solar energy can save traditional energy, and it also reduces the global warming and pollution, so it called which is known as clean energy. Increasing Urbanization need more electrical energy; hence we are facing energy crises. We know that household energy consumption is about 27 % of the total energy production. Hence New Ideas are developing to maximize the solar energy harvesting, Solar Energy contribution is increasing. Today is the world being of smart cities. Now a days we are using solar panels at our roof top, but in recent architectural designs building envelopes will be more solar powered, solar panels are becoming part of our infrastructure, like rooftop, sunshade, facade, public park, roads etc. It may provide us self-sufficient energy buildings, in future, in every house solar panel will cover more than25% of our roof top.

Keywords: Affordable, sustainable, renewable energy, radiation, rooftop, Photo voltaic (PV)

OPTIMIZATION OF INDUSTRIAL PRODUCTIVITY USING DIFFERENT LEAN MANUFACTURING TOOLS

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ABSTRACT

Productivity is a crucial factor in modern business, as it determines profits and reduces product or operational costs. It is defined as the difference between output and input resources used in the production process. Total productivity is the ratio of aggregate output to input. This paper presents a new technique for increasing manufacturing sector productivity using tools like Work-Study Methods, Lean Manufacturing Principles, and Flexible Manufacturing Systems. The flexible manufacturing system consists of scheduling and optimization of goals, which can help avoid schedule delays and decreased production. As the Indian economy opens up to global competition, entrepreneurs are increasingly using advanced technology to boost productivity and avoid closures. This paper aims to provide an outline of a new technique for enhancing manufacturing productivity using flexible manufacturing systems, which can be implemented using Work-Study Methods, Lean Manufacturing Principles, and Flexible Manufacturing Systems.

Keywords: Productivity, Lean Manufacturing, Flexible manufacturing, workload, work allocation, scheduling.

AEFICS060

RURAL INDOOR KITCHEN STRUCTURE OPTIMIZATION TO MINIMIZE THE POLLUTION EXPOSURE: A SUSTAINABLE ENVIRONMENTAL MODELLING APPROACH

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ABSTRACT

Studies showed good ventilation is one of the key factors that can play an important role to minimize the health risk from indoor air pollution. In the present study, toxic indoor air pollutants (CO, CO2, and O_3) were selected as one of the key response variables and the windows number, the kitchen volume, and cooking hour were selected as the factors to optimize the rural kitchen configuration. Optimization was executed in the design expert software while implementing response surface methodology (RSM). From the ANOVA analysis, it was clear that all models applied were significant. Moreover, there were high desirability values in case of CO, CO_2, temperature, and relative humidity provided that the optimum conditions/configurations were applied. This work describes how rural villagers can optimize their kitchens with their low-cost materials to build a sustainable indoor household condition, which will provide a sustainable healthy lifestyle.

Keywords: Biomass burning; Indoor air pollution; Kitchen configuration optimization; Response surface methodology (RSM); Rural sustainable health

AEFICS061

EFFECT OF MACHINING PARAMETERS ON HOLE QUALITY OF MICRO DRILLING FOR ALUMINUM ALLOY MATERIAL

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ABSTRACT

Micro manufacturing is one of the growing topics of recent times. Various new methods are being devised for production of micro / nano features. In case of micro machining, the output is characterized by different input combination of cutting parameters & conditions. This paper helps the effect of combination of cutting parameters & surface finish of aluminum alloy material.

Performance was carried out by conducting drilling operations on work pieces of aluminum alloy material employing a range of drill bits size 0.5mm using a range of spindle speed (10,000 to 50,000 rpm) and manual feed. Finally, combination of selected input parameters were used to find the best combination for accuracy in size of drilled hole and hole errors on different types of material surface.

The results were analyzed for three different parameters: Work piece material surface, Drill bit size & Speed (10,000rpm to 50,000rpm). Accuracy of drilled holes was checked by using travelling microscope. The dimensional error of drilled holes is determined in microns using comparative analysis. From the result it is found that in producing the micro hole the surface roughness is largely influenced by the spindle speed and feed rate. As the spindle speed and feed rate is increased the surface roughness decreases.

Keywords: Micro drilling Machine, Traveling Micro Scope, High RPM

AEFICS063

REVIEW ON CRYSTALLINE ADMIX AS SELF-HEALING CEMENTITIOUS COMPOSITE FOR CONCRETE

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ABSTRACT

Crystalline admixture is self -healing cementitious agent. In this article reviewed the effects of CA on properties and self -healing behaviour. CA not affects the fresh concrete properties but increase strength of concrete and used it in powder form. CA mixed with cementitious mixture in powder form and self-healing activated in presence of moisture and not affects fresh properties of Concrete. CA is made with 80% cement content use as commercial product CA having good healing efficiency. CA reduced the permeability, chloride penetration, sorpitivity. As application CA is cementitious composite considered as low cost with self-healing properties.

Keywords: Composite, Self-healing, Durability, Chloride penetration.

AEFICS064

ADVANCEMENTS IN CONCRETE COMPOSITE MATERIALS: A COMPREHENSIVE REVIEW

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ABSTRACT

Concrete composite materials have garnered significant attention in the construction industry due to their enhanced properties and versatility. This paper presents a comprehensive review of the recent advancements in concrete composite materials. It examines various types of composites, including fiber-reinforced concrete, polymer-modified concrete, and high-performance concrete. The paper also discusses the influence of different additives and reinforcements on the mechanical properties, durability, and sustainability of concrete composites. Furthermore, it explores emerging trends and future prospects in the field of concrete composite materials,

Keywords: Composite, Fibre Reinforced Concrete, Polymer Modified Concrete, High Performance Concrete, Ultra-High Performance Concrete.

STRUCTURAL PERFORMANCE OF POLYMER MODIFIED BITUMEN

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ABSTRACT

Bitumen's characteristics have been improved recently by the use of various additives. Few studies have addressed the use of various additives in the same binder up until this point. Both Evotherm and styrene-butadiene-styrene (SBS) were utilized in this investigation, both alone and in combination. DSR stands for dynamic shear rheometer. There is no negative impact on rutting performance from the 0.5% Evotherm with 4% and 5% SBS modification. When using a large concentration of SBS additive, Evotherm modification may be able to prevent the stiffness increment that results from its use. For the pure binder to operate well at low temperatures, combine 0.8% Evotherm with 5% SBS.

Keywords: Rutting Parameter, SBS, Evotherm, Low Temperature Resistance, Dynamic Shear Rheometer (DSR) Test

INVESTIGATING THE EFFECTS OF PARTIAL REPLACEMENT OF FINE AGGREGATE WITH BURNT CLAY BRICK POWDER IN CONCRETE

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ABSTRACT

Concrete, a fundamental material in construction uses fine aggregate for its structural integrity and performance. However, the escalating demand for fine aggregate, particularly river sand, coupled with environmental concerns regarding its extraction, necessitates the exploration of alternative materials. Burnt clay brick powder (BCBP), a byproduct of construction and demolition activities, poses disposal challenges and environmental hazards. By incorporating burnt clay brick into concrete mixes, this research seeks to address both waste management issues and the depletion of natural resources. Various replacement levels (5%, 10%, and 15%) are evaluated for compressive strength. Laboratory experiments are conducted to assess compressive strength of the concrete specimens. Results indicate that the compressive strength is for 5% replacement no reduction in compressive strength is observed which shows that BCBP can be used as a replacement of fine aggregate in concrete This research underscores the potential of partial aggregate replacement in addressing environmental challenges and contributing to nature conservation.

Keywords— Burnt clay brick powder, Fine aggregate, Replacement, Concrete, Sustainability

AEFICS077

SIGNIFICANCE OF COMPOSITE MATERIALS IN MODERN CONSTRUCTION

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ABSTRACT

This paper aims to describe concisely the importance of various composite materials in the present scenario of building construction. In the present era composite materials are increasingly indispensably in the construction industry which are spontaneous from ancient times and will remain progressive up to the existence of life due to emerging technology. Composites are astounding inventions in the modern construction sector that are being used to replace the traditional constructional material with incredible properties. Composites are the combination of two or more than two physically, chemically and biologically different materials to enhance the features of newly formed material. The various composite materials are presently used in construction sector as they have some phenomenal properties compared to traditional materials like high strength, durability, electro-thermal insulation, corrosion resistant, eco-friendly, etc. These materials leveraging the unique properties to different materials as per requirement such as carbon fiber reinforced polymers, natural fiber reinforced polymers, bio based polymers, glass fiber reinforced polymers with metal alloys, carbon nano-tubes with polymer matrices, etc. The comparative study showed that the composite materials are having various good inherent properties that made them significantly superior to the conventional construction materials.

Keywords: Composite materials, Carbon fiber reinforced polymers, Bio based polymers, Strength, Durability