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SPECTRUM

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Spectrum is an e-magazine with the comprehensive collection of all the papers that have been published in our journal over the last two months — Volume 11, Issue 1 (January-February, 2025). This edition brings together 80 papers by 192 authors from 97 institutions. Each entry links to the abstract and the full paper.

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ABSTRACTS

1 Augmented Reality in Education

Paper ID V11I1-1163 · Pages 1-4 · Engineering

Krishna Santosh Kabra, Student, JSPM's Bhivarabai Sawant Institute of Research and Technology, Wagholi, Pune
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By integrating digital, interactive content with conventional learning environments, this project explores the potential of Augmented Reality (AR) to improve educational experiences. Using 3D models and real-time animations, AR helps students visualize complex ideas, such as Biology models, Zoology models, Computer Science model and Planetary System models. Making abstract concepts more approachable and engaging. Our implementation creates a flexible learning tool that can be applied across a variety of subjects and educational levels by utilizing AR-compatible platforms, such as Unity and Vuforia. By providing an immersive and memorable learning environment, this approach aims to increase student engagement and enhance comprehension.

Keywords: Augmented Reality, Engineering, AR, VR, Education

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2 The Impact of HMPV on the Real Estate Sector in Maharashtra: Insights from Historical Precedents

Paper ID V11I1-1161 · Pages 5-7 · Civil Engineer

Shubham Devidas Kulkarni, Canon Designs, Nashik

The real estate sector in Maharashtra is a cornerstone of economic activity, encompassing residential, commercial, and industrial developments. However, the emergence of high-magnitude public vulnerabilities (HMPVs), such as pandemics, natural disasters, or economic recessions, poses significant challenges to this sector. This research paper explores the potential impact of HMPVs on Maharashtra's real estate market, drawing parallels with historical events such as the COVID-19 pandemic, the 2008 global financial crisis, and natural disasters like the 2005 Mumbai floods. The paper aims to provide a comprehensive understanding of the challenges posed by HMPVs and recommend strategies for resilience and recovery.

Keywords: HMPV, Real Estate, Maharashtra

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3 Harnessing Inception V3 for Enhanced Breast Cancer Detection via Deep Learning

Paper ID V11I1-1160 · Pages 8-16 · Deep Learning

Godishala Sreenidhi, Student, Institute of Aeronautical Engineering, Telangana
K.Swathi, Student, Institute of Aeronautical Engineering, Telangana
M.Dhanalakshmi, Student, Institute of Aeronautical Engineering, Telangana
C. Praveen Kumar, Professor, Institute of Aeronautical Engineering, Telangana
M.Lakshmi Prasad, Deputy Hod, Computer Science and engineering, Institute of Aeronautical Engineering, Telangana

This research aims to develop an optimized deep-learning model capable of detecting breast cancer from medical images, which could be mammograms or histopathological slides. Breast cancer is one of the leading causes of cancer deaths in the world, making breast cancer detection extremely important for enhancing survival rates, when detected early. The traditional breast cancer detection process relies on a medical professional putting their eyes on a medical image, which is typically an inefficient process and disposed to human error. As deep learning and machine learning become more ubiquitous, particularly Convolutional Neural Networks (CNNs), they have opened ways for automation and improved accuracy in breast cancer detection. This project will use the Inception V3 model, which is an established CNN architecture, to develop a reliable breast cancer detection system that classifies images of breast images as benign or malignant. Karri Swathi Dept. of Computer Science and Engineering Institute of Aeronautical Engineering Dundigal, Hyderabad, India 21951A05M4@iare.ac.in Godishala Sreenidhi Dept. of Computer Science and Engineering Institute of Aeronautical Engineering Dundigal, Hyderabad, India 21951A05L2@iare.ac.in likelihood of positive patient outcomes in response to early diagnosis. Further machine or deep learning implementation appears to be a favorable alternative to traditional and time-antique diagnostic and medical behavioral methods. Opportunities for further project improvements can continue evolving, thus incorporating deploying the target theology into increased images per class, utilizing ensemble methods, or deploying into clinical behavioral context and evidentiary articulation after image literature review Keywords— Breast cancer classification, Inception v3 Convolutional Neural Network (CNN). I. INTRODUCTION The theme of this project is to cultivate a deep learning model using the Inception V3 architecture to reliably detect breast cancer from medical images. This involved objectives such as optimizing the input image pre-processing, training the Inception V3 model using a labeled breast cancer image dataset, and then evaluating the performance of the model using standards from accuracy, precision, recall, F1 Score, and AUC, comparison of model results with existing methods

Keywords: Breast Cancer Classification, Inception V3 Convolutional Neural Network (CNN).

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4 Whether Apostasy to Islamism is a Violation of the Fundamental Right of the Partner

Paper ID V11I1-1165 · Pages 17-18 · Family Law

Tvisha G, Student, SASTRA Deemed University, Thirumalaisamudram, Tamil Nadu

This paper discusses the question commonly raised if the husband converts his religion to Islamism with the intention of having multiple wives although according to the Indian Constitution, a person has the right to

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convert to any religion any number of times as per his desire. If such an act is done by the husband will the fundamental rights of the wife? As per the provisions of the Hindu Marriage Act, 1955 such conversions by the husband will be a violation of the fundamental rights of the wife as it was her right to be the only partner for her spouse

Keywords: Apostasy, Islamism, Fundamental Rights, Violation, Spouse Rights

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5 The Birth of Hip-Hop

Paper ID V11I1-1170 · Pages 19-25 · Culture

Krishiv Arora, Student, Saint andrews International School

This research paper is a detailed history of the origins of hip-hop and its 4 main elements which include, Graffiti, MCing, Break Dancing, and DJing. It talks about some of the issues that came with Hip-Hop culture and consists of a timeline of some of the biggest milestones in the history of Hip-Hop. There are a variety of pioneering artists that are talked about in this research paper with some being the fathers of hip-hop! Motivations and the environment of these artists are discussed with information on what it was like on the violent streets of the Bronx, New York. So let's dive into this complex yet interesting world of Hip-Hop and how the worldwide phenomenon started in the first place.

Keywords: Hip-Hop, Graffiti, DJing, MCing, Rapping, Break dancing, B-Boying

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6 COVID-19 Pandemic: A Review Article

Paper ID V11I1-1176 · Pages 26-32 · Pharmaceutics

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COVID-19 is a new coronavirus disease that could endanger millions of lives globally. Recent months have seen a significant amount of knowledge generation, which calls for a careful examination to pinpoint research gaps and help set an agenda for additional studies. Investigating current research areas and their variations concerning income levels and COVID-19 transmission characteristics is the aim of this study. Introduction, history, pathophysiology, coronavirus, kinds, symptoms, causes, spread, transmission, diagnosis, prevention, therapy, and management of COVID-19 infection are the main topics of this review.

Keywords: COVID-19, SARS-CoV, Pandemic

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7 Tamarind Seed Polysaccharide: A Novel Pharmaceutical Excipient with Promising Application

Paper ID V11I1-1174 · Pages 33-37 · Pharmaceutics

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Numerous plant polysaccharides are presently being investigated for their wide-ranging applications as excipients, These diverse functions make tamarind seed powder a valuable ingredient in various pharmaceutical dosage forms, The use of natural excipients for the delivery of bioactive agents has faced challenges due to the prevalence of synthetic materials, but natural excipients offer significant benefits, including non-toxicity, cost-effectiveness, and widespread availability. This chapter provides an in-depth and valuable discussion of the pharmaceutical applications of tamarind seed polysaccharides, highlighting key aspects such as their source, isolation methods, chemical composition, and properties. Notably, tamarind seed polysaccharide is becoming recognized as a promising excipient.

Keywords: Numerous Polysaccharides, Tamarind Seed, Natural Excipients, Widespread Availability

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8 GST System in India – A Look through the Lens of Fiscal Autonomy and Federalism

Paper ID V11I1-1182 · Pages 38-42 · Pol Science And Tax

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This paper combines two important and non-separable fields of discourse: political science and taxation. This paper attempts to examine the GST Council and the overall GST system, introduce them, and analyze them from the viewpoint of fiscal autonomy of the states and federalism. There have been allegations that the GST system is against the federal structure and that it largely undermines the fiscal autonomy of the states. This paper will analyze the system keeping in mind the various allegations and discuss the various issues with the system. This paper also attempts to advocate against the current hatred towards the system and suggests some reforms to tackle the current issues and improve the system. The GST system was a much-needed and ambitious reform, which was the need of the hour, and the hostility and discontent of the states due to them losing their uncanny and uncontrolled fiscal power that they had in the erstwhile system, is precisely what this paper advocates against. This paper tries to bring out how instead of hampering the federal structure, the GST system has provided a platform for the center and the states to come together, thereby strengthening cooperative federalism.

Keywords: GST Council, Cooperative Federalism, Fiscal Autonomy, GST, Goods and Service Tax

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9 Stress Detection with Wearable Sensors

Paper ID V11I1-1158 · Pages 43-47 · Iot And Dl

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Stress has a significant impact on both physical and mental health. The creation of systems for ongoing stress monitoring has been made easier by developments in wearable sensors and machine learning models. This study examines several studies on stress detection with wearable sensors and machine learning methods. The integration of these technologies aims to provide real-time stress detection systems for healthcare, workplace wellness, and personal care. This survey compares methodologies, sensor types, machine learning models, and the effectiveness of stress detection systems from multiple studies. Furthermore, we introduce a novel system based on Convolutional Neural Networks (CNNs) using physiological data from wearable sensors to detect stress in real-time.

Keywords: CNN, Stress Detection, Wearable Sensors, Physical Health

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10 Portrayal of Women in News and Photos in Tanzania Print Media. A Case of Uhuru Jumamosi, Daily News and Habari Leo Newspaper

Paper ID V11I1-1205 · Pages 48-52 · Journalism And Mass Communication

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This study investigates the portrayal of women in Tanzanian print media, focusing on Uhuru Jumamosi, Daily News, and Habari Leo newspapers. It is a significant study for diverse groups including women, media owners, policymakers, and academicians. It was limited to only three newspapers such as Uhuru Jumamosi, Habari Leo, and Daily News. The study employed two theories; Stereotype Theory and Media Representation Theory which altogether framed this study. The study reviewed various literature and empirical studies to identify existing gaps. This study used a mixed-method approach as it applied both qualitative and quantitative methods at some point. Content analysis was used both as a data collection method and analysis method to examine how women are represented in news articles and photographs, particularly in economic, social, and political contexts. The study population comprised 279 newspapers for three (3) months whereby each newspaper comprised 93 units hence the sample size for the study was 36 newspapers where each comprised 12 units as a sample. The study found that Tanzanian print media, specifically Uhuru Jumamosi, Habari Leo, and Daily News, actively include women in economic coverage, with women featured in 63% of articles on economic activities. However, representation often remains stereotypical, with women depicted primarily in agricultural, small-scale business, or social service roles, limiting their portrayal to informal and secondary roles. While Daily News provides a more diverse portrayal, including women in leadership within commerce and finance, Uhuru Jumamosi emphasizes women's achievements through special sections. Social and political portrayals generally

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depict women in family or support roles rather than leadership, especially in political contexts.

Keywords: Print Media, Newspaper, Content Analysis, Uhuru Jumamosi Newspaper, Habari Leo Newspaper, Daily News Newspaper.

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11 Anomaly Detection in SDN-enabled Cloud-Fog Collaborative Networks

Paper ID V11I1-1217 · Pages 53-66 · Computer Engineering

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Software-defined networking (SDN) has brought about a paradigm shift in network management and control, offering increased flexibility and automation capabilities. This transformation is particularly relevant in the context of smart cities, where integrating IoT devices and smartphones is essential for delivering efficient and responsive city services. As SDN gains prominence, the security of these devices in fog computing environments becomes a critical concern for maintaining the integrity and reliability of smart city infrastructures. Effective access control mechanisms are needed to safeguard the network, tailored to the unique requirements of SDN networks. These mechanisms are crucial for smart cities, where many devices and systems need to interact seamlessly while maintaining high-security standards. Additionally, KPI anomaly detection in SDN networks poses challenges due to the real-time processing of copious data. To address these challenges, this paper proposes a cloud-fog collaborative architecture with a GAN-GRU model for malicious activity detection. This architecture is designed with smart cities in mind, where fog nodes divide the network into subregions, mirroring the geographical divisions of a city. The cloud is responsible for model training, while fog nodes execute detection tasks, ensuring a responsive and efficient system for anomaly detection. The proposed method outperforms benchmark algorithms in terms of precision, recall, and F1 score, demonstrating its potential for implementation in smart city infrastructures. Furthermore, the impact of time window length on anomaly detection is analyzed, revealing optimal performance with a window length of 70. This paper also introduces a reputation-based access restriction management mechanism, demonstrating its effectiveness in preventing unauthorized access while ensuring secure operations.

Keywords: Software Defined Networks (SDN), Fog computing, Anomaly Detection, Generative Adversarial Networks (GANs), Gated Recurrent Unit (GRU), Wireless Networks, Smart Cities.

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12 India and the United States a Dynamic Trade Relationship in the Global Economy

Paper ID V11I1-1216 · Pages 67-70 · Trade And Commerce

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This article explores the trade relationship between India and the United States, examining its historical evolution, current trade dynamics, and prospects. The bilateral trade between the two countries has been characterized by growth, despite challenges such as tariffs, trade imbalances, and regulatory concerns. The

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analysis covers various aspects, including key industries, trade agreements, and the role of government policies in shaping the trade landscape.

Keywords: Bilateral Trade, Economic Partnership, Trade Landscape

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13 Would Arthashastra-inspired policies have led to better Economic Outcomes for Post-Colonial India?

Paper ID V11I1-1241 · Pages 71-80 · Economic History

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After independence from Britain in 1947, the Indian government's economic policies under Prime Minister Nehru intended to lay the foundations for a new, prosperous nation. However, until the reforms of the 1980s and 1990s, India's economy struggled with a notoriously low "Hindu rate of growth" and the stifling bureaucracy of the "License Raj." Nehruvian policy took inspiration from Western Socialist doctrine, discarding ancient Indian economic insights, such as those enshrined in Kautilya's Arthashastra. Written in the fourth century BCE, the Arthashastra is widely regarded as a seminal text on economy and statecraft in the ancient world. Its approach, focusing on market and trade-friendly policies, in many ways, contrasted with the Nehruvian approach. This paper examines the extent to which the implementation of the Arthashastra's tenets would have led to better economic outcomes for post-independence India, focusing on the early years of independence in the 1950s and 60s. It models this through an analysis of likely economic outcomes based on experience in other countries and post-liberalization India. The paper critically examines the social, political, and economic context of post-independence India and their impact on economic policy, concluding that while there was some sound rationale for the Nehruvian policies India adopted for its post-colonial economy, a progressive, if not immediate, implementation of the Arthashastra's ideas would have advanced the arrival of growth and prosperity in India. Moreover, it concludes that this debate transcends questions of economics, pointing more broadly to how India can learn from the wisdom of its past as it moves forward on its path of progress instead of only looking westward for inspiration and role models.

Keywords: Indian Economy, Indian History, Economic History

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14 Automation of Solar Dryer

Paper ID V11I1-1244 · Pages 81-84 · Embedded Systems And Iot

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The automation of solar dryers improves their efficiency, reliability, and usability by incorporating modern technology into traditional drying methods. This project aims to design an automated solar dryer system that utilizes a PIC16F877A microcontroller, DHT22 sensors for monitoring temperature and humidity, and a stepper

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motor for stirring. The system features a heating mechanism and a pulley system to avoid overheating, while LoRa communication and the Blynk app facilitate real time data transmission and notifications. The proposed solution seeks to optimize drying processes, enhance energy efficiency, and minimize manual intervention. This research underscores the potential of automated solar dryers in both agricultural and industrial settings, highlighting their sustainability and scalability for wider adoption.

Keywords: Solar Dryer, automation, PIC16F877A Microcontroller, LoRa Communication

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15 Metallurgical Changes and Process Optimization During Forging of Connector Box-Pin- A Comprehensive Study

Paper ID V11I1-1253 · Pages 85-89 · Metallurgy

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This paper investigates the forging process and its effect on the metallurgical properties of connector box-pin, essential components in oil and gas during oil drilling operations. The study focuses on understanding the microstructural changes and the changes in mechanical properties that occur during different stages of forging and how these changes influence the mechanical properties. Key process parameters such as temperature, strain rate, reduction ratios and cooling methods were evaluated for their impact on the final product. Mechanical testing, including tensile, hardness, and Impact test, was carried out to assess and validate its performance in real-world applications. The results show that optimal process control during forging leads to improved microstructure, mechanical properties, and product reliability.

Keywords: Forging, Reduction Ratio, Connector Box-Pin, Microstructure, Mechanical Properties, Process Control

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16 Training Evaluation Report on Modified WHO Hypertension Protocol and Simple App Software

Paper ID V11I1-1197 · Pages 90-93 · Medical Administration

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Non-communicable diseases (NCDs), particularly cardiovascular diseases (CVDs), pose a significant health challenge globally and in Sri Lanka, contributing to substantial morbidity and mortality. Hypertension, a major risk factor for CVDs, remains underdiagnosed and poorly managed in Sri Lanka. A two-day training programme based on the Modified WHO Hypertension Protocol and the Simple App software was conducted for 23 healthcare professionals (11 medical officers and 12 nursing officers) in the Kalutara district to enhance their

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knowledge and skills in hypertension management. The training included lectures, practical sessions, and interactive discussions. Pre- and post-training assessments were conducted using a structured questionnaire to evaluate changes in knowledge, attitudes, and practices (KAP). Results revealed a significant improvement in KAP, with average scores increasing from 7.14 pre-training to 18.33 post-training. Awareness and proficiency in using the Simple App for hypertension management increased markedly, from 6 to all 23 participants. These findings demonstrate the effectiveness of structured training and digital tool integration in improving hypertension management. Regular training and evaluation are recommended to sustain and expand these outcomes.

Keywords: Hypertension, Non-Communicable Diseases, Training Evaluation, Simple App, Digital Health Tools

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17 Nerve Sensitivity Identification by Explainable AI for Diabetic Patients' Nerve Stress Point: A New Approach

Paper ID V11I1-1211 · Pages 94-124 · Artificial Intelligence

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Diabetic neuropathy, a common complication of diabetes, leads to impaired nerve sensitivity, particularly in the feet, resulting in an increased risk of foot ulcers, infections, and amputations. Current diagnostic techniques, often subjective and reliant on invasive procedures, fail to offer early detection of nerve damage, limiting timely interventions. This project leverages Explainable Artificial Intelligence (XAI) to create a diagnostic system aimed at identifying, categorizing, and analyzing foot dynamics and nerve sensitivity in diabetic patients. By utilizing XAI, the proposed system enhances interpretability, offering clinicians a transparent and reliable tool for early diagnosis and personalized treatment. Our solution focuses on capturing foot immersion and image data to assess nerve sensitivity, utilizing a four-point structural analysis to map foot dynamics and detect abnormalities. The system will also address the challenge of false diagnoses by distinguishing diabetic nerve damage from other nerve-related conditions using heat and frequency verification at the foot's nerve endings. The goal is to provide an objective, accurate, and interpretable diagnostic tool that empowers healthcare providers to improve patient outcomes by enabling timely interventions in diabetic neuropathy cases. The use of XAI ensures that the AI models are interpretable and transparent, allowing clinicians to understand the underlying factors influencing the diagnosis. This transparency is critical for clinical adoption, as it builds trust in AI-driven diagnostic systems. By integrating XAI into diabetic neuropathy diagnostics, this project seeks to revolutionize diabetic foot care, enabling more accurate and timely detection of nerve damage, reducing the risk of severe complications, and ultimately improving the quality of life for diabetic patients.

Keywords: Diabetic Neuropathy, Explainable AI, Nerve Sensitivity

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18 The Role of AI Tools like Chatgpt and Copilot in Revolutionizing Software Development and User Experiences

Paper ID V11I1-1213 · Pages 125-131 · Ai

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Artificial Intelligence (AI) has now entered organizations as a key driver of change in software engineering and UX design through such tools as the ChatGPT, and CoPilot among others. AI tools give developers incredible efficiency to improve their productivity, automate processes, and offer unique and better user experiences. This paper aims to evaluate the effects of hyping software developments with AI tools such as ChatGPT and CoPilot, the part they play in enhancing users' experiences, and the complications involved. Some research findings present how these technologies affect Software Engineering practices regarding the future and theoretical questions that come with the gains of these innovations. AI tools are creating new frontiers when applying software engineering techniques. They act as enablers of increased productivity and creativity since they sift through dull, repetitive tasks, allow work in progress to occur in parallel, and provide a framework for development processes that were once limited to the realm of experts. Furthermore, they liberate developers to focus on dreaming and problem-solving as they code while promoting structures that take care of repetitive code writing, generating idiosyncratic documentation in real-time, and providing solutions. However, this transformation is accompanied by obstacles such as; AI call-for-duty dilemmas, issues of data privacy, developers' overdependence, and skill degradation. This paper aims to explore their use to critically evaluate their usability to redefine paradigms in software development and user experience design. It also brings to the fore the importance of creating ethical guiding principles as well as very sound frameworks for the implementation of AI solutions. Lastly, tools such as ChatGPT and CoPilot represent a clear example of the transition to AI-enabled engineering, as distinct from AI-driven engineering, which marks a new age where the symbiosis of human creativity and artificial brainpower delivers results that have not been seen before.

Keywords: Artificial Intelligence, ChatGPT, CoPilot, User Experiences, Productivity, Ethical Considerations.

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19 The Current State of Research into the Efficiency of Distributed Machine Learning Algorithms for Cloud-Based Big Data Analysis

Paper ID V11I1-1269 · Pages 132-134 · Computer Science

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Today, data has become a driving force in nearly every business sector, and cloud computing, alongside artificial intelligence (AI), serves as a critical enabler that enhances business operations and performance. This research focuses on optimizing distributed machine learning (DML) algorithms within cloud environments to efficiently handle and process large datasets. The paper introduces a methodology for improving the performance of DML algorithms by utilizing the computational power and storage capacity of cloud platforms, coupled with parallel processing techniques. The experimental results demonstrate that the proposed approach reduces processing time by 40% and improves model accuracy by 15%, making it highly suitable for big data environments.

Keywords: Distributed Machine Learning, Cloud Computing, Big Data, Optimization, Parallel Processing. Cloud Computing,

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Parallel Processing, Scalability, Fault Tolerance, Data Replication

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20 Do Early Medications in Cases of ADHD Help Children to Cope with Behavioural Issues?

Paper ID V11I1-1278 · Pages 135-140 · Diseases And Health

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Diagnoses of Attention Deficit Hyperactivity disease (ADHD), a common neurodevelopmental disease, have increased globally, especially since the 1980s. Until the late 20th century, ADHD was not as often diagnosed in other parts of the world as it is in Western nations like the United States. This study examines how the prevalence of ADHD diagnoses and medication use is rising across a range of demographics, with a particularly noticeable increase seen between 2005 and 2012. The study lists the main causes of ADHD, which include environmental variables, brain damage, prenatal substance exposure, and genetic factors. Although environmental variables including low birth weight and exposure to pollutants certainly play a part, genetics is the primary determinant, with heritability estimates ranging from 70 to 90%. Individuals of all ages are impacted by the wide-ranging effects of ADHD. Among these are increased chances of comorbid ailments like anxiety, depression, sleep disorders, and behavioral problems. Stimulants and other medications are frequently used to treat ADHD, but they can have negative side effects including appetite suppression, sleeplessness, and more severe mental health issues. The fact that people with ADHD are more likely to commit crimes further emphasizes the disorder's wider social and economic effects. ADHD is managed differently over the world; for example, Australia and India have established protocols for diagnosis and therapy. Although pharmacological therapies are frequently employed, non-pharmacological methods including behavioral therapy and cognitive training are becoming more popular due to worries about their long-term effectiveness and potential negative consequences. This essay promotes a comprehensive, tailored strategy for treating ADHD, stressing the significance of addressing the disorder's influencing hereditary and environmental components. This study adds to the continuing discussion about the diagnosis and treatment of ADHD by emphasizing the value of all-encompassing care plans that weigh the advantages and disadvantages of pharmaceutical treatments against non-pharmacological alternatives.

Keywords: Attention Deficit Hyperactivity Disorder, Medication, Behaviour, Treatment, Non-Pharmaceutical, Pharmaceutical

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21 Tangent Bundles Related to Various Properties of Differential Geometry

Paper ID V11I1-1210 · Pages 141-146 · Mathematics (geometry)

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The objective of the present article is to investigate the lifts of a $F\lambda(2\nu + 3, 2)$ -structure and determine its integrability requirements and partial integrability on the tangent bundle. Finally, the third tangent bundle T^3M is examined in order to study the extension of a $F\lambda(2\nu+3, 2)$ -structure.

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Keywords: Lifts, Nijenhuis Tensor, Partial Differential Equations, Projection Tensors, Integrability.

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22 Adopting Secure Software Development Practices to Improve Financial Transactions in the Banking Sector

Paper ID V11I1-1304 · Pages 147-159 · Computer Security

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Secure software development practices are believed to be the banking sector's backbone of financial transaction security. This research examines the issues of adoption, effectiveness, and challenges of secure software practices, focusing on their implications for transaction security, customer trust, and regulatory compliance. The data from structured surveys and machine learning analysis using the Random Forest algorithm provided actionable insights. The results reflected that secure coding standards and threat modeling were at the top and had brought the vulnerabilities down a lot, raising the security of financial transactions a notch. Security testing and continuous integration had an important role but were less influential. Organizations adopting these practices extensively reported increased operational efficiency, reduced data breaches, and higher levels of customer trust. However, high costs of implementation, lack of skilled personnel, and integration complexities with legacy systems remain a challenge. Indeed, the performance of the machine learning model was very strong, with 90.7% accuracy, 91.6% precision, and 90.7% recall; thus affirming its strength in prediction. The importance of features further emphasized secure coding and threat modeling. This research has identified that strategic investments in employee training, modern security tools, and infrastructure upgrades are needed to address the implementation challenges. The agenda of future research integrates blockchain and AI with secure practices for enhanced security. The general contribution of the study is that secure software development practices have the potential to transform the security of financial transactions, build customer trust, and facilitate regulatory compliance in the banking industry.

Keywords: Secure Software Development, Financial Transaction Security, Banking Sector, Random Forest, Secure Coding Standards, Threat Modeling, Machine Learning, Cybersecurity, Software Development Lifecycle.

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23 Assessing Organization-Specific Vulnerability Patterns- (Identifying Unique Weaknesses within the Organization’s Systems, Processes, and Culture to Proactively Address and Mitigate Risks)

Paper ID V11I1-1246 · Pages 160-164 · Cyber Security

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Assessing an organization's unique vulnerability patterns is crucial for identifying and addressing potential security risks specific to that organization. This process involves looking at internal systems, workflows, and external interactions to spot vulnerabilities that are particular to the organization’s structure and operations. By understanding these patterns, businesses can implement customized security measures, prioritize resources more effectively, and take proactive steps to defend against targeted threats. Effective vulnerability assessment requires ongoing monitoring, employee training, and collaboration across different departments to ensure a well-rounded understanding of the organization’s security situation. This approach not only strengthens the overall cybersecurity posture but also helps organizations align their defenses with their specific operational needs.

Keywords: Vulnerability Assessment Risk Management Security Posture, Threat Landscape, Asset Inventory, Threat Modeling, Cybersecurity Risk

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24 Refined Detection of Knee Osteoarthritis Using Center Net with a Pixel-Wise Voting Approach

Paper ID V11I1-1318 · Pages 165-170 · Engineering

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This paper introduces an advanced approach for detecting Knee Osteoarthritis (OA) using an optimized CenterNet framework integrated with a pixel-wise voting strategy. Early and accurate detection of knee OA is vital for timely intervention and efficient disease management. The proposed method enhances the CenterNet architecture—a leading object detection framework—by incorporating a pixel-based voting mechanism, which leverages local image data to improve detection accuracy. Each pixel contributes to determining whether it belongs to an object or the background, and this aggregated information enables precise identification of objects and their locations. Experiments conducted on a publicly available knee OA dataset demonstrate that the proposed method outperforms existing techniques, achieving state-of-the-art results. The integration of CenterNet with the pixel-wise voting strategy holds significant promise in aiding clinicians with early diagnosis

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and treatment planning for knee OA patients.

Keywords: Knee Osteoarthritis, CenterNet, Object Detection, Pixel-Wise Voting, Medical Imaging, Deep Learning, Convolutional Neural Networks (CNN)

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25 Trada – An AI-Driven Trading Assistant and Stock Analysis Service

Paper ID V11I1-1332 · Pages 171-174 · Fintech

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The stock market poses significant challenges for traders and investors due to fragmented access to essential data and insights. Navigating multiple platforms to gather real-time data, historical trends, and financial information leads to inefficiencies and missed opportunities. Trada is an AI-driven trading assistant that centralizes stock analysis, providing users with real-time data and personalized buy/sell recommendations in one platform. By leveraging advanced machine learning algorithms such as ARIMA, LSTM, EMA, and XGBoost, Trada delivers predictive stock analysis and actionable insights. LLaMA enhances the platform's ability to summarize financial reports, helping users make informed trading decisions without the need to rely on multiple resources.

Keywords: AI-driven trading, Machine Learning, ARIMA, LSTM, EMA, XGBoost, LLaMA, Financial Insights.

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26 Social Determinants Of Saving

Paper ID V11I1-1334 · Pages 175-178 · Economics

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This comprehensive research paper explores the complex landscape of household saving behaviors, moving beyond traditional economic models by integrating psychological, sociological, and economic perspectives. By examining the complex interplay of social determinants, this study employs a mixed-methods approach, incorporating quantitative data from national surveys and qualitative insights through interviews and case studies to provide a nuanced understanding of financial decision-making processes that shape individual and collective saving strategies.

Keywords: Saving , Investment , Household Income , Social Factors , Economy

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27 Nano-Enhanced Hydrophobic Coating with ZnO Nanoparticles for Preserving Cultural Heritage Building

Paper ID V11I1-1337 · Pages 179-188 · Conservation Of Heritage Buildings And Monuments

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Preserving outdoor heritage assets is an ongoing challenge in heritage conservation. The purpose of applying preservative coatings is to improve the hydrophobicity of exposed surfaces of building materials and protect against pollutants, microbiological growths, and especially the effects of rainwater. A good protective coating significantly lowers water absorption, maintains high water-vapor permeability, penetrates deeply, is UV light resistant, offers sufficient breathability, and is environmentally friendly. Polysiloxanes and their precursors have been widely used to protect stone surfaces. To avoid degradation or other modifications to the treated surfaces, the treatment's safety and effectiveness must be evaluated before being directly applied to historical materials. In the past, several nanoparticles were developed and tested to improve the functionality of these coatings. The initial protective layer is made of a solvent-based substance called silane-siloxane, which has poor adherence. As a result, water can partially wash off dirt, pollutants, and microbial colonies. The hydrophobicity of protective coating materials made of ZnO nanoparticles is substantially superior. Photocatalytic coatings can oxidize organic materials on surfaces. Pollutant particles and any other dry deposition were quickly and thoroughly removed by rainwater from protective coatings made of nanoparticles.

Keywords: Stone Protection, Nanostructured Coatings, Nanoparticles, Cultural Heritage Conservation, Hydrophobicity, Photocatalytic Coating, Corrosion, Nobel Metal.

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28 Advancing Girls’ Education In Underprivileged Societies

Paper ID V11I1-1322 · Pages 189-196 · Education

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Girls' education in underprivileged societies remains a critical issue that significantly impacts socioeconomic development, gender equality, and poverty alleviation. This paper explores the challenges and opportunities associated with advancing girls' education, emphasizing its role in empowerment, breaking the cycle of poverty, improving health outcomes, reducing child marriage, lowering fertility rates, promoting gender equality, fostering economic growth, enhancing social development, reducing gender-based violence, and creating global impact. Various socio-cultural, economic, and political barriers prevent girls from accessing quality education, perpetuating inequality and hindering national progress. By analyzing the existing challenges and proposing strategic interventions, this study highlights the need for holistic policy measures, financial investments, and community engagement to bridge the gender education gap. The findings suggest that empowering girls through education can lead to transformative changes, benefiting individuals and society at

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large (UNESCO, 2021; UNICEF, 2020).

Keywords: Girls' Education, Underprivileged Societies, Gender Equality, Socioeconomic Development, Child Marriage, Poverty Alleviation, Empowerment, Policy Interventions.

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29 Leveraging Data Analytics in Investment Banking: Transforming Insights into Strategic Decisions

Paper ID V11I1-1352 · Pages 197-203 · Data Analytics

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Data analytics has become extremely important for modern-day businesses, especially banks. Most of the information in banks is stored in computers as Big data. Analysing this data allows the banks to function efficiently and smoothly. There are various data analytics categories in banking, such as descriptive, diagnostic, prescriptive and predictive analytics. Data analytics has various advantages and challenges. So, an organisation may face various challenges like privacy regulations not allowing the organisation to analyse data freely, technical & architectural challenges, etc. For data analytics to be helpful for the company, it needs to be applied effectively; this can be done by asking practical questions to the software while analysing data or by making the data analysis platform easier for less skilled employees. Various tests, such as the T-test and regression model, play a key role in analysing data. Various companies have capitalised on data analysis by developing software and platforms focusing solely on data analysis. These companies use these platforms to other companies as a service they charge for. The biggest data analysis and investment research company is Bloomberg.

Keywords: Analytics, Big Data, Bloomberg, Regression Analysis

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30 An Analytical Review of Strategies for Empowering Health Literacy Through Effective Health Education Approaches

Paper ID V11I1-1351 · Pages 204-206 · Computer Science

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Health literacy is crucial in empowering individuals to make informed decisions about their health and well-being. This review paper analyses various strategies for enhancing health literacy through effective health education approaches. The paper synthesizes current research literature to identify key methodologies, challenges, and successful interventions promoting health literacy across diverse populations. By examining different educational models, community engagement strategies, and technological advancements, this review offers insights into promising practices for improving health literacy outcomes. Furthermore, it discusses the implications of these strategies for enhancing public health education initiatives and fostering healthier

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communities.

Keywords: Understanding Health Literacy, Educational Models, Community Engagement Strategies, Technological Innovations,

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31 Ensuring Consumer Protection in Online Transactions: The Role of FCCPC in Nigeria

Paper ID V11I1-1365 · Pages 207-209 · Business Law

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With the rapid growth of e-commerce in Nigeria, ensuring consumer protection in online transactions has become increasingly crucial. The Federal Competition and Consumer Protection Commission (FCCPC) plays a pivotal role in safeguarding consumer rights within the digital marketplace. This paper explores the role of the FCCPC in regulating online transactions, emphasizing its enforcement of consumer protection laws, dispute resolution mechanisms, and efforts to combat fraud and deceptive practices. The FCCPC's involvement extends to monitoring e-commerce platforms for compliance with the Consumer Protection Act, promoting consumer awareness, and collaborating with other regulatory bodies to ensure a fair and transparent online environment. Despite technological advancements and enforcement difficulties, the FCCPC continues adapting its strategies to address emerging issues, providing consumers with greater security and confidence in the online marketplace. This paper underscores the importance of a robust regulatory framework in fostering consumer trust and supporting the growth of e-commerce in Nigeria.

Keywords: Consumer, Protection, Online, Federal, Competition, Consumer, Protection.

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32 Prevalence of Oral Diseases in the Tribal Population of Badagas in Nilgiris District – A Cross Sectional Study

Paper ID V11I1-1363 · Pages 210-212 · Dental

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Oral health is a crucial aspect of overall well-being, encompassing functional, structural, aesthetic, physiological, and psychological dimensions. In India, tribal communities, including the Badagas of the Nilgiris, have historically faced socio-economic, political, and educational marginalization. Despite India's independence in 1947, these communities remained largely unrecognized and disconnected from mainstream development. The Badagas, an indigenous group residing in approximately 400 villages, have demonstrated remarkable progress through intensive cash-crop farming, leading to improved living standards. However, oral health

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challenges persist due to neglecting social and material determinants and lacking integration with general health initiatives. As a result, many individuals suffer from severe dental issues, impacting their quality of life. Addressing these disparities requires a comprehensive approach to oral health promotion, ensuring accessibility and awareness among tribal populations.

Keywords: Public Health, Oral Health ,Dental, Community Health, Tribal Population

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33 Future Of Artificial Intelligence and Copyright Law in Nigeria

Paper ID V11I1-1364 · Pages 213-216 · Intellectual Property

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The Rise of artificial intelligence (AI) is transforming industries worldwide, including Nigeria's creative and intellectual property landscape. As AI-generated content becomes more common, it raises important questions: who owns the rights to these works? Can they be protected under existing copyright law in Nigeria, exploring current legal reforms and the urgent need for clearer policies to support innovation and copyright protection? Ultimately, this piece sheds light on the future and offers practical solutions to ensure Nigeria's Legal System keeps pace with technological advancements.

Keywords: AI, Copyright Law, Intellectual Property Right, Ownership And Originality, AI-Generated Content

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34 The Viability of the US Cybercrime Laws in Protecting Digital Trade Space: A Critique

Paper ID V11I1-1366 · Pages 217-222 · Business Law

Sultan Alaaya Adebayo, Student, American University, Washington College of Law, D.C., United States.

This paper critically examines the effectiveness and limitations of U.S. cybercrime laws in safeguarding the digital trade space. As the global economy increasingly relies on digital platforms, cybercrime poses a significant threat to online business operations, intellectual property, and personal data security. The study explores the key components of U.S. legislation, such as the Computer Fraud and Abuse Act (CFAA) and the Cybersecurity Information Sharing Act (CISA), assessing their scope, enforcement, and adaptability in responding to the ever-evolving nature of cyber threats. This critique highlights the gaps in current legal frameworks by analyzing case studies, legal challenges, and the intersection of cybercrime laws with international regulations. It offers recommendations for strengthening protections in the digital trade space. Ultimately, it seeks to provide insights into how U.S. policies can evolve to address the complexities of modern cyber threats better while balancing innovation, privacy, and global cooperation in digital commerce.

Keywords: U.S. Cybercrime Laws, Digital Trade, Cybersecurity, Computer Fraud and Abuse Act (CFAA) Cybersecurity Information Sharing Act (CISA), Digital Platforms.

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35 Harnessing Big Data Analytics for Large-Scale Farms: Insights from IoT Sensor Networks

Paper ID V11I1-1361 · Pages 223-228 · Agriculture

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Large farms experience the need to produce sustainable food from limited resources while facing uncertain climate conditions. The- Internet of Things (IoT) and Big Data Analytics are recent developments that propose solutions to these problems. Sensor networks powered by IoT technology in extensive agricultural areas monitor soil moisture levels, temperature, and nutrient conditions while tracking weather patterns. Cloud-based platforms and on-premise systems analyze the collected data using statistical methods, machine learning approaches, and geospatial analysis to produce decision-supporting insights. Through data-driven strategies, farmers achieve exact control over irrigation practices, fertilizer application, and pest management, re- resulting in reduced waste output while increasing crop yields. The review highlights large farm operations adopting IoT integration, data pipeline operations, and advanced analytical methods. The research reveals two main areas of challenge: limited connectivity, data security, and high scaling costs. The improved applications section investigates which specific regions need these solutions most. The path forward for smart farming development includes AI-enabled automation and blockchain-tracing systems.

Keywords: Agriculture, AI/Ml, Big Data, Smart Farm, IoT, Analysis, Fields, Farms

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36 Blockchain and It’s Applications

Paper ID V11I1-1369 · Pages 229-233 · Science And Technology

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Blockchain technology, first introduced as the underlying technology for Bitcoin in 2008, has evolved into a transformative force across various industries. Blockchain is a decentralized, distributed ledger that records transactions securely, transparently, and immutable. Its core attributes— transparency, security, immutability, and decentralization— make it highly attractive for applications beyond cryptocurrency. One of the most notable applications of blockchain is finance, where it enables peer-to-peer payments, reduces fraud, and enhances security in digital transactions. Smart contracts, self-executing contracts with terms directly written into code, have found applications in legal agreements, insurance, and supply chain management. Blockchain is also being explored in healthcare to secure patient records, in voting systems to ensure election transparency, and in supply chain management to track the provenance of goods from production to delivery. In addition to finance, healthcare, and supply chains, blockchain is used in industries like real estate, energy, and gaming. Its decentralized nature allows for more equitable systems where trust is distributed among participants, reducing the reliance on intermediaries. As the technology matures, challenges like scalability,

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regulatory hurdles, and energy consumption are being addressed, paving the way for broader adoption. In conclusion, blockchain has the potential to revolutionize industries by providing secure, transparent, and decentralized solutions, with applications expanding rapidly as technology and regulatory frameworks evolve.

Keywords: Distributed Ledger, Consensus, Cryptography, Smart Contracts

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37 The Impact of Forensic Accounting on White-Collar Crimes

Paper ID V11I1-1379 · Pages 234-241 · Finance

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The growing frequency of white-collar crime presents international financial systems with a great threat, making forensic accounting a vital tool in the prevention of fraud as well as openness. The paper explores forensic accounting, from its history and methods to its applications in financial crime detection and techniques. The study has taken many past examples and well-known fraud cases such as the Satyam and Harshad Mehta scandals to highlight how vital forensic accountants are for corporate governance, fraud detection, and litigation. Besides covering Benford's law, ratio analysis, data mining, and other forensic accounting techniques, the paper includes various technologies that have transformed the industry into what it is today blockchain, artificial intelligence, and data analytics. These tools deal with the complexities of current financial environments and improve fraud detection and predictability. As it is gaining more importance, it is still full of challenges, such as an unskilled workforce, changing tactics of fraud, and the dangers of cybersecurity. This study indicates that more money must be spent to overcome these challenges by enhancing education for forensic accounting, introducing technology, and reorganizing systems. Forensic accounting is still an important tool in keeping the financial system sound and minimizing the risks of white-collar crimes in a world increasingly connected through fusing old-fashioned methods with the most advanced technological solutions.

Keywords: White-Collar Crimes, Fraud Detection, Forensic Accounting, Artificial Intelligence, Harshad Mehta Scam, Blockchain, Data Analytics, Fraud Investigation, Cybersecurity, Benford’s Law, Legal Proceedings, Cybersecurity

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38 Diabetes Prognosis Using Machine Learning

Paper ID V11I1-1376 · Pages 242-247 · Diabetes Prognosis

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Diabetes is a prolonged disorder brought on by above-normal blood glucose levels, leading to symptoms like frequent urination, thirst, and hunger. It can May cause significant complications, such as blindness, kidney failure, heart failure, and stroke. The pancreas usually produces insulin to help cells absorb glucose for energy, but this process fails in diabetes. Machine learning offers tools for early diabetes prediction. Various algorithms,

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such as KNearest Neighbors, Logistic Regression, Random Forest, and Decision Tree, are evaluated to select the most accurate model for diagnosis.

Keywords: Diabetes in Pregnant Women, Machine Algorithms

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39 Realizing a Fully Functional CPU Using Multi-Layer Perceptrons

Paper ID V11I1-1380 · Pages 248-256 · Computer Science

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This research paper extends our previously introduced concepts of a multi-layer perceptron (MLP)-based CPU. We present exhaustive details on every facet of the design, from historical motivations and theoretical underpinnings to transistor-level implementations, advanced pipeline structures, memory hierarchies, and future-looking innovations such as approximate perceptron logic or on-chip training. While historically, threshold logic was overshadowed by the dominance of CMOS gate-level designs; this paper demonstrates that a fully perceptron-based CPU—dubbed IC 616 Ultra-MLP—can theoretically implement all standard computing tasks by assigning appropriate weights and biases to arrays of threshold units. We thoroughly analyze potential advantages, substantial challenges, and the interplay between neural and digital paradigms. This paper aims to be an exhaustive reference for researchers, students, and architects intrigued by bridging neural networks and CPU design in the most literal sense.

Keywords: Multi-Layer Perceptrons, Neural-Digital Hybrid System, Threshold Logic Computing, Neural-Digital Architecture

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40 A Proposal to Innovate The Design of the Sudanese Vehicle Number Plates

Paper ID V11I1-1350 · Pages 257-263 · Vehicle Number Plates

Galal Mohamed Ismail, Associate Professor, University of Buraimi, Al Buraimi, Oman
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Vehicle number plate display and recognition have been a lawful concern in all countries. Research into improving the quality of plates has been an interesting and challenging task. It is shown that the plates have different shapes and sizes and have assorted colours in different countries. In Sudan, the recent plates are of a white background with black text and numbers written in English and Arabic. This study proposes an innovative plate design that considers regional and international standards. The attempt incorporated the Sudanese flag, reduced the letter crowding and noise, enlarged the font and improved contrast, kept Arabic numbers, excluded the Indian numbers and included a logo for branding the plate. The study has considered both theoretical mathematical and experimental approaches. However, it is commissioned to facilitate the electronic identification of the plate, which is an issue. The experimental component proved a sizable visual difference between the old design and the proposed innovative design. Mainly assembled in two steps; firstly, the plate is visually identifiable from a longer distance than the existing plate; secondly, the segmentation allows a

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sustainable, better electronic recognition.

Keywords: Innovative Vehicle Number Plate Design, Character Distance Identification, Electronic Recognition.

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41 Review, Tutorials and Introduction to Cloud Platforms for Agentic GenAI: A Comparative Studies

Paper ID V11I1-1395 · Pages 264-276 · Ai

Satyadhar Joshi, Bank of America, USA

This paper presents a comparative analysis of leading cloud platforms for Generative AI applications. We evaluate performance, scalability, cost, and ecosystem support for AI workloads. The rapid evolution of generative artificial intelligence (AI) has significantly increased the demand for scalable and robust cloud infrastructure. This paper presents a comparative analysis of major cloud platforms, including Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP), focusing on their capabilities to support generative AI applications. We examine key aspects such as infrastructure scalability, cost efficiency, and the availability of specialized AI services. Furthermore, we discuss the importance of well-architected frameworks and best practices for deploying scalable AI solutions. The paper also explores the strategic collaborations and advancements in supercomputing infrastructure that are driving the future of generative AI. Generative AI (GenAI) is rapidly transforming various industries, demanding scalable and cost-effective infrastructure. Cloud platforms like Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP), and Oracle Cloud Infrastructure (OCI) are vying to provide the necessary tools and services. This literature review examines recent publications and articles discussing the capabilities, architectures, and cost considerations of these platforms in the context of GenAI application development and deployment. We categorize these resources based on their focus: (1) comparative analyses of cloud platforms, (2) GenAI infrastructure and application development, (3) Retrieval-Augmented Generation (RAG) solutions, and (4) scalability and cost optimization strategies. This review aims to provide a comprehensive overview of the current state of GenAI in the cloud, highlighting the strengths and weaknesses of each platform and identifying key trends and challenges.

Keywords: Generative AI, Cloud Computing, AWS, Azure, GCP, Oracle Cloud, RAG, Scalability, Cost Optimization

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42 Noise Pollution and its Impact on the Environment

Paper ID V11I1-1404 · Pages 277-283 · Engineering

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The fact we live in advanced and industrialized societies, or progress and industrialization, although these advances have led to the well-being of human beings, they have also caused a series of problems, such as water, air, and soil pollution. We can also say that the pollution of air, soil, and water has a direct or indirect adverse effect on humans or other creatures, which means that if the air, soil, or water is polluted, it will cause various diseases, but if the air If the water and soil are smooth and in their natural state, the damage that is caused by the effect of so much pollution on the creatures will never be faced. Here we are discussing a part of

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air pollution which is noise pollution, which governments noticed in the past, but with the development of industry and the creation of efficient means of social life, this issue has attracted a lot of attention from governments. And the governments have tried nationally and internationally to limit this phenomenon. In this research, we were reminded about pollution, air pollution and noise pollution, noise pollution, problems and diseases that arise from noise pollution, and the purpose of this research is to provide better conditions for life and evaluate noise pollution, as well as the national rules and The international convention that was created by governments or international organizations to prevent noise pollution, noise pollution that has direct and indirect effects on the environment and human health should be taken into consideration. As a result, noise pollution is considered a serious problem for humanity and other species of this land, even though governments and international organizations have worked to regulate this phenomenon to some extent, they have created rules and principles, but until these principles and rules are not implemented seriously, creating rules will be a waste of time.

Keywords: Environment, Pollution, Noise Pollution

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43 Gig Labor Market Dynamics – A Case Study on Challenges of Gig Economy in Tamil Nadu

Paper ID V11I1-1392 · Pages 284-287 · Gig Economy

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The gig economy is a marketplace where individuals take temporary/contingent jobs at organisations or work as freelancers. It is a booming sector but has remained an unregulated space on a larger scale. Given the nature of their role, they do not maintain a stable relationship with their clients and management and are always open to risk. With the rise of internet users and city growth via investment and urbanisation, Gig workers and their services have become a crucial part of our rapid lives. With the amount of effort, risks, and complexities the Gig workers face in their day-to-day operations, their plight must be considered. In this study, we are focused on understanding and highlighting the challenges of Gig workers. We are trying to work towards addressing an enduring version of the Gig economy, which can help its participant maintain a primary source of income from their gigs. It requires the digital infrastructure, standardized policies, legislations, and corporate work structure to be improved to create space and viability for this growing sector. The research will collect data on real-time Gig workers by understanding their experiences, challenges, social-security requirements, and technological assistance in operations. It is necessary to build on the available secondary data by identifying the areas for improvement in this sector. The study is looking for a scope for improvement in the current framework to result in an environment where the gig economy can thrive and become a perennial source of employment.

Keywords: Gig Economy, Transitional, Challenges, Regulations, Sustainability

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44 Enhancing Solar PV Plant Performance with Digital Twins: Leveraging Data Science and AI for Real-Time Analysis.

Paper ID V11I1-1394 · Pages 288-293 · Industrial Internet Of Things

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As solar power continues to be a crucial element of the global shift towards renewable energy, improving the performance of solar power plants becomes important. Various sensors installed on solar panels, inverters, and other equipment produce data, which is then integrated to create a virtual model, the digital twin, that reflects the solar power plant’s operational behavior. For precise representation and control, the system dynamically models the actions of the plant by integrating MATLAB-simulink simulations. Furthermore, fault detection is achieved using Neural Networks, Adaboost, Naïve Bayes, and Decision Trees. This unification of AI-based Digital Twins with energy generation prediction and forecasting, fault detection, and corrective maintenance technologies amplifies solar power plants' operational efficiency, reliability, and sustainability.

Keywords: Digital Twin, Solar Power Plant, MATLAB-Simulink, Fault Detection, Neural Networks, AdaBoost, Naive Bayes, Decision Trees, AI, Renewable Energy, Energy generation Forecasting, Corrective Maintenance, Operational Efficiency, Real-Time Monitoring.

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45 A Review of Artificial Intelligence in Diabetic Retinopathy Detection

Paper ID V11I1-1382 · Pages 294-299 · Artificial Intelligence

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Diabetic retinopathy (DR) alongside diabetes is rising among the population twenty-first century and is one of the leading sight threatening cause worldwide. With early treatment in the initial stage possible, detecting the problem before it worsens is important. Different methods of eye evaluation for the changes in retina are mainly hospital based and not accessible to rural remote areas. AI methods can aid the process and provide warnings beforehand in places with inaccessible or poor health facilities. In this review, we discuss four applications - IDx- DR, Eye Art, RetinaLyze, and Bosch DR Algorithm - that are in use in real-world or under study for screening retinopathy.

Keywords: Diabetic Retinopathy, Artificial Intelligence, Retina Screening, Early Detection, Remote Healthcare.

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46 Threat Scoring Model Basis Hybrid Attack Emulation

Paper ID V11I1-1390 · Pages 300-304 · Cyber Security

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In today's world, as the globe moves towards the Metaverse, all commercial and business transactions are digitalised, and digital transformation is the new need of the hour owing to COVID and other environmental and health problems. On the one hand, digitalisation is transforming the world; on the other, with an expanding attack surface and a variety of attacker modus operandi, it is critical and long overdue to develop a threat classification model that can provide clear insight into adversaries through their appropriate classification and threat scoring. The research aims to emulate “Threat Scoring based on the Hybrid Attack Model”, which consists of Red Teaming, Attack vectors and Threat Hunting models. The model will be simulated to understand the threat landscape for potential trigger points in the network and operation by initiating a wide range of attacks at various levels with respect to security posture. Hypothesis of results based on attack vectors will be mapped with Threat Intel received from various open Threat Scoring models based on analysis of adversities. The threat modelling process will be based on the MITRE & ATTACK Framework, with discovered threats further classified according to MITRE Tactics, Techniques and Procedures.

Keywords: Threat Scoring, Red Teaming, Osint, Attack Vector, Threat Hunting

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47 Artificial Intelligence and Cyber Law: Navigating Legal Complexities

Paper ID V11I1-1414 · Pages 305-307 · Law

Mahima Shukla, Student, Dr. Shakuntala Misra National Rehabilitation University, Lucknow, Uttar Pradesh

The rapid advancement of Artificial Intelligence (AI) has revolutionized industries worldwide, offering unprecedented opportunities and challenges. However, as AI systems become more autonomous and integrated into various domains, they raise significant legal and ethical concerns, particularly in cyber law. This article explores the intersection of AI and cyber law, addressing key legal complexities such as data protection, liability, intellectual property rights, cybersecurity, and regulatory frameworks. It provides an in-depth analysis of emerging global legal trends and discusses potential solutions for balancing innovation with legal accountability. The paper further delves into the challenges of AI-driven cybercrimes, ethical AI deployment, and the role of policymakers in shaping comprehensive AI regulations. This article aims to provide valuable insights into navigating the intricate relationship between AI and cyber law by examining case studies and international legal frameworks.

Keywords: Artificial Intelligence, Cyber Law, AI Regulations, Data Protection, Intellectual Property, AI Liability, Cybersecurity, AI Ethics, Legal Frameworks

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48 An Analysis of Common Types of Injuries Reported at Out Patient Department of Type a Base Hospital in the Eastern Province of Sri Lanka: A Retrospective Study Using Data from Form Information of Injury (H 1258)

Paper ID V11I1-1422 · Pages 308-312 · Medical Administration

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This study aimed to analyze the injury patterns among patients treated in the outpatient department (OPD) to identify key trends in gender, age distribution, mechanisms of injury, and affected body regions. A total of 880 injury cases were reviewed, with male patients constituting 61% and female patients 39%, resulting in a male-to-female ratio of 1.56:1. The majority of injuries (99%) were unintentional, and alcohol use was noted in 2.61% of cases. The age distribution revealed that 91.1% of patients were children, adolescents, or adults, with 59.6% falling within the adult (18-65 years) age group. The most common mechanisms of injury were falls (34%) and being struck by an object (32%), while lower limbs (48%) and palms/fingers (21%) were the most frequently affected body regions. The study also noted that 59% of patients sought treatment by noon, with the remaining patients treated later in the day. These findings suggest that falls, blunt trauma, and upper extremity injuries are most prevalent, with a significant portion of cases occurring in the productive age group. The study highlights the need for targeted injury prevention programs, better data collection on injury specifics, and timely interventions to reduce injury incidence and improve patient outcomes. Keywords: Injury, outpatient department, age distribution, mechanisms of injury, alcohol use, body region affected, fall prevention, injury prevention.

Keywords: Injury, Out Patient Department, Age Distribution, Mechanism of Injury, Alcohol Use, Injury Prevention, Affected Body Region, Fall Prevention

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49 Macroeconomic Policies- Are They Really Making a Difference in India?

Paper ID V11I1-1423 · Pages 313-327 · Economics

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The behaviour of extremely large economic aggregates, their linkages, and the factors that influence them such as national investment and savings, imports and exports, the balance of foreign payments, and gross national and domestic product are all studied in macroeconomics, and macroeconomic policies address these variables. Over time, India's macroeconomic policies have changed dramatically, affecting growth, inflation, employment, and foreign trade, among other areas of the economy. These policies, which include macro prudential, monetary, and fiscal actions, are all very important in determining the economy's direction. India had a GDP of USD 1.9 trillion at current market values ten years ago, ranking it as the tenth largest economy in the world. Despite the pandemic and inheriting an economy with macro imbalances and a dysfunctional banking system, it is currently the fifth biggest, with a GDP of USD 3.7 trillion (estimated FY24). Numerous macroeconomic policies have been implemented over this ten-year voyage, greatly aiding the nation's economic advancement.

Keywords: Macroeconomic Policies, Economic Growth, (GDP} Gross Domestic Product, International Ties, International

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Monetary Fund(IMF)

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50 Comparative Parenting Styles' Effects on Early Childhood Development in Different Areas

Paper ID V11I1-1434 · Pages 328-332 · Psychology

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This research paper investigates the effects of different parenting styles on developing early childhood understanding in the cognitive, emotional, and social domains. As regards the parenting styles themselves, they include authoritative, authoritarian, permissive, and neglectful. These will greatly determine a child's academic ability to form relationships with others or how the child feels. Based on Diana Baumrind's development model, this study aims to determine the benefits and disadvantages of each parenting style by longitudinal data and psychological theory. Authoritative parenting, which characterizes parental discipline alongside their affectionate nature toward children, will produce excellent developmental outcomes. The authoritarian, permissive, and neglectful ones will also bring about some limitations in the end, such as diminished self-esteem, impulsivity, or social deficiencies. In this regard, the understanding thus provided would translate into practice contexts applicable to parents, educators, and policymakers toward better practices in raising children or supporting family resilience across diverse economic contexts.

Keywords: Parenting Styles, Child Development, Authoritative, Authoritarian, Permissive, Neglectful, Early Childhood

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51 Analysis of the 4d105s7p, 4d105s8p, and 4d105p7s Configurations of Triply Ionized Antimony (Sb Iv)

Paper ID V11I1-1437 · Pages 333-341 · Atomic Physics

Tazeen Rana, Assistant Professor, Qassim University

The 3-m normal incidence vacuum spectrograph was used to record the Antimony spectrum in the 300-2080A0 region. Previous Sb IV analyses were updated. Two configurations were created that were stimulated by electrons: 4d10 5s7p, 4d105s8p, and 4d105p7s. To properly understand the Spectrum, multi-configuration Hartree-Fock calculations with relativistic corrections (HFR) and least square fitting calculations (LSF) were performed.

Keywords: Singly Ionized Antimony Atoms, Isoelectronic Sequence, Triggered Spark Source, Ions, Atoms, Energy Level, Spectrograph, Theoretical Study

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52 Patient Perception of Dental Camp and Factors Influencing Non-Return to Hospital

Paper ID V11I1-1436 · Pages 342-345 · Dentistry

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Oral health on an essential aspect of overall health and well–being. Dental camps provide oral health care to underserved populations, but their effectiveness depends on patient perception. this study explores patient perception views on the usefulness of dental camps and understands their experience and satisfaction with these community-based initiatives.

Keywords: Dental Camps, Oral Health Awareness, Patient Satisfaction

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53 Time & Motion Study

Paper ID V11I1-1473 · Pages 346-349 · Civil Engineering

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Time and motion study is one form of work measurement to note down and study the time employed in performing specified work under prescribed conditions. Time and motion study helps managers streamline the operations of their companies through segmentation of tasks into simpler parts and setting the standards for executing the same. This research sets up normal time for task execution, identifies opportunities for improvement, and suggests realistic measures for enhancing performance, typically in conjunction with wage-incentive systems to enhance employees' motivation levels.

Keywords: Time and Motion Study, Productivity, Work Sampling, Regression Equation, Statistical Analysis

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54 The Impact of Advancement in Robotics on the Medical Sector

Paper ID V11I1-1507 · Pages 350-355 · Robotics

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This paper investigates the impact of robotics on the medical sector, discussing the benefits and negatives of this new intervention. While robots have brought in certain efficiencies in the delivery systems, the human element and its reassuring presence, the cost of using robots, putting human life into the hands of an unresponsive machine, and the job loss that they might bring to a thriving sector are some of the huge

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concerns. Surgical robots, rehabilitation robots, and telepresence robots are all examples of medical robots. Their increasing use in health care is bound to alter the health care landscape, and it would be interesting to understand the long-term implications of this technology induction.

Keywords: Robotics, Healthcare, Disability, Rehabilitation, Ageing, Telemedicine

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55 Intelligent Network Intrusion Detection using ML

Paper ID V11I1-1502 · Pages 356-362 · Computer Science

Ankita Sambhaji Gorde, Savitribai Phule Pune University and EY India

With the rapid expansion of cybercrime, attackers are exploiting vulnerabilities in cloud computing and network infrastructures, posing significant security threats. Traditional Intrusion Detection Systems (IDS) struggle to cope with the dynamic and sophisticated nature of cyber-attacks, necessitating the development of intelligent and adaptive security techniques. Machine learning (ML) has emerged as a powerful tool in cybersecurity, offering improved detection rates, reduced false alarms, and lower computational costs. ML techniques have been applied to various cybersecurity domains, including intrusion detection, malware classification, spam filtering, and phishing detection. While ML cannot fully automate cybersecurity systems, it enhances threat detection efficiency, alleviating the burden on security analysts. This study proposes an intelligent network attack detection framework utilizing deep learning models. The Cyber-Physical System (CPS) is represented as a coordinated network of agents, with one agent acting as a leader, guiding the others. The attack detection phase employs deep neural networks to identify threats in their early stages, ensuring a proactive defense mechanism. To further enhance security, robust control algorithms are integrated to isolate compromised agents using a reputation-based mechanism. Experimental results demonstrate that deep learning techniques significantly outperform traditional IDS methods in detecting and mitigating network attacks. This approach improves cybersecurity by making threat detection more efficient, proactive, and cost-effective, addressing the limitations of conventional security mechanisms.

Keywords: Network Protocols, Wireless Network, Cyber-crime, Machine learning techniques, cyber-security system, attacks, SQL Injection, Cross-Site Scripting (XSS), Phishing Attacks, and Intrusion Detection Attack (IDS)

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56 2D Platformer Game Development with Godot Engine

Paper ID V11I1-1501 · Pages 363-365 · Game Design And Development

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This paper explores the development of a 2D platformer using the Godot Engine, emphasizing its node-based design and procedural generation. By adopting an agile workflow, the project achieved stable 60 FPS on mid-tier hardware, with user tests (n=50) highlighting responsive controls (93% approval) and dynamic levels.

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Godot’s efficiency and open-source flexibility proved ideal for indie teams, though advanced debugging tools were limited. Findings affirm its viability for cost-effective, engaging 2D game development.

Keywords: 2D Platformer, Game Development, Godot Engine, Indie Games, Procedural Generation, Player Mechanics, Physics Simulation, User Experience

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57 Differentiating Fault Current from Leakage Current during IC Testing

Paper ID V11I1-1488 · Pages 366-371 · Computer Engineering

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Differentiating Fault Current from Leakage Current During IC Testing As integrated circuit technology advances, the intricacies related to fault identification and leakage current evaluation have increased markedly. Although conventional I_DDQ (quiescent supply current) testing protocols exhibit effectiveness in detecting major defects, they often struggle to distinguish between typical leakage currents and those reflective of genuine faults, thereby prolonging testing durations. Consequently, current sensors typically initiate measurements once transitions are finalized. In this investigation, we utilize a simulation technique to corroborate the effectiveness of an innovative methodology articulated in [1], which can be used to improve the throughput of the current testing process by detecting the faults using AC components of the current, thereby overcoming a constraint of traditional methods.

Keywords: Current Measurement, Current Sensor, Current Testing, IC Testing, I_DQQ testing, Physical Defects, Test Vectors

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58 Analysis of CNN Models for Melanoma Detection

Paper ID V11I1-1444 · Pages 372-376 · Deep Learning

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Melanoma is the deadliest type of skin cancer that needs to be detected at its early stages to prevent fatality. Using dermoscopy images of the lesion a computer-based system trained with deep learning will be developed to detect melanoma. The model will identify and categorize melanoma with intricate image processing and classification algorithms, which will be trained on a labeled dataset. Some of the goals of this project are to compile and preprocess a dataset of dermoscopy images labeled with benign lesions and melanoma, evaluate using metrics such as AUC-ROC, accuracy and validation with external datasets, addressing bias while following clinical guidelines. At the end of this research, we hope to improve patient outcomes and lessen the cost of healthcare, making it affordable as well as increasing diagnostic accuracy, decreasing false positives, and assisting dermatologists in the early detection of the disease.

Keywords: CNN, Computer Vision, Melanoma

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59 Need for Privacy-Preserving AI for Secure Data Sharing in Cybersecurity

Paper ID V11I1-1460 · Pages 377-385 · Technology

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The purpose of this exploratory study is to look into the necessity for Privacy-Preserving Artificial Intelligence (AI) in secure data sharing in the context of cybersecurity. The research design includes a comprehensive examination of the current literature and a survey questionnaire with industry professionals. The findings show a growing demand for privacy-preserving AI solutions in cybersecurity, driven by increased data privacy rules and the escalation of data breaches. The study found that typical data-sharing mechanisms frequently reveal sensitive information, rendering them inappropriate for handling secret data. The practical ramifications of these findings are substantial. They highlight the importance of enterprises implementing privacy-preserving AI solutions to improve data security while adhering to privacy standards. Such solutions can assist firms in leveraging their data for insights while maintaining the privacy of individuals' information. However, the study does identify shortcomings. The adoption of privacy-preserving AI systems can be difficult due to their computational cost and the potential decrease in data value caused by extra noise for privacy preservation. Furthermore, a lack of awareness and comprehension of these solutions among businesses creates additional hurdles to their implementation. The study underlines the critical need for Privacy-Preserving AI for secure data exchange in cybersecurity and advocates for increased awareness and research in this area to address the stated problems.

Keywords: Security, Privacy, AI, Data, Sensitive, Information, Preserving

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60 Reinforced War Bunker Construction

Paper ID V11I1-1472 · Pages 386-389 · Civil Engineering

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Propagation of shock waves in partially- or fully-confined environments is a complex phenomenon due to the possibility of multiple reflections, diffraction and superposition of waves. In a military context, the study of such phenomena is of extreme relevance to the evaluation of protection systems, such as survival containers, for personnel and equipment. True scale testing of such structures is costly and time consuming but small-scale models in combination with the Hopkinson- Cran scaling laws are a viable alternative. This paper combines the use of a small-scale model of a compound survival container with finite element analysis (with LS- DYNA) to develop and validate a numerical model of the blast wave propagation. The first part of the study details the experimental set-up, consisting of a small-scale model of a survival container, which is loaded by the

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detonation of a scaled explosive charge. The pressure-time histories are recorded in several locations of the model. The second part of the study presents the numerical results and a comparison with the experimental data.

Keywords: Blast-Wave Propagation; Confined Environment; Finite Element Modelling; Experimental Testing; Small-Scale Model; LS-Dyna

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61 Cab Fare Prediction Machine Learning Model

Paper ID V11I1-1480 · Pages 390-392 · Computer Science And Engineering

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Predicting cab fares accurately is crucial for urban transportation, benefiting both passengers and service providers. This research explores machine learning techniques to enhance fare prediction using real-world trip data. Various models, including Linear Regression, Decision Trees, Random Forest, Gradient Boosting, and XGBoost, were evaluated. The Gradient Boosting Regressor emerged as the best-performing model after hyperparameter tuning, achieving high prediction accuracy. The study highlights the significance of trip distance and pickup time in fare estimation. Future enhancements include integrating weather data and deploying the model as a real-time API service to improve usability and precision.

Keywords: Cab Fare Prediction, Machine Learning, Gradient Boosting, XGBoost, Regression Models, Feature Engineering, Hyperparameter Tuning, Urban Transportation, Fare Estimation, Data Science.

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62 Data Privacy and Artificial Intelligence Governance for Marginalized Communities in the United States: How Important is Inclusivity?

Paper ID V11I1-1469 · Pages 393-400 · Artificial Intelligence And Data Privacy

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The study, “Data Privacy and AI Governance for Marginalized Communities in the United States,” examines the digital divide affecting marginalized groups and its exacerbation by biased AI governance. With the objectives of assessing data privacy risks, analyzing biases in AI systems, and proposing inclusive policies to improve AI governance, the research highlights key findings, including that marginalized communities, particularly racial minorities and low-income populations, face disproportionate risks from surveillance capitalism, biased facial recognition, and AI-driven hiring processes. Healthcare is also affected by the technological bias as AI models less accurately serve marginalized groups owing to unrepresentative data sets. In response, the study recommends stringent data protection laws akin to the European Union’s GDPR, ethical AI standards focused on transparency, as well as mandatory diversity in AI development teams to ensure demographic representation. To address biases in surveillance, the enactment of the George Floyd Justice in Policing Act and the Facial Recognition and Biometric Technology Moratorium Act are recommended. The work concludes with an emphasis on the need for digital inclusion and equitable AI governance to prevent further marginalization and

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foster fair participation in a digital society.

Keywords: Artificial Intelligence Governance, Bias, Digital divide, Data Privacy

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63 Dairy Farming

Paper ID V11I1-1475 · Pages 401-404 · Computer Science And Engineering

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The Dairy Farming App enhances traditional livestock trading by offering a secure, transparent, and user-friendly digital platform. Built with Android Studio for the frontend and Java for backend integration, the app facilitates direct interaction between farmers, veterinarians, and buyers, reducing reliance on intermediaries. Its core functionalities include real-time messaging, location-based listings, livestock health record management, and IoT-driven herd monitoring. Comprehensive testing ensured the app meets functional, UI/UX, and security standards, achieving a 95% success rate in transaction completion. This paper explores the app's development, implementation, and its transformative impact on modernizing livestock management through innovative technology.

Keywords: Dairy Farming, IoT, Android Application, Livestock Management, Real-Time Communication.

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64 History of Music: How History Shaped Music, and Music Shaped History

Paper ID V11I1-1515 · Pages 405-408 · Music

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Music is not merely a reflection of history—it is a force that has shaped it. This paper explores the symbiotic relationship between music and historical events, illustrating how melodies, rhythms, and lyrics have influenced societies, driven political movements, and preserved cultural identities. Music has acted as a catalyst for social change, fueling revolutions, advocating for justice, and even altering the course of global diplomacy. Genre hybridization and technological advancements have further expanded music's impact, allowing for cross-cultural fusion and worldwide accessibility. By analyzing key moments in history where music played a pivotal role—whether through protest anthems, nationalistic compositions, or groundbreaking innovations—this study highlights music's enduring power as both a historical artifact and an agent of transformation.

Keywords: Music, History, Social Change, Periods of Music History, Development of Studio, Genres

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65 Rural India’s FMCG Consumer: A Review

Paper ID V11I1-1509 · Pages 409-412 · Mba

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This review paper synthesizes existing research to provide a comprehensive understanding of the Indian rural FMCG consumer. It examines the unique demographic, psychographic, and behavioral characteristics that influence purchasing decisions in this significant market segment. By analyzing various marketing insights, the paper identifies key challenges and opportunities for FMCG companies seeking to penetrate rural India. Specifically, it explores the impact of socio-cultural factors, economic conditions, and evolving digital literacy on consumer behavior, emphasizing the importance of localized marketing strategies, innovative distribution models, and community engagement. This review contributes to the existing literature by providing a consolidated perspective on the multifaceted nature of the Indian rural FMCG consumer, offering actionable insights for effective market penetration and sustainable growth.

Keywords: Rural FMCG, Indian Consumer, Marketing Insights, Distribution, Consumer Behavior, Digital Literacy.

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66 Enhanced Recovery After Surgery (ERAS) vs. Conventional Protocols in Open Abdominal Hysterectomy: A Comparative Study

Paper ID V11I1-1533 · Pages 413-414 · Surgery

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Objective: This study evaluates and compares postoperative recovery outcomes in women undergoing open abdominal hysterectomy using either the conventional recovery protocol (CRP) or the early recovery after surgery (ERAS) protocol. The objective is to assess the impact of ERAS on hospital stay duration, pain management, ambulation, and complications. Methods: A prospective comparative study was conducted on 100 women undergoing open abdominal hysterectomy for benign gynecological conditions. Patients were divided into two groups: 50 managed with CRP and 50 with ERAS. The primary outcome measures were postoperative pain scores, time to ambulation, length of hospital stay, postoperative nausea and vomiting (PONV), and surgical site infection (SSI). Results: Patients in the ERAS group had significantly improved recovery outcomes. Their hospital stay was shorter (3.2 ± 1.1 days vs. 5.8 ± 1.4 days for CRP), ambulation was achieved earlier (8 ± 3 hours vs. 24 ± 6 hours), and postoperative pain scores were lower (VAS score: 4.8 ± 1.1 vs. 7.2 ± 1.3). Additionally, ERAS patients experienced fewer complications, with lower rates of PONV (16% vs. 30%) and SSI (4% vs. 12%). Conclusion: The ERAS protocol enhances postoperative recovery after open abdominal hysterectomy by reducing hospital stay, improving pain control, and decreasing complications. These findings support the implementation of ERAS as a standard approach to improve patient outcomes and reduce healthcare burdens.

Keywords: Hysterectomy, ERAS, Early Recovery, Conventional Recovery Protocol

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67 Federated Learning in Data Warehousing: A Privacy-Preserving Approach for Distributed Analytics

Paper ID V11I1-1513 · Pages 415-418 · Computer Science

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With the explosion of data generated across distributed environments, organizations face challenges in extracting insights while maintaining data privacy and regulatory compliance. Federated Learning (FL), a machine learning paradigm where models are trained across decentralized data sources without moving the data, has emerged as a promising solution. This paper explores the integration of FL with modern data warehousing architectures to enable secure, scalable, and privacy-preserving distributed analytics. We outline a federated data warehousing framework, highlight real-world use cases, evaluate system performance, and discuss future research directions.

Keywords: Federated Learning, Data Warehousing, Privacy-Preserving Analytics, Distributed Machine Learning, Cloud Data Warehouse, Homomorphic Encryption, Differential Privacy, Secure Multi-party Computation, Federated Data Integration, Hybrid Cloud Architecture, Compliance-Aware AI, Real-Time Distributed Analytics

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68 A Patient-Specific Computational Framework Utilizing CFD and Bio-Numerical Modelling to Predict Growth of Abdominal Aneurysms for Therapeutical Aid

Paper ID V11I1-1504 · Pages 419-431 · Computational Fluid Dynamics

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This research aims at devising a framework between a CFD model and a derived biomechanical model that effectively makes AAA (abdominal aortic aneurysms) therapeutics more accurate. The input data required is patient abdominal CT-imaging scans using CAD software's and features we can extract out of the vessel geometry in which, after meshing, we can simulate the blood flow using CFD in Ansys Fluent. This blood flow CFD simulation helps us identify the high-pressure or stressed regions of the vessel wall. Using the biomechanical factors affecting aneurysmal expansion, a model to quantify expansion per unit time was derived. This model took into consideration factors like compliance, elastic modulus, and other mechanical properties. Using the geometrical parameters that can be acquired from VMTK processing on the CAD vessel geometry and variable parameters like pressure and velocity from the CFD simulation, the date of rupture can be approximated, thus precisifying aneurysmal therapeutics.

Keywords: CFD, CAD, Biomechanics, Abdominal Aortic Aneurysms, Ansys Fluent

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69 CBIR: Enhancing Image Retrieval through AutoEncoders and Metric-Based Search

Paper ID V11I1-1496 · Pages 432-436 · Computer Vision

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The exponential growth of visual data demands robust Content-Based Image Retrieval (CBIR) systems that accurately and efficiently retrieve relevant images. In this paper, we present a novel CBIR framework that integrates AutoEncoders for latent feature extraction with hashing and Vantage-Point Trees (VP-Trees) for efficient similarity search. Experimental results on a publicly available dataset demonstrate significant improvements in retrieval precision and computational efficiency.

Keywords: Content-Based Image Retrieval, AutoEncoders, Feature Extraction, Hashing, VP-Trees, Deep Learning

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70 Analysis of Mental Health Economics

Paper ID V11I1-1528 · Pages 437-450 · Economics

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Over the past few decades, the economics of mental health has drawn more attention, changing from a neglected area to a crucial one for healthcare policy and resource distribution. The economic aspects of mental health, such as resource allocation, intervention cost-effectiveness, and the financial toll that mental health illnesses have on both individuals and societies, are examined in this study. It examines how funding for mental and physical health care differs, emphasising the problems of stigma, geographical imbalances, and a lack of qualified personnel. The research paper assesses the cost-effectiveness of preventive, treatment, and rehabilitation programs using data from international studies. It also looks into how economic assessments, like quality-adjusted life years (QALYs) and cost-benefit analyses, are used to make policy. The study emphasises the value of allocating resources in an equal and evidence-based manner, encouraging openness, accessibility, and effectiveness in the provision of mental health services. This paper seeks to support policy changes that improve the availability and caliber of mental health services globally by addressing economic inefficiencies and arguing for more financing.

Keywords: Mental health, Economics, Healthcare costs, Mental health policy, Mental health services, Health economics, Economic burden, Cost-effectiveness, Mental health financing, Economic evaluation, Depression, Anxiety disorders, Mental illness prevalence, Healthcare utilization, Public health

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71 A Review of Collaborative Robotics (Cobots) in Industrial Automation

Paper ID V11I1-1562 · Pages 451-461 · Robotics And Automation

Aayush Desai, Student, Independent Researcher

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Collaborative robots (cobots) represent a transformative advancement in industrial automation, fundamentally changing production paradigms through seamless human-robot interaction. As a cornerstone of Industry 4.0, cobots integrate advanced force/torque sensing, real-time motion control, and machine learning algorithms to enable safe, efficient collaboration in shared workspaces without traditional safety barriers. Their key technological advantages include adaptive impedance control for precise physical interaction, intuitive programming interfaces reducing deployment time by up to 70%, and flexible reconfigurability supporting high-mix, low-volume production. Major industrial applications demonstrate cobots' versatility: in automotive manufacturing, they enable precision tasks like engine component assembly and quality inspection; in electronics, they handle delicate PCB mounting with micron-level accuracy; in pharmaceuticals, they maintain sterile processes during vaccine packaging. Emerging technological frontiers include cognitive human-robot interaction using computer vision, cloud-based swarm coordination for distributed manufacturing, and digital twin integration for predictive maintenance. This comprehensive review analyses: (1) core technological enablers driving cobot capabilities, (2) implementation case studies across key industries, (3) critical safety considerations and ISO/TS 15066 compliance, (4) Applications of Cobots in Industrial Automation and (5) future research directions in AI-enhanced adaptability and human-centric design. The study provides both a technical reference for engineers and strategic insights for manufacturing decision-makers adopting collaborative automation solutions.

Keywords: Collaborative Robotics, Industry 4.0, Human-Robot Interaction, Adaptive Control, Smart Manufacturing, Swarm Robotics Coordination, Industrial IOT (IIOT), Machine Vision, Human-Robot Collaboration (HRC), Artificial Intelligence

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72 AI Based Smart Segregation System

Paper ID V11I1-1563 · Pages 462-464 · Electrical And Information Technology

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The rising demand for premium agricultural produce underscores the need for efficient, accurate sorting technologies. This paper presents an AI-based smart segregation system designed to automate tomato sorting, integrating deep learning, image processing, and robotic automation. The system employs a conveyor belt, ultrasonic sensors, a high-resolution camera, a weigh scale, and robotic arms to categorize tomatoes into reject, ripe, or unripe classes based on visual and weight attributes. Utilizing the YOLOv8 object detection model trained on 731 tomato images, the system delivers high-precision, real-time classification validated through rigorous testing. Results reveal substantial improvements over manual sorting, reducing labor costs, error rates, and processing time while enhancing operational efficiency. Its scalable design suggests applicability to diverse agricultural contexts, heralding advancements in automated farming.

Keywords: Artificial Intelligence, Machine Learning, Tomato Sorting, Image Processing, Robotic Automation, Agriculture

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73 Encoding Digital Information in DNA: Advances, Techniques, and Applications

Paper ID V11I1-1285 · Pages 465-474 · Data Science And Information Technology

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In 2020 approximately 64 zettabytes of Data were generated and it was predicted that by 2025 this number will be greater than twice that of it. This prediction is proving itself as every day approximately 402.74 million Terabytes of data is created and as of 2024 the number has risen to 147 Zettabytes already and it's assumed that this amount will be 181 Zettabytes by the end of 2025. This data primarily includes IoT data which is the fastest growing segment of data which is then followed by social media. The existing storage technologies cannot cater to the needs of the Zettabyte Era, as they have considerable issues like limited durability, high power consumption, and the environmental impact they cause. DNA is nature's best alternative to these problems and can store such high amounts of data for a longer period without very little decay. One gram of DNA can store up to 215 Petabytes of data. Its longevity of thousands of years and enormous information density without harming the environment by generating less e-waste makes it a promising archival storage medium.

Keywords: DNA Storage, Data Growth, Archival Storage, Synthetic Biology, Long-Term data Preservation, Digital Data Explosion, Next-Gen Data Storage

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74 “A Study to Assess the Knowledge Regarding Isbar Handing and Taking Over Tool Among Staff Nurses Working at Selected Hospital in the City.”

Paper ID V11I1-1370 · Pages 475-484 · Nursing

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Clinical handover is the transfer of professional responsibility and accountability for some or all aspects of care for a patient or group of patients to another person/family / legal guardian or professional group on a temporary or permanent basis. It is one of the most important skills that health professionals and students need to be taught. There are several structured formats available for clinical handover. e.g. IPASS3. I-SBAR is a mnemonic that aids in safe handover of patient information and improves communication and decision-making. This technique improves the efficiency and accuracy of Handing and Taking over the process by staff nurses4. PROBLEM STATEMENT: "A study to assess the knowledge regarding I-SBAR handing and taking over tool among staff nurses working in selected city hospitals." OBJECTIVES OF STUDY: • To assess the knowledge among staff nurses regarding the I-SBAR handing and taking over tool • To find an association of knowledge regarding the I-SBAR handing and to take over the tool with selected demographic variables. METHODS: The study was conducted at MGM of Chh. sambhajinagar city. The present study's sample size was 80 MGM hospital Chh staff nurses. sambhajinagar. A structured questionnaire regarding the ISBAR handing and taking over tool was used to assess the knowledge of staff nurses in MGM Hospital Chh. Sambhajinagar. 9 RESULTS:. The majority of samples, 57 (71.25%), have good knowledge regarding ISBAR handing and taking over the tools, 19 (23.75%)

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samples have average knowledge regarding ISBAR handing and taking over the tools, and 4 (5%) samples have poor knowledge regarding ISBAR handing and taking over a tool. CONCLUSION: This study assessed the knowledge regarding ISBAR handling and taking over tools. Based on the result, the investigator concluded that there was a significant association between religion and the knowledge of staff nurses regarding ISBAR handing and taking over tools.

Keywords: Isbar, Handing and Taking Over Tool, Knowledge, Staff Nurses

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75 Design and Development of a Semi-Automated System for Food Waste Disposal and Management

Paper ID V11I1-1553 · Pages 485-491 · Design And Development

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Waste accumulation in multi-tap sink systems causes clogging that disturbs operations in commercial kitchens, hospitals, schools, and industrial buildings. Waste particles gather in sloped disposals, resulting in water stagnation and manual cleaning needed, which inefficiencies and hygienic issues follow from. Constant operation is guaranteed by an automated waste separation system comprising a perforated conveyor belt with a wind-up mechanism and torsional spring. As water runs over the conveyor, solid waste gets caught and allows seamless drainage. By guiding collected waste into a disposal tank, a tapped sheet keeps sink operation free from blockages. By means of a more affordable and low-maintenance substitute for hand waste disposal, this method lowers human effort, improves hygiene, and minimizes operating downtime. Good waste management guarantees continuous sink use in high demand, reduces food waste, and guarantees hygiene environments. Automated operation offers a logical replacement for conventional waste disposal methods in commercial and industrial settings, promoting sustainability and operational effectiveness.

Keywords: Perforated Conveyor Belt, Wind-Up Mechanism, Waste Separation System, Environmental Pollution.

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76 Emotions as a Marketing Strategy in the Social Media World

Paper ID V11I1-1517 · Pages 492-496 · Marketing

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Emotional branding is widely used in building a marketing strategy. In this study, we will discuss various factors involved in creating emotions as benefits of advertising. How emotions as a main tool can create a brand’s identity and uniqueness for consumers to have brand loyalty. This study examines both for-profit and non-profit sectors to show how empathy-driven marketing is becoming important for establishing genuine connections with consumers. The use of emotional appeals in advertising The most important factor of having a strong social media appearance is for consumers to connect with the organization's uniqueness and have a true sight and information about the brand values and ethics towards creating a brand shows the importance to do

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collaborative campaigns with influencers and consumers to get connected with the brand. The use of social media marketing as a main tool in creating awareness through promoting video advertising on brands' Social media handles and, finally, talking about the future trends that will be used in emotional marketing strategy.

Keywords: Emotional Advertising, Video Advertising, Branding, NGO Emotional Appeal.

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77 Advancing Sentiment Analysis: A Comprehensive Review of Data Augmentation Strategies and Deep Learning Techniques

Paper ID V11I1-1559 · Pages 497-505 · Deep Learning

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Sentiment analysis has gained significant attention in natural language processing (NLP) due to its applications in social media monitoring, customer feedback analysis, and opinion mining. However, a major chall enge in sentiment classification is class imbalance, where certain sentiment categories are underrepresented, leading to biased models and reduced accuracy. This research addresses the issue by leveraging data augmentation techniques, specifically synonym replacement and back-translation, to balance the dataset and enhance model performance. Unlike conventional deep learning approaches that rely on complex architectures, this study proposes a simplified yet more effective model by utilizing a Decision-based Recurrent Neural Network (D-RNN) trained on an augmented dataset. Additionally, Aspect-based and Priority-based augmentation techniques are introduced to ensure semantic consistency and emphasize critical contextual information during augmentation. Experimental results demonstrate that the proposed approach effectively reduces class skewness and improves sentiment classification accuracy, surpassing traditional models in performance while maintaining lower computational complexity. This research highlights the significance of data augmentation as a powerful strategy to enhance sentiment analysis, offering a cost-effective and scalable solution without the need for more complex deep learning models.

Keywords: Sentiment Analysis, Opinion Mining, Data Augmentation, Neural Network, Deep Learning, State of Art Models, Synonym Replacement, Back-translation.

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78 LogiX: AI-Driven Secure Login System with Quantum-Resistant Algorithms and Multi-Factor Authentication

Paper ID V11I1-1558 · Pages 506-516 · Quantum Cryptography

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LogiX is a next-generation authentication and security framework designed to withstand emerging cybersecurity threats, including those posed by quantum computing. The system integrates Post-Quantum Cryptographic Algorithms such as Kyber for Key Exchange, Dilithium for Digital Signatures, and NTRU For Encryption To Ensure Robust Data Protection. Additionally, Advanced AI-driven techniques are Employed for Anomaly Detection, Credential Sharing Analysis, Adaptive Multi-Factor Authentication (MFA), and Phishing De-Detection. By leveraging secure authentication protocols, quantum-resistant cryptographic standards, and intelligent monitoring systems, LogiX provides a comprehensive security solution that mitigates risks associated with traditional and quantum-era cyber threats. This documentation outlines the foundational principles, methodologies, and implementation strategies used to fortify authentication mechanisms and protect sensitive user data in cloud-based environments.

Keywords: Security Framework, Cybersecurity Threats, Kyber for Key Exchange, Dilithium for Digital Signatures, NTRU For Encryption, Post-Quantum Cryptographic Algorithms,

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79 Implementation of reflective programming in .NET

Paper ID V11I1-1518 · Pages 517-519 · It

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Programming languages are evolving very fast, but their principles are almost the same. There are two main concepts about the writing process of software, Closed Code and Open-Source Software. Most developers prefer to have the source code of the software developed by other developers so they can understand, read, and change the product very easily. Even when a product is an open source, the number of developers who modify the product is very low compared to the number of users who use the product. In this paper we will present an implementation of reflective programming in .NET to allow other developers to extend the capabilities of a product with their contributions on writing source code even if the project is not open source.

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Keywords: Reflective Programming, Plugin, Open Project, .Net Technology

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80 Creating Tailored Detection and Prevention Mechanisms for Targeted Threats

Paper ID V11I1-1494 · Pages 520-525 · Cyber Security

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In today’s fast-paced world of cybersecurity, standard detection and prevention methods often fall short when it comes to dealing with specific, targeted threats. To truly protect against sophisticated cyberattacks, organizations need to create solutions that are tailored to their unique risks and threat profiles. This means understanding the types of potential attackers, analyzing threats specific to their industry, and implementing detection and prevention strategies that fit the organization’s systems, data, and daily operations. By focusing on detecting targeted threats, using advanced analytics, and continuously improving defenses based on real-time intelligence, organizations can stay ahead of emerging risks. This proactive approach helps minimize vulnerabilities and strengthen overall security, ensuring the organization is always one step ahead of potential attackers.

Keywords: Tailored Detection, Targeted Threats, Cybersecurity Defense, Custom Security Solutions, Threat Profiling, Advanced Analytics, Threat Intelligence,

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