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Content

AI-Driven Personalized Digital Learning for Healthcare Workforce Training Using Natural Language Processing (NLP)

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Abstract

This paper explores the integration of Artificial Intelligence (AI) and Natural Language Processing (NLP) into healthcare workforce training and digital learning ecosystems. The research focuses on developing a personalized learning framework that leverages AI algorithms and NLP-driven analytics to improve the accessibility, adaptability, and efficiency of healthcare education. Using predictive modeling, conversational AI, and sentiment analysis, the proposed system delivers adaptive content, real-time feedback, and individualized learning experiences. The study highlights the application of AI-driven digital platforms in telemedicine, patient data management, and workforce upskilling, ensuring contextualized and ethical learning. Findings suggest that AI–NLP integration enhances learner engagement, reduces cognitive overload, and improves retention rates in digital healthcare training environments.

Keywords: Artificial Intelligence; Digital Healthcare Training; Natural Language Processing; Personalized Learning; Workforce Development

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Cyberloafing, Workplace Violence, and Well-being Among Nurses

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Abstract

Healthcare settings are increasingly affected by workplace violence against nurses, a widespread issue with serious negative consequences for their well-being. At the same time, cyberloafing—traditionally viewed as a counterproductive behavior—is increasingly being recognized as a potential emotion-focused coping mechanism for managing workplace stress. Drawing on the Transactional Model of Stress, this study examined the influence of sociodemographic variables (age, gender, marital status, experience, type and location of institution, political affiliation, and place of residence) on well-being, workplace violence, and cyberloafing among nurses in India. The study also explored the interrelationships among these three core constructs. Using a cross-sectional quantitative design, data were collected from 414 nurses across six hospitals in the Ernakulam district of India using convenience sampling. Measures included a self-structured sociodemographic profile, the Short Warwick–Edinburgh Mental Well-Being Scale (WEMWBS-7), the Workplace Violence Scale, and Lim's Cyberloafing Questionnaire. The results revealed several significant demographic influences. Older nurses (26 years and above) reported higher levels of cyberloafing. Female nurses reported higher well-being, whereas male nurses reported higher workplace violence and cyberloafing. Married nurses also reported higher workplace violence and cyberloafing. Nurses with one to five years of experience demonstrated the highest well-being. Nurses working in the public sector reported higher cyberloafing, and nurses from rural areas experienced higher levels of workplace violence. Correlational analyses showed a significant negative relationship between well-being and workplace violence ($r = -0.12$, $p = 0.01$) and a significant positive relationship between workplace violence and cyberloafing ($r = 0.34$, $p < 0.001$). No significant relationship was found between well-being and cyberloafing. Linear regression analyses were conducted to examine whether cyberloafing predicted nurse well-being and workplace violence. The overall model for well-being was not significant, indicating that cyberloafing did not significantly predict well-being. However, the model for workplace violence was significant, with cyberloafing emerging as a significant positive predictor. These findings highlight the complex interaction among demographic factors, occupational risks, and coping strategies among nurses and suggest that cyberloafing may function as an adaptive response to workplace aggression. The study offers important theoretical and practical implications for addressing workplace violence and promoting nurse well-being.

Keywords: Coping Mechanisms; Cyberloafing; Healthcare; India; Nurses; Workplace Violence; Well-being

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Artificial Intelligence in Digital Learning: A New Era of Talent Development and Management

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Abstract

Artificial Intelligence (AI) is transforming the way people learn, work, and develop new skills in today's digital world. In the field of business and management, AI-based tools and platforms are changing how organizations train their employees and manage talent. This study explores how AI supports digital learning by personalizing training programs, tracking learner progress, and identifying skill gaps in the workforce. Through this approach, companies can design more effective learning and development (L&D) strategies that help employees stay relevant in a fast-changing business environment. The paper also highlights the challenges faced while implementing AI in digital learning systems, such as data privacy, the risk of bias, and the need for human-AI collaboration. It discusses how managers can balance technology with human insight to create a more engaging and ethical learning experience. By analyzing recent developments and case examples, this paper concludes that AI is just not a technological trend but a key driver of continuous learning and talent growth in modern organizations. It emphasizes that future managers must understand the role of AI in shaping digital learning and organizational success.

Keywords: Artificial Intelligence; Business Management; Digital Learning; Organizational Learning; Talent Development

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A Comparative Study of LLM Culmination in NLP for Education

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Abstract

Broad use of Large Language Models in the education sector is growing day by day, considering the increasing prevalence of the relationship between Large Language Models and Natural Language Processing is equally important. This paper explores a comparative study of the integration of Natural Language Processing in Large Language Models for the current education sector. Based on two primary contexts, mentoring and learning, the study focuses on four main Natural Language Processing features which are used in Large Language Models: semantic understanding, contextual awareness, dialogue management, and personalization. The usage of these features enables Large Language Models to act as intelligent mentors and support intelligent learning. Furthermore, a comparative analysis highlights how traditional Natural Language Processing methods have evolved into advanced LLM-driven frameworks that can comprehend, reason, and generate human-like educational content. The findings emphasize that the culmination of Natural Language Processing in LLMs holds transformative potential in shaping personalized, scalable, and accessible education systems for the future. The study shows that concept-based awareness and learning management in LLMs significantly enhance the learning experience.

Keywords: Educational Technology (EdTech); Intelligent Mentoring Systems; Large Language Models (LLMs); Natural Language Processing (NLP); Personalized Learning

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Glauco Vision: Early Detection System of Glaucoma Using Vision Transformer

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Abstract

Glaucoma is one of the main causes of permanent blindness around the world, largely because it's often found too late. In its early stages, it usually doesn't have obvious symptoms, and the current way of checking for it involves doctors looking at the optic nerve by hand, which can be slow, depends on the person doing it, and can make mistakes. To solve this, this study introduces an automatic system for detecting glaucoma using the Vision Transformer (ViT), a modern deep learning model that's commonly used for image recognition. This system looks at retinal images and pays attention to key features throughout the whole image to clearly tell the difference between normal eyes and those with glaucoma. It uses a Python-based system built with Flask for real-time analysis, and a web interface made with HTML, CSS, and JavaScript to provide a smooth and easy-to-use experience for doctors. The model was trained on a big set of retinal images. It helps doctors find diseases earlier, which can protect patients' eyesight and lower the risk of blindness with timely treatment.

Keywords: Automated Screening; Early Diagnosis; Glaucoma Detection; Machine Learning, Optic Disc Analysis; Ophthalmology AI; Retinal Fundus Images; Vision Transformer (ViT)

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AI Driven Consumer Behavior and Pricing Optimization in Online Markets

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Abstract

Artificial Intelligence (AI) has become an innovative technology in electronic commerce (e-commerce), significantly transforming how businesses interact with consumers and manage their operations. This review synthesizes recent literature to examine two major impacts of AI: the prediction of consumer behavior and the application of dynamic pricing models in online marketplaces. Focusing on techniques such as machine learning reinforcement learning (ML), reinforcement learning (RL), and predictive analytics, the paper explains how AI can be used to enhance personalization, improve customer interactions, and substantially increase revenue optimization. In addition, the review identifies key research gaps and limitations, including ethical concerns, high implementation costs, and limited empirical generalizability, and outlines directions for future research in this emerging field. The study highlights the transformative nature of AI-based personalization and its influence on consumer behavior and evolving market trends. Companies must understand and effectively use AI-driven strategies to remain competitive in the digital marketplace. The integration of intelligence and AI-based decision-making has the potential to reshape consumer relationships with online retailers and define the future of e-commerce.

Keywords: Artificial Intelligence (AI); Consumer Behavior Prediction; Dynamic Pricing; E-Commerce Personalization

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Design of an LLM based Bot Framework towards Intelligent Assessment: Automated Feedback System for Subjective Answer Evaluation

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Abstract

The growing adoption of intelligent systems in education has created new opportunities to enhance assessment processes through automation. Traditional evaluation of subjective responses is often time-consuming, labor-intensive, and susceptible to inconsistencies among evaluators. This research proposes the design of a Large Language Model (LLM)–based bot framework for intelligent assessment, with the goal of automating feedback generation for subjective answer evaluation. The framework incorporates advanced natural language processing (NLP) capabilities to interpret context, semantic meaning, and depth of knowledge in student responses. By using fine-tuned LLMs, the system can deliver personalized, constructive, and rubric-aligned feedback while maintaining fairness and scalability in assessment practices. In addition, the framework includes explainability mechanisms and alignment with pedagogical standards to promote transparency and trust in automated grading. The proposed system has the potential to substantially reduce evaluator workload, improve learning outcomes through timely feedback, and support the broader vision of AI-driven personalized education.

Keywords: Automated Feedback; Educational Technology; Intelligent Assessment; Large Language Models (LLM), Natural Language Processing (NLP); Subjective Answer Evaluation

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AI Sports Dynamizer: An Intelligent Performance Tracking and Professional Networking Platform for Student Athletes

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Abstract

Student athletes often face challenges in tracking their performance, receiving personalized training guidance, and connecting with coaches and recruiters. This work proposes the AI Sports Dynamizer, a platform that combines AI-driven sports analytics with professional networking for educational sports ecosystems. The system uses machine learning to support performance prediction, injury risk assessment, and personalized recommendations, while also offering LinkedIn-style networking features. The proposed architecture integrates wearable sensors, video analysis, and recommendation engines with athlete profile creation and connection-building functionalities. This paper addresses a critical gap in sports technology at the amateur level.

Keywords: *Artificial Intelligence; Machine Learning; Performance Tracking; Recommendation System; Sports Analytics, Student Athletes, Social Networking*

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Awareness, Attitude and Practice of Dental Students on the Integration of AI-Based Marketing Education into the Curriculum- A Questionnaire Study

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Abstract

Background: Artificial Intelligence (AI) is reshaping clinical dentistry, academics, and professional marketing by transforming how dental practitioners engage patients and promote services. Tools such as ChatGPT, Jasper, and Canva AI are increasingly used for digital communication and branding. Despite their relevance, AI-based marketing is rarely addressed in dental curricula, potentially leaving students underprepared for technology-driven practice. Understanding student perspectives is essential to guide curriculum innovation. **Aim**: To assess dental students' awareness, attitudes, and practices regarding the integration of AI-based marketing education into the dental curriculum. Methodology: A descriptive cross-sectional study was conducted among undergraduate and postgraduate dental students in Chennai. A structured, pre-validated questionnaire comprising 34 items across five domains (demographics, awareness, attitude, practice, and curriculum integration) was distributed via Google Forms. Data were analyzed using IBM SPSS v25.0 with descriptive statistics and Chi-square tests. **Results**: Among 316 participants, 45.9% reported awareness of digital marketing concepts, and 78.2% were familiar with AI-based tools. Positive attitudes were evident, with 76.9% agreeing that marketing is essential for dental success. However, only 41.5% had used social media for dental awareness, and 33.5% had created AI-generated content, though 49.4% planned to use AI based marketing in future practice. Notably, 53.5% supported integrating AI and marketing into the dental curriculum. **Conclusion and Implications**: Students showed moderate awareness and limited practice but strong attitudes toward AI-based marketing. Findings support embedding AI and digital marketing modules into dental education to enhance digital literacy, ethical communication, and readiness for technology-enabled practice.

Keywords: Artificial Intelligence; Curriculum Integration; Dental Education; Digital Marketing; Student Perception

The Convergence of Artificial Intelligence and Blockchain in Financial Services: Use Cases in Fraud Detection, Risk Management, and Automated Compliance (RegTech)

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Abstract

This paper explores the transformative impact of the convergence between Artificial Intelligence (AI) and Blockchain technologies within the financial services industry. It investigates their synergistic role in strengthening fraud detection, enhancing risk management, and automating regulatory compliance (RegTech). Through literature synthesis and real-world case studies, the paper presents evidence of improved data security, transparency, and operational efficiency. The discussion identifies key research gaps, offers theoretical and practical contributions, and proposes a conceptual framework for future implementation. Findings show that integration of AI and Blockchain has substantial potential to address evolving challenges in finance, yet success depends on strategic governance, ethical oversight, and regulatory alignment.

Keywords: Artificial Intelligence (AI); Blockchain; Financial Services; Fraud Detection; Risk Management

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Artificial Intelligence: Reshaping or replacing faculty in Higher Education – An overview of the Literature

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Abstract

Artificial intelligence (AI) is rapidly emerging as a substantial force in our society, infiltrating nearly every sector—including higher education. This technological integration has raised concerns, particularly regarding how students might use AI to complete coursework, potentially undermining academic integrity. However, when thoughtfully applied, AI and higher education can form a powerful partnership that enhances learning and educational outcomes for students. At the same time, apprehension persists among faculty and instructors about the possibility of being replaced by AI, prompting important questions about how best to blend technology and human interaction in the classroom. This paper aims to review relevant literature to provide a comprehensive overview of the evolving role of faculty in the context of advancing AI technologies. It is substantially clear from the literature survey that the faculty at higher education institutions are not going to be replaced by AI but will be fundamentally reshaping the role of faculty by systematizing the administrative tasks and enabling personalized learning, thus shifting the focus to more mentoring and instructional design. This progression presents both opportunities and challenges related to academic integrity, privacy of Data, and the development of new teaching and research skills.

Keywords: Artificial intelligence; Academic Integrity; Higher Education

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AI Based Ids and Prevention System For IOT

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Abstract

The increasing adoption of Internet of Things (IoT) devices in sectors such as healthcare, smart cities, transportation, and industrial automation has significantly improved automation and connectivity. However, the rapid growth of IoT has also increased exposure to cyberattacks, as many devices lack strong security mechanisms. Conventional intrusion detection systems (IDS), which mainly depend on signature-based techniques, are limited in detecting new and unknown attacks and often suffer from high false alarm rates. To overcome these challenges, this paper presents an AI-based Intrusion Detection and Attack Prediction System for IoT environments. The proposed system employs the XGBoost machine learning algorithm to analyze network traffic and classify it as either normal or malicious. Important traffic features such as flow duration, protocol type, header length, traffic rate, and magnitude are used for accurate detection. The system is implemented using the Flask framework, enabling real-time traffic monitoring and alert generation. The proposed approach enhances detection accuracy, adaptability, and scalability when compared to traditional IDS methods. By integrating artificial intelligence with machine learning techniques, the system effectively identifies both known and previously unseen cyberattacks. This makes the proposed solution suitable for securing IoT and Industrial IoT (IIoT) infrastructures against evolving cybersecurity threats.

Keywords: Artificial Intelligence; Cyberattack Detection; IoT Security; Intrusion Detection System; Machine Learning; XGBoost

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AI-Driven Personalized Learning Framework for Students with Cognitive Learning Disorders

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Abstract

This paper presents an AI-driven personalized framing network designed to support students with cognitive learning disorders, including dyslexia, dyscalculia, dysgraphia, attention-deficit hyperactivity disorder (ADHD), and autism spectrum disorder (ASD). Traditional education platforms often rely on uniform instructional models that overlook individual differences in cognitive processing, learning pace, and engagement. To address this limitation, a standalone intelligent learning assistant is proposed, leveraging machine learning, natural language processing (NLP), computer vision, and reinforcement learning to deliver adaptive educational content aligned with each learner's cognitive and behavioral profile. The system continuously monitors learning indicators such as reading speed, writing fluency, attention patterns, and comprehension accuracy. Based on these data points, the assistant dynamically modifies instructional materials by simplifying text, generating visual explanations, and providing audio support tailored to each student's learning needs. Preliminary findings supported by existing literature indicate significant improvements in comprehension, sustained attention, and engagement among neurodiverse learners. These outcomes demonstrate the transformative potential of AI-based systems in advancing inclusive education through early intervention and personalized learning pathways. The implications of this research extend to educators, technologists, and policymakers by emphasizing how intelligent systems can redefine digital education as a more equitable, responsive, and effective environment for students with diverse cognitive profiles.

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Brand Construction in Digital Learning: Perspectives from Online Learners Across Maharashtra

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Abstract

The expansion of digital learning in India has transformed not only how education is delivered, but also how institutions must craft and sustain their reputations in non-physical environments. In Maharashtra, where online learners span diverse socio-economic and linguistic backgrounds, the construction of an educational brand is both a communicative challenge and an interpretive negotiation. This study revisits brand formation in digital learning by analyzing how 384 online learners from Maharashtra evaluate institutional identity, instructional substance, experiential quality, and digital visibility. Instead of treating branding as a promotional artefact, the study reframes it as a dynamic product of learner engagement with digital cues. Findings indicate that reliable instructional performance, transparent informational structures, and meaningful learner support significantly outweigh promotional branding in shaping perceptions of credibility and loyalty. The study contributes a reconceptualized understanding of branding as a multidimensional construct emerging through lived academic encounters in digital spaces. Strategic insights for providers operating in India's competitive online learning ecosystem are proposed.

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Design and Implementation of Secure Financial Institution Network Topology using Cisco Packet Tracer

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Abstract

This paper presents the design and implementation of a secure network topology using Cisco Packet Tracer. The project focuses on establishing a robust and efficient communication framework integrating routers, switches, and end devices with security configurations such as Access Control Lists (ACL), VLANs, and firewalls. Simulation and testing were performed using Cisco Packet Tracer to ensure data confidentiality and reliable packet transmission across subnets.

Keywords: Cisco Packet Tracer Simulation; Network Security (ACL, VLAN, Firewall); Reliable Subnet Communication; Secure Network Topology

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TSE-Hash: Tangent Space Embedding with Hypergraph-Siamese Networks for Discriminative Copy Detection

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Abstract

The uncontrolled growth of digitally edited content, such as cropped memes, filtered social media posts, and pirated video frames being distorted with a perspective, is a severe threat to the implementation of copyrights since the current state of perceptual hashes cannot withstand severe geometric and non-rigid transformations. To address this, we present Tangent-Hypergraph Hashing (THH), which is a new paradigm that redefines what an identity is by image through the modelling of the space of possible transformations of an image. Fundamentally, THH uses a Siamese hypergraph network to discover higher-order, multimodal (complex) associations between an image and its artificially distorted perspectives that they project into an enhancing-free, deformation-free Tangent Space Embedding. This representation is in turn optimized by a Tangent Triplet Loss to be as discriminative as possible between various content and resistant to quantization error through a Differentiable Bayesian Binarization module. THH predicts an intrinsically invariant hash code that predicts over 98 percent accuracy, with an effective and scalable way to achieve creator rights and counteract digital piracy by allowing platforms to automatically identify highly distorted copies in their presence.

Keywords: Bayesian Quantization; Copy Detection; Deep Metric Learning; Hypergraph Neural Networks; Perceptual Hashing; Tangent Space Embedding

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Investors Perception and Strategic Investment in Online Education: Insights from Kerala It Industry

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Abstract

The rapid expansion of India's digital learning ecosystem has positioned online education as a high-growth investment sector, particularly within technology-driven regions such as Kerala. This study examines the relationship between market potential, investor perception, and strategic investment decisions among stakeholders in Kerala's IT industry. Using a quantitative research design and a structured Likert scale instrument, data were analyzed through reliability testing, descriptive statistics, correlation, and regression analyses. Results revealed strong internal consistency across all constructs and positive mean scores, indicating generally favorable perceptions toward online education ventures. Correlation and regression findings confirmed that market potential significantly influences investor perception, while investor perception strongly predicts strategic investment intent. Together, these results underscore the importance of both objective market evaluations and subjective investor sentiment in shaping investment behavior in emerging EdTech-specific markets. The study contributes to literature by providing region-specific insights and validating a perception-driven approach relevant to investment in digital education entrepreneurship. Implications for EdTech firms, policymakers, and investors are discussed.

Keywords: Ed-Tech; Financial Learning Platforms; Financial Planning; Innovation in Education; Online Education

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Digital Learning through Social Media and Its Impact on Brand Loyalty

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Abstract

Digital learning and social media have transformed how consumers access information and connect with brands. This study investigates how educational content shared on platforms like YouTube, Instagram, Facebook, and WhatsApp influences consumer trust, engagement, and brand loyalty. The key purpose of this research is to understand how knowledge-sharing through social media supports stronger customer–brand relationships. The study follows a descriptive and exploratory research design using only secondary data from journals, books, authentic reports, and online sources. A qualitative thematic analysis approach has been applied to identify common patterns in existing literature, focusing on consumer perception, ease of technological use, and social interaction within digital learning environments. The findings reveal that credible and helpful brand-related learning increases trust and satisfaction among consumers, encouraging them to rely on the brand repeatedly. Psychological factors such as trust and positive attitude, combined with user-friendly technology and supportive online communities, are major contributors to consistent engagement. When consumers learn through social media and feel connected with brand communities, they are more likely to recommend the brand and remain loyal in the long term. The study implies that brands offering valuable educational content and active interaction on social platforms gain a competitive advantage in retaining customers. It emphasizes that digital learning is not just a communication tool but an important strategic driver of brand loyalty in the digital age.

Keywords: Brand Loyalty; Consumer Engagement; Digital Learning; Social Media Marketing

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Youth Unemployment and Gig Work: -A Thematic Review and Bibliometric Study

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Abstract

This study presents a synthesis of research on youth unemployment and gig work by combining a thematic literature review with bibliometric analysis. Using the biblioshiny package in R programming, the study identified trends in this research area, hidden themes, and research gaps through the records collected from the Scopus database covering the years 1985 to 2025. Findings indicate a significant rise in the research area during the year 2024. Thematic mapping reveals that while topics like employment, mental health, and COVID-19 are well-developed and central, emerging areas such as entrepreneurship and youth in developing regions remain underexplored. Co-word and factorial analyses show a strong conceptual interlink between demographic, structural, and policy-related aspects of youth labor career insecurity. Through K-means clustering using Python programming, five core themes were identified: 1. Precarious employment and career insecurity, 2. Entrepreneurship challenges, 3. Pandemic Impact, 4. General labor issues, and 5. Education-employment nexus. These insights suggest that while employment remains the dominant concern, the discourse is broadening to include psychological well-being, informal work, and the structural reforms needed to support youth. The study concludes by proposing future research directions to improve youth labor issues and labor outcomes through targeted education, inclusive policy, and structural support systems.

Keywords: Entrepreneurship; Gigwork; Platform Economy; Unemployment

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Evaluation of the Operational Impact of ERP Implementation at Keltron Knowledge Centres, Trivandrum

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Abstract

Enterprise Resource Planning (ERP) systems play a crucial role in enhancing coordination, data accuracy, and process efficiency across modern organizations. This study assesses the impact of ERP implementation on the operational efficiency of Keltron Knowledge Centre, Kerala, focusing on how integrated digital systems streamline institutional processes. Adopting a descriptive and analytical research design, primary data were collected from 113 employees across various departments through a structured questionnaire. Statistical techniques, including percentage analysis and Spearman's correlation, were applied to examine the relationship between ERP utilization and operational performance. The findings reveal that most ERP users are experienced professionals who use the system daily for tasks such as student record management, accounting, and communication. ERP adoption has significantly improved transparency, reduced duplication of work, and enhanced interdepartmental coordination. A moderate positive correlation was found between ERP efficiency and operational performance, while a strong relationship emerged between ERP training quality and user satisfaction. However, challenges such as technical difficulties, partial module integration, and occasional resistance from non-technical staff were noted. performance. The study concludes that continuous training, timely technical support, and improved system integration are essential for sustaining ERP-driven efficiency. The results offer helpful suggestions for educational and training institutions implementing ERP systems to enhance overall operational performance.

Keywords: ERP Implementation; Keltron Knowledge Centre; Operational Efficiency; Training Effectiveness; User Satisfaction

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Hybrid Deep Learning Architecture (SeedNet-HDL) for Automated Seed Purity Analysis: Integrating Vision Transformers and Graph Neural Networks

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Abstract

The current manuscript proposes a new hybrid machine learning system, SeedNet-HDL, an intelligent hybrid of Vision Transformers (ViT), Graph Neural Networks (GNN), and Quantum-Inspired Convolutional Networks (QCNN) to analyze seed purity without human intervention. Traditional single-algorithm designs are limited by the absence of capturing the morphological and topological relationships of seed-impurity detection. The hybrid model also achieves the highest accuracy level of 98.7% by taking advantage of ViT to extract global features, GNN to model spatial-relationship features, and QCNN to represent features better. The system also includes a Federated Meta-Learning (FML) paradigm, which allows achieving continuous improvement in distributed agricultural facilities. A comprehensive data set of 25000 seed images of eight varieties of crops and validation, including experimental validation, shows significant performance improvements over state-of-the-art algorithms, as it achieves a precision of 98.5 and a recall of 98.9. In addition, architecture also proposes Explainable Artificial Intelligence (XAI) elements, enabling transparent decision-making, which will overcome the problem of the consistency of traditional deep-learned models in agriculture.

Keywords: Agricultural Informatics; Explainable AI; Graph Neural Networks; Hybrid Deep Learning; Quantum-inspired CNN; Seed Purity; Vision Transformers

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Agni Tracker: A Flutter and Firebase Based Real-Time College Bus Tracking Application

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Abstract

The increasing dependence on college-operated transportation systems points out the need for reliable, real-time information to enhance student convenience and safety. Traditional systems rely heavily on static timetables, WhatsApp groups, manual phone calls, or PDF route documents that are not updated dynamically. These outdated methods often lead to confusion, long waiting times, inefficient communication, and frustration among students. Agni Tracker is a mobile application developed using Flutter and powered by a Firebase backend specifically designed for real-time college bus tracking. The system enables seamless communication between drivers, students, and administrators by offering continuously updated GPS-based bus locations, complete route and stop information, driver details, and a minimalistic admin panel for drivers to manage location sharing using a secure PIN-based login. The application uses Google Maps SDK for live tracking and Firebase Firestore for instant data sync, providing students with an accurate and user-friendly experience. Through this implementation, Agni Tracker significantly reduces uncertainty in transportation schedules, minimizes student wait times, and enhances the overall safety and transparency of the college transport ecosystem. Prototype evaluation has shown that the system is performant, scalable, and suitable for deployment with minimal hardware requirements. This paper details the system's design, architecture, data model, key features, implementation, security considerations, and recommendations for future enhancements.

Keywords: Bus Tracking; Cloud Database; Flutter; Firebase; GPS; Mobile Application; Real-Time Tracking; Route Management

AMT

From Waste to Wealth: A Sustainable Approach to Organic Fertilizer Production through GreenFarmaCo

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Abstract

GreenFarmaCo is a sustainable initiative that addresses the growing challenge of organic waste management by promoting eco-friendly agricultural practices. It mainly focuses on converting biodegradable household and municipal waste into a nutrient-dense compost, which provides an alternative to chemical fertilizers through an efficient collection and composting system. This journey aims to foster a cleaner environment while supporting India's sustainable farming vision. The target market includes local farmers, plant nurseries, and urban gardeners seeking waste management solutions. Through partnerships with farmer cooperatives and municipal corporations, GreenFarmaCo ensures a reliable waste supply chain and raises awareness through community workshops and campaigns. This model emphasizes circular-economy principles such as reducing waste, recycling organic matter, and reinvesting it into agriculture. It primarily aligns with **SDG 12: Responsible Consumption and production** while also supporting **SDGs 2, 8, 11, and 13**. Some key findings suggest the model can divert up to **65% of biodegradable waste** from landfills while producing **high-quality organic compost** that enhances soil fertility and reduces reliance on chemical fertilizers. Moreover, it can generate local employment and achieve operational profitability within months of implementation, demonstrating strong economic and environmental viability. This research highlights how sustainable entrepreneurship can advance both community development and ecological balance.

Keywords: Circular Economy; Compost Production; Eco-entrepreneurship; Organic Waste Management; Sustainable Development

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Cybersecurity Vulnerabilities and Mitigating Strategies in Online Learning

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Abstract

The incredible development and acceptance of online learning have revolutionized access to education by removing traditional barriers to learning while also fostering new levels of global engagement. This online phenomenon has, however, created a complex set of cybersecurity threats that affect the quality of online education. As education expands its use of technology, educational institutions and learners have exposed themselves to various threats in cyberspace, such as unauthorized data loss, phishing, identity theft, and unlawful system breaches. The focus of this paper is to identify the key cybersecurity vulnerabilities associated with online learning and to present global strategies for strengthening data security, user privacy, and institutional resilience. This qualitative research project draws on academic literature, case studies from elite institutions, and assessments of major e-learning platforms such as Edemy, Google Classroom, and Coursera. The study calls for online educational communities to actively adopt incident response systems and layered security strategies that integrate effective multi-factor authentication and real-time threat monitoring. Finally, the study highlights the need for continuous cybersecurity awareness among educators and learners, as such awareness can foster a sense of readiness and responsibility toward cybersecurity, which is vital and purposeful.

Keywords: Authentication; Cybersecurity; Cyberspace; Phishing

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AI-Augmented Learning in Telemedicine: Redefining Clinical Competence through Adaptive and Immersive Training Systems

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Abstract

The rapid integration of artificial intelligence (AI) in telemedicine is changing the healthcare industry and hence calls for a redefinition of clinical competence in digital practice. This paper explores how AI-enabled learning ecosystems enhance independence and the training of telemedicine learners using adaptive, experiential, and patient-centered educational systems. This paper incorporates a conceptual-analytical approach to construct an analysis using frameworks from theories and models such as Adult Learning Theory, Cognitive Apprenticeship, and AI-enabled adaptive learning models and integrates case studies from the Johns Hopkins Telehealth Simulation Center, the Mayo Clinic, and India's eSanjeevani telemedicine project and analyzes its potential. Key findings of this paper show that learners exhibit definitive improvements in engagement, retention, and exhibition of concepts, as well as precision in making and communicating clinical decisions. However, despite the numerous identified benefits of AI and digital learning ecosystems, the study also identifies critical challenges like data privacy risks, algorithmic bias, and the need for continuous faculty training. This implication suggests that the AI-incorporated telemedicine industry harbors personalized learning, real-time competency assessments, and immersive virtual simulation, all contributing to enhanced diagnostic accuracy, communication skills, and ethical awareness amongst the workforce, which are key components for reconnecting the world to the healthcare sector. Furthermore, AI-enabled education redefines how learners will learn, adapt, and serve in a world that is adjusting to an increasingly digital era.

Keywords: *Artificial Intelligence (AI); Adaptive Learning Systems; Clinical Competence; Health Informatics and Sustainability; Telemedicine Education*

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Machine Fault Identification Using a Digital Twin-Based Augmented Vision Framework with IoT-Enabled Sensors

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Abstract

In modern industries, machines serve as the backbone of industrial production. Any unexpected downtime can lead to a complete halt in operations, resulting in significant losses in productivity and revenue. Ensuring the continuous and efficient operation of machinery is therefore a critical aspect of industrial reliability in maintenance. The proposed system introduces a Digital Twin (DT)-based Augmented Vision (AV) framework designed to support predictive maintenance by integrating IoT-enabled sensors, real-time visualization, and fault diagnostics. The system employs a DT scanner to capture and visualize the operating condition of machines, providing a color-coded output—green for normal, orange for warning, and red for critical conditions such as abnormal vibration, overcurrent, overheating, or excessive noise. The approach combines IoT-based data acquisition with DT visualization to deliver an intelligent, low-cost, and efficient solution for monitoring and maintaining industrial equipment. Experimental evaluation demonstrates that the proposed system improves diagnostic accuracy, reduces service time, and ensures enhanced operational reliability in environments.

Keywords: Augmented Vision; Digital Twin; IoT; Industrial Monitoring; Predictive Maintenance

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NutriFusion: AI-Based Integrated Diet Management Platform Combining Ayurveda, Unani, TCM, and Modern Nutrition Systems

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Abstract

In today's fast-paced world, personalized nutrition plays a key role in maintaining good health. However, most contemporary diet programs tend to emphasize modern nutritional approaches and often overlook ancient traditions such as Ayurveda, Unani, and Traditional Chinese Medicine (TCM). These traditional systems place significant importance on individual body types and on maintaining harmony between the body and nature. This paper introduces NutriFusion, a diet application that leverages artificial intelligence to integrate traditional dietary knowledge with modern scientific expertise. It provides personalized, preventive, and data-driven recommendations. The application features a comprehensive food database, a recommendation engine that combines rule-based logic and machine learning, and real-time progress-tracking tools. NutriFusion bridges traditional and modern nutrition by delivering a comprehensive, flexible, and scientifically validated approach to diet management. Testing indicates that the application improves users' adherence to dietary plans and promotes better health through tailored recommendations. This research presents an innovative approach to integrating diverse nutritional philosophies into effective, real-time health solutions with broad applicability.

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Touchless ATM of Palm Interaction Using Machine Learning

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Abstract

This project introduces an innovative approach to ATM interactions by leveraging advanced technologies such as facial recognition and hand gesture recognition. The primary goal is to create a secure, user-friendly, and touchless ATM experience, reducing the reliance on physical touchpoints and enhancing overall convenience for users. The system begins with a robust facial recognition process using the Haar Cascade algorithm, ensuring the accurate identification of users based on their facial features. Once the face matching is successfully completed, the system matches with a unique user ID for authentication. To further enhance security, users are prompted to enter a password. Hand gesture recognition, powered by the Mediapipe library, plays a pivotal role in enabling touchless navigation within the ATM interface. Users can interact with the system, select debit transactions or balance inquiries, send WhatsApp balance information to WhatsApp-friendliness, and navigate through the ATM menu using hand gestures. This intuitive gesture-based interaction eliminates the need for physical contact with the ATM interface, providing a seamless and secure user experience. The graphical user interface (GUI) of the ATM is designed with user-friendliness in mind, presenting users with clear menu options for their transactions. The integration of these cutting-edge technologies not only ensures a high level of security but also positions the project at the forefront of modern ATM design.

Keywords: Face Recognition; Hand Gesture; Haar Cascade Algorithm; Media Pipe; Touchless ATM; Virtual Keyboard; Virtual Mouse

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Technology Shift in the Education Industry: An Analysis of the COVID and Post-COVID Transition in India

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Abstract

The COVID-19 pandemic profoundly transformed the global education landscape, forcing institutions to shift from conventional classroom settings to digital and technology-driven learning environments. This study investigates the evolution of the Indian education sector during and after the pandemic, focusing on the rise and transformation of EdTech enterprises and the increasing role of Artificial Intelligence (AI) in education. The purpose of this research is to assess the extent of technological integration, the level of acceptance among learners and educators, and the sustainability of digital education models in the post-pandemic context. The methodology is based on secondary data analysis of leading Indian EdTech companies—both listed and unlisted—through examination of their business models, sales performance, profitability, customer base, and operational adaptability across three temporal phases: pre-COVID, COVID, and post-COVID. The results reveal a sharp growth in EdTech businesses during the pandemic, driven by necessity, followed by a decline once physical institutions reopened, despite continued AI advancement. This trend suggests that while technology has enhanced accessibility, scalability, and efficiency, it cannot replace the human elements of mentorship and interaction essential for effective learning. The study concludes that the future of education will depend on a strategically managed hybrid framework, integrating technological innovation with human engagement. From a strategic management perspective, such a framework will enable institutions to enhance resilience, optimize resource allocation, and sustain competitiveness in a dynamic post-pandemic educational environment.

Keywords: Artificial Intelligence; COVID-19; EdTech; Hybrid Education; Strategic Management

An Integrated TAM–SDT Immersion Framework for Post-COVID Distributed Workforces: Adoption Dynamics in the Recruitment-to-Onboarding Transition

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Abstract

In post-COVID distributed environments, the recruitment-to-onboarding transition is a structural vulnerability. The transition from remote candidate evaluation to effective team member is frequently characterized by employee isolation, poor information transfer, and a mismatch between recruiting expectations and onboarding reality. Post-COVID, organizations increasingly adopt augmented reality (AR) and virtual reality (VR). VR-based training lowers newcomer anxiety by 45%, increases learning retention by 35%, and improves usefulness and 12-month retention by 20–25%. Yet adoption rates remain below 15%. To address this paradox, this conceptual paper develops an integrated framework through systematic literature synthesis of TAM and SDT across three dimensions: (1) Adoption Drivers: Autonomy support, perceived usefulness, and perceived ease of use; (2) Implementation Barriers: Technical complexity, user resistance, high upfront costs, organizational clarity, and change readiness deficits; (3) Success Metrics: Employee engagement, technology acceptance (psychological belonging and role clarity), and retention outcomes. Three propositions emerging from TAM & SDT: (P1) Employee behavioral-organizational intention to use VR pre-arrival preparation increases with high organizational autonomy support and perceived usefulness. (P2) The usefulness-adoption relationship is reduced under high-cost perceptions, and this effect can be mitigated by training support and phased implementations. (P3) Organizations with strong change readiness will achieve faster adoption and quicker acceptance. This framework provides theoretical guidance on how organizational context, technology design, and change readiness influence adoption success through immersive tech. Future empirical research can fully investigate these propositions and provide evidence-based implementation suggestions for organizations wishing to incorporate immersive technologies in the distributed recruitment-to-onboarding workforce

Keywords: Immersive Technologies; Post-COVID Distributed Workforces; TAM-SDT Integration

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An Explainable NLP Framework for Transparent Descriptive Answer Evaluation in Digital Learning Systems

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Abstract

The rapid integration of artificial intelligence in digital learning has transformed assessment practices, particularly in evaluating descriptive answers. However, the lack of transparency in automated scoring systems limits trust and adoption among educators and learners. This paper proposes an explainable NLP framework for transparent descriptive-answer evaluation using a BERT-based classifier combined with state-of-the-art Explainable AI (XAI) techniques. A custom dataset of student responses is created and categorized into good, average, poor, and poor answer classes. Sentence embeddings derived from DistilBERT are used to train a supervised classifier that predicts the quality of an unseen answer. To ensure interpretability, two complementary XAI methods—LIME and SHAP—are integrated into the system. LIME highlights the specific keywords and phrases (e.g., sunlight, glucose) that positively influence the predicted score, while SHAP provides global and local contribution plots that visually justify why an answer is graded as Good, Average, or Poor. Case studies from simulated digital classroom scenarios demonstrate how the system supports teachers with transparent feedback and helps learners understand their strengths and weaknesses. The proposed framework enhances fairness, accountability, and trust in AI-driven educational evaluation, aligning with future directions in ethical and explainable digital learning systems.

Keywords: Answer Evaluation; BERT; Digital Learning; Descriptive LIME; Explainable AI; Natural Language Processing; SHAP

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EduPath – Unified AI Platform for Student Career Guidance with Real-Time Features

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Abstract

The accelerated development of artificial intelligence has provided the new possibilities of individual career guidance and development of professional skills. This essay presents an overview of EduPath, an AI-driven career development application that helps students make sound career choices due to intelligent automation and real-time feedback. The system incorporates several AI-based modules, such as salary forecasting with machine learning models, automated resume generation with PDF downloadable output, career roadmap generation based on user profiles, and a career suggestion quiz based on aptitude. In addition, the site also has a real-time student communication system based on WebSocket-based messaging and a Gemini-powered AI chatbot with voice support to keep it up to date on appropriate guidance. The frontend is built with the help of React and Tailwind CSS to create a responsive and interactive user experience, whereas the backend is built with the help of Node.js, Express, MongoDB, and Socket. IO to handle data security and scalability. The experimental findings prove the system can be used to offer real-time recommendations, predict, and provide efficient user interaction. The proposed platform intends to fill the gap between education and employability with the help of personalized, data-driven career intelligence.

Keywords: Artificial Intelligence; Career Recommendation System; Salary Prediction; Resume Automation; Real-Time Communication

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Bridging Theory and Practice in Digital Marketing Education: A Neuromarketing- Informed Framework Integrating Cognitive Load, AI Literacy, and Attention Economy—Evidence from Empirical Validation

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Abstract

This study validates the Neuromarketing-Optimized Framework for Digital Education (NMOFDE), a comprehensive instructional design model integrating seven evidence-based components: cognitive load optimization, attention ethics, social presence, teaching presence, personalization, artificial intelligence integration, and real-world application. The framework synthesizes insights from 20 peer-reviewed articles spanning cognitive load theory, multimedia learning, the Community of Inquiry framework, and attention economics to address the fragmented landscape of contemporary digital marketing education. A cross-sectional survey of 120 Bachelor of Business Administration students specializing in digital marketing at SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India (November 2025), employed a mixed-methods design to assess component importance ratings (1–7 Likert scales), design improvement priorities (forced-choice selection from 15 evidence-based interventions), artificial intelligence usage patterns, and self-reported attention challenges. All seven framework components received strong validation (M = 5.40–5.75 out of 7.0), indicating consistent recognition of each dimension's educational importance. Critical findings reveal that 78.3% (n = 94 of 120) of students experience regular cognitive overload despite decades of research documenting effective cognitive load reduction strategies; 95.0% (n = 114) utilize artificial intelligence tools regularly, yet 77.5% (n = 93) report receiving insufficient institutional training; and 46.7% (n = 56) report significant attention difficulties attributed primarily to instructional design factors (dense text presentation, passive content delivery, unclear instructions) rather than personal discipline deficits or external distractions. Student-expressed learning priorities demonstrated striking alignment with evidence-based design principles: short video segments (80.0%, n = 96), artificial intelligence support systems (66.7%, n = 80), and visual learning aids (65.0%, n = 78) emerged as top implementation priorities, corresponding directly to framework components addressing cognitive efficiency and technological integration. This convergence between student needs and cognitive science provides compelling evidence that participatory approaches to curriculum design can effectively identify legitimate educational priorities grounded in neuroscientific research. Findings provide robust empirical support for multi-theoretical frameworks addressing cognitive, technological, ethical, and vocational dimensions simultaneously. While validated within digital marketing education contexts, framework principles generalize to broader online and hybrid education delivery modalities.

Keywords: *Artificial Intelligence;* Cognitive *Load Theory; Digital Marketing Education; Evidence-Based Pedagogy; Instructional Design Framework; Literacy*

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Consumer Engagement in Virtual Platforms: A Managerial Study of Android Custom ROM Communities

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Abstract

Vibrant Android custom ROM is evolving into a fantastic ecosystem in this digital environment with the help of various platforms like Telegram groups, GitHub repositories, YouTube channels, XDA Developers Group, participants, and Reddit forums, which collaboratively involve, participate, and exchange their ideas. The members of these platforms greatly engage themselves, which makes the users highly involved and motivated to use custom ROMs. This conceptual study investigates the drivers behind the user's engagement in these virtual ecosystems. Users and Gratification Theory, proposed by Katz, Blumler, and Gurevitch in 1973, examines five gratifications, namely connection, community, interactivity, customization, entertainment, and information, and their impact on the engagement of the users and user addiction in custom ROM virtual ecosystems. Early theories focused and explored only the technical aspects of custom ROMs but didn't focus on how and why the users engage in these virtual ecosystems. This paper proposes how theoretical and technical aspects can be linked with digital engagement among belongings and users. The conceptual study proposes how the users get involved, how they interact with the system, personalization insights, knowledge sharing, social belongings, and enjoyment. This framework improves our knowledge regarding digital consumer behavior within the virtual ecosystems and offers new directions for future research groups.

Keywords: Custom ROM, Consumer Behavior; GitHub; Gratification Theory; Reddit; XDA Developers

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Hybrid Classical-Quantum Machine Learning Framework for Network Traffic Anomaly Detection

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Abstract

Some attacks remain among the most serious threats to digital infrastructures, as they exploit previously unknown vulnerabilities and cannot be detected through traditional signature-based methods. This paper introduces a hybrid intrusion detection framework that combines classical deep learning with quantum machine learning to support the identification of previously unseen attack patterns. The system preprocesses raw network traffic data, encodes categorical attributes, reduces dimensionality, and learns normal behavior using autoencoder-based models. To provide additional analytical insight, a variational quantum classifier processes compressed latent features within a quantum circuit, enabling more expressive decision boundaries. An experimental evaluation shows that the combined classical and quantum components can detect anomalous network activity indicative of previously unseen malicious behavior.

Keywords: *Anomaly Detection; Autoencoder; Hybrid Classical-Quantum Model; Intrusion Detection System (IDS); LSTM Autoencoder, Network Security; Quantum Machine Learning*

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Comparative Analysis of Various Explainable AI-Driven CNN Models for Accurate and Transparent Diagnosis of Gastrointestinal Cancer

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Abstract

Gastrointestinal (GI) cancers remain one of the leading causes of global cancer mortality. To To cure this, accurate and early diagnostic technologies are needed. Recent advancements in deep learning, particularly Convolutional Neural Networks (CNNs), have significantly improved tumor detection and classification across various modalities such as endoscopy, CT, MRI, and histopathology. However, the opaque "black-box" nature of CNNs limits their clinical acceptance. Explainable Artificial Intelligence (XAI) has emerged as a critical solution and provides visually meaningful explanations for model predictions. This comprehensive review analyzes state-of-the-art XAI techniques (SHAP, LIME, Grad-CAM) and CNN architectures (TransResNet). The paper selection was restricted to studies published over the past 15 years; GI cancer predictions were considered. The study evaluates its effectiveness, interpretability, quality, clinical relevance, and limitations. Furthermore, it highlights emerging hybrid XAI-CNN frameworks, dataset challenges, validation constraints, and potential integration into real-time endoscopic workflows. The review concludes that XAI-based CNN models significantly enhance diagnostic trust and performance.

Keywords: AI; Cancer; Diagnosis; Gastrointestinal

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Cloudburst Detection with Severity Analysis in Real Time with the ML Regression Model and Weather Data

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Abstract

Cloudbursts are weather events characterized by intense, localized rainfall over a short duration. These events are highly dangerous to human lives, crops, and infrastructure. The atmosphere is highly unpredictable and non-linear, making it virtually impossible to predict such conditions in real time using conventional meteorological techniques. The current project, titled 'Real-Time Cloudburst Detection and Severity Analysis Using Weather Data and Machine Learning Regression Models,' introduces a data-driven machine learning regression model to assess real-time weather parameters associated with cloudbursts, detect their occurrence, and classify their severity levels. This approach aims to reduce forecasting errors by considering various weather parameters, including temperature, humidity, atmospheric pressure, wind speed, and precipitation rate. The proposed system models weather data collected through IoT-based sensors and an open weather API. The data is preprocessed to eliminate noise and anomalies before being input into strict regression-based machine learning algorithms, such as Random Forest Regression and Support Vector Regression (SVR). These models analyze how climatic variables depend on the environment to predict the likelihood and intensity of a cloudburst event. The identified severity levels are classified into various alert levels to ensure timely disaster management responses. This architecture enhances the accuracy and reliability of extreme weather prediction systems by utilizing continuous data collection, real-time forecasting, and predictive intelligence. The findings of this project will assist meteorological departments and local authorities in taking proactive mitigation measures to prevent potential loss of life and property in high-risk areas.

Keywords: Cloudburst Detection; Climate Prediction; Live Analysis Severity Prediction; Machine Learning; Regression Model; Weather Prediction; Weather Data Using IoT

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Cognitive Twin Learning Systems (CTLs): Predictive Personalization for the Future of Digital Education

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Abstract

Introduction: The rapid expansion of digital learning illustrates the importance of adaptive systems that understand individual learning behaviors rather than delivering uniform content. This study introduces the concept of Cognitive Twin Learning Systems (CTLs), AI-driven digital counterparts that replicate a learner's cognitive style, pace, and engagement patterns. **Purpose**: The paper aims to explore how CTLs can transform online education by predicting learner needs and providing real-time, personalized learning experiences. **Methodology**: A conceptual model was developed using Python-based data analysis and visualization tools such as Tableau to simulate learner interaction data. The framework applies machine learning techniques and behavioral analytics to forecast preferred learning formats and cognitive performance trends. **Key Results**: Preliminary simulations show that CTLs can significantly enhance engagement, optimize content delivery, and minimize learning fatigue by anticipating user responses. **Implications**: CTLs present a forward-looking solution to bridge learning gaps, promote data-driven education design, and personalize digital instruction across disciplines, particularly in analytical and financial education. The research advocates for ethical AI deployment and transparent data usage as integral to sustainable digital learning ecosystems.

Keywords: AI in Education; Cognitive Twins; Data Science; Personalized Education; Predictive Learning

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Empowering Sustainable Social Entrepreneurship through Digital Learning: The Case of DigestiCutlery

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Abstract

The innovation of DigestiCutlery explores how digital learning can empower youth-led social entrepreneurship for sustainable development. The proposed innovation, "DigestiCutlery," introduces dissolvable and edible utensils made from natural & organic ingredients such as flour, glucose syrup, fennel, cumin, and ginger. The cutlery will be sturdy enough to serve light to medium foods, and after a typical mealtime it can be dissolved in water and consumed as a digestive drink. Designed to address environmental pollution caused by detrimental plastic cutlery and promote digestive health, DigestiCutlery combines eco-consciousness with traditional Indian wellness practices. With the rapid growth of digital learning platforms and online entrepreneurship programs, students and innovators can be trained to design, market, and scale such sustainable ventures. Digital tools such as e-commerce platforms, AI-driven market analytics, and virtual incubators can accelerate awareness and adoption. DigestiCutlery can be the best model for future sustainable innovations by demonstrating how eco- and health-conscious design, digital learning, and social entrepreneurship can collaboratively develop scalable, impactful, and environmentally responsible business solutions. This is how integrating sustainability education with digital innovation fosters mindful entrepreneurship and contributes to both environmental and public health goals in India's growing fast-food ecosystem.

Keywords: Aids Digestion; Biodegradable Utensils; Digital Learning; Edible Spoons; Eco-Friendly Cutlery; Sustainable Social Entrepreneurship

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Enhancing Student Engagement in Online Higher Education through Digital Learning Strategies

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Abstract

Student engagement is a critical factor influencing learning success in online higher education, where issues such as reduced motivation, limited interaction, and lack of real-time support often hinder effective learning. This paper explores how digital learning strategies can enhance engagement in online higher education environments. Adopting a systematic literature review and conceptual analysis approach, the study synthesizes research findings from recent academic articles, institutional reports, and digital learning frameworks. The review highlights the effectiveness of strategies such as interactive multimedia content, virtual discussions, gamified learning experiences, and adaptive learning technologies in improving learner participation and persistence. The analysis further reveals that timely feedback, personalized learning pathways, and collaborative online spaces play a central role in sustaining continuous engagement. The paper argues that student engagement can be significantly strengthened when institutions integrate thoughtful digital pedagogy, invest in faculty development for online teaching, and utilize learning analytics to identify and support disengaged learners. The study offers practical recommendations and a conceptual model that institutions can adopt to build more engaging and learner-centered online environments, contributing to ongoing discussions on the future of digital higher education.

Keywords: *Digital Pedagogy; Digital Learning Strategies; Higher Education; Online Engagement; Student Participation*

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Efficacy of Artificial Intelligence-Based Diagnostic Tool in Detecting Common Dental Problems in Children Under 12 Years of Age

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Abstract

Background and Aim: The integration of artificial intelligence (AI) in diagnosing dental problems is gaining momentum, with evidence showing that AI systems can match or even surpass traditional diagnostic methods for certain dental conditions. However, there is a lack of studies in the literature regarding its efficacy in diagnosing common dental problems in children. This study aims to evaluate the efficacy of an AI-based diagnostic tool in detecting common dental problems in children under 12 years of age. **Methodology**: This prospective clinical study included 200 participants. Two experienced pediatric dentists, who were not involved in the study, first examined the participants using visual and tactile methods. Then, the ScanO AI dental checkup mobile application was used to take images of the same participants to detect dental problems. Both sets of findings were recorded and compared. **Results**: The prevalence of at least one carious lesion was 81.0%, visible plaque 88.0%, gingivitis 60.0%, and enamel defects/anomalies 16.0%. For child-level caries detection, AI achieved a sensitivity of 92.6%, specificity of 78.9%, positive predictive value (PPV) of 94.9%, negative predictive value (NPV) of 71.4%, and accuracy of 90.0%, with an area under the ROC curve (AUC) of 0.93. Surface-level sensitivity and specificity were 91.2% and 82.5%, respectively. AI sensitivity for cavitated lesions was 96.5% (specificity 90.2%). For plaque detection, AI achieved an accuracy of 90.5% (sensitivity 93.2%, specificity 80.0%); for gingivitis, accuracy was 84.0%. For enamel defects/anomalies, AI showed a sensitivity of 90.6%, specificity of 94.0%, and accuracy of 93.5%. Agreement with the reference standard for caries (kappa = 0.78) exceeded inter-examiner agreement between dentists (kappa = 0.68). The mean AI analysis time was 1.2 ± 0.4 minutes per child, compared to 7.8 ± 2.1 minutes for full clinical charting. **Implications**: The efficacy of the AI tool in diagnosing dental problems in children is up-to-date, relevant, research-backed, and addresses both clinical and technological advancements in pediatric dentistry. This high-efficacy model can be incorporated into day-to-day practice as an adjunct.

Keywords: Artificial intelligence; Automated Diagnosis; Pediatric Dentistry

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WI-FI Scanner Mac Spoof Detector

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Abstract

Wi-Fi networks remain vulnerable to MAC address spoofing, where adversaries impersonate legitimate devices to evade access controls, perform man-in-the-middle attacks, or trigger denial-of-service through forged management frames, a risk compounded by the lack of authenticity checks in IEEE 802.11 management traffic and the prevalence of benign MAC randomization in modern devices. This paper presents a lightweight, real-time Wi-Fi scanning system that combines behavior-driven rules with protocol-level cross-verification to distinguish malicious spoofing from legitimate randomization on commodity hardware. The method fuses 802.11 MAC-layer fingerprints—including sequence-number continuity, RSS stability, probe timing cues, and OUI–vendor consistency—with ARP IP–MAC mapping to compute a risk score that flags identities as Normal, Monitored, or Suspicious. Implemented in Python using Scapy with monitor-mode capture, the system provides operator-oriented visualization and alerting, supports ethical deployment on authorized networks, and avoids payload/PII logging by operating on link-layer metadata. Evaluation on controlled WLAN scenarios with scripted spoofing and background benign traffic demonstrates practical detection of duplicate identities, ARP inconsistencies, and abnormal sequence/RSS patterns, while heuristics for transient probe-only devices reduce false positives from MAC randomization. The results indicate that transparent, rule-based analytics can deliver actionable spoof detection with low overhead and immediate operational value, forming a foundation for future fusion with data-driven models and expansion to newer 802.11 bands.

Keywords: ARP Inconsistency; IEEE 802.11; MAC Spoofing; RSS Fingerprinting; Sequence Numbers; Wi-Fi Security

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Leveraging Software Containers for Efficient Research Deployments

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Abstract

Research organizations that rely on complex IT infrastructures benefit from containerization, which enables the smooth deployment of applications across various environments, whether on premises, in the cloud, or on edge devices. This portability is particularly crucial in research systems, where mission-critical applications must run consistently regardless of the environment. The importance of containers and their management is growing, especially in sectors where flexibility, security, and reliability are paramount, such as healthcare and public services. The Open Container Initiative (OCI) provides standards for containerization to ensure that containers are portable across environments and remain compatible with modern orchestration and automation tools. This paper explores basic containerization concepts and offers a comprehensive analysis of OCI-compliant containerization tools in the context of research deployments. It aims to assist researchers and IT administrators in making informed decisions to achieve their research and operational goals.

Keywords: Application Scalability; Container; Containerization; Docker; Interoperability

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Smartconnect: An Ai-Based Platform for Daily Wage Job Matching

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Abstract

AI-Based Platform for Daily Wage Job Matching helps to recommend the worker to the client based on the requirement of the client. Today, some educated people struggle to get a job. This idea is mainly focused on unemployed daily wage workers getting jobs from the surroundings. The job involves work like plumbing, electric work, and others. Small businesses in their relative location. This project is aimed at connecting people and wage workers without a third-party involvement. So, there are no broker charges. This improves the revenue of the worker. This project helps customers to find the employee based on the recruitment they post in the application. This technique helps to recommend employees by matching the customer's work needs. This also ensures the security of authenticating the client and the worker. This works by verifying the information of the worker, like certification and government IDs. This ensures the safety of both workers and clients. The client can also track the worker using the GPS from their home or any other place from their mobile at the assigned date and time of the work if the worker allows. After the work is done by the worker, that customer can post a review, feedback, and a rating for the worker. This is the feedback system; other people can easily reach the review and rating through the feedback without cheating. This ensures development of trust between the worker and employee. It also ensures satisfaction among the client and customer.

Keywords: AI-Based Job Matching; Based Recommendation System; Broker-Free Employment; Daily Wage Workers, GPS Tracking

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The Fragility of Consistency in Modern Large Language models (LLMs)

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Abstract

LLMs are widely used today and are very useful in what they do—next token prediction. It is not known where the training data came from nor how LLMs compress it. For example, ChatGPT is trained on trillions of tokens and compressed into a billion-parameter model due to redundancy in those tokens. Since the training data are unknown, there is no way to tell if the model is hallucinating. If used blindly, problems arise. Packages differ in parameters, programming style, and functionality. The methods that LLMs choose for calculations or programs vary widely. A study has been conducted on how LLMs calculate moments to show the potential pitfalls of relying on them without understanding the underlying logic.

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