

Editorial

The *Journal of Engineering Research and Sciences (JENRS)* continues its commitment to disseminating high-quality research that addresses contemporary scientific, technological, and societal challenges. The papers featured in this issue represent a diverse collection of studies spanning higher education assessment, sustainable digital infrastructure, advanced optical communications, data-driven business intelligence, ethical implications of artificial intelligence, and machine learning applications in computer vision. Collectively, these contributions demonstrate the growing importance of interdisciplinary research in advancing knowledge, innovation, and sustainable development across multiple domains.

The first paper examines the predictors of academic success among undergraduate students in Mongolia by analyzing data from more than 21,000 graduates across major universities. The study evaluates the relative influence of university admission test scores and prior academic achievement on undergraduate performance. The findings reveal that high school academic performance serves as a stronger predictor of university success than admission test scores, while a combined model incorporating prior academic indicators and third-year performance provides the highest predictive accuracy. The study offers valuable insights for policymakers and educational institutions seeking to improve admission practices and student outcomes through evidence-based decision-making [1].

The second paper addresses the critical challenge of energy efficiency in modern data centers through computational fluid dynamics (CFD)-based analysis of cooling system performance. By investigating dynamically controlled air-cooling units operating under both normal and failure conditions, the research evaluates the effects of control strategies, airflow leakages, and hot-air recirculation on thermal management. The results demonstrate notable energy savings under normal operating conditions and highlight the significant performance degradation caused by leakages during failure scenarios. The study contributes practical design recommendations for enhancing data center sustainability and operational reliability [2].

The third contribution explores the versatility of Nested Antiresonant Nodeless Fiber (NANF) technology for future optical communication networks. Through detailed numerical analysis, the study demonstrates how adjustments to a single structural parameter can transform NANF performance from quasi-single-mode transmission to quasi-two-mode operation. The findings underscore the adaptability of NANF as a platform capable of supporting both conventional communication systems and emerging space-division multiplexing applications. This work represents an important advancement in the development of low-loss, high-capacity optical transmission technologies [3].

The fourth paper presents a cloud-native data architecture designed to address the challenges of fragmented data ecosystems within retail and consumer packaged goods industries. By integrating multiple business data streams into a unified and governed platform, the proposed framework significantly reduces decision-making time, lowers computational costs, and improves operational efficiency. Furthermore, the architecture incorporates FinOps and GreenOps principles, demonstrating measurable environmental and economic benefits while maintaining robust analytical performance. The study provides a scalable and sustainable blueprint for modern enterprise data management [4].

The fifth paper investigates demographic biases embedded within large language models by examining how Meta LLaMA-3.1-8B-Instruct attributes personality and Dark Triad traits to synthetic demographic personas. Through extensive psychometric analysis and statistical evaluation, the research identifies systematic variations in personality trait assignments across gender, race, religion, and regional categories. The findings reveal the presence of latent

psychometric biases within model representations and raise important ethical considerations regarding the deployment of artificial intelligence systems in decision-making environments. The study contributes to the growing discourse on fairness, transparency, and accountability in AI technologies [5].

The final paper provides a comparative evaluation of deep learning and traditional machine learning techniques for binary face classification. By assessing end-to-end convolutional neural networks, hybrid CNN-MLP architectures, and transfer learning approaches based on ResNet50 feature extraction, the study offers a comprehensive examination of performance trade-offs between accuracy and computational complexity. The results demonstrate the effectiveness of both optimized deep learning models and feature-based classical classifiers, providing valuable guidance for researchers and practitioners selecting appropriate methodologies for computer vision applications [6].

In conclusion, the papers published in this issue highlight the breadth and depth of contemporary research addressing challenges in education, information technology, artificial intelligence, communications engineering, and data analytics. The diverse methodologies and innovative findings presented herein contribute meaningful knowledge to their respective fields while emphasizing the importance of sustainable, ethical, and data-driven approaches to future technological development. It is hoped that these studies will inspire further research, foster interdisciplinary collaboration, and support the advancement of science and engineering for the benefit of society.

References:

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