Editorial

The integration of advanced computational techniques, emerging communication paradigms, and innovative modeling frameworks is reshaping the research landscape across a wide spectrum of disciplines. From healthcare and education to industrial diagnostics and telecommunications, the presented studies demonstrate the transformative impact of machine learning, AI, and data analytics in resolving real-world challenges. These research contributions underscore not only the necessity of adopting sophisticated models but also the importance of aligning technology with human-centered design, ethical considerations, and systemic robustness.

Dealing with imbalanced datasets remains a significant obstacle in the deployment of predictive modeling, especially in regression problems involving real-time continuous data. This study undertakes a comparative evaluation of traditional machine learning algorithms and neural network architectures, with and without dimensionality reduction, using a satellite-based air pollution dataset. Principal Component Analysis (PCA) is applied for feature selection, and five regression techniques—Multilinear, Ridge, Lasso, Elastic Net, and SVM—are tested. The findings demonstrate that deep neural networks offer superior performance over conventional models, especially under skewed data distributions. By independently modeling and testing each approach, this research provides valuable insights into the role of neural networks in enhancing prediction accuracy amidst data imbalance [1].

The convergence of 5G networks, Internet of Things (IoT), and artificial intelligence is heralding a new era of intelligent connectivity, particularly in the context of wireless private networks. This work introduces a conceptual business model tailored for AI-enabled 5G-IoT private networks, aiming to guide operators in capitalizing on this disruptive shift. The framework addresses the economic and strategic considerations necessary for maintaining competitive edge while fostering sustainable innovation. With the mobile services sector undergoing rapid transformation, the study encourages a re-evaluation of existing business paradigms to support the growth of intelligent and adaptive network services [2].

Autonomous vehicles are becoming central to the conversation around the future of mobility, bolstered by AI, sensor integration, and V2X communications. This comprehensive analysis explores the infrastructure requirements, security vulnerabilities, regulatory landscapes, and social implications of autonomous vehicles, drawing on case studies of industry leaders like Tesla, Waymo, and General Motors. A comparative analysis with drones offers insights into shared cybersecurity risks, including GPS spoofing and unauthorized access. The study underscores the urgent need for regulatory clarity, robust cybersecurity protocols, and public trust to enable the safe deployment of AVs. It presents a forward-looking assessment of how AVs can revolutionize transportation while remaining secure and sustainable [3].

Kernel methods, a foundational concept in machine learning, are revisited in this extended exploration through the lens of high-dimensional geometry and clustering. The paper revisits the k-means clustering algorithm, tracing its classical origins and detailing its adaptation using Reproducing Kernel Hilbert Space (RKHS). The kernel trick facilitates complex operations without explicit embedding, enhancing computational efficiency. By refining initialization strategies and allowing quantification of target function improvements, the paper offers a more robust and interpretable version of kernelized k-means. This methodological advancement strengthens the applicability of clustering algorithms in various analytical domains [4].

Fleet maintenance and reliability analysis depend on accurately modeling system failures and evaluating heterogeneity across units. This research critiques existing methods for estimating mean times between failures (MTBFs) by highlighting the discrepancies that arise when comparisons are made at different time points. The proposed method introduces a unified reference process to estimate MTBFs across systems simultaneously, resulting in more consistent and robust evaluations. Through the analysis of three datasets, the superiority of the proposed

approach is validated, offering a practical solution for reliability engineers and fleet managers seeking improved fault diagnosis and prediction [5].

Visualizing biclusters derived from gene expression data presents a unique challenge due to their overlapping and bi-dimensional nature. This work surveys and evaluates various visualization strategies that enable researchers to analyze multiple biclusters simultaneously. The paper emphasizes how meaningful interpretation of biclustering results is crucial for identifying gene interactions across conditions. By categorizing and assessing different techniques, the study aids biologists and data scientists in selecting the most appropriate visualization tools for complex genomic datasets, ultimately enhancing their ability to derive actionable biological insights [6].

Mental health monitoring among university students, especially in demanding disciplines like engineering, is an area of growing importance. This study expands on prior work by incorporating physiological and eye-tracking data into a framework for assessing emotional well-being. By analyzing baseline data, the study uncovers correlations between emotional states and physiological signals—such as the link between fear and physical activity or happiness and electrodermal activity. Temporal trends indicate emotional spikes during evening hours, supporting the need for context-aware mental health interventions. The framework sets the stage for real-time, personalized support systems that promote student wellness and academic performance through non-invasive monitoring [7].

These diverse yet interconnected studies reflect the depth and breadth of contemporary research aimed at harnessing the power of data, algorithms, and interdisciplinary thinking. Whether enhancing system resilience, decoding biological patterns, or supporting mental health, each contribution underscores a collective vision for a smarter, more equitable, and technologically empowered future.

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Editor-in-chief

Prof. Paul Andrew