Editorial

In the ever-evolving landscape of science and technology, this issue brings together a collection of 16 accepted research papers that delve into diverse domains, ranging from robotics and healthcare to machine learning, cyber-physical systems, and environmental sustainability. Each paper represents a significant contribution to its respective field, offering novel methodologies, insights, and solutions to address contemporary challenges. The papers span a spectrum of cutting-edge topics, showcasing the breadth and depth of research endeavors undertaken by scholars and practitioners globally.

In the agricultural sector of Senegal, where climate change, environmental impacts, and traditional methods pose challenges, the paper proposes a smart farming management system named MbaïMi that utilizes IoT technology. MbaïMi aims to improve Senegalese agriculture by providing real-time decision support tools, optimizing seed selection, and helping manage water resources, ultimately contributing to sustainable agriculture, environmental benefits, and food self-sufficiency [1].

Using Oura Rings, paper investigates left and right differences in sleep patterns of two healthy women in their 40s. The study reveals small differences in bed time, sleep time, rem sleep, sleep score, and heart rate. Notably, significant differences in sleep latency, awakening time, and sleep efficiency are observed, providing insights into individual variations in sleep indices and the potential applications of wearable technology in sleep science [2].

Addressing the challenges of traditional resume screening, paper introduces an innovative approach using machine learning (ML) and natural language processing (NLP) techniques. The study implements the RankSVM algorithm to rank resumes based on semantic attributes, outperforming traditional scoring methods. The proposed comparative ranking, relying on semantic descriptions, enhances the accuracy of candidate selection for job requirements, demonstrating the potential for automation in human resource departments [3].

Focused on IoT security, paper enhances the LoRaWAN server framework, strengthening it against cyber threats by migrating from RVC4 to AES encryption. The integration with Grafana's mapping plugin leverages geolocation data, addressing vital aspects of IoT security and geolocation integration. The research contributes to the understanding of LoRaWAN's technological evolution, emphasizing the implications for academic and practical domains in reinforcing IoT and network security [4].

The study introduces an advanced emotion analysis framework that recognizes dominant facial emotions, integrates gesture recognition, and includes text-to-speech recognition. Leveraging pre-trained models like Residual Masking Network and CNN architectures, the multidisciplinary framework achieves promising accuracy rates for Asian and European facial expressions, highlighting its potential for understanding and interpreting different facial expressions in diverse cultural settings [5].

Focusing on urban drainage in South Africa, the paper explores the use of pervious concrete to mitigate challenges related to flash floods. By developing various structural pervious concrete mixes, the research identifies effective combinations that satisfy road and bridge works standards, demonstrating the potential of pervious concrete for urban drainage in South African cities [6].

Addressing network anomaly detection, paper employs a hybrid model combining convolutional neural network and Bidirectional Long-Short Term Memory. The research optimizes the model

through extensive parameter tuning, achieving high accuracy for binary and multiclass datasets. The proposed approach contributes valuable insights into selecting hyperparameters for deep learning techniques, enhancing anomaly detection in network traffic [7].

Investigating the progress of Machine Translation (MT) systems, paper provides a historical perspective on MT's evolution, focusing on its development against the complex background of low-resource languages. The interdisciplinary methodology integrates linguistics, technology, and culture, contributing not only to the understanding of MT's evolutionary history but also supporting the conservation of endangered languages, such as the Wa language in the Myanmar-Wa corpus [8].

Augmented reality is employed for maintenance support and training of a railroad vehicle's air compressor in paper. The study introduces modeling techniques for fast animation and visualization algorithms for fluid flow in air compressors. The developed augmented reality content is evaluated for usability, achieving good system usability and user experience scores, indicating effective application for maintenance support and training [9].

Recognizing the cultural nuances in healthcare, paper introduces a mobile app designed for Native Americans with diabetes. Developed through participatory design principles and direct input from stakeholders, the app features culturally tailored nutrition plans, community-based support systems, and engagement with tribal health resources. The innovative integration of technology and cultural heritage aims to improve engagement, self-efficacy, and health outcomes for Native Americans with diabetes [10].

The paper introduces a smart-agent architecture for effective direct load control, focusing on thermostatically controlled appliances. By employing a mathematical model to forecast aggregated power consumption behavior, the research demonstrates adaptability to changes, self-retraining capability, and continuous improvement in predicting aggregated power consumption, providing insights for demand-side management [11].

The integration of a Diffuse Kalman Filter (DKF) is vital for reliably determining the state of an autonomous vehicle. In three essential parts—Kalman filter, fuzzy control, and simulation of a GPS sensor signal—the research compares the efficiency of DKF against a conventional Kalman filter. The study highlights DKF's superior reliability in position estimation and its potential for optimal trajectory control in autonomous vehicles [12].

Investigating the stability of explainable Artificial Intelligence (XAI) algorithms, paper introduces two intuitive methods for assessing the stability of XAI algorithms. The study develops a taxonomy to categorize evaluation criteria and proposes an objective metric to classify XAI algorithms based on their explanation stability. The research contributes valuable insights into the determinism and stability of XAI methods, addressing challenges in generating consistent explanations [13].

The study explores the feasibility of differentiating between the heart rate patterns of Macaca fascicularis and human infants, evaluating the suitability of Macaca fascicularis heart rate data for privacy safeguarding methodologies. The research verifies the similarity of cynomolgus monkey heart rate data to human heart rate data, suggesting the plausible use of non-human subjects for privacy-related experiments and raising considerations for the ethical use of health-related data [14].

The paper introduces an automated Global System for Mobile Communication Signal Strength and Radio Climatological (GSM-RC) measuring device, integrating sensors for meteorological

parameters and GSM signal strength. The device offers synchronized measurements to reduce errors and demonstrates good correlation in signal strength compared to conventional devices. Field tests validate the device's reliability, making it a valuable tool for simultaneous measurements in diverse locations [15].

Focused on wind turbine simulation, paper presents a mathematical model of a five-phase permanent magnet generator supplying nonlinear load. The research explores the impact of nonlinear loads on generator performance, demonstrating advantages over conventional three-phase systems. The proposed system offers higher nonlinear load voltage and faster response, contributing valuable insights to the field of wind turbine simulation and nonlinear load analysis [16].

As we conclude this exploration into the diverse realms of research and innovation, it becomes evident that each paper contributes to the evolving narrative of technological progress. The findings and methodologies presented in these papers offer valuable insights that not only advance our understanding within specific domains but also collectively contribute to the broader tapestry of human knowledge. In this era of rapid technological evolution, the collaborative efforts of researchers showcased in this collection play a pivotal role in shaping the future landscape of science and technology. The journey continues, and with each new discovery, we move closer to unravelling the mysteries of the universe and enhancing the quality of human life.

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