Editorial

In an era where technology continues to redefine the boundaries of research and innovation, this issue of our journal presents a vibrant collection of interdisciplinary studies that reflect the diversity and dynamism of contemporary scientific inquiry. Spanning fields such as artificial intelligence, environmental monitoring, digital healthcare, education technology, and sustainable development, the 12 papers included in this edition showcase groundbreaking methodologies and practical applications that promise to shape the future of both academia and industry.

There is a critical challenge in aquaculture—the prediction of seawater temperatures with limited training data. By leveraging transfer learning, the authors demonstrate how accurate predictions can be achieved even with small datasets, offering a practical and efficient tool for farmers to mitigate the risk posed by abnormal temperature fluctuations. Their findings hold great promise for sustainable marine farming practices, particularly in data-scarce environments [1].

In the realm of medical imaging, there is an advanced method for the automatic 3D segmentation of brain tumors using optical scanning holography and active contour modeling. This innovative approach not only minimizes human error but also enhances diagnostic precision, making it a valuable asset for computer-aided diagnosis systems in neuro-oncology [2].

The architecture of RetePAIoT, is a public IoT network in the Emilia-Romagna region. By enabling seamless integration and sharing of data from thousands of sensors, the authors propose a robust and scalable system that empowers public administrations and private users alike. The work lays a foundational framework for region-wide IoT deployment with an emphasis on interoperability and data accessibility [3].

Focusing on medical informatics, there is an automated ICD coding system powered by deep learning and enhanced by GPT-4. The hierarchical classification model efficiently addresses the complexity and scale of ICD coding tasks, showing how AI can streamline healthcare documentation and improve clinical workflows with greater speed and accuracy [4].

Switch-mode power supplies a predictive maintenance model for aluminum electrolytic capacitors, incorporating functional data analysis and fuzzy logic. This research contributes significantly to the field of reliability engineering by offering a precise and adaptable approach to monitoring component degradation under variable conditions [5].

The human-robot interaction, proposed a multimodal system that integrates verbal commands with gesture recognition for precise task execution. By combining skeleton tracking and hand gesture detection with natural language processing, the system enables intuitive and efficient communication with robots, enhancing automation in service and industrial contexts [6].

By introducing two novel algorithms—one based on tree search and the other on trie-like graphs—the authors succeed in significantly reducing computational complexity, offering more practical solutions for personalized recommendation systems and customer satisfaction analysis [7].

The effectiveness of the MIMOSYS voice analysis system in detecting depression among Vietnamese speakers. By correlating voice-derived vitality scores with established psychological scales, the research offers compelling evidence for the system's potential in non-invasive mental health monitoring, paving the way for broader linguistic and cultural validation [8].

Addressing safety in domestic environments, there is a smart LPG monitoring system that merges IoT and business intelligence. Through automated data collection and real-time alerts, the model

reduces the risk of gas leaks while demonstrating high user satisfaction. Its practical deployment across mobile and web platforms highlights its accessibility and real-world impact [9].

There is a big data maturity models tailored for SMEs, emphasizing the need for scalable and adaptable frameworks in the digital transformation journey. The study identifies existing gaps and proposes directions for developing new models that align with the resource constraints and operational realities of small and medium-sized enterprises [10].

The energy management landscape of ASEAN countries is analyzed with a focus on regional cooperation, policy frameworks, and sustainability initiatives. The authors identify critical challenges and propose policy recommendations to enhance energy security and support the region's transition toward a low-carbon economy, making it a timely contribution to environmental policy literature [11].

The integration of augmented reality with educational robotics through the ASCAT-AR system. Targeted at STEM education, the study shows that students using AR-assisted learning tools perform better and are more engaged compared to traditional methods. This paper exemplifies how immersive technologies can revolutionize learning experiences and boost student outcomes in engineering and programming education [12].

This edition brings together a multifaceted collection of research that addresses pressing global challenges through technological innovation, analytical rigor, and practical application. Whether it's through the enhancement of healthcare diagnostics, the safeguarding of energy and environmental systems, or the reimagination of education through immersive technology, each paper contributes meaningfully to the advancement of its respective field. We hope these studies will inspire further research, spark interdisciplinary collaboration, and inform evidence-based practices in academia, industry, and policy-making

References:

[1] H. Murakami, T. Miwa, K. Shima, T. Otsuka, "Proposal and Implementation of Seawater Temperature Prediction Model using Transfer Learning Considering Water Depth Differences," Advances in Science, Technology and Engineering Systems Journal, 9(4), 1–6, 2024, doi:10.25046/aj090401.

[2] A. El-Ouarzadi, A. Cherkaoui, A. Essadike, A. Bouzid, "Hybrid Optical Scanning Holography for Automatic Three-Dimensional Reconstruction of Brain Tumors from MRI using Active Contours," Advances in Science, Technology and Engineering Systems Journal, 9(4), 7–13, 2024, doi:10.25046/aj090402.

[3] S. Nanni, M. Carboni, G. Mazzini, "From Sensors to Data: Model and Architecture of an IoT Public Network," Advances in Science, Technology and Engineering Systems Journal, 9(4), 14–20, 2024, doi:10.25046/aj090403.

[4] J. Carberry, H. Xu, "GPT-Enhanced Hierarchical Deep Learning Model for Automated ICD Coding," Advances in Science, Technology and Engineering Systems Journal, 9(4), 21–34, 2024, doi:10.25046/aj090404.

[5] D. Mallamo, M. Azarian, M. Pecht, "Early Detection of SMPS Electromagnetic Interference Failures Using Fuzzy Multi-Task Functional Fusion Prediction," Advances in Science, Technology and Engineering Systems Journal, 9(4), 35–50, 2024, doi:10.25046/aj090405.

[6] S. Kumar Paul, M. Nicolescu, M. Nicolescu, "Integrating Speech and Gesture for Generating Reliable Robotic Task Configuration," Advances in Science, Technology and Engineering Systems Journal, 9(4), 51–59, 2024, doi:10.25046/aj090406.

[7] Y. Chen, B. Chen, "On Mining Most Popular Packages," Advances in Science, Technology and Engineering Systems Journal, 9(4), 60–72, 2024, doi:10.25046/aj090407.

[8] L.T. Vinh Phuc, M. Nakamura, M. Higuchi, S. Tokuno, "Effectiveness of a voice analysis technique in the assessment of depression status of individuals from Ho Chi Minh City, Viet Nam: A cross-sectional study," Advances in Science, Technology and Engineering Systems Journal, 9(4), 73–78, 2024, doi:10.25046/aj090408.

[9] A.R. Espinoza de los Monteros, M.G. Tandazo Espinoza, B.I. Punina Cordova, R.E. Tandazo Vanegas, "IoT and Business Intelligence Based Model Design for Liquefied Petroleum Gas (LPG) Distribution Monitoring," Advances in Science, Technology and Engineering Systems Journal, 9(4), 79–92, 2024, doi:10.25046/aj090409.

[10] D. Salian, S. Brown, R. Sbeit, "Digitalization Review for American SMEs," Advances in Science, Technology and Engineering Systems Journal, 9(4), 93–101, 2024, doi:10.25046/aj090410.

[11] W.Y.L. Yie Leong, Y. Zhi Leong, W. San Leong, "Energy Management Policy and Strategies in ASEAN," Advances in Science, Technology and Engineering Systems Journal, 9(4), 102–109, 2024, doi:10.25046/aj090411.

[12] W. Sawangnamwong, S. Charoenseang, "Assistive System for Collaborative Assembly Task using Augmented Reality," Advances in Science, Technology and Engineering Systems Journal, 9(4), 110–118, 2024, doi:10.25046/aj090412.

Editor-in-chief

Prof. Passerini Kazmersk