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EDITORIAL

INTELLIGENT SYSTEMS AND DATA-DRIVEN INNOVATIONS



The rapid evolution of intelligent computing paradigms and the unprecedented growth of data-driven technologies have fundamentally transformed the way modern scientific, industrial, and societal challenges are addressed. Artificial Intelligence (AI), Machine Learning (ML), Deep Learning (DL), Explainable AI (XAI), Natural Language Processing (NLP), Computer Vision, intelligent communication systems, and data analytics are no longer isolated research domains; rather, they have become indispensable components of next-generation intelligent systems. These technologies continue to reshape healthcare, agriculture, education, finance, communication networks, robotics, cybersecurity, and numerous other application areas, enabling smarter decision-making and fostering sustainable innovation.

Against this backdrop, this Special Issue on **"Intelligent Systems and Data-Driven Innovations"** has been conceived to present recent advances, innovative methodologies, and practical applications that demonstrate the transformative potential of intelligent computational techniques. The objective of this issue is to provide a multidisciplinary platform that brings together researchers, academicians, and industry practitioners working at the intersection of intelligent systems, data science, and emerging digital technologies.

The contributions included in this special issue reflect the diversity and breadth of current research trends. Several articles explore explainable and trustworthy artificial intelligence, emphasizing transparent decision-making frameworks and interpretable machine learning models. A significant portion of the issue focuses on healthcare applications, presenting intelligent diagnostic systems for heart failure, breast cancer, cervical cancer, thyroid cancer, bone cancer, and neurophysiological biomarker prediction. These studies demonstrate how advanced learning algorithms can enhance disease diagnosis, prognosis, and clinical decision support.

Another important theme represented in this issue is the application of artificial intelligence in agriculture. Contributions addressing crop disease identification, fruit disease classification, and automated fruit quality assessment illustrate the growing role of deep learning and computer vision in precision agriculture, promoting sustainable farming practices and improving food quality monitoring.

The issue further encompasses emerging research in education, natural language processing, and human-centric artificial intelligence. Articles on educational analytics, automated pedagogical question generation using large language models, sentiment and emotion analysis, sarcasm detection, and academic document intelligence collectively demonstrate the expanding impact of AI-driven language technologies in improving educational systems and digital communication.

Complementing these themes are contributions in computer vision, robotics, intelligent communication systems, wireless networking, and AI-enabled security. The collection includes studies on real-time face detection, object detection-based robotic systems, predictive beam stabilization for terahertz communications, reinforcement learning-based routing strategies, and comprehensive surveys on AI-integrated image security. Together, these works showcase the interdisciplinary nature of intelligent

systems research and its growing influence across diverse engineering disciplines.

Each manuscript included in this volume has undergone a rigorous peer-review process conducted by experts in the respective domains. The review process was designed to ensure scientific rigor, originality, technical quality, and relevance to the theme of this special issue. We sincerely appreciate the valuable efforts of the reviewers, whose insightful comments and constructive suggestions have significantly contributed to enhancing the quality of the published articles.

We extend our heartfelt gratitude to all authors for choosing this special issue as a platform to disseminate their research contributions. Their enthusiasm, dedication, and commitment to scientific excellence have made this collection both comprehensive and impactful. We also express our sincere appreciation to the Editor-in-Chief, the Editorial Board, and the publishing team of *Science and Culture* for their continuous guidance, encouragement, and unwavering support throughout the planning, review, and publication process.

We hope that this special issue will serve as a valuable resource for researchers, educators, professionals, and students working in intelligent systems, artificial intelligence, machine learning, and data-driven technologies. We believe that the research presented herein will inspire further innovation, encourage interdisciplinary collaboration, and stimulate future investigations addressing the complex technological challenges of our rapidly evolving digital society.

Finally, we trust that this collection will contribute meaningfully to the advancement of intelligent systems research and foster the development of innovative, reliable, and sustainable technological solutions that benefit both academia and industry. ❒

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