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Editorial

Preface

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Editor-in-Chief Editorial

This volume, Volume 2, of Computing & AI Connect (CAIC) includes 21 high-quality, peer-reviewed research that reflect CAIC's commitment to share advances in the theory, design, and application of computing and artificial intelligence–driven systems. Volume 2 articles cover contemporary challenges in intelligent systems, communication networks, security, data analytics, and human-centered technologies. They also contribute to the development of foundational methodologies and interdisciplinary perspectives.

A central focus of this volume is the pervasive role of *artificial intelligence and machine learning as enabling technologies* across diverse application domains. Several contributions investigate the integration of AI into critical infrastructure systems, including power transmission networks and next-generation communication architectures. In particular, the systematic review on AI-based fault detection for smart grids highlights the potential of intelligent analytics to enhance system reliability and operational efficiency. Related studies on AI-assisted 6G communication systems, intelligent reflective surfaces, and mobile edge computing demonstrate the growing reliance on learning-based optimization in high-performance and low-latency networks.

Security and privacy constitute another major thematic area of Volume 2. Articles addressing threats and countermeasures in the Industrial Internet of Things (IIoT), security assurance in 5G network components, and privacy-preserving data management in transportation systems underscore the importance of robust security frameworks in increasingly interconnected and software-defined environments. The inclusion of surveys on quantum-safe networking, post-quantum cryptography, and quantum key distribution further emphasizes the necessity of forward-looking security solutions capable of withstanding emerging computational paradigms.

The application of AI and advanced data analytics to *healthcare and life sciences* is prominently represented. Contributions focusing on deep learning–based prediction of cognitive impairment, AI-enabled facial emotion recognition using thermal imaging, genomics-driven precision oncology, and the development of AI-supported cardio-oncology registries illustrate the translation of computational techniques into clinically relevant solutions. These studies demonstrate how data-driven approaches can support improved diagnostics, personalized treatment strategies, and evidence-based decision making in medical and public health contexts.

Volume 2 also covers advances in *autonomous systems, intelligent perception, and learning-based optimization*. Research on transformer-based reinforcement learning for network function virtualization, multi-modal large language model approaches for autonomous driving under diverse weather conditions, and hybrid deep learning frameworks for topic and sentiment analysis reflects the increasing sophistication of AI systems operating in complex and uncertain environments.

In addition to applied research, the volume presents *theoretical and conceptual contributions* that address fundamental questions related to intelligence, cognition, and ethics. Articles examining fuzzy computational models of human intelligence, ethical and cognitive considerations in AI-driven education systems, and comprehensive classifications of web tracking technologies provide important analytical frameworks that complement technical advances. These works emphasize the need for responsible and transparent development of intelligent systems.

The interdisciplinary scope of the volume is further strengthened by studies *exploring AI and IoT applications in agriculture, social services, and education*. Contributions on intelligent pest detection for precision agriculture, IoT-based home-care models for the elderly, and reinforcement learning approaches for anomaly detection in higher

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education assessment systems illustrate how computational intelligence can be effectively deployed to address domain-specific challenges and societal needs.

Finally, Volume 2 includes work that introduces novel analytical techniques for fragment sequencing based on topological Markov chains and hierarchical block matrix structures. By incorporating stochastic effects, generalized covariance analysis, and NP-hard complexity considerations, the study represents a rigorous contribution to the theoretical foundations of data analysis and modeling.

Overall, Volume 2 exemplifies the journal's mission to disseminate scientifically rigorous, technically sound, and forward-looking research that bridges theory and practice. The editorial board expresses its appreciation to the authors for their high-quality contributions, to the reviewers for their thorough evaluations, and to the readers for their continued support and engagement.

It is anticipated that the research presented in this volume will stimulate further investigation, promote interdisciplinary collaboration, and contribute to the ongoing advancement of computing, artificial intelligence, and intelligent systems research.

Editor-in-Chief
Volume 2

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