SPECIAL ISSUE ON

ADVANCING COMPUTATIONAL INTELLIGENCE IN AUTONOMOUS LEARNING AND OPTIMIZATION SYSTEMS

Aims and Scope

In the realm of artificial intelligence (AI), computational intelligence (CI) stands as a cornerstone, exemplified by powerful technologies such as deep neural networks, evolutionary computation, fuzzy sets and systems, and their hybridizations. Its significance has become increasingly pronounced in the contemporary surge of autonomous and intelligent learning and optimization systems. Over the past decade, this surge has marked one of the most dynamic and rapidly advancing areas within artificial intelligence.

CI has exhibited remarkable achievements across diverse domains, ranging from Autonomous Driving and Game AI to Embodied Intelligence, Intelligent Transportation, Smart Manufacturing, and Evolutionary Robotics. The integration of advanced CI in autonomous learning and optimization systems, such as robots, auto machine learning, and aerospace systems, is crucial for achieving reliability, robustness, and flexibility in various applications.

However, as the operational environments of these complex systems become more intricate, characterized by high levels of uncertainty, dynamic changes, and incomplete observations, the associated learning and optimization tasks grow increasingly challenging. While ongoing research has produced promising outcomes, there are numerous unexplored avenues within this field. Innovative CI techniques are anticipated to provide more potent and efficient tools to enhance the optimization and learning efficiency of autonomous systems across various facets, including system architecture design, modeling, planning, control, and decision-making. These advances are poised to effectively address the escalating complexities of modern operational environments.

This special issue is dedicated to advancing the development of novel and advancing CI techniques towards autonomous learning and optimization system design in real-world applications. These techniques aim to address the growing complexities and interdependencies within autonomous learning and optimization systems, which play an increasingly prominent role in contemporary real-world applications.

Topics

This special issue is targeted on general readership articles about design and application of CI technologies. Topics of interest include, but are not limited to:

- Knowledge learning and transfer in autonomous optimization systems
- Meta-heuristic design in autonomous optimization systems
- Brain-inspired CI techniques in autonomous learning and optimization systems
- Explainable CI techniques in autonomous learning and optimization systems
- Learning to learn/optimization in autonomous learning and optimization systems
- Graph learning in agent-based autonomous systems
- Representation learning in autonomous optimization systems
- Autonomous learning and optimization for efficient large model training
- Theoretical analysis of CI techniques in autonomous learning and optimization systems
- Applications of CI techniques in autonomous learning and optimization systems

Submission

The IEEE Computational Intelligence Magazine (CIM) publishes peer-reviewed high-quality articles. All manuscripts must be submitted electronically in PDF format. Manuscripts must be in standard IEEE two-column/single space format and adhere to a length of 10 pages (including figures and references) for regular papers. A mandatory page charge is imposed on all papers exceeding 10 pages in length.

More information on manuscript details and submission guidelines can be found at the following websites:

- IEEE CIM website: https://cis.ieee.org/publications/ci-magazine/cim-information-for-authors

Important Dates

- Manuscript Due: **July 1, 2024**
- First Notification: Aug 15, 2024
- Revision Due: Sep 30, 2024
- Final Notification: Nov 1, 2024

Guest Editors

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