SPECIAL ISSUE ON

WHEN COMPUTATIONAL INTELLIGENCE MEETS EDGE INTELLIGENCE

Aims and Scope

Recent attempts to combine edge computing and AI, thereby fully unleashing the potential values of big data generated at the edge, have led to the Edge Intelligence (also named Edge AI) paradigm. Edge Intelligence brings together edge computing and AI together to shift intelligence to the edge, relieving the network infrastructure with exponentially increasing network stress. In the process, it also promises end-users context-aware, real-time, and intelligent services at the edge of the network.

In the realm of Edge Intelligence, the journey of implementation is not without its share of challenges. Edge devices, often constrained by limited resources like computation, network and power, are accompanied by a dearth of security measures. The dynamic nature of edge network conditions further complicates matters, while the data residing within these networks carry inherent attributes, such as high volume, velocity, privacy and security sensitivity, contextual dependency, heterogeneity and non-IID distribution.

Within this landscape, Computational Intelligence emerges as a formidable branch of techniques that focuses on crafting a diverse array of computational methodologies and algorithms inspired by intelligent behaviors in nature and biology. Such techniques may equip machines with the capacity to solve intricate problems, by learning from the data and making decisions grounded in discernment among other ways. The realm of Computational Intelligence exhibits great promise and abundant prospects for applications in the domain of Edge Intelligence, where it can serve as both an enabler, bolstering the capabilities of Edge Intelligence services, and a problem-solver, surmounting the obstacles that obstruct the design, development, and deploy of Edge Intelligence techniques.

Edge intelligence and Computational Intelligence are two originally distinct paradigms in the field of artificial intelligence, each with its own set of characteristics and applications. The key difference lies in their deployment and scale: Edge Intelligence prioritizes localized, resource-efficient AI on edge devices, while Computational Intelligence typically relies on more centralized, high-capacity computing environments. This special issue endeavors to bring together scholarly research that illuminates the pathways of synergizing Computational Intelligence with Edge Intelligence for shaping the future of next-generation information technology.

Topics

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

- Machine/deep learning-enabled edge intelligence
- AI model compression, pruning, and efficiency on edge and IoT devices
- Uncertainty-aware edge intelligence in dynamic environments
- Energy, computation, memory and network optimization for edge intelligence applications
- Edge intelligence service deployment, selection and orchestration
- Intelligent security and privacy protection for edge intelligence applications
- Intelligent quality assurance for edge intelligence applications
- Federated learning for edge and IoT devices and applications
- Privacy-aware and energy-aware federated learning
- Advanced scheduling and caching methods for efficient edge intelligence model training and inference

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: **Jan 1, 2024**
- First Notification: Mar 1, 2024
- Revision Due: Mar 29, 2024
- Final Notification: Apr 30, 2024

Guest Editors

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