SPECIAL ISSUE ON

FEDERATED LEARNING FOR FUTURE COMMUNICATION NETWORKS

Aims and Scope

Industry and academia have begun experimenting with future 6G communications systems since 5G networks were deployed worldwide. One of the primary components of 6G communication is bringing computational intelligence to the network. Computational Intelligence will bring robustness, resilience, intelligence, adaptivity, self-configuration, self-organization, and self-healing to future 6G communication networks. Computational intelligence is traditionally divided into three components, i.e., neural networks, fuzzy systems, and evolutionary computation.

In general, 6G will be based on ubiquitous Artificial Intelligence (AI), a component of computational intelligence, to realize data-driven machine learning (ML) solutions distributed across heterogeneous, massively scalable networks. Traditionally, ML requires a central server that collects and processes data, but privacy concerns make this a complex technique to implement at scale due to centralized data collection and processing. Federated learning, a new approach to AI that preserves privacy, is particularly suitable for various communication applications, especially when treated as one of the keys to attaining ubiquitous AI in the 6G networks.

The objective of this special issue is to solicit high-quality papers from leading researchers actively working in the emerging field of federated learning in communication systems to address the fundamental question: federated learning for solving communication problems and optimizing network performance.

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:

- Implementation of federated learning over wireless networks
- Deep neural networks in federated learning
- Federated learning for quality-of-service management
- New federated learning driven architectures for wireless systems

- Federated neural architecture

- Federated learning empowered autonomous robotics and Industry 4.0 applications

- Federated learning for emerging technologies, such as edge computing, caching, age of information, reconfigurable intelligent surface (RIS), intelligent reflecting surface (IRS), and nonorthogonal multiple access (NOMA)

- Federated learning for augmented and virtual reality systems over wireless networks

- Federated learning for multiple access/massive connectivity

- Large-scale optimization in federated learning

- Distributed federated learning for network decision-making, network control, and management

- Federated learning algorithms for intelligent signal processing, including signal detection, channel estimation, and radio map generation

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

Important Dates

- Manuscript Due: **June 1, 2022**

- First Notification: September 1, 2022

- Revision Due: October 1, 2022

- Final Notification: December 1, 2022

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