Cognitive Radio and AI-Enabled Networks Symposium

Co-Chairs

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Scope and Motivation

When cognitive radio meets the emerging artificial intelligence (AI)-enabled networking technologies, it potentially enables disruptive solutions to efficient spectrum utilization and resource allocation in wireless networks. Such a paradigm can not only improve the coexistence and interoperability crossing different wireless communication systems and different active (like radar) and passive (like remote sensing and radio astronomy) sensing systems, but also make the future generation systems autonomous and self-reconfigurable. The ultimate goal of AI-enabled radio and networks is to make the spectrum users self-adaptive, self-managed, and truly cognitive across all ranges of spectrum (few MHz all the way up to mmWave, Optical and THz frequencies). The aim of this symposium is to bring together and disseminate state-of-the-art research contributions that address various aspects of analysis, design, optimization, implementation, standardization, and applications of AI-enabled radio and coexistence technologies. The scope of this symposium includes (but is not limited to) the topics below.

Topics of Interest

The Cognitive Radio and AI-Enabled Networks Symposium seeks original contributions in the following topical areas, plus others that are not explicitly listed but are closely related:

- Challenges and issues in designing AI-enabled radio communications
- Architectures and building blocks of AI-enabled radio and networks
- Spectrum sensing, spectrum sharing, and spectrum learning and prediction
- Interference minimization for passive users, like Radio Astronomy and Remote Sensing
- AI and signal processing techniques for Cognitive Radar
- Spectrum measurements and statistical modeling and learning of spectrum usage
- AI-enabled cognitive medium access control, interference management, resource allocation
- Energy-efficient cognitive radio communications and networking
- Self-configuration, interoperability and co-existence issues
- Waveform design, modulation, and interference aggregation for cognitive radio and AI-enabled networks
- Machine learning techniques for cognitive radio and networks
- Deep learning techniques for cognitive radio and networks

- Reinforcement learning and transfer learning for cognitive radio and networks
- Distributed and federated learning for cognitive radio and networks
- Architecture and implementation of database-based cognitive radio networks
- Distributed adaptation and optimization in cognitive radio and networks
- Handoff and routing protocols for AI-enabled radio and networks
- Economic aspects of spectrum sharing
- Regulatory policies and their interactions with communications and networking
- Privacy and security of cognitive radio and spectrum sharing and management
- Attack modeling, prevention, mitigation, and defense in cognitive radio systems
- Physical-layer security in cognitive radio networks
- Security, robustness and resilience of AI and ML techniques in cognitive radio and networks
- Modeling and performance evaluation for AI-enabled radio and networks
- Quality of service provisioning in AI-enabled radio and networks
- Information-theoretic aspects of spectrum sharing
- Coexistence of satellite communication with passive users
- Wideband spectrum sensing and compressive sensing techniques
- Reconfigurable intelligent surfaces for better spectrum utilization
- Spectrum sensing, learning, sharing, and access for millimeter-wave (mmWave) and Terahertz systems
- Applications and services (e.g., cognitive networking in TV whitespace, adaptation with LTE networks such as LTE unlicensed, and integration with other emerging techniques such as massive MIMO, NOMA, intelligent reflecting surface, and full-duplex)
- Cognitive radio and AI-enabled network standards, testbeds, simulation tools, and hardware prototypes
- Cognitive radio and AI techniques for spectrum coexistence of active and passive systems
- Cognitive radio and AI techniques for Advanced Aerial Mobility (e.g., UAV/UAS networks)
- Cognitive radio and AI techniques for space and satellite communications
- Cognitive radio and AI techniques for 5G and Beyond 5G (B5G) systems
- Blockchain and distributed ledger technology for Cognitive radio and AI enabled networks

Biographies of the Co-Chairs

Yu Cheng is a professor at the Department of Electrical and Computer Engineering, Illinois Institute of Technology, USA. His research interests include wireless network performance analysis, network security, machine learning, and age of information. He is an IEEE Fellow.

Zehui Xiong is with Singapore University of Technology and Design. He has won many prestigious career/paper awards, and served as the editor for many leading journals in the areas of Internet of Things, wireless networks, edge computing and intelligence. He is a Clarivate Highly Cited Researcher.

How to Submit a Paper

All papers for technical symposia should be submitted via EDAS. Full instructions on how to submit papers and important deadlines are posted at https://icc2025.ieee-icc.org/

The authors of selected papers from this symposium will be invited to submit an extended version of their work for fast-track review and possible publication in the IEEE Open Journal of the Communications Society.