Workshop on Applications of Artificial Intelligence in Next-Generations Wireless Communications

The fifth generation (5G) wireless communications, which is currently being rolled out, features innovative technologies such as infrastructure densification, antenna densification, use of frequency bands in the mmWave range, which promise to achieve the targets of 1000x higher data-rates and 2000x higher bit-per-Joule energy efficiency compared to the previous wireless generation. Achieving these goals is a significant challenge, and existing approaches using traditional design methodologies are starting to show some of their limits. 5G and beyond networks will require robust intelligent algorithms to adapt network protocols and resource management for different services in different scenarios.

Artificial intelligence (AI), which broadly refers to the ability of machines to mimic the process of human intelligence, is emerging as a key enabler for future 5G and beyond wireless networks. These AI approaches including Machine Learning (ML), Deep Learning (DL) and Deep Reinforcement Learning (DRL) approaches are gradually being applied to the design of wireless communication systems for various purposes from the physical layer waveform to radio resource management to the network core to the applications that make use of the network.

This workshop focuses on the state-of-the-art research of AI techniques and their applications in 5G and beyond wireless communications systems and networks. Suggested topics of interest include but are not limited to the following:

- Machine-learning and pattern recognition based algorithms for wireless communication technologies.
- Applications of AI for optimizing wireless communication systems, including channel modeling, channel estimation, channel prediction, beamforming, modulation and coding schemes, code book design, and linear and non-linear signal processing.
- AI Aided resource allocation and resource management, including spectrum resources, energy sources, cloud resources and computing resources.
- Application of AI for 5G enabling technologies, including non-orthogonal multiple access (NOMA), massive multiple-input multiple-output (MIMO), millimeter wave (mmWave).
- Applications of transfer learning in wireless communication.
- Applications of ML for Network Slicing Optimization.
- Application of ML for security, detection, and integrated networking, caching and computing.
- Applications of AI based technologies for signal classification.
- Applications of ML for ultra-reliable and low latency communications (URLLC), internet of things (IoT) and massive connectivity.
- Applications of DL for transceiver design and channel decoding.

- Design of DL, DRL, and convolutional neural network approaches for wireless system applications and services.
- Applications of ML for joint communication, control, and security & privacy.

IMPORTANT DATES
Paper Submission Deadline: June 30 2021
Notification of Acceptance: July 30 2021
Camera-ready Papers: August 10 2021

EDITOR
Telex M. N. Ngatched
Memorial University of Newfoundland
Canada