

## **Machine Learning for the Wireless Networks of the Next Decade**

Our society is undergoing a digitization revolution, with a dramatic increase of both Internet users and connected devices. The fifth generation of wireless communication networks will be rolled out shortly, featuring innovative and performing transmission technologies. However, the global IP traffic will continue increasing at an exponential rate between 2020 and 2030, eventually reaching levels that were not envisioned before. In addition, the wireless networks of the next decade will have to provide extremely heterogeneous vertical services (e.g. massive IoT, enhanced mobile broadband, vehicular-to-everything communications, ultra-reliable low-latency communications), which pose very diverse requirements in terms of throughput, latency, energy consumption, etc.

In such a complex scenario, present approaches to network design are not adequate as they entail an unaffordable computational complexity and/or feedback overhead. To address this challenge, a paradigm shift is required towards artificial-intelligence-enabled wireless networks, that can self-manage and self-configure. An emerging technology in wireless communications with the potential of enabling such a paradigm shift is machine learning, in particular through deep learning and artificial neural networks (ANN), thanks to its ability to learn how to execute tasks directly from data, without the need to be explicitly programmed.

Motivated by this background, this special session solicits contributions in line with, but not necessarily limited to, the following topics.

- Machine learning for end-to-end wireless communication system design.
- Machine learning for resource management in wireless communications.
- Machine learning in complex network setups.
- Machine learning for distributed designs and federated learning.
- Machine learning for channel acquisition.
- Machine learning for fingerprinting and positioning.

### **Organizers:**

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