6G on the Horizon: Machine Learning-Driven Radio Access Slicing in B5G Networks

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ABSTRACT

The evolution of future networks beyond 5G (B5G) and 6G is expected to rely heavily on network slicing to meet the diverse requirements of applications in public and private B5G networks. Radio access network (RAN) slicing plays a critical role in achieving end-to-end network slicing, especially for ultra-reliable low-latency communications (URLLC) required by applications such as autonomous vehicles or augmented reality in public networks and emergency management systems and controlled air mobility facilitated by private B5G networks. However, slicing the RAN poses challenges due to its dynamic nature and the stringent requirements of URLLC services. Artificial intelligence (AI) and machine learning (ML) techniques, including deep reinforcement learning (DRL) algorithms, offer interesting solutions for efficient network resource management. In this talk, we will provide an overview of some promising directions for using AI for RAN slicing in an open radio access network, as well as an exploration of current challenges and open questions.

BIO

Prof. Soumaya Cherkaoui is a Full Professor at the Department of Computer and Software Engineering at Polytechnique Montréal, Canada. Her research interests are in wireless networks. Particularly, she works on Machine learning-empowered next-generation networks (B5G/6G), distributed edge intelligence, and communication networks for verticals such as connected and autonomous vehicles, IoT, and Industrial IoT. She leads a research group that conducts research funded both by the government and industry. Before joining academia as a professor in 1999, she worked for the industry as a project leader on projects targeted at the Aerospace Industry. Cherkaoui has held invited positions at leading institutions, including the University of California at Berkeley. Bell Laboratories, Monash University, and the University of Toronto, as well as an adjunct position at Lulea University in Sweden. Pr. Cherkaoui avails of a long research experience in wireless networking. Her work resulted in technology transfer to companies and to patented technology. She has delivered several keynote addresses and invited talks in the area. Pr. Cherkaoui has published over 200 research papers in reputed journals and conferences. She has been a guest editor and a member of the editorial board of several IEEE, Wiley, and Elsevier Journals, including IEEE JSAC, IEEE Network, IEEE Systems, and Computer Networks. Her work was awarded with recognitions and best paper awards, including the best paper award at the IEEE Communications Society Flagship Conference IEEE ICC in 2017. She has chaired prestigious conferences such as IEEE LCN 2019 and has served as a symposium co-chair for flagship conferences, including IEEE ICC 2018, IEEE Globecom 2018, IEEE Globecom 2015, IEEE ICC 2014, and IEEE PIMRC 2011. She was also Chair of the IEEE Communications Society Technical Committee on IoT-Ad hoc and Sensor Networks in 2020-2021. She is a Professional Engineer and an IEEE Communications Society Distinguished Lecturer.