Artificial Intelligence in Wireless Signal Processing from Compressive Sensing to Machine Learning

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The Hong Kong Polytechnic University

Abstract
The presentation aims to discuss the sparse signal processing in wireless communications, with particular focus on the most recent developments on compressive sensing, embedded Artificial Intelligent (AI) and Machine Learning (ML) enabled approaches from theory to practice. With sparsity property, sub-Nyquist sampling can be achieved by adopting compressive sensing. Moreover, ML has rebooted intelligent signal processing in wireless communications, such as signal detection and channel estimation. This talk starts from a brief introduction and general framework of sparse signal processing in wireless communications. The second part presents a framework for compressive spectrum sensing, which guarantees noise robustness, low-complexity, and security. Moreover, the real-world signals and data collected by the in-field tests carried out during the TV white space and millimetre-wave pilot trial will be presented to verify the algorithm designs and provide significant insights on the potential of bringing compressive spectrum sensing from theory to practice through an embedded AI approach. Finally, the presentation shows the examples of machine learning in sparse signal processing and AI-enabled cognitive radio framework.

About the Speaker
Yue Gao received the Ph.D. degree from the Queen Mary University of London (QMUL), U.K., in 2007. He was a Research Assistant, a Lecturer (Assistant Professor), and a Senior Lecturer (Associate Professor) with QMUL. He is currently a Reader in Antennas and Signal Processing, and the Director of the Whitespace Machine Communication Lab, School of Electronic Engineering and Computer Science, QMUL. He is leading a team developing fundamental research into practice in the interdisciplinary area on embedded artificial intelligence among smart antennas, signal processing, spectrum sharing, millimetre-wave and Internet of Things systems. He has published over 170 peer-reviewed journal and conference papers, 2 patents, 1 book and 5 book chapters. He is an Engineering and Physical Sciences Research Council Fellow from 2018 to 2023. He was a co-recipient of the EU Horizon Prize Award on Collaborative Spectrum Sharing in 2016, and the Research Performance Award from the Faculty of Science and Engineering at QMUL in 2017. He served as the Signal Processing for Communications Symposium Co-Chair for IEEE ICC 2016, the Publicity Co-Chair for the IEEE GLOBECOM 2016, the Cognitive Radio Symposium Co-Chair for the IEEE GLOBECOM 2017, and the General Chair of the IEEE WoWMoM and iWEM 2017. He is the Chair of the IEEE Technical Committee on Cognitive Networks and the IEEE Distinguished Lecturer of the Vehicular Technology Society. He is an Editor for the IEEE Transactions on Vehicular Technology, the IEEE Wireless Communications Letters, and China Communications.

ALL are welcome!
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