IEEE Distinguished Lecture Series

Location: National Chiao Tung University Engineering Building 4 ED816 (Arcadyan Creative Space)

Time: 9:50am-11:50am, Aug 22, 2018 (Wed)

Industrial Internet of Things (IIoT): An Integrated Design of Secure Communications, Caching, Computing, and Control(SC^4)

Speaker: Dr. Sumei SUN

Institute for Infocomm Research (I2R), Singapore

Abstract:

Industrial internet of things (IIoT), by providing connectivity to machines, robots, and sensors, etc, enables data intelligence-assisted information technology (IT) and operation technology (OT) convergence. In IIoT, multi-disciplinary research on communications, caching, computing, control, and security (SC4), is needed, with built-in autonomous learning and adaptation capabilities.

In this talk, we will start with a brief introduction to IIoT, and then share the IIoT research and design challenges. A design approach will then be proposed to overcome these challenges, under the theme of cognitive IIoT in which the device and the network will build up learning capabilities for context-aware resource, interference, and mobility management, automated fault detection and recovery, and robust connectivity; multi-modal security detection capability is incorporated into the device and network for real-time anomaly and security detection and management. The interactive and cooperative edge-cloud analytics will also be introduced to enable low-latency real-time actionable insight and robust feature engineering. Finally, the 5G's role, especially the 5G machine-type communications (MTC), from both the massive MTC aspect, and the ultra-reliable low latency communications (uRLLC) aspect, will be discussed.

Wireless Device-to-Device Communications and Networks

Speaker: Prof. Zhu Han

ECE Department and CS Department,

University of Houston, USA

Abstract:

Mobile data traffic, especially mobile video traffic, has dramatically increased in recent years with the emergence of smart phones, tablets, and various new applications. It is hence crucial to increase network capacity to accommodate these bandwidth consuming applications and services. D2D communication, which has been listed in 3GPP as a study item, is a promising concept to improve user experiences and resource utilization in cellular networks, both for licensed and unlicensed spectrum. However, design, analysis, and optimization of D2D communications & networking require multidisciplinary knowledge, such as wireless communication and networking, signal processing, artificial intelligence (e.g., for learning), decision theory, optimization, and economic theory. Therefore, this tutorial, containing the basic concepts/theories for addressing research advances that enable D2D communications in cellular networks, the state-of-the-art of research and development and the related information, will be useful in designing D2D-based wireless communications systems and services.

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