学 术 报 告

ACADEMIC LECTURE

Topic： Agile and Efficient Spectrum Access: Quickest Sensing, Random Gossiping and Knowledge Dissemination

Time： 2014年07月15日（周二）上午10:00-11:30

Venue： 信电大楼-215学术会议室

Speaker： Husheng Li, Associate Professor,
EECS Department,
the University of Tennessee, USA

Biography

Husheng Li received the BS and MS degrees in electronic engineering from Tsinghua University, Beijing, China, in 1998 and 2000, respectively, and the Ph.D. degree in electrical engineering from Princeton University, Princeton, NJ, in 2005. From 2005 to 2007, he worked as a senior engineer at Qualcomm Inc., San Diego, CA. In 2007, he joined the EECS department of the University of Tennessee, Knoxville, TN, as an assistant professor. He is promoted to tenured associate professor in 2013. He is also an International Scholar of Kyung Hee University, South Korea. His research is mainly focused on wireless communications and networking, statistical signal processing, cyber physical systems and smart grid. Dr. Li is the recipient of the Best Paper Award of the EURASIP Journal of Wireless Communications and Networks, 2005, the best demo award of Globecom 2010 and the Best Paper Awards of ICC 2011 and SmartGridComm 2012.

Abstract

Opportunistic spectrum access (OSA), in particular cognitive radio, is a new paradigm for addressing the scarcity of available frequency spectrum. Spectrum sensing is a key component of OSA, which provides the functionality of quickly searching for available wireless channels. In this talk, we will discuss a family of novel approaches in spectrum sensing, ranging from single-user-single-channel case to multi-user-multi-channel case. First, we apply the framework of quickest detection to spectrum sensing in order to reduce the detection delay while keep a reasonable false alarm rate. In order to improve the robustness, two quickest sensing algorithms are proposed, which waive of any necessity of prior information about signal and noise. Then, these prior-knowledge-free algorithms will be integrated with algorithms utilizing signal features. Second, we consider multiple collaborative users using random censored gossiping for quickest spectrum sensing. The broadcast probability, as a function of local likelihood ratio, is optimized using variational analysis. Finally, we study the case of multiple users and multiple channels, where each user recommends its favorite channels to neighbors in order to improve the spectrum access efficiency. The frameworks of interacting particles and epidemic propagation dynamics are applied to analyze the ergodicity and transience of the knowledge dissemination procedure. The works in the talk are supported or motivated by NSF projects CCF-0830451 and CNS-1247834.