TEXAS A&M UNIVERSITY at QATAR

ELECTRICAL AND COMPUTER ENGINEERING PROGRAM

THE ELECTRICAL & COMPUTER ENGINEERING PROGRAM PRESENTS

Cognitive Radios for Spectrum Scarcity

Dr. Hazem Refai, Associate Professor, The University of Oklahoma - Tulsa

Sunday, April 11
12 – 1 p.m. light lunch will be served
Lecture Hall 238/ 2nd floor

Used collectively, cognitive radios and networks could provide a solution to spectrum scarcity. Secondary users could utilize inactive spectrum licensed by primary users, thus promoting spectrum sharing and increasing spectrum exploitation. The forthcoming IEEE 802.22 air interface standard offers the use of TV spectrum white spaces for wireless service in regional area networks and is the first designed to use cognitive radios. To successfully implement such cognitive wireless networks, radio designs must incorporate mechanisms to perform spectrum sensing, channel coordination, and software and hardware switching techniques. The accuracy, speed, scalability, and computational complexity are essential parameters to the design of any spectrum sensing algorithm. This seminar demonstrates the design and implementation of a cognitive radio based on a DSP/FPGA small form factor software radio platform, as well as the application of a compressive sensing algorithm, namely Fast Fourier Sampling, for use in detecting IEEE 802.22 air interface compliant signals.

Dr. Hazem Refai received his MS and PhD degrees from The University of Oklahoma in 1993 and 1999, respectively. Since fall of 2007, Dr. Refai has been an Associate Professor in the School of Electrical and Computer Engineering. He is the founder and director of the Wireless and Electromagnetic Compliance and Design Center (WECAD) on the OU Tulsa campus. Fourteen PhD and two MS students work in the Center under his direct supervision on various research projects that have focused on a myriad of subjects, including optical/RF wireless communication, disaster area wireless networks, vehicle tovehicle communication, auto collision avoidance systems, as well as technology system development in the area of transportation. He has published in excess of 100 peer reviewed journals and conference proceedings. He currently serves on the editorial board for the Journal of Information & Knowledge Management (JIKM).

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