

## Security and Secondary User Access Control in Cognitive Radio Networks

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### Abstract:

Cognitive radio technologies have been developed to improve the radio spectrum utilization. In cognitive radio networks, a spectrum band becomes available when primary users are not active in that band and secondary users are able to utilize the spectrum band or channel after performing spectrum sensing. Therefore, spectrum sensing is a critical step or task in cognitive radio networks. It is known that, with appropriate spectrum sensing algorithms, secondary users are able to effectively utilize spectrum white space in cognitive radio networks. However, due to the open and dynamic nature of cognitive radio networks, there can be significant security vulnerabilities (e.g., primary user emulation attack, most active band attack, and spectrum sensing data falsification attack). In this presentation, we focus on the issue of authorized secondary users versus unauthorized secondary users in spectrum access. It is desirable for a spectrum owner or spectrum manager to perform secondary user access control (SUAC), in which authorized secondary users are permitted to utilize the spectrum white space while unauthorized secondary users are not allowed to use the spectrum. SUAC can also be utilized when implementing resource management for spectrum pricing, priority control, etc. This presentation covers the following topics, cognitive radio, cognitive radio security, secondary user access control, machine learning, and deep learning.

### Speaker Bio:

Yu-Dong Yao received the B.Eng. and M.Eng. degrees from the Nanjing University of Posts and Telecommunications, Nanjing, in 1982 and 1985, respectively, and the Ph.D. degree from Southeast University, Nanjing, in 1988, all in electrical engineering. He was a visiting student with Carleton University, Ottawa, Canada, from 1987 to 1988. He has been with Stevens Institute of Technology, Hoboken, NJ, USA, since 2000, where he is currently a Professor and the Department Chair of Electrical and Computer Engineering and also the Director of Stevens' Wireless Information Systems Engineering Laboratory. From 1989 to 2000, he was with Carleton University, Spar Aerospace Ltd., Montreal, and Qualcomm Inc., San Diego. He has been active in the nonprofit organization WOCC, Inc., which promotes wireless and optical communications research and technical exchange. He served as the WOCC President from 2008 to 2010 and the Chairman of the Board of Trustees from 2010 to 2012. He holds one Chinese patent and 13 U.S. patents. His current research interests include wireless communications and networking, cognitive radio, machine learning, Internet of things for healthcare applications. Dr. Yao was an Associate Editor of the IEEE Communications Letters and IEEE Transactions on Vehicular Technology and an Editor of the IEEE Transactions on Wireless Communications. Dr. Yao is a Fellow of IEEE (2011), National Academy of Inventors (2015), and Canadian Academy of Engineering (2017).