



IEEE Vehicular Technology Chapter Presentation

Double Sense Multiple Access for Wireless Ad Hoc Networks

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Abstract: In wireless ad hoc networks, it is a challenging problem to design an efficient random access protocol that can completely avoid the interference from the hidden terminals, which are defined as the terminals out of the radio coverage area of the transmitter but within that of the receiver. The dual busy tone multiple access (DBTMA) protocol, proposed by Haas and Deng, uses two out-of-band busy tone (BT) signals to clear other packet transmissions within the radio coverage area of the intended transmitter-receiver pair. As an extension of DBTMA, we present a double sense multiple access (DSMA) protocol for solving the hidden-terminal problem in wireless ad hoc networks. DSMA uses the “double sense” mechanism and two time-slotted channels, i.e. control and data, to completely avoid the data packet collisions. Compared with DBTMA, our DSMA protocol reduces the transmission delay and is more efficient in channel utilization and power consumption. For a realistic non-fully-connected network scenario, the throughput performance of DSMA is derived mathematically and verified by computer simulation. The tradeoff relationship between throughput and other parameters is also discussed.

Yang Yang received the BEng and MEng degrees in Radio Engineering from Southeast University, Nanjing, China, in 1996 and 1999, respectively; and the PhD degree in Information Engineering from The Chinese University of Hong Kong in 2002. He is currently a Lecturer in the Department of Electronic and Electrical Engineering at University College London (UCL), United Kingdom. Prior to that, he served the Department of Information Engineering at The Chinese University of Hong Kong as an Assistant Professor from Aug. 2002 to Aug. 2003, and the Department of Electronic and Computer Engineering at Brunel University, United Kingdom, as a Lecturer from Sept. 2003 to Feb. 2005. His general research interests include mobile ad hoc networks, wireless sensor networks, third generation (3G) mobile communication systems and beyond, dynamic radio resource management (RRM) for integrated services, cross-layer performance evaluation and optimization, and medium access control (MAC) protocols.

Invited by W. Zhuang