Electrical Engineering Colloquium

Dallas Chapter of IEEE Signal Processing Society Presents

Voice and Video over Wireless Networks

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Wireless networks are rapidly becoming part of our networking infrastructure, and although these networks have been designed primarily with data in mind, it is clear that they will be required to support the reliable transport of voice and video traffic as well. While considerable work has been performed to accommodate voice and video in these networks, there are several important issues that are not widely recognized or considered in the design and analyses of these networks to support voice and video. We investigate the transmission of G.711 and G.729 voice traffic and H.264/AVC video traffic over IEEE 802.11a wireless local area networks (WLANs) for a realistic fading channel model. We calculate the maximum voice capacity of an IEEE 802.11a WLAN and illustrate the tradeoffs when considering transmitted bit rate, channel conditions, throughput, payload size, retransmissions, packet loss rate, and delivered voice quality. For our performance indicator, we define MOSx, which is the mean opinion score achieved for x% of the voice calls. We also investigate the interactions of H.264/AVC codec parameters and the video source for video communications over fading wireless links. We introduce a new performance indicator, PSNRr,f, which is the PSNR achieved by f% of the frames in each of r% of the realizations, and show that it captures the performance experienced by users per channel use better than average PSNR.

Jerry D. Gibson is Professor of Electrical and Computer Engineering at the University of California, Santa Barbara. He is the author, co-author, and editor of several books and handbooks, including *Principles of Digital and Analog Communications* (Prentice-Hall, second ed., 1993) and *Digital Compression for Multimedia* (Morgan-Kaufmann, 1998). He was Associate Editor for Speech Processing for the *IEEE Transactions on Communications* from 1981 to 1985 and Associate Editor for Communications for the *IEEE Transactions on Information Theory* from 1988-1991. He was President of the IEEE Information Theory Society in 1996, and he is an elected Member-at-Large on the IEEE Communications Society Board of Governors for 2005-2007. Dr. Gibson is a Fellow of the IEEE and a past recipient of The Fredrick Emmons Terman Award from ASEE. He was co-recipient of the 1993 IEEE Signal Processing Society Senior Paper Award for the Speech Processing area, and he is an IEEE Communications Society Distinguished Lecturer for 2007-2008.

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