



THE CHINESE UNIVERSITY OF HONG KONG

Department of Information Engineering

Seminar

Application-Aware Network Coding

by

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Venue : Room 833, Ho Sin Hang Engineering Building
The Chinese University of Hong Kong

Abstract

In this work, we explore the interaction and joint optimization of network coding at the lower layer and applications (such as video and TCP traffic) at the higher layers.

First, we study video streaming over coded wireless networks. Our key insight is that, when video streams are transmitted over coded networks, the content of packets matters. Network codes should be selected so as to maximize not only the network throughput but also the video quality. We propose video-aware opportunistic network coding schemes that take into account both the decodability of coded packets by several receivers, and the distortion values and deadlines of the original video packets. Simulation results demonstrate that our schemes significantly improve both video quality and throughput.

Second, we study the interaction between congestion control and network coding. Standard TCP protocols are known to not fully exploit network coding opportunities due to the bursty behavior of TCP. We formulate congestion control over coded wireless networks as a network utility maximization problem, and we find a distributed solution. Inspired by the structure of the optimal solution, we design a network coding-aware queue management (NCAQM) scheme and we demonstrate that it significantly improves TCP performance.

Biography

Hulya Seferoglu received the B.S. degree in Electrical Engineering from Istanbul University, Turkey, in 2003 and M.S degree in EECS from Sabanci University, Turkey in 2005. She is currently working towards the Ph.D degree at the University of California, Irvine. She had summer internships at Microsoft Research, Cambridge and Docomo USA Labs in 2007 and 2008, respectively. Her research interests include network coding, congestion control, and multimedia streaming.

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