Integrated Access Control and Detection
for QoS in Multimedia CDMA Networks
by Cristina Comaniciu, Princeton University

Date: May 8, 2002 (Wednesday)
Time: 11:30 am (refreshment starts at 11:15 am)
Place: 202 ECEC, NJIT

About the Speaker

Cristina Comaniciu received the M.S. degree in electronics from the Polytechnic University of Bucharest in 1993, and the Ph.D. degree in electrical and computer engineering from Rutgers University in December 2001. From 1998 to 2001 she was with the Wireless Information Network Laboratory (WINLAB) at Rutgers University, working on integrated access control and detection algorithms for multimedia CDMA systems. She is currently a postdoctoral fellow in the Electrical Engineering Department at Princeton University. Her research interests include radio resource management, admission control for multimedia wireless systems, multiuser detection, cross layer design for multimedia wireless networks, and modeling and performance analysis for wireless systems.

About the Talk

With the ever-increasing demand for wireless systems to support multimedia applications, resource management techniques become crucial to guarantee QoS. In this talk, we consider the problem of integrating access control and receiver design for a CDMA system in which bursty real-time and non real-time traffic coexist. We first investigate integrated voice/data CDMA systems using conventional receivers, and propose access control protocols that are based on estimating the residual capacity available for data users, using a simple, adaptive prediction technique based on delta modulation. We then discuss how this design can be applied for web traffic access in multimedia CDMA systems. The challenge is that the web traffic is highly bursty, hence, the offered load per connection is difficult to estimate. As a solution, we propose a www traffic admission control that adaptively estimates the aggregate average load based on load measurements in a sliding observation window. Finally, we consider the benefits of integrating access control with multiuser detection. We propose an access control scheme that gives priority to real-time users. Non real-time traffic is scheduled for transmission such that all users can achieve their target SIRs by choosing appropriate transmit powers, as well as receiver filter coefficients. We show that significant gains can be achieved by integrating access control and multiuser detection and discuss tradeoffs between the implementation complexity and system performance.

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