Seminar Announcement

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Sampling and Inference Problems in Constrained Wireless Sensor Networks

May 20, 2005, 2:00 p.m. – 3:00 p.m.
Room 369 Link Hall

Abstract

The talk outlines interesting applications of large-deviation theory and asymptotic analysis to the design of wireless sensor networks. Sensor networks are envisioned to contain a large number of wireless nodes. As such, asymptotic regimes where the number of nodes becomes large are important tools in identifying good design rules for future sensor systems. Through examples, we show how the method of types, Stein's lemma, Cramer's theorem, and the Gartner-Ellis theorem can be used to study the impact of node density on overall performance in resource constrained systems. Specifically, we consider the problem where sensor nodes receive partial information about their environment, and then send a summary of their observations to a fusion center for purpose of detection. Each node transmits its own data on a communication channel. It is found that high node density performs well even when observations from adjacent sensors are highly correlated. Furthermore, the tools reviewed in this presentation can be employed for a more complete analysis of the tradeoff between resource allocation, system complexity, and overall performance in wireless sensor networks.

Biography

Jean-Francois Chamberland is an assistant professor in the Department of Electrical Engineering at Texas A&M University. He received the B.Eng. degree from McGill University, Montreal, Canada, in 1998; and the M.S. degree from Cornell University, Ithaca, NY, in 2000. He completed the Ph.D. degree at the University of Illinois at Urbana-Champaign in Electrical Engineering in 2004. His research interests are in the areas of communication and control theory. Recently, he has been studying the efficient design of wireless sensor networks in the context of decentralized detection.