



THE CHINESE UNIVERSITY OF HONG KONG
 Department of Information Engineering
Seminar

Estimation and Communication: Observation Driven Sensor Scheduling
 By

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Time : 14:00pm – 15:00pm
Venue : Room 1009, William M.W. Mong Engineering Building
The Chinese University of Hong Kong

Abstract

The modern instantiation of a sensor network is a cyberphysical (CPS) system where often CPS subsystems are interconnected by a shared communication network of limited bandwidth. A common problem in CPS networks is the sensing and communication of spatio-temporal signals. However, there are fundamental differences between estimation (sensing) and communication. For example, the type of signal one would design to optimize sensing is very different from that for optimized communication. In this talk, we explore some of these differences and discuss how joint communication and sensing should occur in different problem settings. In particular, we examine problems where multiple sensors make observations and must share the communication medium to transmit these signals to a fusion center that will endeavor to perform remote estimation all of the sensed signals. A new class of remote estimation problems, where the communication resources are allocated dynamically based on the observations at the sensors, rather than purely on their statistical description are examined. We address the optimal design of a collision avoidance policy by selecting the most informative sensor to transmit at a time. First, we will establish person-by-person optimal policies for the scheduling of sensors making Gaussian observations. Then, we will show how our theoretical results can be applied to design scheduling policies where the joint probability density of the observations is unknown. Finally, we will extend our results to the case when the scheduler uses an energy harvesting battery.

Biography

Urbashi Mitra received the B.S. and the M.S. degrees from the University of California at Berkeley and her Ph.D. from Princeton University. Dr. Mitra is currently the Gordon S. Marshall Professor in Engineering at the University of Southern California with appointments in Electrical Engineering and Computer Science. She is the inaugural Editor-in-Chief for the IEEE Transactions on Molecular, Biological and Multi-scale Communications. She has been a member of the IEEE Information Theory Society's Board of Governors (2002-2007, 2012-2017), the IEEE Signal Processing Society's Technical Committee on Signal Processing for Communications and Networks (2012-2016), the IEEE Signal Processing Society's Awards Board (2017-2018), and the Vice Chair of the IEEE Communications Society, Communication Theory Working Group (2017-2018). Dr. Mitra is a Fellow of the IEEE. She is the recipient of: the 2017 IEEE Women in Communications Engineering Technical Achievement Award, a 2015 UK Royal Academy of Engineering Distinguished Visiting Professorship, a 2015 US Fulbright Scholar Award, a 2015-2016 UK Leverhulme Trust Visiting Professorship, IEEE Communications Society Distinguished Lecturer, 2012 Globecom Signal Processing for Communications Symposium Best Paper Award, 2012 US National Academy of Engineering Lillian Gilbreth Lectureship, the 2009 DCOSS Applications & Systems Best Paper Award, Texas Instruments Visiting Professorship (Fall 2002, Rice University), 2001 Okawa Foundation Award, 2000 Ohio State University's College of Engineering Lumley Award for Research, 1997 Ohio State University's College of Engineering MacQuigg Award for Teaching, and a 1996 National Science Foundation CAREER Award. She has been an Associate Editor for the following IEEE publications: Transactions on Signal Processing, Transactions on Information Theory, Journal of Oceanic Engineering, and Transactions on Communications. Dr. Mitra has held visiting appointments at: King's College, London, Imperial College, the Delft University of Technology, Stanford University, Rice University, and the Eurecom Institute. Her research interests are in: wireless communications, communication and sensor networks, biological communication systems, detection and estimation and the interface of communication, sensing and control.

**** ALL ARE WELCOME ****

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