Seminar Series

Wireless Collaborative Computing & Networking: From Cyber Physical Systems to Key Enabling Technologies

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Abstract

Our world is evolving into a smart planet, including smart building, intelligent manufacturing, smart transportation, to name a few. The essence in this evolution is the marriage of cyber and physical systems (or CPS). In short, CPS is a system of collaborating computational elements that makes physical entities behave intelligently. The underlying technology of CPS is a synergy of control, sensing, communications, networking, computation, among others. In this talk, I will focus on complex networking problems that arise from CPS, particular those new problems involving complicated mathematical models. Many of the existing models, although successful to address problems for a small network, are hardly useful to study problems in a complex network environment involving a large number of nodes. In these cases, new tractable models and algorithms are needed for networking research. I will describe our research efforts in developing simple and tractable models for complex network systems. I will also describe our efforts on applying these models to cross-layer optimizations that involve network, link, and physical layers. Many of these new networking problems are extremely challenging and call for interdisciplinary expertise from a number of technical domains.

Biography of Speaker

Tom Hou is a Professor and IEEE Fellow in the Bradley Department of Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA. He received his Ph.D. degree from NYU Polytechnic School of Engineering (formerly Polytechnic Univ.). His research interests include distributed network algorithms and protocols, Internet content distribution and quality-of-service, and complex networking problems for cyber physical systems. His current research focuses on developing innovative solutions to complex cross-layer optimization problems in wireless and mobile networks.

Prof. Hou has been PI/Co-PI of over $13.7M externally funded research projects, with a personal share over $5M. He was a recipient of an ONR Young Investigator Award (2003) and an NSF CAREER Award (2004). He has published extensively in IEEE/ACM journals and conferences and received five best paper awards from IEEE (including IEEE INFOCOM 2008 Best Paper Award and IEEE ICNP 2002 Best Paper Award) and one Distinguished Paper Award from ACM. He holds five U.S patents. His publications have been cited more than 7900+ times per Google Scholar and his h-index is 43. He has published two graduate textbooks: Cognitive Radio Communications and Networks: Principles and Practices (Academic Press/Elsevier, 2009) and Applied Optimization Methods for Wireless Networks (Cambridge University Press, 2014). The first book has been selected as one of the Best Readings on Cognitive Radio by IEEE Communications Society. For his research accomplishments, he was awarded Virginia Tech College of Engineering Dean’s Award for Excellence in Research (2013) and Dean’s Faculty Fellow Award (2008).

Prof. Hou is currently an Area Editor of IEEE Transactions on Wireless Communications (overseeing a team of 10 editors in wireless networks area), and Editor for IEEE Transactions on Mobile Computing, IEEE Journal on Selected Areas in Communications (Cognitive Radio Series), and IEEE Wireless Communications. He is the Steering Committee Chair of IEEE INFOCOM conference, which is ranked by Google Scholar as the top conference in computer networks.