

Keynote Speech: Sensor Network Control Challenges

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Abstract

Sensor networks open significant challenges in distributed computing that pertain to the specification and control of aggregate network behavior. While significant efforts have gone into developing abstractions and high-level programming paradigms for specifying sensor network behavior on a macroscopic scale, models and algorithms for control of such behavior have not yet been adequately explored. This talk presents some of the current directions in sensor network macro-programming and protocol design, as well as challenges in achieving the desired aggregate behavior in the context of such protocols and abstractions. These challenges are interpreted from a control perspective yielding preliminary examples of applying a control-theoretic approach to sensor network software development.

Bio: Tarek Abdelzaher received his B.Sc. and M.Sc. degrees in Electrical and Computer Engineering from Ain Shams University, Cairo, Egypt, in 1990 and 1994 respectively. He received his Ph.D. from the University of Michigan in 1999 on Quality of Service Adaptation in Real-Time Systems. He has been an Assistant Professor at the University of Virginia, where he founded the Software Predictability Group. He is currently an Associate Professor at the Department of Computer Science, the University of Illinois at Urbana Champaign. He has authored/coauthored three book chapters and more than 80 refereed publications in leading conferences and journals in several fields including real-time computing, distributed systems, sensor networks, and control. He is Editor-in-Chief of the Journal of Real-Time Systems, an Associate Editor of the IEEE Transactions on Mobile Computing, the ACM Transaction on Sensor Networks, the International Journal of Embedded Systems and the Ad Hoc Networks Journal, as well as Editor of ACM SIGBED Review. He served on numerous technical program committees in real-time computing, networking, quality of service, distributed systems, sensor networks, multimedia, and mobile computing, among others. He also held several conference organization positions including Program Chair of RTAS 2004, Sensor Networks Vice Chair of ICDCS 2006, System Vice-Chair of DCoSS 2006, General Chair of RTAS 2005, Program Chair of RTSS 2006, General Chair of IPSN 2007, and General Chair of RTSS 2007. Abdelzaher's research interests lie broadly in understanding and controlling the temporal properties of software systems in the face of increasing complexity, distribution, and degree of embedding in an external physical environment. Tarek Abdelzaher is a member of IEEE and ACM.