Invited Talk at CSE@IITK

January 12, 2018 Friday

Time: 3:30 PM

Venue: RM 101

Smart Living: The Next Frontier

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ABSTRACT

We live in an era in which our physical and personal environments are becoming increasingly intertwined and smarter due to the advent of pervasive sensing, wireless communications, computing, and actuation technologies. Indeed our daily living in smart cities and connected communities will depend on a wide variety of smart service systems and cyber-physical infrastructures, such as smart energy, transportation, healthcare, supply-chain, etc. Alongside, the availability of low-cost wireless sensor networks, Internet of Things (IoTs) and rich mobile devices (e.g., smartphones) are also empowering humans with fine-grained information and opinion collection through crowdsensing about events of interest, thus resulting in actionable inferences and decisions. This synergy has led to *cyber-physical-social* (CPS) convergence with human in the loop that exhibits complex interactions, inter-dependencies and adaptations between engineered/natural systems and human users with a goal to improve quality of life experience in what we call *smart living*. However, the main challenges are posed by the scale, heterogeneity, big data, and resource limitations in context recognition and situation awareness using sensors, IoTs and CPS networks. This talk will first highlight unique research issues and challenges in smart living and CPS systems, followed by novel solutions for energy-efficient data gathering and fusion, coverage and connectivity, security and trustworthiness, and trade-off between energy and information quality in multi-modal context recognition. We will present case studies and experimental results for smart grid and smart healthcare applications. The talk will be concluded with directions for future research.

BioGRAPHY

Dr. Sajal K. Das, whose academic genealogy includes Thomas Alva Edison, is a professor of Computer Science and Daniel St. Clair Endowed Chair at Missouri University of Science and Technology, Rolla, where he was the Chair of Computer Science Department during 2013-2017. During 2008-2011, he served the NSF as a Program Director in the Computer and Network Systems Division. Prior to 2013, Dr. Das was a University Distinguished Scholar Professor of Computer Science and Engineering, and founding director of Center for Research in Wireless Mobility and Networking (CReWMaN) at the University of Texas at Arlington. His broad research interests include IoTs, big data analytics, cloud computing, wireless sensor networks, mobile and pervasive computing, cyber-physical systems, smart environments including smart grid and smart healthcare, cyber-security and trustworthiness, biological and social networks, and applied graph theory and game theory. He has directed over $15M funded projects and published over 700 papers in high quality journals and refereed conference proceedings. He holds 5 US patents, co-authored 52 invited book chapters, and 4 books – "Smart Environments: Technology, Protocols, and Applications" (John Wiley, 2005); "Handbook on Securing Cyber-Physical Critical Infrastructure: Foundations and Challenges" (Morgan Kaufman, 2012); "Mobile Agents in

Distributed Computing and Networking" (Wiley, 2012); and "Principles of Cyber-Physical Systems: An Interdisciplinary Approach" (Cambridge University Press, 2018). According to DBLP, Dr. Das is one of the most prolific authors in computer science. His h-index is 78 with more than 25,000 citations according to Google Scholar. He has graduated 41 Ph.D. students. He is a recipient of 10 Best Paper Awards and numerous awards for research, teaching, mentoring and professional services, including IEEE Computer Society's Technical Achievement Award for pioneering contributions to sensor networks and mobile computing, and Graduate Dean's Award of Excellence in Mentoring Doctoral Students. Dr. Das serves as the founding Editor-in-Chief of Elsevier's Pervasive and Mobile Computing journal (since 2005) and as Associate Editor of several journals including IEEE Transactions on Mobile Computing and ACM Transactions on Sensor Networks. A (co)-founder of IEEE PerCom, WoWMoM, SMARTCOMP, and ICDCN conferences, he has served on numerous ACM and IEEE conference committees as General Chair, Technical Program Chair, or Program Committee member. Dr. Das is an IEEE Fellow for pioneering contributions to parallel, distributed and mobile computing.