

Keynote: Wearable and IoT for Cognitive Health Assessment: Significance and Challenges

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Abstract—The U.S. Census Bureau reports that the U.S. population of people aged 65 and up will grow more than double in between 2010 and 2050. The market for remote patient monitoring is expected to grow from \$10.6 billion in 2012 to \$21.2 billion in 2017. This growing societal and economical needs revitalize the work on technology-assisted proactive and preventive health monitoring in smart home environments. In recent time the proliferation of commodity smart healthcare appliances and stand-alone and integrated sensing devices (Internet of Things) make it increasingly easier to ubiquitously and continuously monitor an individuals health-related vital signals, activities, and behaviors to provide just-in-time interventions for the aging population. Nevertheless, developing reliable and clinically equivalent point-of-care technologies to perform automated health assessment and intervention remain challenging. In this talk, I will discuss how signal processing and machine learning techniques help analyze the activity and physiological signals to gauge the cognitive and behavioral health of older adults. I will also discuss the comparative performance of technology-guided algorithmic methodology with clinically-driven survey, observation, and performance-based measurements. I will conclude the talk highlighting our experiences of deploying this smart home health service systems for Alzheimer’s patients living in retirement community centers.

BIOGRAPHY

Dr. Nirmalya Roy [4] is currently an Assistant Professor in the Information Systems department at the University of Maryland, Baltimore County (UMBC). He has been awarded NSF CPS (Cyber-Physical Systems), NSF GCTC (Global City Team Challenge), Office of Naval Research, Constellation E2: Energy to Educate, and UMB-UMBC Research and Innovation Partnership grants [1], [2], [3]. His current research interests include pervasive healthcare, sensor-driven health technologies, design and modeling of smart environments, and green building energy analytics. He is a recipient of Mark Weiser Best paper award in IEEE PerCom 2006 conference, Best paper award in QShine 2009 conference, Best paper award nomination in IEEE PerCom 2011 conference, and Institute for Infocomm 2011 Best Research paper award. He is currently leading the NSF Cyber-Physical Systems: Virtual Energy Auditing project and NSF Global City Team Challenge: Flash Floods Detection in Smart City project at UMBC. Prior



to joining UMBC, he was a Clinical Assistant Professor in the School of Electrical Engineering and Computer Science department at the Washington State University. He worked as a Research Staff Member in the Institute for Infocomm Research (I2R) in Singapore from 2010 to 2011 and as a postdoctoral fellow in the Electrical and Computer Engineering department at the University of Texas at Austin from 2008 to 2009. He received his M.S. and Ph.D. degrees in Computer Science and Engineering from the University of Texas at Arlington in 2004 and 2008, respectively. He received his B.E. degree in Computer Science and Engineering in 2001 from Jadavpur University, India. He currently serves as an associate editor of Elsevier’s Pervasive and Mobile Computing (PMC) journal. More information about him can be found at <http://userpages.umbc.edu/~nroy>.

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