

Security and Energy Trade-Offs in Smart City Cyber-Physical Systems

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Abstract:

The concept of city has originated in 3500 BCE from Mesopotamia, Indus valley, and Nile valley. The first smart cities are in operation since 1994. According to estimates, 70% of the world population will live in urban areas by the year 2050 due to continuous rapid migration of population from the rural to urban areas. The smart cities concept is envisioned as a solution to continuous rapid migration of population from the rural to urban areas. Smart cities use one or multiple smart systems (or components) including smart healthcare, smart energy, smart infrastructure, smart transportation, smart agriculture, and, smart home, and hence in an essence is a system of systems. The systems of the smart cities are essentially cyber-physical systems (CPS) which are built using Internet of Things (IoT). In this keynote, the various components of the smart cities and the underneath technologies will be elaborated. Specific smart city building-blocks like sensors for diverse applications, Unmanned Aerial Vehicle (UAVs), Camera Technology, Blockchain, Physical Unclonable Functions (PUF), and Artificial Intelligence (AI) in the context of smart cities will be discussed. In the connected world, security and energy-awareness of system and information are equally important. Security is a broad concept that covers many aspects including system security, information security, personal/location/data privacy, system trustworthiness, and system/data ownership protection. The attacks on the CPS components as well as the security solutions can be either software or hardware based. The software based security solutions that rely on some form of encryption is not full proof as breaking them is just matter of time. This talk will present broad perspective of the vast multifaceted forms of security attacks and hardware-assisted security (HAS) aka security by design (SbD) solutions. Any form of security solutions using software or hardware increases the energy consumption overhead of a system. The talk will discuss the security and energy trade-offs in designing of smart city components.

Speaker Biography:

Dr. Saraju P. Mohanty is a Professor at the University of North Texas. Prof. Mohanty's research is in "Smart Electronic Systems" which has been funded by National Science Foundations, Semiconductor Research



Corporation, US Air Force, IUSSTF, and Mission Innovation Global Alliance. He has authored 300 research articles, 4 books, and invented 4 US patents. His Google Scholar h-index is 32 and i10-index is 114. He was a recipient of nine best paper awards, the IEEE-CS-TCVLSI Distinguished Leadership Award in 2018 for services to the IEEE and to the VLSI research community, and the 2016 PROSE Award for Best Textbook in Physical Sciences and Mathematics category from the Association of American Publishers for his Mixed-Signal System Design book published by McGraw-Hill. He has delivered 8 keynotes and served on 5 panels at various International Conferences. He is currently the Editor-in-Chief (EiC) of the IEEE Consumer Electronics Magazine (MCE). He has been serving on the editorial board of several peer-reviewed international journals, including IEEE Transactions on

Consumer Electronics (TCE), IEEE Transactions on Big Data (TBD), and ACM Journal on Emerging Technologies in Computing Systems (JETC). He has been serving on the Board of Governors (BoG) of the IEEE Consumer Electronics Society since 2019, and has served as the Chair of Technical Committee on Very Large Scale Integration (TCVLSI), IEEE Computer Society (IEEE-CS) during 2014-2018. He is the founding steering committee chair for the IEEE International Symposium on Smart Electronic Systems (iSES), steering committee vice-chair of the IEEE-CS Symposium on VLSI (ISVLSI). More about his biography, research, education, and outreach activities is available at: <http://www.smohanty.org>.