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Department of Information Engineering

Seminar

Exploiting Induced Skin Electric Potential for Resilient Body-area IoT Systems

by

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Time : 9:30am – 10:30am

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Abstract

Internet-of-Things (IoT) devices are increasingly deployed in indoor environments. It is estimated that by 2022, a typical family home could contain more than 50 smart devices. IoT devices are generally equipped with processing units, various sensors, communication modules, and software platforms to meet the application needs. A key characteristic of the IoT systems is the heterogeneity of hardware (e.g., sensors) and software (e.g., operating systems). Such heterogeneity introduces significant challenges to the universal implementation of basic system functions, such as clock synchronization and device authentication, to meet the performance/security requirements of IoT applications. Through extensive measurement studies on the electromagnetic radiation signals emitted from the electric power lines in indoor environments, we find that the human body can act as an effective antenna and generate induced skin electric potentials (iSEP). Based on iSEP's features of high synchrony and similarity, we design TouchSync and TouchAuth systems. For the first time, users can leverage the existing indoor infrastructure to synchronize clocks and authenticate devices for heterogeneous touchable IoT objects. This talk will present the design and evaluation of these two systems. In addition, it will briefly introduce the speaker's other recent system works on IoT resilience/security.

Biography

Dr. Zhenyu Yan is a Research Fellow at School of Computer Science and Engineering, Nanyang Technological University (NTU), Singapore. He received the Ph.D. degree from NTU in 2020. Dr. Yan's research includes sensing systems, mobile computing, and resilient AIoT systems. His research has been published on prestigious venues like MobiCom, SenSys, IPSN, and IEEE Transactions on Mobile Computing (TMC). Dr. Yan has offered various services to the sensing research community including reviewers for INFOCOM, TMC, UbiComp, TOSN, and Internet of Things Journal, Review Editor of Frontiers in Communications and Networks Journal, and Social Media Chair of IEEE ICDCS 2020.

**** ALL ARE WELCOME ****

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