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COMPUTER SCIENCE COLLOQUIUM

Advancing Ambient IoT: Integrating Energy Harvesting with Sensory Functions

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VENUE G7315, Green Zone, Yeung Kin Man
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ABSTRACT

Ambient IoT, pursued by 3GPP, IEEE, and Bluetooth SIG, is a transformative class of IoT devices optimized for pervasive use across multiple sectors. These devices are designed to minimize power, cost, and size for operation in environments where batteries are impractical. They are expected to run on energy harvesting, removing the need for batteries and reducing associated maintenance costs. A key focus of this initiative is the standardization of low-power communication protocols like backscatter, which significantly reduces wireless communication power requirements. Yet, the vision for truly pervasive Ambient IoT is hindered by the significant power drain from sensing operations, including the energy used by specialized sensors and data acquisition processes. This highlights the need to not only optimize communication technologies but also to revolutionize sensory mechanisms. This talk introduces the concept of using energy harvesters as dual-purpose tools—both as power sources and as sensors. This approach promises to drastically cut sensing overhead by eliminating the need for specialized sensors and potentially complex analog-to-digital sampling processes. Through various methodologies and case studies, this talk will demonstrate how this innovative use of energy harvesters can be a game-changer for Ambient IoT. We will conclude by advocating for urgent interdisciplinary research between energy harvesting and IoT sensing, highlighting the critical need to bridge these domains to fully realize the potential of Ambient IoT.

BIOGRAPHY

Mahbub Hassan is a Full Professor in the School of Computer Science and Engineering at the University of New South Wales, Sydney, Australia. He served as an IEEE Distinguished Lecturer from 2013 to 2016. Professor Hassan is the author of "Wireless and Mobile Networking," published by CRC Press in 2022. He earned the distinction of Exemplary Associate Editor for the IEEE Communications Surveys and Tutorials in 2023 and was also named to the 2023 Stanford/Elsevier list of the World's Top 2% Scientists. More information about Professor Hassan is available at http://www.cse.unsw.edu.au/~mahbub.

All are welcome!

In case of questions, please contact Prof. XU Weitao at weitaoxu@cityu.edu.hk, or visit the CS Departmental Seminar Web at https://www.cs.cityu.edu.hk/events/cs-seminars/recent-cs-colloquiums.