Notice and Invitation
Oral Defense of Master’s Thesis
The Volgenau School of Engineering, George Mason University

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Optimal Allocation of Computation in IoT Network

Tuesday, May 2\textsuperscript{nd}, 2017, 2:00pm
Room 3202 Engineering Building
All are invited to attend.

Committee
Dr. Houman Homayoun, Thesis Director
Dr. Avesta Sasan
Dr. Cameron Nowzari

Abstract

Internet of things (IOT) is being developed for a wide range of applications from home automation and personal fitness, to smart cities. With the extensive growth in adaptation of IoT devices, comes the uncoordinated and substandard designs aimed at promptly making products available to the end consumer. This substandard approach restricts the growth of IoT networks in the near future and necessitates studies to understand requirements of an efficient design. A particular area where IoT applications have grown significantly is the surveillance and monitoring. Applications of IoT in this domain are mainly relying on distributed sensors, each equipped with a battery, capable of collecting images, reprocessing images, and communicating the raw or processed images to the nearest node until it reaches the base station for decision making. In such an IoT network where processing can be distributed over the network, the important research question is how much of data each node should process and how much they should communicate.

The goal of this thesis is to answer this question by analyzing IoT networks to understand the energy-performance trade-off with different objectives and target metrics. We look at various network configurations (homogeneous vs heterogeneous network), objectives (minimizing overall energy, maintaining batteries lifetime, and meeting delay deadline).
This thesis analyzes how the distribution of the processing among various nodes affects the performance and energy-efficiency and shows that the most energy-efficient solution in several studied cases is one in which, all the computation is done on a single node.