SPECTRUM-AWARE COGNITIVE MOBILE CLOUD COMPUTING

S. Eman Mahmoodi, Stevens Institute of Technology

Date: April 27, 2016 (Wednesday)
Time: 5:15 pm (refreshment starts at 5:00pm)
Place: 202 ECEC, NJIT

About the Speaker

S. Eman Mahmoodi is a final year PhD candidate of Electrical and Computer Engineering at the Stevens Institute of Technology working in the Information Networks and Security Lab. He received the BS and MS degree in Electrical Engineering from Iran University of Science and Technology, respectively in 2009 and 2012. He was awarded a 4-year Innovation & Entrepreneurship doctoral Fellowship, and also selected as the Outstanding Research Assistant in 2014 of Department of Electrical & Computer Engineering both at the Stevens. The experimental part of his PhD project was selected and accepted to run on NSFCloud, which is a large experimental platform to drive research on a new generation of innovative applications of cloud computing. He has been working on Mobile Cloud Computing, Optimization and Applied Modelling, Cognitive Networking, and Wireless Communications. Research outputs of the recent years have been reflected in a U.S. patent, and several published research articles in well-known IEEE journals and conference proceedings.

About the Talk (registration: https://meetings.vtools.ieee.org/meeting_registration/register/39423)

The advent of 5G networking technology has increased the expectations of mobile users for anywhere, anytime, content-rich experiences. On one hand, mobile devices such as smartphones and tablets are getting smaller and lighter, with the expectation that computationally intensive and sophisticated applications will be offloaded to a remote cloud. On the other hand, offloading applications will also produce an increase in the load on the wireless backhaul. Given the fact that mobile web traffic has increased significantly, computation offloading will add to the burden on the wireless networks. In this talk, we define the new concept of cognitive cloud offloader as offloading the computations scheduled based on characteristics of wireless networks. We introduce the concept of wireless-aware joint scheduling and computation offloading (JSCO) for multi-component applications, where an optimal decision is made on which components need to be offloaded as well as the scheduling order of these components. The JSCO approach allows for more degrees of freedom in the solution by moving away from a compiler predetermined scheduling order for the components towards a more wireless-aware scheduling order.

Meanwhile in the wireless networking world, the trend has shifted to multi-RAT enabled communications. We provide a comprehensive offloading solution that uses the multiple radio links available for associated data transfer, optimally. Finally in a more holistic approach, a time-adaptive and wireless-aware heuristic is proposed that will achieve two joint ends: (i) assigns the schedule order of applications components; and (ii) determines the offloading strategy while optimally the percentage of data to be sent by the mobile device and the cloud are allocated via each wireless interface.

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