THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering

Seminar

Distributed Resource Allocation for Mobile Applications
by
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Date : **4 Jan., 2017 (Wed.)**
Time : **2:00pm – 3:00pm**
Venue : **Room 833, Ho Sin Hang Engineering Building**
The Chinese University of Hong Kong

Abstract

For a distributed resource allocation problem, it is possible to formulate it as a stochastic game, where multiple users interact with each other over a horizon of time for some objectives. In this seminar, we present two special cases under this general framework for some emerging mobile applications.

The first one is related to the users' interactions in mobile crowdsensing (MCS). With the rich set of embedded sensors installed in smartphones and the crowd of mobile users, we are witnessing the emergence of innovative commercial MCS applications, which aim to deliver time-sensitive and location-dependent information to their customers. Motivated by these real-world applications, we consider the distributed task selection problem for heterogeneous users. We propose an asynchronous and distributed task selection algorithm to help the users plan their task selections on their own. We prove the convergence of the algorithm and further characterize the computation time for the users' updates.

The second one is related to a user's dynamic decisions in mobile data offloading. To accommodate the explosive growth in mobile data traffic, both the cellular operators and mobile users are increasingly interested in offloading the traffic from cellular networks to Wi-Fi networks. In this work, we study the Wi-Fi offloading problem with delay-tolerant applications, where we aim to achieve a good tradeoff between the user's payment and its quality of service characterized by the file transfer deadline. We first propose a general Delay-Aware Wi-Fi Offloading and Network Selection (DAWN) algorithm for the general case. We then analytically establish the sufficient conditions, under which the optimal policy exhibits a threshold structure in terms of both the time and file size. As a result, we propose a monotone DAWN algorithm that approximately solves the general offloading problem with a much lower computational complexity.

Biography

Man Hon Cheung received the B.Eng. and M.Phil. degrees in Information Engineering from the Chinese University of Hong Kong (CUHK) in 2005 and 2007, respectively, and the Ph.D. degree in Electrical and Computer Engineering from the University of British Columbia (UBC) in 2012. He was a postdoctoral fellow with the Department of Information Engineering at CUHK, and is currently a postdoctoral fellow with the Department of Electrical and Computer Engineering at the University of Macau. He was awarded the Graduate Student International Research Mobility Award by UBC, and the Global Scholarship Programme for Research Excellence by CUHK. He has served as a Technical Program Committee member in various conferences, which include IEEE ICC, Globecom, and WCNC. His research interest lies in the field of resource allocation in communication networks, with the current focus on mobile crowdsensing, mobile data offloading, and network economics.

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