

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Faculty of Engineering

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Area: Communications & Networks

Host: Dr Wu Qingqing

TOPIC	:	Multi-Antenna UAV Data Harvesting: Joint Trajectory and Communication Optimization
SPEAKER	:	Mr Zhang Jingwei Graduate student, ECE Dept, NUS
DATE	:	20 February 2020, Thursday
TIME	:	1pm to 2pm
VENUE	:	E4-04-02, Engineering Block E4, Faculty of Engineering, NUS

ABSTRACT

Unmanned aerial vehicle (UAV)-enabled communication is a promising technology to extend the coverage and improve throughput performance for the traditional terrestrial communication systems. We consider a UAV-enabled wireless sensor network (WSN), where a multi-antenna UAV is dispatched to collect data from a group of sensor nodes (SNs). The objective is to maximize the minimum rate collected from all SNs via jointly optimizing the scheduling and power allocation of SNs and the trajectory of the UAV, subject to scheduling, transmit power, and maximum speed constraints. The resulting problem is challenging to be directly tackled as it involves non-convex constraints and binary optimization. To draw some insights, we firstly consider an ideal case of the problem by ignoring speed constraint and optimally solve it via employing the Lagrange dual method. It is found that in this case, the UAV should only hover above a given set of locations. Next, we consider the general case of the problem where the speed constraint is included and design a traveling salesman problem (TSP)-based initial trajectory, where the UAV sequentially visits all locations obtained from the relaxed problem. Then with the initial trajectory, we find the corresponding scheduling and power allocation of SNs and further optimize the trajectory via employing block coordinate descent (BCD) and successive convex approximation (SCA) techniques. Finally, numerical results are provided to illustrate the performance gain of the proposed scheme with different number of antennas, as compared to benchmark schemes.

BIOGRAPHY

Zhang Jingwei received his B.Eng. degree in Communication Engineering from the University of Electronic Science and Technology of China (UESTC) in 2016. He is currently working towards his Ph.D. degree in the Electrical and Computer Engineering Department at the National University of Singapore. His research interests include convex optimization and UAV communications.

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