SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
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Area: Communications & Network

Host: Assoc Prof Mandar Anil Chitre

TOPIC	:	**Adaptive Modulation in Underwater Acoustic Communication**
SPEAKER	:	**Ms Wu Shuangshuang** **Graduate Student, ECE Dept, NUS**
DATE	:	**Tuesday, 20 April 2021**
TIME	:	**10.30AM to 11.15AM**
WEBINAR	:	**Join Zoom Meeting** **https://nus-sg.zoom.us/j/89818263564?pwd=TENoRm1KdjVnRUJIRThwSW5pVlR2UT09** **Meeting ID: 898 1826 3564** **Password: 464168**

ABSTRACT

The properties of the Underwater Acoustic Communication (UAC) channel are different from those of traditional terrestrial wireless communication channels. The unique properties of UAC such as lower signal frequencies, limited bandwidth, strong multipath propagation, and huge delay spread over tens or even hundreds of milliseconds result in severe non-stationary fading statistics in UAC channels. When the channel statistics change, a modulation scheme designed for a specific fading model will underperform. This motivates the need for realtime link tuning. We use Adaptive Modulation (AM) with a high degree of freedom in Modulation and Coding Schemes (MCSs) to optimize channel throughput in the timevarying UAC channel. To maximize average data rate without any prior knowledge of the UAC environment, the key to AM is the exploration versus exploitation dilemma which is formally formulated as Markov Decision Process (MDP). Reinforcement learning methods help estimate Channel State Information (CSI) and schedule packet transmission to achieve good communication throughput. In this talk, we present a hybrid algorithm that includes short-term planning in MDPs to select MCSs. This helps us manage the computational burden and achieves comparable performance as algorithms that perform full-planning. We also study an online learning strategy to determine an appropriate number of transmission packets between every two feedback packets to reduce the time spent on obtaining feedback, as the long propagation delay and slow communication makes frequent feedback impractical.

BIOGRAPHY

Wu Shuangshuang is currently pursuing a Ph.D. degree in the Department of Electrical and Computer Engineering, National University of Singapore under the supervision of Assoc Prof. Mandar Chitre. Her research interests include adaptive modulation in underwater acoustic communication, black-box optimization, and their application.