

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Faculty of Engineering

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Area: Communication and Networks

Host: Assoc Prof Biplab Sikdar

TOPIC	:	Multi-Hypothesis Sequential Testing for Illegitimate Access and Collision based Attack Detection in Wireless IoT Networks
SPEAKER	:	Mr. Bikalpa Upadhyaya Graduate Student, ECE Dept, NUS
DATE	:	Tuesday, 13 April 2021
TIME	:	11.00AM to 11.30AM
WEBINAR	:	Join Zoom Meeting https://nus-sg.zoom.us/j/81829157930?pwd=RkFyYVp1WEdnWGI0aHhpdXNINDNvdz09 Meeting ID: 818 2915 7930 Password: 855615

ABSTRACT

Jamming or illegitimate wireless network access interferes with legitimate communication sessions by mimicking the legitimate transmissions and degrades the network performance. In this paper, we propose a methodology to detect such attacks by implementing a multiple hypothesis sequential testing-based detection framework with variance and Channel State Information (CSI) based algorithms. The detection framework focuses on distinguishing between legitimate and illegitimate transmissions and the nature of illegitimate transmissions with a quaternary hypotheses test. The quaternary hypotheses include no transmission, legitimate node transmission, illegitimate node transmission, and collision-based attack. We first devise a sequential testing problem on a ternary hypothesis problem and then tackle the remaining hypothesis with both variance-based approach and CSI based approach. We devise algorithms based on the same and compare their performance. We also compare our approach with generalized Neyman-Pearson approach based on detection speed. In addition, we present a multiple sensor-based approach to further improve the detection performance through soft and hard decision combining. We conduct extensive performance evaluations based on both simulated and measurement data. The numerical results show fewer sample size requirement for the proposed algorithms, leading to faster detection.

BIOGRAPHY

Bikalpa Upadhyaya received the B.Eng degree in Electrical and Electronics Degree from Kathmandu University, Dhulikhel, Nepal in 2014. He is currently pursuing the PhD degree in statistical and machine learning based IoT security with National University of Singapore (NUS), Singapore. His research interests include wireless and mobile networks, security for Internet of Things and cyber physical systems and network security.

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