

Good afternoon,
You are invited to attend our weekly ECE Graduate Seminar.

Old Dominion University
College of Engineering and Technology
Department of Electrical and Computer Engineering

All lectures to be held at 3:00pm on Fridays online at

https://vs.prod.odu.edu/kvs/interface_webex/?cid=202020_ECE731ECE831VS_94044

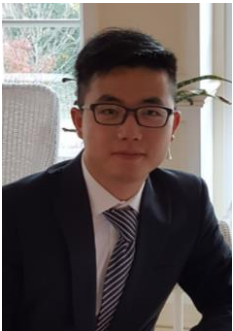
For more information, contact Dr. Chung Hao Chen at (757) 683-3475 or email cxchen@odu.edu.

Friday, February 26, 2021 Seminar Topic:

DeepPOSE: PREVENTING GPS SPOOFING ATTACK VIA DEEP NEURAL NETWORK by Peng Jiang,
PHD Candidate in the Department of Electrical & Computer Engineering at Old Dominion University

Abstract:

The Global Positioning System (GPS) has become a foundation for most location-based services and navigation systems, such as autonomous vehicles, drones, ships, and wearable devices. However, it is a challenge to verify if the reported geographic locations are valid due to various GPS spoofing tools. The existence of pervasive tools such as Fake GPS, Lockito, and software-defined radio makes it feasible for ordinary users to hijack and report fake GPS coordinates, to cheat the monitoring server without being detected. Furthermore, it is also a challenge to get accurate sensor readings on mobile devices because of the high noise level introduced by commercial motion sensors. To this end, we propose DeepPOSE, a deep learning model, to address the noise introduced in sensor readings and detect GPS spoofing attacks on mobile platforms. Our design uses a convolutional and recurrent neural network to reduce the noise, to recover a vehicle's real-time trajectory from multiple sensor inputs. We further propose a novel scheme to map the constructed trajectory from sensor readings onto the Google map, to smartly eliminate the accumulation of errors on the trajectory estimation. The reconstructed trajectory from sensors is then used to detect the GPS spoofing attack. Compared with the existing method, the proposed approach demonstrates a significantly higher degree of accuracy for detecting GPS spoofing attacks.



Bio:

Peng Jiang is a Ph.D. Candidate in the ECE Department at Old Dominion University. He received his Bachelor's in Electrical Engineering from Chongqing University of Posts and Telecommunications in 2014 and a Master of Engineering in Electrical and Computer Engineering from Old Dominion University. His research interests include the security issue in wireless communication, localization, and autonomous driving.