

AMMAR HAYDARI
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PhD Student at UC Davis

EDUCATION

UNIVERSITY OF CALIFORNIA, DAVIS

Davis, CA

Ph.D., Electrical & Computer Engineering

September 2019 – Present

- *Advisor:* Prof. Chen-Nee Chuah
- *Co-Advisor:* Prof. H. Michael Zhang
- *Research:* Data Analysis, Intelligent Transportation Systems, Security

UNIVERSITY OF SOUTH FLORIDA

Tampa, FL

MS., Electric & Electronic Engineering

August 2017 – August 2019

- *Advisor:* Assistant Prof. Yasin Yilmaz
- *Research:* Security of VANET, Deep Reinforcement Learning, Statistical Anomaly Detection
- *GPA:* 3.96

ULUDAG UNIVERSITY

Bursa, TURKEY

B.Sc., Electronic Engineering

July 2014

- *Thesis:* Adaptive intersect controlling for intelligent transportation systems
- *Membership:* The group of Electronic Engineer students in Uludag University

UNIVERSITY OF NAPOLI FEDERICO 2

Naples, Italy

B.Sc, Electric & Electronic Engineering

September 2012 – February 2013

- Erasmus Exchange Student
- Electronic Measurement and Instrumentation, Optoelectronic and Multimedia Systems are received along with the Italian language course

RESEARCH INTERESTS

- Intelligent transportation systems
- Machine Learning
- Deep Reinforcement Learning
- Differential Privacy
- Statistical Anomaly Detection
- Network systems
- Big Data analysis

EXPERIENCE

Lawrence Berkeley National Lab

Engineer Intern

April 2020 - Present

University of California, Davis

Graduate Assistant

Davis, CA, USA
September 2019 – Present

KOCSISTEM IT Inc.

Summer Network Engineer Intern

Istanbul, Turkey
June – August 2013

- Worked with variety of network types such as LANs, WANs, WLANs
- Designed and implemented network based solutions and improved resilience of the current environment with Cisco routers and switches
- Configured the routing and switching equipment
- Analyzed network operational status by gathering and prioritizing information
- Presented and discussed results in the group meeting in a weekly basis

ISBAK Transportation Engineering Inc.

Summer Intern

Istanbul, Turkey
June - July 2014

- The graduation thesis and real-time applications are analyzed and results are compared
- Implemented image processing for adaptive traffic controlling.
- Implemented and installed the real-time application of traffic controlling system for traffic intersections in Istanbul

PUBLICATIONS

(J) A. Haydari and CN. Chuah, M. Zhang, D. Ghosal, “Security Vulnerabilities of Deep Reinforcement Learning (DRL) Based Urban Traffic Light Controllers”, to be submitted, *IEEE Communications Magazine*

(J) A. Haydari and Y. Yilmaz, “Online Intrusion Detection and Mitigation for VANET”, to be submitted, *IEEE Transactions on Dependable and Secure Computing*

(J) A. Haydari and Y. Yilmaz, “Deep Reinforcement Learning for Intelligent Transportation Systems: A Survey”, *IEEE Transactions on Intelligent Transportation Systems*, 2020

(C) A. Haydari and Y. Yilmaz, “Real-Time Detection and Mitigation of DDoS Attacks in Intelligent Transportation Systems”, *IEEE International Conference on Intelligent Transportation Systems (ITSC)*, 2018

COMPLETED PROJECTS

Security Vulnerabilities of Deep Reinforcement Learning based Traffic signal controllers

- We explore the security vulnerabilities of Deep Reinforcement Learning-based Traffic Signal Controllers in the presence of adversarial attacks. We investigate the impact of external brute-force attacks without the knowledge of the learning model as well as model-based white-box and black-box attacks. We simulated these three attack models on different DRL-based TSC algorithms in a single intersection and multiple intersections. The results show the performance of the DRL learning agent decreases in all three attack models, resulting in higher levels of traffic congestion. However, while the impact of a brute-force attack is limited in its duration, white-box and black-box attacks can have long term impact on the learning agent.

Statistical Anomaly Detection for Intelligent Transportation Systems (MS Thesis)

- Road side units (RSU) based nonparametric statistical intrusion detection and mitigation system is proposed for different attack types in ITS. Our detection model is capable for false data injection (FDI) attacks and low rate DDoS attacks. Voting based detection models are not capable for FDI attacks when attack is performed with a large group of vehicle, however, since our detection algorithm runs on every vehicle, VANET does not effected by the amount of attacker vehicle with proposed detection algorithm. Traditional methods cannot deal with low rate DDoS attacks due to highly dynamic nature but our introduced nonparametric model is also well performing against low rate DDoS attacks by protecting availability of RSUs. After presenting theory, presented model is applied on real dataset for FDI attacks and on simulated data for DDoS attacks.

Adaptive intersect controlling for vehicles (Bachelor Graduation Project)

- Microcontroller (Raspberry Pi) based system is designed and implemented for controlling traffic jams. The system consists of digital cameras located at traffic intersections. The captured videos from cameras are processed in the microcontroller by using Linux based C programming language with OpenCV library. The implemented program counts the number of vehicles with the image processing algorithms and regulates green light on period. Similar algorithms are also implemented in MATLAB by using image processing toolbox.

MEMBERSHIPS

- IEEE student member
- IEEE ITS society student member
- The Chamber of Electrical Engineers of Turkey

WORKSHOPS AND SEMINARS

Summer Information Technologies Internship Program

July – Sept. 2013

- SQL database controlling and programming
- Social media mining
- Artificial intelligence and machine learning

Lawrence Berkeley Lab Summer Seminar Series

June 2020- Aug. 2020

Intensive Italian Course, University of Naples Federico II, Italy

Sep. – Dec. 2012

Intensive English program, 800 hours at Marmara University

Jane – Sep. 2016

Transist 2016, 9th Istanbul Transport Congress and Exhibition

Dec. 2016

Florida Center for Cybersecurity, 2017

Oct. 2017

10th Annual Graduate Student Research Symposium, Poster Presentation at USF

March 2018

21th IEEE International Conference on ITS, Paper Presentation

Nov. 2018

SKILLS and ACTIVITIES

Language

English and Turkish (Fluent), Italian (Intermediate)

Computer Skills

Python, MATLAB, C and C++, OMNET++, OpenCV, Mac OS, Linux,

Extracurricular Activities

Reading, Swimming, Hiking

AWARDS

Scholarship from European Union

2012-2013

Erasmus Student Exchange Program in Naples, Italy

Scholarship from Ministry of National Education of Turkey

2016 - 2019