Mahdi Zaman

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Summary

Machine Intelligence enthusiast, experienced in algorithm development for perception and communication for robots, vehicles and things.

Research Experience

University of Central Florida | Graduate Research Assistant 08/2018 – present

Ford Motor Company | Research Intern 06/2020 – 08/2020

Education

University of Central Florida | PhD, Computer Engineering 08/2024

University of Central Florida | MS, Computer Engineering 04/2022

Bangladesh University of Engineering and Technology | BS, Electrical and Electronic Engineering 02/2017

Projects

Multi-scale Local Attention for Semantic Segmentation (ongoing)

- formulating novel attention mechanism for small object segmentation
- exploring efficient fusion of multi-scale attentional features

Cooperative Steering Control for Autonomous Driving

- enabled look-ahead for V2X-equipped transport
- developed end-to-end learning with LSTM-based deep network

Automated Vehicle Marshaling System (ongoing)

- developing system architecture to support remote driving under infrastructural supervision
- extending message types beyond safety to enable advanced tele-operated driving

Learning-based communication module for Realistic Driving Simulator (ongoing)

- developing attention-based model to emulate vehicular communication in CARLA under diverse condition

Infrastructure-assisted Autonomous Driving

- prototyped a scalable V2I-based service for tele-operated driving support
- added aperiodic multi-priority packet handling feature in medium access layer of LTE D2D

Scalability in Cellular-V2X

- enhanced transmission rate control algorithm with increased adaptability to medium congestion
- simulated traffic scenario with synthetic mobility traces to test scalability in I-405 highway
- co-authored a congestion control algorithm that accommodates advanced safety services
- applied for patent and submitted as technical document for 3GPP standardization jointly with Ford Motor Company

Dynamic-Object-Map-based Architecture for Cooperative Vehicle Safety Systems

- enabled centralized in-vehicle map to enhance autonomous navigation
- laid out platform to build advanced vehicular safety protocols

Point-to-Point Driver Messenger System

- enabled arbitration in critical driving maneuver via local object map sharing
- defined scenario detection and target recognition module to notify driver intent

Publications

- On Batching Acknowledgements in C-V2X Services; *IEEE VTC 2023*
- Addressing Rare Outages in CV2X with Time-controlled One-shot Resource Scheduling; *TechRxiv 2023*
- Performance Analysis of V2I Zone Activation and Scalability for C-V2X Transactional Services; *IEEE VTC 2022*
- Performance Analysis of Cellular-V2X with Adaptive and Selective Power Control; *IEEE CAVS 2020*

- Controlling Steering Angle for Cooperative Self-driving Vehicles utilizing CNN and LSTM; *IEEE IV Symposium 2019*
- Connected and Autonomous Vehicles in the Deep Learning Era:; *IEEE IV Symposium 2019*
- Dynamic Object Map based Architecture for Robust CVS Systems; *SAE Technical Paper*
- Finite State Markov Modeling of C-V2X Erasure Links for Stability Analysis of Platooning Applications, *IEEE Syscon 2022*
- A Maneuver-based Urban Driving Dataset and Model for Cooperative Vehicle Applications; *IEEE CAVS 2020, Canada*
- Connected Autonomous Vehicles in the Deep Learning Era: A case study on Computer-guided Steering; *Handbook of Pattern Recognition and Computer Vision, 6th ed. p365-384; 2020*

Patents

- One-shot transmission for v2x messaging

Teaching Experience

Algorithms for Machine Learning | Instructor, UCF
- designed course curriculum and evaluation strategies
- lectured core-to-advanced ML topics to 200+ students
- guided in writing NLP/CV models and mentored in MLOps

Digital Systems and Computer Organization | Graduate Teaching Assistant, UCF
- instructed courses and projects on FPGA using verilog and low-level assembly language

Skills

- Python, PyTorch, OpenCV, Scikit-learn
- C++, NS3, MATLAB
- Git, Bash Scripting, Linux

References

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