Jie Li

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Ph.D. Candidate, School of Vehicle and Mobility, Tsinghua University, Beijing

EDUCATION

School of Vehicle and Mobility, Tsinghua University Beijing
Ph.D. of Engineering – Advisor: Prof. Shengbo Eben Li Expected in Jul. 2024
Bachelor of Engineering – Advisor for Dissertation: Prof. Shengbo Eben Li Jul. 2018

- **Award**: Outstanding Undergraduate Student in Beijing (top 1%), Excellent Undergraduate Award of Tsinghua University (top 5%)

Department of Mathematical Sciences, Tsinghua University Beijing
Bachelor of Science – Advisor for Dissertation: Assoc. Prof. Hao Wu Jul. 2018

- Relevant Coursework: Differential Equations, Differential Geometry, Statistical Inference, Numerical Analysis, Probability Theory, Real Analysis, Complex Analysis

RESEARCH INTERESTS

I am interested in research that intersects the domains of machine learning and robust control, with a focus on the theoretical analysis of convergence and stability, the development of decision and control algorithms that are not only robust and adaptive but also specifically optimized for intelligent (connected) vehicles, along with their practical applications.
Methods: Adaptive Dynamic Programming, Reinforcement Learning
Problems: Disturbance Attenuation, Robust Performance, H_∞ Optimal Control

RECENT PUBLICATIONS

- **J. Li**, S. E. Li, J. Duan, Y. Lyu, W. Zou, Y. Guan, and Y. Yin, "Relaxed policy iteration algorithm for nonlinear zero-sum games with application to H-infinity control," IEEE Transactions on Automatic Control, 2023.
- **J. Li**, R. Nagamune, Y. Zhang, and S. E. Li, "Robust approximate dynamic programming for nonlinear systems with both model error and external disturbance," IEEE Transactions on Neural Networks and Learning Systems, 2023.
- J. Duan*, **J. Li***, X. Chen, K. Zhao, S. E. Li, and L. Zhao, "Optimization landscape of policy gradient methods for discrete-time static output feedback," IEEE Transactions on Cybernetics, 2023.
- **J. Li**, J. Wang, S. E. Li, and K. Li, "Learning optimal robust control of connected vehicles in mixed traffic flow" in Proceedings of 62nd IEEE Conference on Decision and Control, 2023.
- J. Duan*, **J. Li***, Q. Ge, S. E. Li, M. Bujarbaruah, F. Ma, and D. Zhang, "Relaxed actor-critic with convergence guarantees for continuous-time optimal control of nonlinear systems," IEEE Transactions on Intelligent Vehicles, 2023.

WORK EXPERIENCE

Horizon Robotics

Research Intern, Basic Algorithms Department, Mentor: Qian Zhang Jul. 2021 – Oct. 2021

PROJECTS PARTICIPATED

Networked Modeling and Cooperative Control of Connected and Automated Electric Vehicles

Student Leader Supported by MOST Sep. 2019 – Mar. 2021

- Performance evaluation of connected platoon under different communication topologies
- Distributed controller (LQR, MPC) design with C/C++ and platoon simulation with MATLAB/Simulink
- **Software Platform** design with C/C++ in ROS, including positioning, radar, V2V communication, platoon control and vehicle control
- **Hardware Modification** of CHANGAN passenger vehicles with power supply system, CAN communication module, GPS, IMU and V2V communication module
- Algorithm deployment and **platoon test** with 3 heterogeneous electric vehicles in various scenarios including car following, cooperative lane change, and vehicle cut in/out

Road-Vehicle-Cloud Cooperative Control Technology

Participant Supported by Toyota Dec. 2019 – Dec. 2020

- Safety oriented model predictive controller design with Ipopt and simulation with Python
- Traffic scene design of virtual crossroad
- Controller deployment and **vehicle test** at virtual crossroad

Development and Deployment of Motion Control Algorithm with Domain Controller

Main Participant Supported by UAES Sep. 2018 – Mar. 2019

- Construction of vehicle dynamics simulation model with MATLAB/Simulink
- Longitudinal and lateral motion controller (MPC) design with C/C++ and simulation with S-Function
- Algorithm program in XCU and **Hardware-in-the-Loop** experiment

SKILLS

- Proficient in MATLAB/Simulink and Python programming (PyTorch), familiar with C/C++ programming and ROS
- Basic use of automobile and traffic simulation software (CarSim and SUMO)