FANGJIAN LI

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SUMMARY

- Engineer specializing in learning-based prediction and planning algorithms for autonomous driving
- Ph.D. in Robotics and Control, Mechanical Engineering, Clemson University, SC
- Highly capable in the design and analysis of autonomous driving algorithms (deep learning (DL), deep reinforcement learning (DRL), imitation learning (IL), optimal control)
- Proven capability in programming language (Python, C++, MATLAB)
- Experienced with Linux, high-performance computing (HPC), and robot operating system (ROS)

EDUCATION

08/2016 – 05/2022 **Ph.D.** Mechanical Engineering (GPA 4.0)
Clemson University *Clemson, SC*
Research Topic: Behavior Planning, Autonomous driving, Reinforcement Learning

08/2014 – 08/2016 **Master of Science** in Automotive Engineering (GPA 3.7)
Clemson University *Clemson, SC*
Study Focus: Vehicle Dynamics, Modern & Optimal Control

08/2010 – 06/2014 **Bachelor of Engineering** Vehicle Engineering (GPA 3.8)
Hefei University of Technology *Hefei, China*
Study Focus: Vehicle dynamics, Control theorem

PROFESSIONAL EXPERIENCE

11/2023 – present **Senior Algorithm Engineer,** *Arriver/Qualcomm* *Novi, MI*

Skills: Deep learning, Autonomous driving, Behavior planning

- Develop the deep learning-based vehicle motion predictor for the Qualcomm autonomous driving platform.
- Develop the deep learning-based vehicle behavior planning algorithm.
- Support the testing and verification process of the prediction and behavior planning function of the new autonomous driving stack

03/2023 – 11/2023 **Advanced Driver Assistance System (ADAS) Dev. Engineer**, Bertrandt *Sunnyvale, CA*

Skills: Motion planning algorithm, Autonomous driving, C++, Testing and validation

- *Develop the motion planning algorithm for the level 2+ prototype cars*
- *Maintain the knowledge stack of the motion planning algorithm*
- *Test and verify the performance of the motion planning algorithm*

05/2022 – 03/2023 **Engineer – Adaptive Cruise Assist (ACA)**, *Audi Automated Driving* *San Jose, CA*

Skills: Deep learning, Motion planning algorithm, Python

- *Building the deep learning pipeline for the driver monitoring system*
- *Function owner of driver monitoring system and motion planning system*
- *Deep learning network building for neighbor vehicle trajectory prediction*

05/2018 – 08/2018 **ADAS Engineer Co-op**, *Byton North America Corporation* *Santa Clara, CA*

Skills: Control system simulation, Simulink, Vehicle testing

- *Develop ADAS simulation models with SIMULINK and Carmaker*
- *Benchmark testing of the ADAS features in the testbed*

HONORS & ACTIVITIES

- **Guest speaker** at *2023 American Control Conference (ACC)* in the *Human Autonomy Interaction Workshop*
- **Invited speaker** at *CCDC TARDEC Innovation Talk*, 2019, Warren, MI
- **Chair** in Machine Learning Session at *2022 Modeling, Estimation, and Control Conference (MECC)*, NJC
- **Co-chair** in Control Theorem Session at *2021MECC*, Austin, TX.
- **Guest Editor** at *Sustainability*, special issue on "ITS and Sustainability", IF 3.889
- **Active reviewer** of the *IEEE top-tier journals* and Conferences
- **Full member of** *Scientific Research Honor Society Sigma Xi*

LIST OF SELECTED PROJECTS

- **Safe Vehicle Motion Planning in Corner Cases**: A novel two-player-zero-sum Markov game (TZMG) framework is proposed to train safe motion planner networks so that the maximum adversaries of the neighbor vehicles can be accommodated. The driving simulator is built on top of CARLA. Human participants are invited to act as aggressive (road-angry) neighboring drivers in the verification process.
- **Safe Imitation Learning (IL) in Highway Driving Scenario**: As a mentor, the human operator can teach autonomous systems how to drive safely. To reach this goal, a safety critic network is trained under the guidance of control barrier function (CBF). The trained safety critic can then inject safety awareness into the planner in the IL process.
- **Deep learning Pipeline for Automated Driver Sleepiness Labeling Assistant:** A deep learning-based automated driver sleepiness labeling assistant is built. Given the video recordings, the automated assistant outputs the driver's sleepiness level and its confidence as human's reference. The labeling interface is built with Qt5.
- **Haptic Assistive Control with Learning-Based Driver Intent Recognition:** In semi-autonomous driving scenarios, the driver intention is first recognized by the AdaBoost.M2. A Nonlinear model-predicative controller (NMPC) is then used to track the updated trajectory based on the recognized driver intentions.
- **Safe Human-centered Adaptive Cruise Control Design:** The driver's psychological comfort is quantified based on the action point (AP) driver model. An optimal control problem is formulated to improve driver comfort with the satisfaction of safety constraints. CarSim and Simulink were used to model the system and verify its design.
- **Human-Robot-Interaction (HRI) for the Vehicle Team under Adversaries:** An HRI solution is developed to improve the vehicle team's survivability under adversaries. The HRI is composed of an anomaly detection system, a Bayesian inference-based information management system, and a graphical user interface (GUI). Human-in-the-loop (HITL) experiment has been conducted with the proposed HRI.

LIST OF SELECTED PUBLICATIONS

- Wang, Yue, Fangjian Li, Huanfei Zheng, Longsheng Jiang, Maziar Fooladi Mahani, and Zhanrui Liao. "**Human Trust in Robots: A Survey on Trust Models and Their Controls/Robotics Applications.**" IEEE Open Journal of Control Systems, 2023.
- Li, Fangjian, Mengtao Zhao, John Wagner, and Yue Wang. "**Adversarial Learning for Safe Highway Driving based on Two-Player Zero-Sum Game.**" 2023 American Control Conference. IEEE, 2023.
- Li, Fangjian, Chengshi Wang, Dariusz Mikulski, John R. Wagner, and Yue Wang. "**Unmanned Ground Vehicle Platooning under Cyber Attacks: A Human-Robot Interaction Framework.**", IEEE Transactions on Intelligent Transportation Systems. 2022.
- Li, Fangjian, John R. Wagner, and Yue Wang. "**Safety-aware Adversarial Inverse Reinforcement Learning (S-AIRL) for Highway Autonomous Driving.**", ASME Journal of Autonomous Vehicles and Systems. 2021.
- Wang, Chengshi, Fangjian Li, Yue Wang, and John R. Wagner. "**Haptic Assistive Control with Learning-Based Driver Intent Recognition for Semi-Autonomous Vehicles.**", IEEE Transactions on Intelligent Vehicles. 2021.
- Sarker, Ankur, Haiying Shen, Mizanur Rahman, Mashrur Chowdhury, Kakan Dey, Fangjian Li, Yue Wang, and Husnu S. Narman. "**A Review of Sensing and Communication, Human Factors, and Controller Aspects for Information-Aware Connected and Automated Vehicles**." Transactions on Intelligent Transportation Systems, 2019.
- Li, Fangjian, and Yue Wang. "Cooperative Adaptive Cruise Control for String Stable Mixed Traffic: Benchmark and Human-Centered Design.", IEEE Transactions on Intelligent Transportation Systems. 2017.