Zhaoyi Wang

Phone: +86 178-0808-1543 | Email: 2233591@tongji.edu.cn
LinkedIn: wang-zhaoyi-907a262b6 | WebSite: wi11ione.github.io

EDUCATION

Tongji University (Tongji), Shanghai, China   Sep 2022 - Mar 2025

M.S.Transportation Engineering (Intelligent Vehicles track)

- GPA: 4.56/5.00 (88.9/100)
- Research Interests: The safety of autonomous vehicles for decision-making in long-tail environments. Specifically, safety-critical scenario generation, safety evaluation of autonomous vehicles, and data-closed loop self-evolve of decision-making algorithms.
- Advisor: Prof. Yanjun Huang (NSFC for Excellent Young Scholars)
- Core Courses: Traffic Engineering (5.0/5.0), Transport Data Analysis (5.0/5.0), Principles of Artificial Intelligence (5.0/5.0)

Jilin University (JLU), Changchun, China   Sep 2017 - Jun 2021

B.Eng. Automotive Engineering

- GPA: 3.71/4.00 (89.9/100 | JLU Outstanding Student)
- Core Courses: Mathematical Model (4.0/4.0), C Program Design (4.0/4.0), Fundamentals of Computer Technology (3.9/4.0),

  Advanced Mathematics (4.0/4.0), Probability and Statistics (4.0/4.0), Automobile Construction (4.0/4.0),

  Theory of Vehicle Control (4.0/4.0), Automobile Electronic Control Technology (4.0/4.0)

PUBLICATIONS & MANUSCRIPTS

[1] **Zhaoyi Wang**, Xincheng Li, Dengwei Wei, Liwen Wang, Yanjun Huang, "Efficient Generation of Safety-Critical Scenarios Combining Dynamic and Static Scenario Parameters", IEEE Transactions on Intelligent Vehicle (T-IV), 2024. **(JCR Q1)**

[2] Xincheng Li, **Zhaoyi Wang**, Yanjun Huang, Hong Chen "A Survey on Self-evolving Autonomous Driving: a Perspective on Data Closed-Loop Technology", IEEE Transactions on Intelligent Vehicle (T-IV), 2023. **(JCR Q1)**

[3] **Zhaoyi Wang**, Jialei Nie, Xincheng Li, Yanjun Huang, "Safety Boundary Online Identification for Autonomous Vehicle Considering Long-tailed Distribution", IEEE Transactions on Intelligent Transportation System (T-ITS), 2024. **(JCR Q1,under review)**

[4] **Zhaoyi Wang**, Xincheng Li, Shuo Yang, Shizhen Li, Jiatong Du, Xinyu Zhang, Yanjun Huang, "Safety Evaluation of Autonomous Driving Based on Safety-Critical Scenario Generation", IEEE Intelligent Transportation System Conference (ITSC), 2024. **(under review)**

[5] Xinyu Zhang, Zewei Zhou, Yangjie Ji, Jiaming Xing, **Zhaoyi Wang**, Yanjun Huang, "Co-HTTP: Cooperative Trajectory Prediction with Heterogeneous Graph Transformer for Autonomous Vehicles", IEEE Intelligent Transportation System Conference (ITSC), 2024. **(under review)**

[6] Yanjun Huang, **Zhaoyi Wang**, Jialei Nie, Haotian Chen, Xincheng Li,Jiatong DU, Safety-Critical Scenario Generation Method for Autonomous Driving Decision-Making Algorithm, 2024, CN Patent,**(under review)**

[7] Yanjun Huang, **Zhaoyi Wang**, Haotian Chen, Jialei Nie,Xincheng Li, Jiatong DU, Safety-Critical Scenario Generation Software for Autonomous Driving Decision-Making Algorithm, 2024, Software Copyright, **(under review)**

[8] Yanjun Huang, Xincheng Li, **Zhaoyi Wang**, Closed-loop self-evolving autonomous driving software, 2024, Software Copyright, **(under review)**

[9] **Zhaoyi Wang**, Peilun Han, Xincheng Li, Yanjun Huang, "Safety-Critical Scenario Generation Considering Global Diversity",2024,**(underwriting)**

RESEARCH EXPERIENCE

Key Technologies for Self-Evolving Learning-Based Autonomous Driving Systems | Institute of Intelligent Vehicles, Tongji University | Directed by Prof.Yanjun Huang   Sep 2022 - Present

Supported by the National Key R&D Program of China under Grant No2022YFB2502900

- Proposed a risk-guided policy optimization method for safety-critical scenario generation, which generates more diverse and plausible scenarios more efficiently.
- Proposed an adversarial traffic participant behavior model combining traffic prior and reinforcement learning, which solves the limitation that adversarial scenario generation can only be applied to specific working conditions.
- Proposed a safety-critical scenario generation method combining dynamic and static scenario parameters, which greatly improves the efficiency of scenario generation.

- Working on quantifying the diversity of scenarios and improving the diversity in safety-critical scenario generation for a comprehensive evaluation of autonomous vehicles.

Adaptive Evolution and Evaluation of Secure and Confident Intelligent Systems | Institute of Intelligent Vehicles, Tongji University | Directed by Prof.Yanjun Huang   Dec 2023 - Present

Supported by National Natural Science Foundation of China under Grant U23B2061

- Proposed an approach for the safety analysis of autonomous vehicles from complex safety-critical scenario data, which can intuitively reveal the distribution and characteristics of safety-critical scenarios for any given algorithm.
- Proposed a safety boundary online identification method that learns from the test data under a long-tailed environment.

Self-Evolutionary Methods and Applications for Intelligent Systems in Complex Environments | Institute of Intelligent Vehicles, Tongji University | Directed by Prof.Yanjun Huang   Feb 2023 - Present

Supported by Fundamental Research Funds for the Central Universities , Ministry of Education of China

- Working on applying continual reinforcement learning methods to improve the self-evolution of autonomous driving algorithms under safety-critical scenarios.
- Working on combining naturalistic driving data with adversarial scenario generation to improve the naturalness and plausibility of the generated scenario.

Design of New Generation Chassis Vehicle Traveling System and Analysis of Its Dynamic Performance | State Key Laboratory of Automotive Simulation and Control, Jilin University | Directed by Prof.Hsin Guan and Prof.Pingping Lu   Sep 2020 - Jun 2021

- Designed a new traveling system with four-wheel independent drive and four-wheel independent steering.
- Modeling of the vehicle dynamics and the distribution algorithm of steering angles and torques of four wheels
- Vehicle dynamics simulation and its performance analysis based on Matlab/Simulink and Carsim

Design of Active Lane-Changing System for Intelligent Vehicle and Its Hardware-in-the-Loop Testing | State Key Laboratory of Automotive Simulation and Control, Jilin University | Directed by Prof.Bing Zhu   Sep 2018 - Jun 2020

- Designed a lane change decision-making algorithm combining risk and efficiency and a lane-changing trajectory planning & control algorithm considering driving comfort and stability
- Designed a lane detection hardware-in-the-loop test platform

TECHNICAL STRENGTHS

Languages Skills:

 TOEFL iBT: 93 (Reading 23, Listening 23, Speaking 23, Writing 24)

 College English Test-6: 562 / 710 (Top 20%)

 College English Test-4: 581 / 710 (Top 20%)

Software Skills:

 Carla; Carsim; Prescan; Pytorch; Tensorflow; Gym;

Programming:

 Python; Matlab; Simulink;

ACADEMIC SERVICES & MENTORSHIP

Reviewers

Part D: Journal of Automobile Engineering Dec.   2023-Present

Mentoring

Haotian Chen (BS) Adversarial Scenario Generation Method for Arbitrary Working Condition.   Dec 2023-Present

Jialei Nie (BS) Online Identification of Safety Boundaries for Autonomous Driving Decision Algorithms   Jan 2024-Present

Peilun Han (BS) Diversity Enhanced Adversarial Scenario Generation Method Mar.2024-Present   Jan 2024-Present

HONORS & AWARDS

First Class Scholarship of Jilin University   2020.11

First Class Scholarship of Jilin University   2020.11
Outstanding Student of Jilin University   2020.11
Outstanding Student Leader of Jilin University   2020.11
First Class Scholarship of Jilin University   2019.11
Outstanding Student of Jilin University   2019.11
Tongji University varsity basketball tournament runner-up   2023.05

LEADERSHIP EXPERIENCE

Student Union of College of Automobile Engineering, Jilin University   Sep 2019 - Jun 2020
Head of Student Union Life Department