Zhuoren Li

- Currently pursuing Ph.D. degree with School of Automobile Studies, Tongji University, Shanghai.
  Advisor: Prof. Lu Xiong. Co-Advisor: Prof. Jia Hu and Associate Prof. Bo Leng.
- B.E. degree in Engineering Mechanics, Tongji University, Shanghai, China.
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I plan to finish my Ph.D. study in June 2025, and I'm looking for a post-doctoral position.

Research Experience

- **Interest of Autonomous Driving**: focusing on *Motion Planning, Interaction Decision, Reinforcement Learning, Uncertainty*.
  - Safety enhanced reinforcement learning for behavior decision making.
  - Integrated motion planning in uncertainty environment based on POMDP.
  - Optimization/Sample-based efficient trajectory planning.
- **Technology Director of 'Tiev-Plus' Electric Autonomous Vehicle** of Institute of Intelligent Vehicles.
  - Software system architecture.
  - Planning algorithm integration and Trajectory tracking.
- **Student Director of the Research Group of Decision and Control.**
  - Has been mentored 4 PhD students and 13 Master's students.
  - Project management and funding writing assistance.
- **20 Peer-reviewed Research Papers and 5 Patents：**
  - **Main Presented Papers:**

[1] Lu Xiong, **Zhuoren Li**, Danyang Zhong, et al. "Rule-Guidance Reinforcement Learning for Lane Change Decision-making: A Risk Assessment Approach," *Chin. J. Mech. Eng.* (accepted)

[2] **Zhuoren Li**, Jia Hu, Bo Leng, et.al. An Integrated of Decision Making and Motion Planning Framework for Enhanced Oscillation-Free Capability. *IEEE Trans. Intell. Transp. Syst.*, vol. 25, no. 6, pp. 5718-5732, June 2024.

[3] **Zhuoren Li**, Guizhe Jin, Ran Yu, Bo Leng and Lu Xiong, "Interaction-Aware Deep Reinforcement Learning Approach Based on Hybrid Parameterized Action Space for Autonomous Driving," *SAE Intell. Connected Veh. Symposium (SAE ICVS)*, 2024.

[4] **Zhuoren Li**, Lu Xiong, Bo Leng et.al. Safe Reinforcement Learning of Lane Change Decision Making with Risk-Fused Constraint, in *Proc. IEEE Intell. Transp. Syst. Conf. (ITSC)*, 2023, pp. 1313-1319.

[5] **Zhuoren Li**, Lu Xiong Bo Leng. A Unified Trajectory Planning and Tracking Control Framework for Autonomous Overtaking Based on Hierarchical MPC. in *Proc. IEEE Intell. Transp. Syst. Conf. (ITSC)*, 2022, pp. 937-944.

  - **Prepared Papers:**

[1] **Zhuoren Li**, Bo Leng, Jia Hu, et.al. "Safety Enhanced Reinforcement Learning for Autonomous Driving: Dare to Make Mistakes to Learn Faster and Better," *IEEE Trans. Intell. Transp. Syst.* (under review)

[2] Bo Leng, Ran Yu, **Zhuoren Li***, Wei Han, Lu Xiong and Bo Leng, "Risk-Aware Reinforcement Learning for Autonomous Driving: Improving Safety When Driving through Intersection," *IEEE Robot. Autom. Lett.* (under review)

[3] Bo Leng, Lu Xiong, **Zhuoren Li***, et.al. Multi-Mode Evasion Assistance Control Method considering Human Driver Operation. *Chin. J. Mech. Eng.*. (under review)

[4] Ruolin Yang, **Zhuoren Li**, Bo Leng, et.al. Convergent Harmonious Decision: Lane Changing in a more Traffic Friendly Way, *IEEE Trans. Intell. Transp. Syst.* (under review)

[5] **Zhuoren Li**, Jia Hu, Bo Leng, Lu Xiong, et.al. A Survey of Reinforcement Learning-based Motion planning for Autonomous Driving: Lessons Learned from a Driving Task Perspective.

- **Main Awards：**
  - SAE International Outstanding Technical Paper Award, SAE ICVS 2024.
  - Outstanding Doctoral Student Scholarship, Tongji University, 2024.
  - High-Level Academic Poster Award, China SAE Doctoral Student Academic Forum, 2024.
  - Vehicle-road-cloud Integrated Autonomous Driving Challenge, Third Prize, 2024.
  - World Artificial Intelligence Conference AI Driving Simulation Competition, Third Prize in the University Challenge Competition, 2022.
  - Annual Outstanding Individual Award of Institute of Intelligent Vehicles, 2022, 2023 and 2024.

Main Project Experience

- "High-Mobility Motion Planning and Control Research for Chassis-by-wire All-terrain Unmanned Vehicle with Hybrid-steering", **National Natural Science Foundation of China**, 2024, Project Core Participant.
- "Key Technology of Perception and Control in Cooperative Vehicle-Infrastructure System for Urban Public Transportation", **National Key Research and Development Program of China**, 2023, Project Core Participant.
- "Binary mixed traffic behavior characteristics and collaborative paradigm", **Science and Technology Commission of Shanghai**, 2022, Subproject Participant.
- "Development of Advanced Assistance Algorithm for Emergency Collision Avoidance based on Steer-by-Wire System", **Shanghai Automotive Industry Science and Technology Development Foundation**, 2022, Project Technical Director.
- "Autonomous Valet Parking (AVP) System Development", Project for Enterprise, 2021, Project Technical Director.
- "Development and Application of Automatic Valet Parking System", Project for Enterprise, 2020, Project Technical Director.