Zhuoren Li /李拙人

- 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 Making and Trajectory Planning.**
  - Has been providing research guidance for 2 PhD students and 9 graduate students.
  - Funding writing assistance and project management.
- **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, Lu Xiong, Zhuoren Li*, et.al. Multi-Mode Evasion Assistance Control Method considering Human Driver Operation. *Chin. J. Mech. Eng.*. (under review)

[3] 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)

[4] Zhuoren Li, Jia Hu, Bo Leng, Lu Xiong, et.al. Motion Planning for Autonomous driving: A Survey of Deep Reinforcement Learning Approach. (preparing for *IEEE TITS*)

- **Main Awards：**
  - 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 and 2023.
  - Vehicle-road-cloud Integrated Autonomous Driving Challenge, Third Prize, 2024.
  - High-Level Academic Poster Award, China SAE Doctoral Student Academic Forum, 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.