Long Xu | 徐隆

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Education

Zhejiang University (ZJU), Hangzhou, Zhejiang, China **2022 – Present**

Ph.D. student in Electronic Information, College of Control Science and Engineering.

- Advisor: Prof. Fei Gao

Zhejiang University (ZJU), Hangzhou, Zhejiang, China **2018 – 2022**

B.Eng. in Automation, College of Control Science and Engineering.

Honors and Awards

- **1st** prize at RoboMaster 2022 University AI Challenge 2022
- Zhejiang Government Scholarship (top 3%) 2020
- First Academic Scholarship of Zhejiang University (top 3%) 2019

Experiences & Projects

FAST (Field Autonomous System & compuTing) Lab **05/2021 – Present**

RoboMaster 2022 University AI Challenge (RMUA2022)

- Designed motion planning module. [Vedio]
- Realized **dynamic obstacle avoidance**, **dual-robot collaboration** and **rapid local re-planning**.
- Accelerate the process of trajectory optimization by using **CUDA** and GPU.

Research on motion planning of mobile robots on unstructured road (Graduation Project)

- Designed a geometry-based local **terrain assessment** algorithm.
- Using **B-spline** curve parameterized trajectories, implemented a local planner that considers **curvature constraint** and **terrain roughness**. [Vedio]

Design and manufacture of Ackermann chassis mobile robot (Research Assistant)

- Refitted the climbing remote control toy car into a **robot**. [Vedio]
- Implemented basis speed controller with STM32 and PID controller.
- Reproduced and implemented **Stanley trajectory tracking controller** with C++ and ROS.
- Reproduced and implemented the motion planning algorithm proposed in the work "Driving on Point Clouds"

Publications

(*Equal Contribution)

[1] Z. Han*, **L. Xu***, L. Pei, F. Gao, "Dynamically Feasible Trajectory Generation with Optimization-Embedded Networks for Autonomous Flight", *IEEE Robotics and Automation Letters*, 2025.
[Paper][Web]

[2] X. Li*, **L. Xu***, X. Huang*, D. Xue, Z. Zhang, Z. Han, C. Xu, Y. Cao, F. Gao, "SEB-Naver: A SE(2)-based Local Navigation Framework for Car-like Robots on Uneven Terrain", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2025.
[Paper][Vedio][Code]

[3] Z. W, Y. Li, **L. Xu**, H. Shi, Z. Ma, Z. Chu, C. Li, F. Gao, K. Yang, K. Wang, "SF-TIM: A Simple Framework for Enhancing Quadrupedal Robot Jumping Agility by Combining Terrain Imagination and Measurement", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2025.
[Paper][Web]

[4] S. Tan*, Z. Hou*, Z. Zhang*, **L. Xu**, M. Zhang, Z. He, C. Xu, F. Gao, Y. Cao, "Real-time Spatial-temporal Traversability Assessment via Feature-based Sparse Gaussian Process", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2025.
[Paper][Code]

[5] K. Chai*, **L. Xu***, Q. Wang, C. Xu, P. Yin, F. Gao, "LF-3PM: a LiDAR-based Framework for Perception-aware Planning with Perturbation-induced Metric", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024.
[Paper][Vedio][Code]

[6] Z. Han*, Y. Wu*, T. Li, L. Zhang, L. Pei, **L. Xu**, C. Li, C. Ma, C. Xu, S. Shen, F. Gao, "An Efficient Spatial-Temporal Trajectory Planner for Autonomous Vehicles in Unstructured Environments", *IEEE Transactions on Intelligent Transportation Systems*, 2023.
[Paper][Vedio][Code]

[7] **L. Xu**, K. Chai, Z. Han, H. Liu, C. Xu, Y. Cao, F. Gao, "An Efficient Trajectory Planner for Car-like Robots on Uneven Terrain", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023.
[Paper][Vedio][Code]

[8] C. Ma, Z. Han, T. Zhang, J. Wang, **L. Xu**, C. Li, C. Xu, F. Gao, "Decentralized Planning for Car-Like Robotic Swarm in Cluttered Environments", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023.
[Paper][Vedio][Code]

[9] J. Wang*, **L. Xu***, H. Fu, Z. Meng, C. Xu, Y. Cao, X. Lyu, F. Gao, "Towards Efficient Trajectory Generation for Ground Robots beyond 2D Environment", *IEEE International Conference on Robotics and Automation (ICRA)*, 2023.
[Paper][Vedio][Code]

SKILLS

- **Programming**: C++/C, Python, MATLAB, Java, CUDA
- **Software Development**: UE, ROS, Pytorch
- **Hardware Development**: IoT chips (STM32, Arduino)

ADDITIONAL ACTIVITIES

- Minister of Youth Volunteer Department of Youth League Committee, ZJU 2019
- Chief sax of Marching Band of Zhejiang University 2019