Jiaxin Li

Tel +86 159 70217523, Email: 22120207@bjtu.edu.cn

Education

Beijing Jiaotong University, Beijing, China 2022 Sep – 2025 Jun (Expected)
MS in Control Science and Engineering, GPA 92.27 / 100
Academic focus / background:
UAV trajectory optimization and control, non-omnidirectional robot path planning, robotic inspection systems, and dense crowd monitoring

Beijing Jiaotong University, Beijing, China 2018 Sep – 2022 Jun
BS in Automation, GPA 3.78 / 4.0 (Ranked 2nd out of 55)

Research Experience

Beijing Jiaotong University, Beijing, China 2023 Oct – Present

UAV Trajectory Planning and Tracking Control – Principal Investigator

- UAV Perching Trajectory Planning:
  - Developed a trajectory planning model for UAV perching on inclined surfaces using stereo vision for pose estimation.
  - Applied numerical methods to solve the optimal control problem, achieving precise tracking through geometric control.
- Multi-UAV Cooperative Landing:
  - Designed an optimal landing time model for scenarios with more UAVs than available landing spots, focusing on collision avoidance.
  - Implemented control strategies that optimized mission time while ensuring safe landings.

Beijing Jiaotong University, Beijing, China 2022 Sep – 2023 Jul

Airport Runway Inspection Robot – Principal investigator

- Developed a robot for autonomous airport runway inspections, incorporating RTK for outdoor positioning and a self-designed spiral complete coverage path planning algorithm to enhance path efficiency and coverage. This spiral algorithm improves upon traditional parallel line coverage by reducing overlap and offers greater stability compared to reinforcement learning-based methods. Integrated the YOLOv5 algorithm for real-time detection of surface cracks during inspections.
- Published a paper as the first author in the *Journal of field Robotics* (JCR: Q2), currently under revision.

Beijing Jiaotong University, Beijing, China 2022 Feb – 2022 Aug

Dense Crowd Monitoring: Pedestrian Counting and Tracking – Principal investigator

- Developed an algorithm to track pedestrians in dense urban environments, addressing challenges like occlusions and target overlap.
- Enhanced tracking robustness by integrating spatial density information with motion estimation, leading to improved accuracy in complex scenarios.
- Implemented improvements inspired by the DeepSORT algorithm, increasing reliability in tracking

pedestrians in crowded spaces.

Beijing Jiaotong University, Beijing, China 2021 Jul – 2021 Nov

Train Simulation and Demonstration Platform – Principal investigator

- Developed a semi-physical simulation system for train operation control using intelligent mobile robots and ROS. This approach addresses the safety and cost issues of real-world experiments, providing a reliable and cost-effective platform for validating train control theories and technologies.
- Designed and implemented a communication system for simulated trains and trackside devices, using ESP8266 for control and UDP for networking.
- A control center's software interface is designed using Qt.
- Awarded the Outstanding Undergraduate Design / Thesis at the University Level.

Beijing Jiaotong University, Beijing, China 2020 May – 2021 May

Intelligent Food Delivery Robot – Team leader of undergraduate students

- Led a team to design an intelligent food delivery robot, integrating image recognition, robotic arm control, and AGV navigation.
- Enhanced image recognition through preprocessing and optimized edge detection algorithms, improving accuracy and efficiency.
- Implemented SLAM for positioning; utilized A* and DWA algorithms for path planning and obstacle avoidance.
- Awarded the National College Students' Innovation and Entrepreneurship Training Program Project.

Teaching Experience

Beijing Jiaotong University, Beijing, China 2023 March – 2023 May

Teaching assistant:

- Sensors and Detection Technology (2023)

Publications

Jiaxin Li, Taogang Hou*, Xuan Pei, Hao Wang, Tianhui Liu, " A spiral coverage path planning algorithm for non-omnidirectional robots" submitted to *Journal of Field Robotics* (under revision).

Jiaxin Li, Xuan Pei, Hongjie Liu, Shuai Su, Tao Tang, Taogang Hou, "A Novel Train Operation Simulation System Based on Intelligent Mobile Robot and ROS Communication Network," 34th Chinese Control and Decision Conference (CCDC). IEEE, 2022: 97-102.

Extracurricular Activities

Graduate Student Union of Beijing Jiaotong University, Beijing, China 2022 Sep – 2023 Jun

Executive Member of the Scientific Research and Innovation Department

- Organized and led 48 students from the college to attend the China Scientific Instrument Standardization Forum.

- Coordinated and conducted pre-competition tutoring sessions for the China Graduate Electronics Design Competition.

Additional Info and Awards

- Skilled in ROS, Linux, Matlab, Python, C / C++, Qt
- First-class Scholarship ×3, BJTU 2022 - 2024
- Second Prize in the North China Division of the 18th China Graduate Electronics Design Competition, BJTU 2023
- Bronze Award at the National Competition of the 8th China International 'Internet Plus' College Students Innovation and Entrepreneurship Competition, BJTU 2023
- Second Prize at the National Level of the 13th 'Challenge Cup' China College Students Entrepreneurship Plan Competition, BJTU 2023
- Second Prize in the 2023 'Challenge Cup' Extracurricular Academic and Technological Works Competition for Capital College Students, BJTU 2023
- Outstanding Undergraduate Thesis, BJTU 2022