

Bai Ruofei

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Education

Nanyang Technological University (NTU) Ph.D. Candidate in Robotics School of Electrical and Electronics Engineering GPA: 4.92/5.00 Supervisor: Prof. Lihua Xie & Dr. Wei-Yun Yau	Singapore 08/2022 till now
Zhejiang University (ZJU) M.Eng. in Control Theory & Control Engineering College of Electrical Engineering GPA: Top 3/42 Supervisor: Prof. Ronghao Zheng	China 09/2019 - 03/2022
Zhejiang University (ZJU) B.Eng. in Automation College of Electrical Engineering GPA: 3.93/4.00	China 09/2015 - 05/2019

Research Project

Multi-Robot Navigation under Connectivity Constraints ICRA 2025	06/2024 till now
<ul style="list-style-type: none">Design planning algorithms to ensure inter-robot communication & observation in unknown environments.Formulate Line-of-Sight (LoS) constraints from raw LiDAR scans using visibility analysis in computer vision, eliminating previous limitations on prior environmental maps.Establish an MR-exploration framework in ROS & Gazebo: robots map unknown environments while keeping LoS connectivity.	
Active SLAM-Aware Robot Exploration RA-L 2024, IROS 2024	08/2022 - 05/2024
<ul style="list-style-type: none">Exploit prior topological-metric information for efficient exploration & reliable localization and mapping.Relate SLAM uncertainty with predicted pose graph topology for efficient SLAM uncertainty evaluation.Prove submodularity property for performance guarantee; verified in single- & multi-robot experiments.	
Path & Task Planning with Temporal Logic Specifications RAS 22, IROS 21	01/2020 - 03/2022
<ul style="list-style-type: none">Design a multi-robot task planning framework under linear temporal logic (LTL) specifications, including both individual and global collaborative tasks.Establish a hierarchical method to generate robots' execution plans: distributed local strategy search & joint optimization of global tasks.	

Work Experience

Planning and Control (PnC) Algorithm Intern Autowise.ai	04/2022 - 06/2022
<ul style="list-style-type: none">Implemented and evaluated path planning algorithms for autonomous driving, including sampling-based dynamic programming (DP); quadratic programming (QP) within driving corridors; and reachability set analysis for vehicle prediction.Developed a patent about merging driving corridors for improved planning efficiency.	
Team member Intelligent Car Competition of ZJU	01/2018 - 06/2018
<ul style="list-style-type: none">Designed fuzzy PID control laws to drive a tricycle car following the electromagnetic line in race competition, with challenging environments with sharp turns and uphill.Won first price in the University Competition (tricycle track).	
Software Engineer Intern Shenzhen D.Y. Innovations Technology Co. Ltd.	07/2018 - 09/2018
<ul style="list-style-type: none">Applied Bonjour mDNS protocol to automatically set up IP addresses for devices in a local area network with different operating systems, including Windows, Linux, and Android.	

Publications

[1] Realm: Real-Time Line-of-Sight Maintenance in Multi-Robot Navigation with Unknown Obstacles, 2025 IEEE International Conference on Robotics and Automation (ICRA)	2025
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Ruofei Bai, S Yuan, K Li, H Guo, WY Yau, L Xie.

- [2] Swept Volume-Aware Trajectory Planning and MPC Tracking for Multi-Axle Swerve-Drive AMRs, 2025 IEEE International Conference on Robotics and Automation (ICRA) 2025
T Hu, S Yuan, **Ruofei Bai**, X Xu, Y Liao, F Liu, L Xie.
- [3] AirSwarm: Enabling Cost-Effective Multi-UAV Research with COTS drones, Preprint. 2025
X Li, K Xu, F Liu, **Ruofei Bai**, S Yuan, L Xie.
- [4] Graph-based Slam-Aware Exploration with Prior Topo-Metric Information, IEEE Robotics and Automation Letters (RA-L) 2024
Ruofei Bai, H Guo, WY Yau, L Xie.
- [5] Multi-Robot Active Graph Exploration with Reduced Pose-SLAM Uncertainty via Submodular Optimization, 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2024
Ruofei Bai, S Yuan, H Guo, P Yin, WY Yau, L Xie.
- [6] Hierarchical Multi-Robot Strategies Synthesis and Optimization under Individual and Collaborative Temporal Logic Specifications, Robotics and Autonomous Systems (RAS) 2022
Ruofei Bai, R Zheng, M Liu, S Zhang.
- [7] Multi-Robot Task Planning under Individual and Collaborative Temporal Logic Specifications, 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2021
Ruofei Bai, R Zheng, M Liu, S Zhang.

Academic services: Reviewer of RA-L, ICRA, IROS, sensors, AIM, etc

Selected Awards

Singapore International Graduate Award (SINGA)	2022 - 2026
Outstanding Graduate of Zhejiang Province & ZJU (M. Eng.) Top 5%	2022
Outstanding Graduate of Zhejiang Province & ZJU (B. Eng.) Top 5%	2019
National Encouragement Scholarship (all three times)	2016, 2017, 2018
Honorable Mention Award for 2016 MCM/ICM	2016

Skills

Languages: CET-4; CET-6; IELTS 7.0; GRE 153(V)+169(Q)+3.5(AW)

Programming Languages: Python, C/C++, Matlab, Git, Bash, VHDL (for FPGA)

Engineering Software: ROS, Gazebo, Gurobi, G2O, GTSAM

Platforms: TurtleBot3, Pioneer3AT, DJI Tello UAV, MCU (Arduino, Raspberry Pi)