Yuexin Mu

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Education

Chongqing University (985 & 211 & double first-class)   Sep 2023 - Jun 2026
- Master of Software Engineering, GPA: 4.11(Ranked 4th)

Guangdong University of Technology (Graduate Recommendation, exam-exempt)   Sep 2019 - Jun 2023
- Bachelor of Computer Science and Technology, GPA: 3.72(Ranked 3rd)

Research Experience

1. Yuexin Mu, Ao Ren, Duo Liu, Zihao Zhang. " LIO-DPC: Accurate and Fast LiDAR-Inertial Odometry with Dynamic Pose Chain". ACM/IEEE Design Automation Conference (DAC), 2025. **(CCF-A Conference, Accepted)**

- Proposed LIO-DPC, a LiDAR–inertial odometry system integrating filtering and graph optimization via a dynamic pose chain, supporting real-time incremental updates and batch updates to achieve fast, accurate pose estimation.
- Introduced a loop-quality metric that identified and retained only the highest-quality loop closures for optimization, significantly reducing computational cost and enhancing mapping accuracy in real-world scenarios.
- Demonstrated superior accuracy over state-of-the-art methods on real-world datasets while maintaining real-time performance (on the UTBM dataset achieved speed comparable to the fastest Faster-LIO with about 5× accuracy gain).

2. Yuexin Mu, Ao Ren, Duo Liu, Zihao Zhang. "LIO-HKDT: Fast and Accurate LiDAR Inertial Odometry with Hash K-D Tree". IEEE Robotics and Automation Letters (**RA-L**). (**JCR-Q1** Under Review)

- This work proposed hkd-Tree, a hybrid data structure that integrates voxel-based localized search with the high-efficiency KNN search of k-d trees, avoiding overhead from exhaustive neighbor traversal and large-tree maintenance.
- Designed a voxel distribution mechanism and a buffered update strategy to enhance KNN search and incremental point cloud insertion, significantly improving the efficiency of real-time LiDAR–inertial odometry.
- Extensive experiments showed that LIO-HKDT maintained accuracy comparable to state-of-the-art methods while significantly improving efficiency, achieving about 42% faster point cloud matching than Faster-LIO in typical scenarios.

3. Zihao Zhang, Ao Ren, Duo Liu, **Yuexin Mu**. "EOL: Explicit Knowledge-Guided Object-Goal Navigation via Large Language Models." Association for the Advancement of Artificial Intelligence (**AAAI**). (**CCF-A**, Under Review)

4. Yuexin Mu, BaoYao Yang. "A Method and System for Cardiovascular Image Segmentation", 2023. (**Invention Patent**)

Project Experience

1. National Key Project: Cooperative Perception for Unmanned Vehicle Swarms   Jan 2024 - Jul 2025

- Developed hardware drivers and simulation plugins for chassis, IMU, and LiDAR, unifying real and simulated interfaces so algorithms validated in simulation could be directly deployed on vehicles, accelerating development.
- Designed a cooperative pose estimation algorithm integrating pose estimation, distributed loop closure, pose graph optimization, and dynamic pose chain management, enabling multi-robot localization and collaborative SLAM.
- Developed a distributed loop closure module using STD point cloud descriptors to build a feature database, matching local and neighboring descriptors to achieve both intra-robot and inter-robot loop closure detection.

2. Project Huiyan: Autonomous Perception and Navigation for Unmanned Vehicles   Oct 2023 - Sep 2024

- Developed URDF files and simulation plugins from vehicle parameters, building and testing environments in Gazebo.
- Developed chassis, LiDAR, and IMU drivers and simulation plugins based on the ROS-control framework, enabling vehicle localization, mapping, and navigation development in both simulation and real-world environments.
- Deployed and debugged localization, mapping, and navigation algorithms on real unmanned vehicles across diverse environments, including indoor office buildings, outdoor industrial parks, and warehouses.

Competition Experience

1. 20th China Postgraduate Mathematical Contest in Modeling – *National Third Prize*   Sep 2023 - Oct 2023

2. 22nd National College Students *Robocon* Competition – *National First Prize*   Sep 2022 - Aug 2023

- Responsible for mapping and navigation of a self-developed omnidirectional chassis, developing motor PID control, motion control, simulation models, sensor drivers, communication, SLAM, and path planning using ROS-control.

3. 21st National College Students *RoboMaster* Competition – *National Third Prize*   Sep 2021 - Aug 2022

- Responsible for debugging and tuning self-developed mecanum, omni, and steering wheel chassis, as well as launcher and gimbal mechanisms, using the ROS-control framework to ensure reliable performance in competition.
- Developed GPIO drivers and controllers in the ROS-control framework and implemented CAN protocols between host and vehicle; created URDF models for simulation and controller validation in Gazebo.

4. 21st National College Students *Robocon* Competition – *National First Prize*   Sep 2021 - Aug 2022

- Managed team operations, technical training, solution selection, and task planning; organized exchanges, wrote documentation, optimized control code, and set collaborative standards to improve efficiency.

5. 13th Lanqiao Cup National Software Competition – *Provincial Second Prize*   May 2020 - Aug 2021

6. 20th China Robotics and AI Competition – *Provincial Third Prize*   May 2020 - Aug 2021

- Developed task planning for a 6-DOF vehicle-mounted manipulator using MoveIt, scripting motions for grasping, inserting, and retracting a fuel nozzle, enabling automated operation and reliable task execution.

7. 10th National College Student Mechanical Design Competition – *Provincial Second Prize*   Mar 2020 - Aug 2021

- Developed motion control on STM32 for servos, stepper, and brushless motors, and implemented a task-switching state machine to coordinate multiple modules, ensuring reliable execution of robotic competition tasks.

8. 15th China Collegiate Computing Design Competition – *Provincial Second Prize*   Mar 2020 - Aug 2021

- Implemented motion control for an Ackermann steering vehicle and trained YOLO on a self-collected dataset to detect road signs and lane markings, enabling reliable perception and autonomous navigation in competition tasks.

9. 20th National College Students *Robocon* Competition – *National Third Prize*   Sep 2020 - Aug 2021

- Developed full control software on STM32 for one robot, covering motor closed-loop control, chassis driving, servo and cylinder actuation, and implementation of a task execution state machine with module-level debugging.
- Improved steering-wheel chassis control algorithm to eliminate cable entanglement, and optimized path planning with temporal constraints, enabling faster movement and higher task efficiency during competition.

Honors & Awards

First-Class Graduate Scholarship, Chongqing University	Sep 2024 - Jun 2025
First-Class Graduate Scholarship, Chongqing University	Sep 2023 - Jun 2024
Outstanding Graduate, Outstanding Undergraduate Thesis, Guangdong University of Technology	Sep 2022 - Jun 2023
First-Class Excellent Student Scholarship, Guangdong University of Technology	Sep 2021 - Jun 2022
Second-Class Excellent Student Scholarship, Guangdong University of Technology	Sep 2020 - Jun 2021

Skills

C/C++ , Python, SLAM, ROS, Pytorch, Opencv, STM32 microcontroller, 3D modeling.