

Jiahao Wang

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EDUCATION

Wuyi University

Master of Engineering, Computer Technology

Jiangmen, P.R.China

2020-2023 (expected)

Wuyi University

Bachelor of Engineering, Electronic Information Engineering

Jiangmen, P.R.China

2016-2020

EXPERIENCE

[Haomo.ai](#) (Internship)

Shenzhen, P.R. China

Large-Scale Mapping & Multi-Area Map Contact

2023.02-now

- Utilized IESKF as the slam front-end to reconstruct a major (5km*5km) point cloud map.
- Utilized ISAM2 as the factor graph model of slam back-end optimization.

Automatic Vectorization of High-definition map Lane Lines

2022.11-2023.02

- Designed and built a portable data collection device for mapping by using Livox LiDAR, Hesai 32-line LiDAR, IMU and GNSS.
- Reconstructed point cloud maps with clear intensity reflective lane lines and no overlapping points using FASTLIO-SAM, and integrated loop closure and GPS prior factor into the optimization process of the factor graph.
- Extracted point cloud 3D line features and image 2D line features, based on PnP(Perspective-n-Point) to estimate camera and LiDAR extrinsic.
- Based on the Mask2Former network, performed semantic segmentation on the image data and extracted 3D lane line point cloud through the camera and LiDAR extrinsic.
- Clustered the semantic point cloud of lane lines and fitted a polynomial to the point cloud.

[Tencent, Robotics X](#) (Internship)

Shenzhen, P.R. China

Wheeled Bipedal Robot Ollie Ball Balancing Control System

2022.03-2022.11

- Adapted the whole body dynamic control (WBC) algorithm to achieve self-balancing and high manoeuvrability of the robot based on the structural features of the castors and linkages of the underdriven wheeled bipedal robot.
- Utilized whole-body dynamic control, the robot solves a hierarchical QP problem with an optimization method and then achieves full-body posture adjustment by sending joint torques.
- Utilized the Gazebo simulation platform to simulate the robot's dynamics and incorporated simulated feedback signals from tactile sensors.

Multi-sensor Fusion Localization Robot & Relocalization Initialize

2021.04-2022.01

- Added laser odometry factor, IMU pre-integration factor, prior map matching factor and GNSS prior factor to the factor graph model, and completed global graph optimization using Ceres to estimate the current real-time attitude.
- Utilized Scancontext descriptor for 360-degree heading traversal matching, and ICP for acceptable registration, to initialize the Relocalization pose.
- Completed EVO trajectory alignment tests on the KITTI public dataset with an RMSE of 0.5m and a 90% repositioning success rate, eight times more efficient than ICP and NDT matching methods.

- Worked on robot recognition and detection using a camera, wrote embedded STM32 and motor driver code, created PCB, built a ROS-based robot control system, and was the electrical control team leader for two years in 2018 and 2019 in order to lead the team in the RoboMaster robotics competition hosted by DJI.
- Developed autonomous robots with 2D laser SLAM, navigation and path modules for power inspections in the Southern Power Grid of China.
- Combined 2D laser SLAM with 5DOF robotic planning and control and voice recognition to develop an elderly assistance service robot for the China Robotics Competition 2018.

AWARDS AND HONORS

- First-class Scholarship for Academic Excellence awarded by Wuyi University (2021,2022,2023)
- First Prize in Guangdong-Hong Kong-Macao Greater Bay Area IT Application System Development Competition (2022)
- Second Prize in the China Postgraduate Electronics Design Competition South China Division (2022)
- Second Prize in the RoboMaster Robotics Competition (2018,2019)
- Third Prize in the China Robot Contest in Sichuan Province (2018)
- Second Prize in the Guangdong Electronic Design Competition (2018)

PUBLICATIONS

- **J. Wang**, Z. Li, Y. Kong, and H. Huang, Adaptive Control System for Wheeled-Legged Robots, Computer Knowledge and Technology, 2022. (in Chinese)
- J. Zhang, **J. Wang**, S. Wang, Y. Zheng, and Z. Zhang, Ball Balancing on the Wheel-Bipedal Robot by Passivity-Based Control. (in Submission)

SKILLS

- **Programming:** Python, C/C++, MATLAB, ROS, Javascript.
- **Embedded:** Linux, RTOS, STM32, Arduino, Raspberry Pi, Rk3399, Esp82666.
- **Technologies:** Kalman Filter, Factor Graph, Nonlinear Optimization, Gazebo, PID, Point Cloud Processing, Calibration.
- **Tools:** OpenCV, CUDA, GTSAM, Ceres, g2o, Sophus, PCL, Git.
- **Languages:** Native Chinese speaker, fluent in English.

EXTRA-CURRICULAR ACTIVITIES

- Volunteered a total of 160 hours during my undergraduate and postgraduate studies in Jiangmen, including providing free education, visiting the elderly, promoting civilization, and other community services at Enping Middle School in Jiangmen.
- Developed an open-source 3D slam project called [FASTLIO-SAM](#) (Github 0.2K), which is a framework for Robotics or Handle Collect. The project has been compared with IESKF + ISAM2.
- Created Slam & Robotics study notes: [Sensor-fusion-for-localization-and-mapping](#) (Github star 0.5k) and [CSDN blog](#) (176 total posts). The notes contain personal slam learning records and a variety of laser slam algorithms, inertial navigation principles, based on optimization and filtering methods.