Yufeng Liu

curriculum vitae

Harbin Institute of Technology(Shenzhen)
Shenzhen
China
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Interests&Skills: ***SLAM***, ***Robotics***

Education

2020.9–present **B.Eng.**, *Harbin Institute of Technology(Shenzhen)*, Shenzhen, *GPA 3.6/4*.
Major: Automation

Publications

[1] Yu Wang, Haoyao Chen, Yufeng Liu, and Shiwu Zhang. Edge-based monocular thermal-inertial odometry in visually degraded environments. *IEEE Robotics and Automation Letters(RA-L)*, 8(4):2078–2085, 2023.

Experience

Vocational

2022.3-2022.12 **Research on SLAM algorithms specifically designed for thermal infrared cameras.**, *nROS-Lab*, HITsz.
Implemented experiments on extreme environments and datasets.
Participated in the implementation and debugging of the algorithm.
Evaluated state-of-the-art Monocular VIO like VINS-Mono, ORB-SLAM3, DM-VIO, ROVIO, PL-VINS, etc. on both our experiment data and open source datasets.
Our results are published in the form of articles in RA-L [1].

2022.9–present **Research on sensor fusion SLAM techniques that combine data from thermal cameras, LiDAR, and IMU sensors.**, *nROS-Lab*, HITsz.
Proposing a SLAM framework that fuses thermal camera, LiDAR and IMU.
Evaluated state-of-the-art LIO or LVIO like FAST-LIO, LIO-SAM, LVI-SAM, R2Live, R3Live, FAST-LIVO, etc.
Applied multiple ways to achive multi-sensor extrinc parameters calibration, like camera-IMU, LiDAR-IMU and Camera-LiDAR.Also, explored multiple approaches to perform time synchronization between sensors, including PTP, PPS(GNSS triggered or STM32 triggered).

2023.1–present **Research on a teleoperated robot equipped with a virtual reality (VR) remote-controlled gimbal system.**, *nROS-Lab*, HITsz.
Designed a two-axis gimbal for mobile robots:
Designed the 3D model by SolidWorks; implemented LQR and PID controllers for realtime gimbal pose control by coding on STM32; utilized the onboard BMI088 IMU for attitude estimation; established communication between STM32 and Intel NUC using CAN Bus.
Successfully developed a ROS node that subscribes to human control commands through Unity-ROS-TCP-Endpoint from a remote location and sends control messages to the STM32.

2023.1–present **Research on a deep learning-based framework for removing dynamic objects from pointcloud data**, *nROS-Lab*, HITsz.

Implemented shared memory to accelerate the transfer of point cloud data between a C++ ROS node and a Python PyTorch-based detection node.

2021.8–2022.8 **Team leader of Sentry Robot Group in RoboMaster competion**, *Critical-HIT robot team*, HITsz.

Led the Sentry Robot Group in the HITsz Critical-HIT RoboMaster Team.
Designed a fully automatic inspection and combat integrated robot. As the team leader, I coordinated task allocation and fostered collaboration among team members. Additionally, I served as the designer of embedded software. Developed a software framework programmed in C for the STM32 microcontroller, encompassing essential functions including a full-automatic state machine, motor control, communication, and more.

Miscellaneous

2022.7–2022.12 **Research on underwater mechincal grab robot**, *Lujian Technology Ltd.Co.*, Shenzhen.

Participated in the research of underwater robot design, contributed to the execution of underwater motion control.

2020.11–2021.7 **National University Students Intellingent Car Race**, *HITsz smartcar team*, HITsz.

Designed a tiny, automatic racing motorbike and implemented the Kalman Filter to solve IMU pose estimation while also applying control algorithms.

2020.10–2021.10 **Developed a ROS-based navigation system for a car equipped with 2D LiDAR for navigation and utilized OpenCV for line following capabilities**, *HITsz Freshman Term Annual Project Design*, HITsz.

Applied the ROS Navigation package for navigation of a mini mecanum wheel car. Implemented custom code for line following using OpenCV. Evaluated the performance of Cartographer for mapping and localization on the car.

Awards

2021.8 National — First Prize of RoboMaster University Championship

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2021.9 National — Thrid Prize of ChinaUndergraduate Mathematical Contest in Modelling

2020.12 Inter-school — First Prize with First Place among all students of Competion of the Robot Design and Practice Course