Yufeng Liu | curriculum vitae

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Education

Harbin Institute of Technology(Shenzhen) **Shenzhen,China**
B.Eng. in Automation *Sept.2020–present*

Skills

Programming: C++, C, Python, MATLAB

Software&tools: ROS, OpenCV, Gazebo, Eigen, PCL, GTSAM, Ceres, Git, PyTorch, LaTeX, Qt Creator

Hardware: STM32, SolidWorks

My Focus: SLAM, Robotics

Experience

Multi sensor SLAM algorithm in complex environments. **nROS-Lab,HITsz**
Oct.2021-present

- Participated in the implementation and experiment of an Edge-Based Monocular Thermal-Inertial Odometry [detailed in our publication] (2021.10-2022.12).
  - Achieved a simulation system in Ignition Gazebo for SLAM in complex extreme environments.
  - Deployed our ETIO in real world and conducted experiments in real world and datasets.
  - Familiar with the system framework of Monocular VIOs like VINS-Mono, etc.
  - Skilled in VIO deployment in the real world.
  - Skilled in thermal image processing.
- Proposing a SLAM framework that fuses thermal camera, LiDAR, and IMU.
  - Built a code framework fused sensors using ESIKF and factor graph optimization.
  - Skilled in ways to achieve multi-sensor extrinsic parameter calibration.
  - Skilled in approaches to perform time synchronization between sensors, including PTP, PPS (GNSS triggered or STM32 triggered).
  - Familiar with the system framework of LIO or LVIO like: FAST-LIO, LIO-SAM, LVI-SAM, R2Live, R3Live, FAST-LIVO, etc.
- Participated in the implementation of a SLAM system integrated planning and dynamic obstacle avoidance.
  - Achieved a pointcloud object detection system detecting moving target.
  - Applied deep-learning method for removing dynamic objects from pointcloud data to optimize the LiDAR odometry.
  - Implemented shared memory method to accelerate the transfer of point cloud data between a C++ ROS node and a Python PyTorch-based detection node.

Teleoperated robot equipped with a VR remote-controlled gimbal system. **nROS-Lab,HITsz**
Dec.2022–present

- Designed a two-axis gimbal with sensors for mobile robots:
  - Designed the 3D model using SolidWorks and implemented real-time gimbal control using STM32.
  - 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.
  - Developed Multi sensor SLAM algorithm on the gimbal.

Team leader of Sentry Robot Group in RoboMaster competition **Critical-HIT robot team,HITsz**
Aug.2021–Aug.2022

- Led the Sentry Robot Group in HITsz Critical-HIT RoboMaster Team.
  - Designed a fully automatic inspection and combat integrated robot.
  - Coordinated task allocation and fostered collaboration among team members as team leader.
  - Integrated fully automatic electronical control systems for the robot with STM32.
  - Developed target aiming algorithm framework, including detection with YOLOv5 and tracking with OpenCV, EKF.

Underwater grab robot control and navigation **Lujian Technology Ltd. Co.,Shenzhen**
May.2022–Dec.2022

- Participated in the research of underwater robot design and contributed to the execution of underwater motion control with STM32,IMU and underwater motors.
- Achieved a mono VIO system in Gazebo which suits the underwater environment and a controller with joystick.
- Achieved underwater target detection using YOLOv5.

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. [arxiv]

Awards

- First Prize of 2022 RoboMaster University Championship 2022
- First Prize of 2021 RoboMaster University Championship 2021
- Thrid Prize of ChinaUndergraduate Mathematical Contest in Modelling 2021
- First Place among all students of Competion of the HITsz Robot Design and Practice Course 2020