

# Yufeng Liu | curriculum vitae

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## Education

**Harbin Institute of Technology (Shenzhen)**  
*B.Eng. in Automation GPA:3.6/4.0*

**Shenzhen, China**  
*Sept. 2020–present*

## 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 the real world and conducted experiments in the 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, and 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 targets.
  - 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 electronic 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 the joystick.
- Achieved underwater target detection using YOLOv5.

## Skills

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Programming: C++, C, Python, MATLAB

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

Hardware: STM32, SolidWorks

My Focus: SLAM, Robotics

## Publications

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[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

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|---|------|
| ○ First Prize of 2022 RoboMaster University Championship                                      | 2022 |
| ○ First Prize of 2021 RoboMaster University Championship                                      | 2021 |
| ○ Third Prize of China Undergraduate Mathematical Contest in Modelling                        | 2021 |
| ○ First Place among all students of Competition of the HITsz Robot Design and Practice Course | 2020 |