Yixin Zhang

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Education

Harbin Institute of Technology — Shenzhen, CHN
Bachelor of Electrical Engineering and Automation(Control Track) — *Sep. 2020 – present*
- **GPA: 91.896/100, Rank: 1/44**
- Selected courses: Advanced Mathematics, Linear Algebra and Analytic Geometry, Probability Theory and Mathematical Statistics, Electric Circuit, Analog Electronics, Digital electronics

University of California San Diego — San Diego, USA
Visiting student, EECS — *Fall. 2023 – Spring.2024(Expected)*
- **GPA: 4.0**
- Selected Courses: Introduction to Computer Architecture, VLSI Implementation for Machine Learning (Graduate Level), Problistic Reason&Learning (Graduate Level), Search and Optimization (Graduate Level), Robotics (Graduate Level), Sensing&Estimation in Robotics (Graduate Level)

Publication

1. Yiming Ou, Hao Xiong, Hantao Jiang, **Yixin Zhang**, Bernd R. Noack, "Dynamic Obstacle Avoidance of Fixed-wing Aircraft in Final Phase via Reinforcement Learning", *IEEE Transactions on Aerospace and Electronic Systems*

Research Experience

Fixed-Wing Aircraft RL Obstacle Avoidance — Mar. 2023 – Present
Robot Learning Group — Harbin Institute of Technology, Shenzhen
Supervisor: Prof. Hao Xiong — *School of Mechanical Engineering and Automation*
- Developed the flying controller via offline reinforcement learning.
- Implemented a learning-based 3D cost map as navigator.
- Achieved a higher success avoidance rate than the baseline.

Honors & Awards

MITACS Research Scholarship, Canada	2023
National Scholarship, China's Ministry of Education	2022
First-class Undergraduate Academic Scholarship, HIT	2021-2023
Honorable Mention of Mathematical Contest in Modeling (MCM), COMAP	2022
First Prize in Mathematics Competition in Province, Chinese Mathematical Society	2021
Zhongsheng Outstanding High School Graduates Scholarship	2020

Selected Projects

Energy-Efficient Drone Landing Vision Framework — Sep. 2023 – Dec. 2023
Advisor: Prof. Mingu Kang — *UC, San Diego*
- Developed and quantized an end-to-end landing framework utilizing Proximal Policy Optimization (PPO) and Quantization Aware Training(QAT).
- Mapped the neural network on 2D systolic array and improved its performance.
- Archived a high task success rate and performance of computing units.

Orientation Tracking & Panoramic Image Construction
Jan. 2024

Advisor: Prof. Nikolay Atanasov — *UC, San Diego*

- Implemented a gradient descent algorithm to estimate the three dimensional orientation of a body using gyroscope and accelerometer measurements.
- constructed a panoramic image by stitching the RGB camera images over time based on the estimated body orientation.

LiDAR-Based SLAM
Feb. 2024

Advisor: Prof. Nikolay Atanasov — *UC, San Diego*

- Implemented odometry estimation using encoder and IMU measurements to accurately track the robot's movement and position over time.
- Enhanced initial odometry estimates by employing the Iterative Closest Point (ICP) algorithm for precise LiDAR scan matching, significantly improving the robot's localization accuracy.
- Produced a detailed 2-D occupancy map of the environment using LiDAR scans, along with a 2-D texture map of the floor utilizing Kinect RGBD images for a comprehensive environmental model.
- Leveraged the GTSAM library for further optimization of robot trajectory estimates, incorporating loop-closure constraints to refine the accuracy of the robot's path over long distances.

Visual-Inertial SLAM
Mar. 2024

Advisor: Prof. Nikolay Atanasov — *UC, San Diego*

- Designed and implemented an Extended Kalman Filter (EKF) based on SE(3) kinematics integrating IMU measurements for real-time IMU localization to predict robot pose over time.
- Developed landmark mapping algorithms using EKF updates by processing visual feature measurements from stereo-camera data, optimizing for computational efficiency.
- Advanced the project to visual-inertial SLAM by fusing IMU predictions with visual observations to enhance the stereo-camera observation model and achieve robust environmental mapping.

Skills

Languages: English (*IELTS*: Overall: 7(writing7)), Mandarin Chinese(native)

Programming: C/C++, Python(PyTorch, TensorFlow), Verilog, MATLAB/Simulink

Tools: Git, Arduino, Raspberry Pi, STM32, DSP