Qiyuan LIU

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SKILLS

Programming & Tools: Python, PyTorch, C++, MATLAB/Simulink, ROS, Linux, Simulation (Unity, PyBullet, Gazebo), Git, Docker

Engineering: Robotics, Control (PID, LQR, MPC), RL, Sensor Fusion, SLAM, Embedded (ESP32, STM32, PX4, RB5), SolidWorks

Soft Skills: Cross-Disciplinary Collaboration, Rapid Prototyping & Iterative Design, Debugging & Root Cause Analysis

EDUCATION

University of California, Berkeley (UCB) - CGPA 3.85 / 4.00 **Aug. 2024 – May 2025**

Master of Engineering, Mechanical Engineering – Control of Robotics & Autonomous Systems

– Recipient of UC Berkeley **Eaton-Hachigian Fellowship** for outstanding academic performance and leadership.

Nanyang Technological University, Singapore (NTU) - CGPA 4.57 / 5.00 **Aug. 2020 – Jul. 2024**

Bachelor of Engineering, Mechanical Engineering – Robotics and Mechatronics Stream

– with Robotics and Mechatronic Engineering Certificate.

EXPERIENCE

Research Assistant **Sep. 2024 – May 2025**

UC Berkeley, High Performance Robotics Lab (HiPeRLab)

– Collaborated on a PX4+RB5 UAV platform; tuned EKF2 parameters for better vision-IMU fusion to improve the state estimation accuracy; conducted repeatable flight tests to evaluate fusion stability. Reduced pose drift in indoor flights by over 20%.

– Developed a Unity-ROS simulation framework enabling rapid algorithm testing and halving UAV development time; built and validated a multi-drone control system in simulation, with refined flight logic for smoother and more coordinated trajectories.

Robotics Engineer **Dec. 2022 – May 2023**

Satellite Research Center (SaRC)

– Trained a vision-based pushing and grasping (VPG) model for object manipulation in cluttered environments using RGB-D input and a custom reward function based on grasp success. Built randomized PyBullet scenes to improve generalization and robustness.

– Deployed VPG on a UR5 by converting model outputs to end-effector poses using depth projection and camera calibration, generating executable trajectories with MoveIt and TrajOpt to ensure smooth, collision-free pushing and grasping in cluttered tabletop settings.

Mechanical Engineer **May 2022 – Dec. 2022**

Surbana Jurong - NTU Corporate Lab (SJ-NTU Lab)

– Contributed to the project iScan2BIM by tuning parameters of a LiDAR-IMU SLAM system and integrating A* global planning with DWA local control for indoor navigation. Improved trajectory stability and reduced BIM scanning runtime over 25%

– Designed and implemented a soft-joint four-bar vibration isolation mount for the IMU, effectively mitigating vehicle motion-induced noise and reducing IMU drift. Enhanced overall SLAM consistency and localization accuracy.

PROJECT

UC Berkeley Capstone Project at HiPeRLab **Sept. 2024 – Jul. 2025**

Efficient Path Planning and Data Transmission for UAVs in Precision Agriculture

Researcher, supervised by Prof. Mark W. Mueller

– Developed a scalable multi-UAV system for automated agricultural sensor data collection, with intelligent task allocation and onboard obstacle avoidance; validated in Unity simulation to collect data from 100 soil sensors over a 500 $\times$ 500 m area within 31 minutes. Deployed on a single UAV for lab testing, achieving reliable data acquisition. Detailed model: Website-EPPDT.

Multi-Agent collaborative Objects Retrieval **Sept. 2024 – Dec. 2024**

Weighted Voronoi Cell-based Task Allocation for Collaborative Object Retrieval

Student, supervised by Prof. Negar Mher

– Designed a task allocation algorithm which adjusts Voronoi cell weights based on task suitability and completion status, allowing boundaries to flexibly adapt. This enhances the flexibility of traditional space-partitioning algorithms, resulting in a 57.14% increase in task efficiency and a 21.71% improvement in task distribution balance. Detailed model: GitHub-DVSPTA.

NTU Final Year Project at RRC, Singapore **Jan. 2023 – May 2024**

Behavior Imitation for Manipulator Control with Deep Reinforcement Learning

Researcher, supervised by Prof. Chen Lyu & Prof. Bihan Wen

– Developed a PPO-based motion imitation model that enabled a 6-DOF robotic arm to closely imitate human arm motion extracted from video inputs. Model validated in a PyBullet simulated environment, resulting in robust performance and adaptability to various motion patterns with an average imitation accuracy of 92% across diverse test scenarios. Detailed model: GitHub-MoIm.

RobotX Challenge: Autonomous Maritime System **May 2022 – Jan. 2023**

Cognition & Recognition of Floating Object on Water Surface

Contestants, supervised by Prof. Ming Xie

– Trained a high-precision YOLOv5 floating object recognition model and integrated it into an autonomous navigation system for an unmanned surface vehicle (USV). The system combines GPS and IMU for localization and state estimation, and uses a calibrated perspective projection transformation to accurately compute the 3D coordinates of targets, enabling precise navigation.