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**
A Cooperative Multi-UAV System for Autonomous Data Retrieval in Agricultural Environments
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 500×500 m area within 31 minutes. Deployed on a single UAV for lab testing, achieving reliable data acquisition. Project website: 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**
Vision-Based Object Detection and Target Projection for USV Perception
Contestants, supervised by Prof. Ming Xie
– Trained a YOLOv5 model to detect floating objects under complex water-surface conditions using a custom-labeled dataset, and integrated it into a ROS-based perception pipeline for a USV; contributed to GPS+IMU localization and 2D-to-3D target projection, and validated system robustness through simulation and real-world field testing with senior teammates.