Qiyuan LIU

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SUMMARY

Experienced in learning-based / adaptive / real-time control, estimation & filtering, and sys. integration, including hands-on work with automation systems. Seeking a Mechanical Engineer role to advance control strategies and drive innovative applications in automation.

SKILLS

Developing: Python, C++, MATLAB, PyTorch, Linux, RTOS, ROS, Arduino, ESP32, Git, Docker, Unity, PyBullet, Gazebo, LATEX

Mechanical: Robotics, Control Systems, RL, SLAM, System Integration, Mechatronics, 3D-Printing, SolidWorks, AutoCAD, FEA

Softskills: Leadership & Teamwork, Time Management & Multitasking, Problem-Solving, Adaptability & Continuous Learning

EDUCATION

University of California, Berkeley (UCB) - CGPA 3.846 / 4.0 **Aug. 2024 – Present**

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

- Awarded 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

- Certified with Robotics & Mechatronics Specialization.

PROFESSIONAL EXPERIENCE

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

Satellite Research Center (see website)

- Implemented motion planning for the UR5 robotic arm using MoveIt with TrajOpt for global trajectory and Cartesian Path for precise end-effector motion. Resulted in improved execution efficiency, and reduced mechanical wear in industrial automation tasks.
- Deployed a vision-based pushing and grasping system on the UR5 robotic arm, training a self-supervised deep reinforcement learning model (VPG) to enhance object manipulation efficiency, resulting in improved grasp success rates in cluttered environments.

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

Surbana Jurong - NTU Corporate Laboratory (see website)

- Deployed LiDAR SLAM-based indoor navigation, with LIO-SAM for LiDAR-IMU fusion. Integrating A* + DWA for real-time navigation and obstacle avoidance. Accelerated the iScan2BIM workflow by one-third and enabled more efficient indoor navigation.
- Designed and 3D printed low-friction TPU wheels and flexible chassis components, optimizing tread patterns, wheel geometry, and structural damping to reduce vibration and improve stability in differential drive ground vehicles.

PROJECT EXPERIENCE

UC Berkeley Capstone Project at HiPeRLab **Sept. 2024 – Present**

Efficient Path Planning and Data Transmission for UAVs in Precision Agriculture

Researcher, supervised by Prof. Mark W. Mueller

- Developed a fully autonomous agricultural data retrieval drone system that supports both single and multi-drone versions to accommodate different scales of work. The system integrated a heuristic global planning, VIO and Kalman Filter for real-time state estimation, and RAPPIDS local controller with precise path planning and obstacle avoidance for efficient and reliable data collection.

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

Weighted Voronoi Cell-based Task Allocation for Collaborative Objects 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.