Qiyuan LIU

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SKILLS

Programming: Python, PyTorch, DRL, C++, ROS, Linux, Data Analysis, Git, PyBullet, Gazebo, MATLAB, Markdown, LaTeX

Mechanical: Robotics, Intelligent Control, SLAM, Mechatronics, Robot Design, SolidWorks, AutoCAD, Finite Element Analysis

Softskills: Teaming & Project Management, Leadership, Collaboration, Adaptability, Problem-Solving, Time Management

EDUCATION

University of California, Berkeley (UCB) - CGPA 3.8/4.0 **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

Research Assistant **Dec. 2022 – May 2023**

Satellite Research Center (see website)

– Developed a DRL-based robotic control system, ensuring highly precise UR3 grasps in real time and dynamic environments.
– Implemented a 3D pose estimation algorithm to extract skeletal motion data from video with robust real-time performance.
– Designed a vision-based model automating IC structure recognition, easing diagram generation and removing manual effort.

Robotics Engineer & Research Assistant **May 2022 - Dec. 2022**

Surbana Jurong - NTU Corporate Laboratory (see website)

– Contributed to an indoor navigation algorithm for iScan2Bim, significantly optimizing pathfinding and operational efficiency.
– Designed a multi-agent simulation environment for collaborative tasks, ensuring interaction and coordination among robots.
– Debugged ROS to troubleshoot operational challenges, ensuring robust software-hardware integration for robot performance.

PROJECT EXPERIENCE

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

Efficient Path Planning and Data Transmission for UAVs in Precision Agriculture

Researcher, supervised by Prof. Mark W. Muller

– Developing an autonomous multi-UAV path planning algorithm and data transmission strategy for precision agriculture, focusing on safe navigation in cluttered environments and adaptable data retrieval from various sensor placements. Constructing a simulation test environment in agricultural scenarios, with plans for real-world UAV deployment upon successful validation.
– Designed and implemented a fully automated UAV controller, achieving precise and stable operation of sensor-equipped UAVs in complex environments, with advanced features such as adaptive control algorithms and robust obstacle avoidance capabilities.

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

Weighted Voronoi Cell-based Task Allocation for Collaborative Objects Retrieval

Researcher, supervised by Prof. Negar Mher

– Designed a task allocation algorithm based on Voronoi space partitioning, which assigns tasks by dynamically adjusting the boundaries of Voronoi cells to adapt to environmental and task changes. Achieved a 57.14% increase in task efficiency, and a 21.71% improvement in task distribution balance. Detailed model at: GitHub-DVSPTA.

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

Behavior Imitation for Manipulator Control with Deep Reinforcement Learning

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

– Developed a DRL-based motion imitation model leveraging Proximal Policy Optimization (PPO) that enabled a 6-DOF robotic arm to closely imitate human arm motion extracted from video inputs. See detailed model at: GitHub-MoIm.
– Successfully validated the model in a simulated environment using PyBullet, demonstrating robust performance and adaptability to various movement patterns, achieving an average imitation accuracy of 92% across diverse test scenarios.

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

Cognition & Recognition of Floating Object on Water Surface

Researcher, supervised by Prof. Ming Xie

– Built and deployed a robust floating object recognition system for unmanned surface vehicles, integrating machine learning algorithms to enhance object detection and classification accuracy in dynamic maritime environments. Successfully achieved full autonomy in completing competition tasks, demonstrating reliable system performance under waves, lighting, and debris.