SHIH-CHUAN WANG

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EDUCATION

Carnegie Mellon University, School of Computer Science — Pittsburgh, PA
M.S. in Robotic Systems Development — GPA: 4.0/4.0 — May 2021

National Taiwan University (NTU) — Taipei, Taiwan
B.S. in Biomechatronics Engineering — Jun. 2018

SKILLS

Programming	C/C++, Python, Julia, MATLAB, MySQL
Robotics	Motion planning, Trajectory optimization, Optimal control, Navigation
Software/Tools	ROS/ROS 2, MoveIt 2, OMPL, Gazebo, Docker, Git, SBPL, Simulink, etc

EXPERIENCE

Miso Robotics — Pasadena, CA
Software Engineer — Jul. 2021 - May 2023

- Contributed to all aspects of behavior and planning system for robotic kitchen assistants, including feature development, maintenance, deployment, processes, and tools, etc
- Boosted overall planning system performance by identifying and fixing bugs, developing new features and tools, and leveraging real-world data. One of the KPIs in interest increased 90%
- Performed refactoring on the entire behavior system to improve scalability for different configurations and customer needs
- Led design and development of a new fallback planner to improve planning system performance using ROS2
- Served as the subject matter expert of behavior and planning on the project for Miso's next-generation robotic kitchen assistants, and worked closely with hardware, platform, and infrastructure team
- Supported robot testing, integration, deployment, and troubleshooting for multiple customer sites

Biorobotics Lab, Robotics Institute, CMU — Pittsburgh, PA
Research Assistant — Feb. 2021 - May 2021

- Worked on planning and control of off-road autonomous RC car for fast navigation and exploration
- Improved local planner and reference tracking controller to satisfied stakeholder requirements using model predictive stochastic optimal control algorithm (MPPI), EKF sensor fusion, and point cloud processing
- Maintained software infrastructure for efficient system field test and deployment using Docker and customized deployer

Search-based Planning Lab, Robotics Institute, CMU — Pittsburgh, PA
Research Intern — Jun. 2020 - Aug. 2020

- Conducted research on multi-UAV path planning with global deconfliction for persistent coverage and surveillance
- Adapted frontier-based exploration for goal assigner utilizing multi-objective utility function and multi-goal A*
- Designed motion primitives for kinodynamic motion planning using graph search(MHA*) and lattice-based planner
- Developed novel goal assigner and debugged existing software pipeline to improve coverage performance by 80%

Robots and Medical Mechatronics Lab, NTU — Taipei, Taiwan
Research Assistant — Jul. 2018 - Jan. 2019

- Performed system identification and designed DOB controller on a surgical robot prototype to improve tracking accuracy
- Derived inverse dynamic model and analyzed controller performance of a handheld surgical robot, suppressed error of tip motion to within 2mm

PROJECTS

Apartment Package Delivery System with UAV — Pittsburgh, PA
MRSD Capstone Project — CMU

- Developed an unmanned aerial vehicle system to deliver packages from building entrance to apartment balconies
- Built and integrated a software stack(ROS/C++/Python) comprising of planning, navigation, perception & simulation modules with ability to conduct full pipeline experiments
- Implemented sampling-based global planner and receding-horizon local planner by leveraging OMPL and OctoMap representation to generate smooth and collision-free trajectory
- Devised visual servo algorithm and recovery strategy to pickup package while having limited localization accuracy(GPS)

Model Learning and Trajectory Optimization for Power Drifting Vehicle — Pittsburgh, PA
Underactuated robotics — CMU

- Utilized trajectory optimization framework (iLQR) to stabilize vehicle to a specific power drifting condition
- Learned the vehicle dynamic model using Sparse Spectrum Gaussian Process to achieve efficient approximate inference