SHIH-CHUAN WANG

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EDUCATION

Carnegie Mellon University, School of Computer Science — Pittsburgh, PA
M.S. in Robotic Systems Development — GPA: 4.0/4.3 — May 2021
Selected Coursework: Planning and Decision-making in Robotics, Robot Localization and Mapping

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

EXPERIENCE

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 state 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

- Mobile Robot for Field Robot Competitions
  - Consturcted robotic software platform on a ARM Cortex-M3 based microcontroller using C/C++ to enable speed control and data transmission interface for mobile robot navigation
- Handheld Surgical Robot for Orthopedic Surgery
  - Performed system identification and designed DOB controller on a surgical robot prototype to improve tracking accuracy using Simulink and xPC
  - Derived inverse dynamic model and analyzed controller performance of a handheld surgical robot, suppressed error of tip motion to within 2mm

Robots and Medical Mechatronics Lab, NTU — Taipei, Taiwan
Undergraduate Researcher — Sep. 2016 - Jun. 2018

- Built the redundant SCARA robot from scratch, from motor control, robot kinematic and dynamic analysis, to planning algorithm (RRT) simulation, as a prototype for obstacle avoidance study
- Devised controller using feedback control strategy and achieved joint steady-state error of 0.1 degree

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 using OMPL and OctoMap representation to generate smooth and collision-free trajectory

Robot Manipulation with Self-supervising Reinforcement Learning — Pittsburgh, PA
Robot Autonomy — CMU

- Designed and developed policies to reset simulation environment as a part of learning-resetting pipeline for task of putting groceries in cupboard
- Implemented Constrained-RRT and collision checking algorithm to generate feasible path for Franka robot arm

Robot Localization using Particle Filter — Pittsburgh, PA
Robot Localization and Mapping — CMU

- Created a global localization filter for a lost indoor mobile robot with a given map using C++
- Demonstrated ability to converge to a correct position leveraging data from odometry and laser rangefinder

SKILLS

Programming	C/C++, Python, MATLAB, LaTeX
Software/Tools	ROS, OMPL, Gazebo, SBPL, Simulink, SolidWorks, OpenCV, xPC, etc
Language	Chinese(native), English(fluent)