

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, Underactuated robotics

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
 - Constructed 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

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

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

SKILLS

Programming

C/C++, Python, MATLAB, \LaTeX

Software/Tools

ROS, OMPL, Gazebo, SBPL, Simulink, SolidWorks, OpenCV, xPC, etc

Language

Chinese(native), English(fluent)