Po-Jui 'Ray' Huang

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Education

University of Southern California August 2023 - Present, Los Angeles, CA
Master of Science in Computer Science (Intelligent Robotics)
National Yang Ming Chiao Tung University September 2017 - March 2023, Hsinchu, Taiwan
Master of Science in Electrical and Control Engineering GPA: 4.01/4.3
Bachelor of Science in Electrical and Computer Engineering GPA: 3.61/4.3

Skills

Programming Languages: C/C++, Python, Matlab, HTML
Frameworks/Tools: PyTorch, TensorFlow, ROS, ROS2, Gazebo, Docker, OpenCV, PCL, Git
Embedded Board: Nvidia Jetson (Xavier, TX2, Nano), Raspberry PI(3B, 3B+), RB5, PXA270

Work Experience

Maritime RobotX Challenge Sydney, Australia
NYCU Team Leader January 2022 - March 2023
- Achieved 3rd place out of 20 teams as the head of a fifteen-member team, responsible for WAM-V related missions
- Developed deep reinforcement learning autonomy system for WAM-V using TensorFlow and Gazebo simulator, resulting in sim-to-real capabilities for goal navigation and collision avoidance
- Integrated autonomy system with EfficientDet perception module and applied behavior tree to manage the state of WAM-V with Python, C++ and ROS

URSROBOT Inc. Taipei, Taiwan
Software Engineer Intern May 2023 - July 2023
- Applied ROS2 navigation pipeline in simulation and real robot with Nav2 and Robot Localization
- Designed software for GPS waypoints navigation with Python, C++ and ROS2. Implemented trajectory recording and following functionalities, and deployed the system on RB5 with Docker and auto bring up; Qualcomm sponsored project

Curriculum Reinforcement Learning for Robot Navigation Hsinchu, Taiwan
Research Assistant in Assistive Robotics Group
Topic: Heterogeneous Robot Transfer (patent pending) March 2022 - March 2023
- Utilized TensorFlow to implement curriculum reinforcement learning on unmanned ground vehicle and unmanned surface vehicle, adapting to heterogeneous robot setups with varying sensor modalities and vehicle dynamics

Topic: Navigating among Movable Obstacles July 2021 - January 2023
- Applied curriculum reinforcement learning with TensorFlow to stimulate agent to achieve high reward space; dealt with complex tasks including passing narrow gates and interacting with movable obstacles
- Published paper to **IEEE Robotics and Automation Letters 2023**

DARPA Subterranean Challenge: Urban Circuit Elma, Washington, USA
NCTU Team Member
Topic: Millimeter wave radar navigation in adverse environmental conditions March 2020 - March 2021
- Built and calibrated sensor system to collect 5000+ synchronized data for millimeter wave radar navigation

Topic: Unmanned Fireproof Spherical Robot Platform September 2019 - March 2020
- Built movable spherical nodes including mesh WiFi and Xbee with Python and ROS for communication systems, as well as emergency stop system to adhere to competition safety criteria
- Executed fireproof experiment using spherical robot; robot still functioned after being on fire for 45 seconds

Published papers to **IEEE Robotics and Automation Letters 2021** and **Field Robotics 2021**

Selected Projects

Search and Rescue with Mobile Robot
- Implemented a teleoperated robot (LoCoBot) system with mission to detect and localize specific objects in an environment where a map is given via Apriltags by Python, C++ and ROS (won 1st place out of 10 teams in final project competition)

3D Object Tracking and Localization
- Applied ICP algorithm to estimate self-driving car positions with a given point cloud map using C++ and PCL
- Accomplished Argoverse 3D Tracking Competition by detecting and giving location for every object in scene using PCL

Embedded Operating Systems
- Designed card matching game with PXA270 by socket, semaphore, multi-thread and timer with C++