Ray Huang

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Education

University of Southern California August 2023 - May 2025, 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
Bachelor of Science in Electrical and Computer Engineering

Technical 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

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)

International Competition Experience

Maritime RobotX Challenge Sydney, Australia
NYCU Team Leader January 2022 - January 2023
- Achieved 3rd place out of 20 teams as leader of a fifteen-member team, represented team to present technical skills and system architecture to competition organizer
- Developed deep reinforcement learning autonomy system for WAM-V using TensorFlow and Gazebo simulator, resulting in sim-to-real capabilities and achieved 98% success rate 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

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 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

Research Experience

Thesis: *Heterogeneous Robot Transfer for Autonomous Navigation via Curriculum Reinforcement Learning* 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
- Submitted paper to IEEE Robotics and Automation Letters 2024 (first author), patent pending in Taiwan

Navigating among Movable Obstacles July 2021 - October 2022
- 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

Selected Projects

Embedded Operating Systems Spring 2022
- Designed card matching game with PXA270 by socket, semaphore, multi-thread and timer with C++

Search and Rescue with Mobile Robot Spring 2020
- 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)