Po-Jui 'Bory' Huang

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EDUCATION

National Yang Ming Chiao Tung University Hsinchu, Taiwan
M.S. in Graduate Degree Program of Robotics September 2020~ March 2023(expected)

National Tsing Hua University Hsinchu, Taiwan
B.S. in Electrical Engineering September 2016~ June 2020

SKILLS

- **Programming:** Python, C/C++, Matlab
- **Middleware and Libraries:** ROS, Gazebo, Docker, OpenCV, PCL
- **Embedded Board:** Nvidia Jeston (Xavier, TX2, Nano), Raspberry PI(3B, 3B+)
- **Hardware:** SolidWorks, 3D Printing

RESEARCH EXPERIENCE

Maritime RobotX Challenge Sydney, Australia
Team NYCU Control & Communication Lead March 2022 - November 2022

- Won 3rd place out of 20 teams in the competition
- Developed resilient communication system using the combination of **customized Wi-Fi device TVL** and **Xbee**; achieved stable communication between WAM-V and shoreside base station for situation awareness purpose.
- Integrated lidar and camera to get the precise depth of the desired object in the bounding box with **Python and ROS,** and is used in docking, find and fling, entrance and exit, scan the code mission.
- In charge of WAM-V-related missions; responsible for heartbeat and design of find and fling system
- Head of Control & Communication system, responsible to all propulsion and communication system on board, including cracking Torqeedo motor RS485 protocol.

Resilient communication system used in multi robot search and rescue mission April 2022 - Present

- Implemented HRVO algorithm to multiple USV, prevent multiple USV from colliding to each other during doing search and rescue mission in same area.
- Applied resilient communication system to USV, let USV can switch to decentralized mode when facing signal interference.

Long-term monitoring USV September 2020 - Present

- Design and assemble light weight solar USV- Solar Duckieboat , which can survive by itself for about 3 month by the lake, and has remote control and monitor availability at the same time.
- Ongoing project – sending second version Solar Duckieboat to Suao port and control it by VR device from Hsinchu.

Eurobot - International robotics contest La Roche-sur-Yon, France
DIT robotics Team Member July 2018 - May 2019

- Tied for fifth place among more than a hundred teams.
- Using Autodesk Inventor to design whole robot mechanism, manufacturing robot parts by laser cutting or light-cured 3D printing and assemble the robot.
- Using Eagle Autodesk to design circuit and PCB layout, we used stm32 chip to be our main microcontroller.
- Implemented closed loop control to do precise robot localization within 2m*1m competition space.

Eurobot - International robotics contest La Roche-sur-Yon, France
DIT robotics Team Member July 2017 - May 2018

- Won 24th place among more than a hundred teams.
- Using Autodesk Inventor to design whole robot mechanism, manufacturing robot parts by laser cutting or light-cured 3D printing and assemble the robot.
- Using Eagle Autodesk to design circuit and PCB layout, we used stm32 chip to be our main microcontroller.
- Implemented closed loop control to do precise robot localization within 2m*1m competition space.

ASME SPDC Hsinchu, Taiwan
DIT robotics Team Member September 2016 - March 2017

- Perform excellent in the competition
- Designed, assembled and coding a robot which can perform following mission : 10m switchback, weightlifting, throwing, stair climbing and golfing

PUBLICATIONS

- P.-J. Huang*, C.-I. Huang*, S. K. Lim, **P.-J. Huang**, M.-F. Hsieh, L. S. Yim, Y.-T. Ko, H.-Y. Hung, Y. Chen, J.-X. Liu, L.-W. Liou, S.-F. Chou, Y.-C. Teng, K.-J. Weng, W.-C. Lu, H.-C. Wang, "A Learning-based Modular Heterogeneous USV and UAV Team in the Maritime RobotX 2022 Competition", Maritime RobotX 2022 Competition Technical Design Paper (*Equal Contribution)

PROJECT EXPERIENCE

Mechatronics Design and Practice September 2021 - January 2022

- Designed and assembled Stewart platform using stepper motor which can catch ping pong and make ping pong move circle on the platform
- Implemented Opencv to catch ping pong position and feedback to complete stepper motor control.

Self-Driving Cars September 2020 - January 2021

- Used Iterative closest point algorithm to estimate self-driving car positions with a given point cloud map using **C++** and **PCL**
- Participated in Argoverse 3D Tracking Competition detecting and giving location for every object in the scene using **C++** and **PCL**

Robotics September 2020 - January 2021

- Implemented forward and inverse kinematics for a simulated robot arm using **Matlab**
- Implemented joint and Cartesian movement to plan path for a robot manipulator using **Matlab**

Mobile Robots September 2020 - January 2021

- Using embedded computing system Rpi with ROS programming environment to design an autonomous mobile robot which can complete robot hockey contest.
- Designed robot which can explore in contest area to find a flash hockey, catch it and used IR sensor to shoot hockey in right goal.
- Used YD-lidar to let our mobile has obstacle avoidance function.