Po-Jui ‘Ray ’ Huang

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Education

B.S. in Electrical and Computer Engineering, 09, 2017 ~ present
National Chiao Tung University(NCTU), Taiwan.

Research Interests

Robotics, Mechanical design, Automatic Control System, Machine Learning

Projects

- **DARPA Subterranean Challenge Urban circuit**
  I joined team NCTU to compete in Darpa SubT Challenge, SubT Challenge aimed to seek novel approaches to accomplish mapping, navigation, searching and communication in underground environment automatically. We used UGV(Husky) and UAV(Duckiefloat) to search for artifacts such as cellphone, rope, backpack etc. In the team, I am responsible for the hardware of UGV and the system of Spherical Robot(demo).
- **UGV platform design and system setup**
  In urban circuit contest, the view angle of our cameras(D435) are too narrow, therefore I design a pan-tilt camera system by Dynamixel motors to increase the field of view and also assemble it on our UGV Husky. Besides, I am in charge of setting up our new UGV Jackal, I assemble the hardware system and establish the software repository. Jackal is capable for data collection and running deep learning algorithms.
- **mmWave Radar Deep RL paper**
  I participated the research of our laboratory seniors. The seniors’ research is based on reinforcement learning that enable robot to avoid obstacles by the point clouds generated by millimeter wave radar(mmWave)。Therefore, we can use cheap mmWave to replace expensive 3D Lidar. Besides, this method enable us to accomplish obstacle avoidance task when Lidar fail to operate(e.g. smoke environment). I design the mmWave module with our lab senior and integrate the hardware specifications so that this technology can be applied to all the robots in our laboratory.

- **Human-Centric Final Project**
  The Final Project is a simulation of Subterranean Challenge contest. The final project is divided into two parts. The first part used Locobot robot to perform object detection and localization. We will search for designated Artifact in the site arranged by the teaching assistant, and stored the information in JSON format. The second part is to perform object detection under complicated circumstances. I am responsible for JSON data storage and assist the training of object detection model.

Relevant Coursework

Object-Oriented Programming, Automatic Control System, Digital Signal Processing, Introduction to Artificial Intelligence, Human-Centric Project

Teaching Experience

- **Teaching Assistant,** AI 機器人開發工作坊 Locobot A to H(Summer 2020)
- **Teaching Assistant,** Introduction to Artificial Intelligence(Fall 2020)

Technical Skills

- **Programming:** C/C++, Python, MATLAB
- **Middleware and Libraries:** Robotic Operating System(ROS), Arduino, Pytorch
- **Embedded Devices:** Raspberry pi, NVIDIA Jetson(Xavier, TX2, Nano)
- **Hardware:** SolidWorks, 3D printing and modeling