Kuan-Lin 'Wolf' Chen

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Education

Ph.D. in Institute of Electrical and Control Engineering,   2019~
National Chaio Tung University
B.S. in Mechanical Engineering, National Chaio Tung University   2015~2019

Research Knowledge/Experiences

Robotics, Mechanical Design, Automatic Control Systems, Computer Vision

Recent Projects and Professional Experiences

Mini Competition for Mobile Manipulation (2020/09~2020/06)
This competition is the final project of **Sensing and Intelligent System course in National Chiao Tung University**. The purpose of this competition is to simulate the environment in unmanned factory and deal with the pick-n-place mission for product classification. There are four main tasks in this competition: object segmentation, pose estimation, navigation, and pick-n-place. I am the teaching assistant in this course, and I am responsible for the whole progress of the mini competition. We used **Fully Convolutional Network (FCN)** for object segmentation, **Point Cloud Library (PCL)** for pose estimation, **Astar and ultra-wideband (UWB) module** as for navigation and localization, and using **Moveit!** for pick-n-place mission.

DARPA Subterranean Challenge Urban Circuit - 8th place (2020/02)
This is the second round of the DARPA Subterranean. In this circuit, we have to complete our task in a coal mine. I am responsible for the improvement of "Duckiefloat", we upgrade the control system and increase the mobility.

DARPA Subterranean Challenge Tunnel Circuit - 7th place (2019/08)
This is an international challenge which is held by Defense Advanced Research Projects Agency (DARPA). We build our own robot groups includes UGV, UAV, and communication module to solve the search and rescue mission problem with low light source, indoor environment, multi-floors, and constrained passage. In this circuit, we have to complete our task in a coal mine. I am responsible for the development of autonomous blimp system "Duckiefloat", which is our main aerial vehicle system, and we have to design all the hardware platform and software control.

In-hand Manipulation System (2019/05~)
The design of this gripper allows the cylindrical objects can be rotated when they are grasped by this gripper. We can decrease the times to turn the object into specific pose with only one grasping time. I am the only designer and the maker in this project.

Autonomous Aeiral Vehicle System "Duckiefloat" (2019/3~2020/3)
The main purpose of this project is to design a blimp to adapt the aerial-searching mission in DARPA Subterranean Challenge. The collision-tolerance ability, low power consumption benefit, long-term

searching ability is better then the multicopter, which is popping up in recent years. I am the main designer of the hardware system and the control system.

2018 Maritime RobotX Challenge - 5th place (2018/12)
This is an international challenge which is held in Hawaii, USA. The main purpose of this challenge is to develop an autonomous marine system, and to complete numerous of the tasks such as: obstacle avoidance, docking, detect and delivery, launch and recovery, etc. In this challenge, I am responsible for the mechanical design of the **launcher** in task detect and delivery and also an **underwater-gripper** and a **winder** in launch and delivery task.

Automatically Good Shot Zone Judgment System (2018/12)
To calculate the good shot zone in baseball game objectively, we designed a system to judge the good shot zone with a monocular camera to deal with the object segmentation, and judge the height and the position when the ball comes in the good shot zone. I am the team lead of this project, and responsible for the design of the system and the structure of software.

Professional Skill

Programming Languages	C/C++, python, Matlab
Mechanical Design	Solidworks, AutoCAD, Ansys, Cura, Working Model, LTSpice
Middleware and Libraries	Robotic Operating System (ROS), Point Cloud Library (PCL), OpenCV, Moveit!
Sensors and Hardware	Depth Caemra, LiDAR, UR3, UR5, Duckietown, Husky, Arduino, Raspberry Pi 3B & 3B+, Nvidia TX2, Nvidia Nano, AR<>M Broad
Machining Tools	Drilling Machine, Shearing Machine, Lath, CNC, Eletric Welding, Argon Welding, Grinder, 3D Printer, Laser Marking, Laser Cutting

Teaching Experience
Teaching Assistant, AI Robotics Hub at Central Taiwan Science Park (CTSP) (2020/06)
Teaching Assistant, Sensing and Intelligent System (Summer 2020)