

# CHENG LIU

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## Work Experience

### Kick Robotics

*Robotics Engineer Intern*

**May 2022 – Present**

*College Park, Maryland*

#### Grass Segmentation

- Built a simple segmentation model to distinguish grass, obstacles, and background.
- Tested the segmentation model in the farm with Oak S2 and Oak D Lite on ROS2.
- Executed the segmentation in the farm videos based on MMSegmentation with PyTorch.

### Industrial Technology Research Institute

*Assistant Engineer*

**July 2020 – Dec 2020**

*Taichung, Taiwan*

#### Robotics Application

- Adjusted the parameters of Mobile Arm Robot System (MARS) under different environment.
- Aided holding Epidemic Prevention Robot Contest and examined MARS during the contest.
- Assisted ROS course and built live stream connecting robot arms with C++.
- Taught disadvantaged children to learn Scratch and Arduino and utilize them on MiniBot.

## Related Experience

### UMD Perception Robotics Group

*Independent Study*

**Sep 2022 – Present**

#### Multi Morality Segmentation and Modelling

- Fixed the joystick connection problem and researched BlueROV2 with QGroundControl in the real environment.
- Trained the dataset from the simulation and analyzed the model in the real environment dataset to search BlueROV2 using Faster R-CNN with PyTorch.

## Education

### University of Maryland, College Park

*Master of Engineering in Robotics*

**Sep. 2021 – May 2023**

*College Park, Maryland*

- Cumulative GPA: 3.88/4.0
- Coursework: Robot Modeling, Control Systems, Perception, Planning

### National Sun Yat-Sen University

*Bachelor of Science in Mechanical and Electro-Mechanical Engineering*

**Sep. 2016 – June 2020**

*Kaohsiung, Taiwan*

- Coursework: Stochastic Processes and Modelling, Computer Programming on Engineering Problems, Mobile Robots

## Projects

### Quadruped Robot Locomotion Control with Reinforcement Learning *Python, PyBullet*

**May 2022**

- Implemented Proximal Policy Optimization (PPO) in PyBullet to train a quadruped robot walking with different controller combination and iterations.

### 3D Indoor Scene Reconstruction using RGBD Camera *C++, OpenCV*

**May 2022**

- Implemented a visual odometry algorithm using Intel RealSense Depth Camera (D435i).
- Developed a Gauss-Newton non-linear optimizer from scratch to find the pose between frames that minimizes the sparse (keypoints) and dense (photo-consistency) matching errors for visual odometry

## Publications

- Lin, X., **Liu, C.**, Pattillo, A., Yu, M., Aloimonous, Y. (2023). SeaDroneSim: Simulation of Aerial Images for Detection of Objects Above Water. In Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (pp. 216-223).

## Technical Skills

**Languages:** Python, C++, Matlab

**Tools/Libraries/Frameworks:** Pytorch, Tensorflow, OpenCV, ROS, ROS2, Arduino, Solidworks, Git

**Skills:** 3D/2D Object Detection, Segmentation, Visual Odometry, Image Classification, Machine Learning, Deep Learning