Cheng Liu

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Education

The George Washington University, PhD in Mechanical and Aerospace Engineering — Sep 2024 – Recent

- **Coursework:** Electromechanical Control Systems, Tele-medical Robotics and Machine Learning, Machine Learning

University of Maryland, Master of Engineering in Robotics — Sep 2021 – May 2023

- **Coursework:** Robot Modeling, Control Systems, Perception, Planning

National Sun Yat-Sen University, Bachelor of Science in Mechanical and Electro-Mechanical Engineering — Sep 2016 – Jun 2020

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

Technical Skill

Languages: C++, Python
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

Projects

ICareYou, Project Leader — 2024

- Integrated Yolo-v8 pose estimation with depth image to construct 3D pose in RCareWorld simulation
- Invented one dimentional reinforcement learning model to achieve bed bathing task for PhyRC Challenge
- Tools used: Python, Moveit, Unity

Quadruped Robot with Reinforcement Learning, Project Manager — 2023

- Implemented Proximal Policy Optimization (PPO) in PyBullet to train a quadruped robot to walk with different combination and iterations of the controller.
- Tools used: Python, Pybullet

Experience

Kick Robotics, Robotics Engineering Intern, MD — May 2022 – May 2024

- Executed segmentation model in the farm videos based on MMSegmentation with PyTorch
- Tested segmentation model to detect grass on real farm with Oak S2 and Oak D Lite on ROS2
- Utilized Rtabmap to reconstruct the 3D environment and navigate customized robot in warehouse on ROS2

UMD Perception Robotics Group, Research Volunteer, MD — Sep 2022 – May 2023

- Fixed joystick connection problem and researched BlueROV2 with QGroundControl in real environment
- Trained synthetic dataset and analyzed model in real environment dataset to search BlueROV2 using Faster R-CNN with PyTorch
- Adapted synthetic dataset to track whale from satellite images with Mask-RCNN and U-Net

Publications

X. Lin, **C. Liu**, A. Pattillo, M. Yu and Y. Aloimonous, "**SeaDroneSim: Simulation of Aerial Images for Detection of Objects Above Water,**" 2023 IEEE/CVF Winter Conference on Applications of Computer Vision Workshops

A. Gaur, **C. Liu**, X. Lin, N. Karapetyan and Y. Aloimonos, "**Whale Detection Enhancement Through Synthetic Satellite Images,**" OCEANS 2023 - MTS/IEEE U.S.