HOUJIAN YU

Seeking Summer Internship in 2024

(858)203-8364 | yu000487@umn.edu | Website | LinkedIn

EDUCATION

University of Minnesota, Twin Cities — Minneapolis, MN
Doctor of Philosophy in Electrical and Computer Engineering, GPA: 3.69/4.0 — Sept. 2020 – Exp. May 2025

University of California, San Diego — La Jolla, CA
Master of Science in Electrical and Computer Engineering, GPA: 3.55/4.0 — Sept. 2018 – Mar. 2020

North China Electric Power University — Beijing, China
Bachelor of Engineering in Electrical and Electronic Engineering, GPA: 3.45/4.0 — Sept. 2014 – Jun. 2018

EXPERIENCE

Robotics Research Assistant [website] — Sept. 2020 – Present
Choice Robotics Lab, University of Minnesota — Minneapolis, MN

- Proposed a robot-assisted interactive segmentation pipeline to solve the novel object segmentation problem, achieving 0.84 AP score
- Developed a deep Q-learning network to singulate objects from a dense clutter
- Proposed an image-driven object search and grasp pipeline to find and grasp the fully occluded target

PROJECTS

Visual-Language Attribute-based Robotic Grasping — Jan. 2023 - Aug. 2023

- Implemented a multimodal encoder to fuse the language attributes with visual inputs
- Learned a multimodal embedding space with triplet loss, enforcing a closer representation between the grasped object and the attribute feature vector
- Achieving an 80% grasping success rate on 34 novel YCB objects in simulation

Target-aware Object Searching and Grasping — June. 2022 - Mar. 2023

- Trained a DQN to perform a synergy of push and grasp on a target object from a dense clutter, achieving task success rate of 92%
- Trained a classifier-based hierarchical policy to determine the current low-level task type
- Trained a Siamese Network with self-collected synthetic data for target matching with an accuracy of 90% on simulated novel object

2D SLAM Implemented with Particle Filter and EKF — Jan. 2019 - Mar. 2019

- Implemented an EKF based visual-inertial SLAM with real-world IMU measurement and a stereo camera data to visualize the vehicle trajectory and landmark points
- Implemented a Particle Filter based SLAM algorithm with odometry and 2-D laser data
- Applied Bayes decision rule and log-odds mapping methods to update the map over time

SKILLS

Programming: Python, MATLAB, Java, C/C++

Deep Learning and Robotics: PyTorch, **OpenCV**, **ROS**, PyTorch-Geometric, Tensorflow, Keras, scikit-learn, Gym, MuJoCo, Coppeliasim, PyBullet

Courses: Robotics Vision, **Sensing and Estimation in Robotics**, **Intelligent Robotic Systems**, Advanced Algorithms and Data Structures, Computer Architecture

SELECTED PUBLICATIONS

Houjian Yu et al., "IOSG: Image-driven Object Searching and Grasping", IEEE/RSJ International Conference on Intelligent Robots (IROS), 2023 [website,pdf]

Houjian Yu et al., "Self-Supervised Interactive Object Segmentation Through a Singulation-and-Grasping Approach", European Conference on Computer Vision (ECCV), 2022 [website, pdf]