HOUJIAN YU

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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

Target-aware Object Searching and Grasping

- 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

Particle Filter Based Simultaneous Localization and Mapping (SLAM) and Texture Mapping

- 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

Extened Kalman Filter Based Visual Inertial SLAM

- Implemented an EKF based SLAM with real-world IMU measurement and a stereo camera data to visualize the vehicle trajectory and landmark points

SKILLS

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

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

Courses: Robotics Vision, Sensing and Estimation in Robotics, Computer Architecture, Data Geometry, Intelligent Robotic Systems, Linear Algebra

SELECTED PUBLICATIONS

IOSG: Image-driven Object Searching and Grasping
IEEE/RSJ International Conference on Intelligent Robots (IROS), 2023 (Accepted. To appear) [website]

Self-Supervised Interactive Object Segmentation Through a Singulation-and-Grasping Approach
European Conference on Computer Vision (ECCV) Tel Aviv, Israel, 2022 [website, pdf]

Dependable Content Distribution in D2D-Based Cooperative Vehicular Networks
IEEE Transactions on Intelligent Transportation Systems (T-ITS), 2018 [pdf]