Haoming Li

3900 Chestnut Street, Philadelphia
856-496-7466

lihaomingforreal@gmail.com
Homepage: haoming99.github.io

Education

University of Pennsylvania, Philadelphia, PA — May 2024
Master of Science, Electrical Engineering — *GPA: 3.63/4.00*

- Advisor: Dr. Nadia Figueroa, Dr. Pratik Chaudhari
- Thesis: Towards Generalizable Robust Safe Robotic Systems via Lipschitz Regularization

China University of Geosciences, Beijing — June 2021
Bachelor of Engineering, Electronic and Information Engineering — *GPA: 89.74/100*

Publication

Haoming Li, Wen Jiang, Kostas Daniilidis, "DiffGrasp: Diffusion-based 3D Shape Completion for Robust Robotic Grasping," In preparation; planned submission to RA-L

Satyajeet Das, Yifan Xue, **Haoming Li**, Nadia Figueroa, "RNBF: Real-Time RGB-D Based Neural Barrier Functions for Safe Robotic Navigation, " IROS 2025 Under review.

Yan Liu, **Haoming Li**, Mingzhe Huang, Deyuan Chen, and Bo Zhao, "Ice Crevasse Detection with Ground Penetrating Radar using Faster R-CNN," *2020 15th IEEE International Conference on Signal Processing (ICSP)*, 2020, pp. 596-599. (Oral)

Haoming Li, "Towards Generalizable Robust Safe Robotic Systems via Lipschitz Regularization," *Master's Thesis*

Research Experience

GRASP Lab, University of Pennsylvania
Research Assistant (Advisor: Dr. Kostas Daniilidis) — June. 2024 – Present

- Proposed DiffGrasp, a diffusion-based 3D shape completion method for robust robotic grasping.
- Our method compresses 3D shapes into a lower-dimensional latent space using VAE and takes the 3D shape completion as a reverse diffusion process conditioned on a partial point cloud to produce multimodal yet realistic complete 3D shapes.
- At runtime, our method takes a single view depth image as input and generates multiple accurate 6-DoF grasp poses based on the completed 3D shapes using a Kinova Gen3 robot.

GRASP Lab, University of Pennsylvania
Research Assistant (Advisor: Dr. Nadia Figueroa) — May. 2023 – May. 2024

- Proposed a MLP-based continuous learning system that maps a stream of depth images to signed distance functions (SDFs) for real-time collision avoidance.
- Utilized the learned SDFs to construct control barrier functions (CBFs) to determine the safe set of control actions.
- Conducted experiments in the Gazebo environment demonstrating our model's effectiveness in safe robotic navigation.

GRASP Lab, University of Pennsylvania
Research Assistant (Advisor: Dr. Nadia Figueroa) — Oct. 2023 – May. 2024

- Proposed a semantic-informed neural implicit SLAM to enhance the generalization thus produce precise scene reconstruction and robust camera tracking.
- Introduced a novel weight normalization and regularization to improve network robustness against noises and perturbation by restricting Lipschitz constants.

- Evaluated our method on the Replica and the Neural RGBD datasets, demonstrating its capability of reconstructing fine geometric structures as well as appearance details and achieving low Absolute Trajectory Error Root Mean Squared Errors (ATE RMSE).

Institute of Electronics, Chinese Academy of Sciences
Research Assistant (Advisor: Dr. Keming Chen) Oct. 2020 – July. 2022

- Introduced a transformer-based remote sensing change detection method to globally model spatial and temporal context in multi-temporal remote sensing images.
- By introducing Transformer into modeling the global context, the network achieved 8% and 13% improvements for F1 and IoU scores against state-of-the-arts.

University of Chinese Academy of Sciences
Research Assistant (Advisor: Dr. Yan Liu) Feb. 2019 – Sep. 2020

- Proposed an ice crevasse detection method based on Faster R-CNN achieving an accuracy above 95% for safe navigation.

Awards

Second Prize in the 1st Undergraduate Physics Academic Competition of Beijing.

First Prize in the 10th Innovation Creativity Entrepreneurship.

Third Prize in the 14th Undergraduate Physics Experiment Competition.

School of Information Engineering Award

Selected Courses

University of Pennsylvannia: Linear Systems Theory, Statistics for Data Science, Principles of Deep Learning, Machine Perception, Convex Optimization, Big Data Analytic, Graph Neural Networks

University of Chinese Academy of Sciences: Matrix Analysis, Advanced Artificial Intelligence, Computer Vision, Data Mining

China University of Geosciences: Digital Image Processing, Digital Signal Processing, Signal and Systems, Stochastic Processes, Information Theory, Complex Analysis, Probability and Statistics, Data Structure

Skills

Programming Languages: Python, C++, C, MATLAB, SQL

Libraries & Tools: ROS, Gazebo, CVXPY, PyTorch, Point Cloud Library (PCL), OpenCV, Pandas, LaTeX.

Robots: Kinova Gen3