

Haoming Li

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Education	University of Pennsylvania , Philadelphia, PA <i>Master of Science</i> , Electrical Engineering Coursework: Modern Convex Optimization, Machine Perception, Linear Systems, Principles of Deep Learning, Statistics for Data Science, Big Data Analytics, Graph Neural Networks May 2024 (Expected) GPA: 3.67/4.00
	China University of Geosciences , Beijing <i>Bachelor of Engineering</i> , Electrical and Information Engineering Coursework: Digital Image Processing, Embedded Systems, Digital Signal Processing, Stochastic Processes, Elements of Information Theory June 2021 GPA: 89.74/100
Publication	Y. Liu, H. Li, M. Huang, D. Chen, and B. 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 Presentation)
	"Real-time Perception Based Control Barrier Functions for Efficient Robotic Navigation Using RGB-D Camera". (To be submitted to RA-L December 2023)
	"Towards Generalizable Robust Safe Robotic Systems via Lipschitz Regularization". (Master's Thesis)
Research Experience	Master's Thesis: Towards Generalizable Robust Safe Robotic Systems via Lipschitz Regularization <i>Research Assistant (Advisor: Dr. Nadia Figueroa & Dr. Pratik Chaudhari)</i> <i>University of Pennsylvania</i>
	Explore the benefits of restricting the Lipschitz constant of an MLP to improve the generalizable power of reactive perception control.
	Reactive Collision Avoidance using Neural Signed Distance Functions and Neural Radiance Fields <i>Research Assistant (Advisor: Dr. Nadia Figueroa)</i> <i>University of Pennsylvania</i> May. 2023 – Present
	Implicitly represent the scene (RGB-D stream) using parametric (hash grid) and positional encodings. Use two MLPs to decode the features as signed distance functions (SDFs) and their gradients in real-time.
	Use the estimated SDFs and their gradients to construct control barrier functions to achieve reactive collision avoidance.
	Apply our method to both the simulation and the real robot (Fetch), and achieved real-time performance.
	Improving Robustness by Restricting Estimated Lipschitz Constants of Neural Networks <i>Research Assistant (Dr. George Pappas's Group)</i> <i>University of Pennsylvania</i> Dec. 2022 – Feb. 2023
	Implement a weight normalization and a Lipschitz regularization on autoencoders and DeepSDF to encourage smooth latent spaces.
	Restrict Lipschitz constants of MLPs to improve the performance of adversarial robustness, 2D/3D shape interpolation, and reconstruction.
	Hyperspectral Remote Sensing Images Change Detection Based on Vision Transformer <i>Research Assistant (Advisor: Dr. Keming Chen)</i> Oct. 2020 – July. 2022

Institute of Electronics, Chinese Academy of Sciences

Propose a self-attention-based architecture to handle remote sensing image change detection (segmentation) tasks with an accuracy above 98%.

Enhancing Safety for Arctic Expedition Vehicles with Real-time Detection of Ice Crevasses

Research Assistant (Advisor: Dr. Yan Liu)

Feb. 2019 – Sep. 2020

University of Chinese Academy of Sciences

Develop an ice crevasse detection method based on Faster R-CNN achieving an accuracy above 95%.

Process each ground penetrating radar data sample with 0.18 seconds, which reaches real-time performance for protecting Yeti robots from ice crevasses in polar exploration.

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

Skills

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

Libraries & Tools: ROS, CVXPY, PyTorch, TensorFlow, Pandas, scikit-learn, L^AT_EX.

Activities

Serve as a volunteer supporting autistic children in daily life in Beijing Volunteer Federation (BVF) for one year.