

Zhefan Xu

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EDUCATION

Carnegie Mellon University

Doctor of Philosophy, Mechanical Engineering (Robotics)
Ph.D. Minor, Machine Learning
Advisor: Professor Kenji Shimada
GPA: 3.93/4.0

Pittsburgh, PA
Present

Carnegie Mellon University

Master of Science, Mechanical Engineering - Research
GPA: 3.96/4.0

Pittsburgh, PA
May 2021

University of Pittsburgh

Bachelor of Science, Mechanical Engineering (Joint Program)
GPA: 3.98/4.0

Pittsburgh, PA
May 2019

Sichuan University

Bachelor of Engineering, Mechanical Engineering
GPA: 3.93/4.0

Chengdu, China
May 2019

SKILLS

Programming Languages: C++, Python, ROS, PyTorch, TensorFlow, Matlab, Java.
Robotics: Path Planning, Trajectory Optimization, Object Detection, SLAM, VIO.
Machine Learning: Machine Learning, Reinforcement Learning, Vision Language Model.

WORK

EXPERIENCE

Cruise LLC

The Behaviors Team
PhD Intern, AI Robotics

San Francisco, CA
June 2024 - Aug. 2024

- Improved the behavior planning of the autonomous vehicle in emergency pullovers.
- Designed the visual language model-based (VLM) method to solve AV failure cases.

SELECTED

PUBLICATIONS

LV-DOT: LiDAR-visual dynamic obstacle detection and tracking for autonomous robot navigation [pdf] 2025

Zhefan Xu, Haoyu Shen*, Xinming Han, Hanyu Jin, Kanlong Ye, Kenji Shimada
Submitted to IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2025.

NavRL: Learning Safe Flight in Dynamic Environments [pdf] 2025

Zhefan Xu, Xinming Han, Haoyu Shen, Hanyu Jin, Kenji Shimada
IEEE Robotics and Automation Letters (RA-L) 2025.

Intent Prediction-Driven Model Predictive Control for UAV Planning and Navigation in Dynamic Environments [pdf] 2025

Zhefan Xu*, Hanyu Jin*, Xinming Han, Haoyu Shen, Kenji Shimada
IEEE Robotics and Automation Letters (RA-L) 2025.

Heuristic-based Incremental Probabilistic Roadmap for Efficient UAV Exploration in Dynamic Environments [pdf] 2024

Zhefan Xu*, Christopher Suzuki*, Xiaoyang Zhan, Kenji Shimada
IEEE International Conference on Robotics and Automation (ICRA) 2024.

Quadcopter Trajectory Time Minimization and Robust Collision Avoidance via Optimal Time Allocation [pdf] 2024

Zhefan Xu, Kenji Shimada
IEEE International Conference on Robotics and Automation (ICRA) 2024.

Onboard dynamic-object detection and tracking for autonomous robot navigation with RGB-D camera [pdf] 2023

Zhefan Xu*, Xiaoyang Zhan*, Yumeng Xiu, Christopher Suzuki, Kenji Shimada
IEEE Robotics and Automation Letters (RA-L) 2023.

A Vision-Based Autonomous UAV Inspection Framework for Unknown Tunnel Construction Sites With Dynamic Obstacles [pdf] 2023

Zhefan Xu, Baihan Chen, Xiaoyang Zhan, Yumeng Xiu, Christopher Suzuki, Kenji Shimada
IEEE Robotics and Automation Letters (RA-L) 2023.

A real-time dynamic obstacle tracking and mapping system for UAV navigation and collision avoidance with an RGB-D camera [pdf] 2023

Zhefan Xu*, Xiaoyang Zhan*, Baihan Chen, Yumeng Xiu, Chenhao Yang, Kenji Shimada
IEEE International Conference on Robotics and Automation (ICRA) 2023.

Vision-aided UAV Navigation and Dynamic Obstacle Avoidance using Gradient-based B-spline Trajectory Optimization [pdf] 2023

Zhefan Xu, Yumeng Xiu, Xiaoyang Zhan, Baihan Chen, Kenji Shimada
IEEE International Conference on Robotics and Automation (ICRA) 2023.

DPMPC-Planner: A real-time UAV trajectory planning framework for complex static environments with dynamic obstacles [pdf] 2022

Zhefan Xu, Di Deng, Yiping Dong, Kenji Shimada
IEEE International Conference on Robotics and Automation (ICRA) 2022.

Autonomous UAV Exploration of Dynamic Environments Via Incremental Sampling and Probabilistic Roadmap [pdf] 2021

Zhefan Xu, Di Deng, Kenji Shimada
IEEE Robotics and Automation Letters (RA-L) with ICRA presentation 2021.

TEACHING EXPERIENCE

Introduction to/Intermediate Deep Learning (CMU 24-788/24-789)

College of Engineering at CMU

Pittsburgh, PA

Teaching Assistant

Jan. 2025 - May. 2025

- Taught weekly recitations on deep learning concept and coding.
- Designed, reviewed, and graded machine learning homework assignments.
- Conducted weekly office hours, providing support in machine learning theory.

Engineering Optimization (CMU 24-785)

College of Engineering at CMU

Pittsburgh, PA

Teaching Assistant

Aug. 2024 - Dec. 2024

- Designed, reviewed, and graded optimization homework assignments.
- Conducted weekly office hours, providing support in optimization theory.

Introduction to Deep Learning (CMU 11-785)

School of Computer Science at CMU

Pittsburgh, PA

Teaching Assistant

Jan. 2020 - May 2020

- Led two recitations and developed presentation slides on Convolutional Neural Networks and statistics visualization in PyTorch Tensorboard.
- Conducted weekly office hours for 2 hours, offering support and addressing students' inquiries regarding deep learning concepts and programming.