Xiangbo Gao

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EDUCATION

MS in Robotics, University of MichiganExpected June 2025BS in Computer Science & Mathematics, University of California, IrvineSep. 2018 - Mar. 2023Summer Session, University of California, BerkeleyJune 2019 - Sep. 2019

SKILLS & Research Interest

Programming Language: Python, C/C++ Software: PyTorch, OpenMMlab, Carla Simulator, RLlib, TorchGeometry Research Interests: Autonomous Driving, Robotics, Perception, Deep Learning, Computer Vision, Motion Prediction, and Planning

PUBLICATIONS

- 1. **X Gao**¹, et al. "Scale-free and Task-agnostic Attack: Generating Photo-realistic Adversarial Patterns with Patch Quilting Generator" arXiv:2208.06222, 2022
- M Liu, X Li, X Gao³, J Chen, L Shen, & H Wu "Sample hardness based gradient loss for long-tailed cervical cell detection", International Conference on Medical Image Computing and Computer-Assisted Intervention, pp. 109-119. Springer, Cham, 2022

RESEARCH EXPERIENCE & LEADERSHIP

University of California, Irvine, CA

Auto-generated Graphical Model in the Autonomous Driving SystemMay 2022 - Dec. 2022Advisor: Prof. Mohammad Al Faruque, Dept of EECS

- Designed and created a multi-domain autonomous driving dataset for various driving scenarios using the CARLA simulator.
- Developed a probabilistic LSTM structure to encode states as variational embeddings.

Goal-conditional Reinforcement Learning

Advisor: Prof. Roy Fox, Dept of CS

- Conducted a literature review on imitation learning and general reinforcement learning.
- Proposed a Spring Loss method that utilizes contrastive learning to align embeddings linearly, visualized with PCA for better real-world trajectory alignment.

ZerO Waste Anteaters

Advisor: Prof. Sharad Mehrotra

- Led a team of eight to explore waste recognition solutions.
- Trained and deployed lightweight models for waste image classification and object detection, achieving an accuracy of ~0.94 and an average mean precision of ~0.76 respectively.
- Designed an introductory Image Recognition tutorial and side projects for students interested in the field

Institute of Computer Vision, Shenzhen University, China

Sep. 2020 – Apr. 2022

Feb. 2022 – June 2022

and robustness against different defense algorithms. Long-tailed Cervical Cell Detection Advisor: Prof. Linlin Shen **INTERNSHIPS Perception Algorithms Researcher** Apr. 2023 - July 2023 Anhui Cowa ROBOT Co., Ltd, Shanghai, China Online HD Map Construction with Flow Map Prior (3.2% higher mAP than the baseline) Motion Prediction with Historical Trajectories Clustering **Full-stack Software Developer** June 2020 - Aug. 2020 Tandll Investment Management, Ltd, Shenzhen, China currently in active use. **Software Developer** Feb. 2019 - June 2019

Calit 2, University of California, Irvine

Developed a virtual reality (VR) teaching tool for the MA6 Mask Aligner.

COMPETITIONS

[Rank 13 th] CVPR Camera-based online HD map construction challenge 2023	May 2022
Rank 1 st] Machine Learning Hackathon, University of California, Irvine	April 2020
[Rank 2 nd] Google Hash Code 2020 Algorithms Competition, Irvine, CA,	Feb. 2020
[Outstanding Award] Netease Hackathon Competition	June 2020

ACTIVITIES

UCI Rock Climbing Group

- Regularly join the indoor rock-climbing activities at the UCI anteater recreation center.
- Regularly Join the outdoor adventure trips with group members including rock climbing, camping, and backpacking.

Adversarial Attack with Semantic Pattern

Advisor: Prof. WeiCheng Xie

- Proposed a novel PQ-GAN training strategy that learned a series of cascaded generators to manipulate image patterns at varying scales seamlessly
- Applied the PQ-GAN to adversarial attacks, demonstrating state-of-the-art attack strength

May 2021 - Jan. 2022

Conducted experiments and contributed to 20% of paper writing for a proposed Grad-Libra Loss that uses gradients to dynamically calibrate sample hardness and rebalance gradients.

Developed and deployed a management website using Django, MySQL, and React, which is

Apr. 2021 - Oct. 2022