Xiangbo Gao

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EDUCATION

University of California, Irvine (GPA-3.720)   2018.9 - Present
Double Majors: *Computer Science, Mathematics*   BS expected 2023.3
ICS Honor Program, Dean's List
University of California, Berkeley, Summer Session (GPA-3.8)   Berkeley, CA
Core Courses: Python (CS 61A), Data Structure (CS 61B), Intro to AI (CS188)   2019.6- 2019.9

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 (On Submission)
2. M Liu, X Li, **X Gao**[3], 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
A Self-supervised graphical model in the autonomous driving system   2022.5 ~ Present
Advisor: Prof. Mohammad Al Faruque, Dept of EECS
- Designed and created a multi-domain autonomous driving dataset for different driving scenarios using CARLA simulator
- Designed a probabilistic LSTM structure that encodes states to variational embeddings.
- Transferred the knowledge from PointNet to encode the unordered lane marks information.
- Evaluating the model performance and cross-domain transferability by various metrics and comparing them with other motion prediction algorithms (MTP, PGP, Trajectron++, etc.)

Goal-conditional Reinforcement Learning   2022.2 ~ 2022.6
Advisor: Prof. Roy Fox, Dept of CS
- Reviewed literature on imitation learning and general reinforcement learning
- Come up with spring loss which uses the idea of contrastive learning that aligns the embeddings in linear distance.
- Visualization by the PCA dimension reduction method shows that the learned embedding better aligns with the real-world trajectory.

ZerO Waste Anteaters   2020.9 ~ 2022.4
Advisor: Prof. Sharad Mehrotra
- Led a team of 8 members to explore waste recognition solutions
- Trained light-weight models for waste image classification (Mobilenetv3, ShuffleNet, and EfficientNet) and waste object detection (Faster-RCNN and YOLOv5); achieved ~0.94 classification accuracy and ~0.76 mean precision error
- Deployed the waste recognition models to resource-limited machines (Jetson Nano)

Institute of Computer Vision, Shenzhen University, China

Adversarial Attack with Semantic Pattern (Publication 1)   *2021.4 ~ 2022.3*
Advisor: Prof. WeiCheng Xie
- Proposed a novel Patch Quilting Generative Adversarial Network (PQ-GAN) training strategy that learned a set of cascaded generators to manipulate image patterns of varying scales without distortion or discontinuity
- Applied the PQ-GAN to adversarial attacks that delivered state-of-the-art attack strength and robustness with respect to various types of defense algorithms

Long-tailed Cervical Cell Detection (Publication 2)   2021.5 ~ 2022.1
Advisor: Prof. Linlin Shen
- Assisted to propose a Grad-Libra Loss that leverages the gradients to dynamically calibrate the hardness of each sample and rebalanced their gradients.

SUMMER INTERNS

Intern, Tandll Investment Management Limited, China   2020.06 ~ 2020.08
Position: Full-stack Software developer
Personal contribution
- Built a quantitative trading support website using Python (Django & React) and MySQL, which supported high-level trading management, model parameters modification, and historical data & behaviors Visualization

COMPETITIONS

***Competition**, University of California, Irvine, CA, USA*   *2020.4*
1st place in Machine Learning Hackathon at UCI
Google Hash Code 2020 Algorithms Competition, Irvine, CA   2020.2
Result: 2nd place / 13 at UCI
Netease Hackathon Competition   2020.6
Outstanding Award

INDEPENDENT RESEARCH   2022.5-2022.7
Multi-modal 3D Object Detection
- Literature review of existing general 3D object detection algorithms including camera-based, point-based, voxel-based, and multi-model algorithms
- Run experiments on multi-model 3D object detection algorithms (Lidar Painting, Bev fusion)

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.

SKILLS
Programming Language: Python, C/C++, Java, C#, JavaScript, SQL
Software: PyTorch, OpenMMlab, RLlib, TorchGeometry, TensorFlow