

Shaoyuan Xie

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EDUCATION BACKGROUND

University of California, Irvine (UCI)

Ph.D. in Computer Science

Sep.2023

- Dean's Fellowship

Huazhong University of Science & Technology (HUST)

B.Eng. in Automation (Concentration: Artificial Intelligence)

Sep.2019-Jun.2023

- GPA: 3.97/4.0 (93.18%) Ranking: 2/79
- National Scholarship, Ministry of Education of PRC (Highest Honor, **Top 0.2%** Natinal Wide), **TWICE**

PUBLICATIONS

- **RoboBEV: Towards Robust Bird's Eye View Detection under Corruptions**
Shaoyuan Xie, Lingdong Kong, Wenwei Zhang, Jiawei Ren, Liang Pan, Kai Chen, Ziwei Liu
In Submission
- **Benchmarking Bird's Eye View Detection Robustness to Real-World Corruptions**
Shaoyuan Xie, Lingdong Kong, Wenwei Zhang, Jiawei Ren, Liang Pan, Kai Chen, Ziwei Liu
ICLR 2023 Workshop Scene Representations For Autonomous Driving, 2023
- [On the Adversarial Robustness of Camera-based 3D Object Detection](#)
Shaoyuan Xie, Zichao Li, Zeyu Wang, Cihang Xie
arXiv preprint arXiv:2301.10766, 2023

RESEARCH EXPERIENCE

MMLab@NTU, Nanyang Technological University

Remote

Advisor: Assistant Prof. Ziwei Liu

Topic: [Towards Robust Bird's Eye View Perception under Common Corruption and Domain Shift](#)

- Study out-of-distribution and cross domain robustness of camera-based 3D object detection models
- Create nuScenes-C dataset by introducing eight natural corruptions widely occurred in driving scenes
- Todo: benchmark cross-domain robustness, propose training strategy to improve model robustness

Cihang Xie Research Group, University of California Santa Cruz

Santa Cruz, CA

Advisor: Assistant Prof. Cihang Xie¹

Sep.2022- Nov.2022

Topic: [On the Adversarial Robustness of Camera-based 3D Object Detection](#)

- Goal: Get comprehensive understanding of adversarial robustness of camera-based 3D object detection
- Propose pixel-based & patch-based attack algorithms to generate adversarial examples for camera-based 3D object detection models and evaluate attack performance on nuScenes dataset
- Benchmark adversarial robustness of camera-based 3D object detection models, such as BEVFormer, FCOS3D, DETR3D, BEVDepth
- Get deep understanding of adversarial robustness of camera-based 3D object detection

CCVL Lab, JHU²

Baltimore, MD

Advisor: Assistant Prof. Cihang Xie

Jun.2022-Sep.2022

Topic: Multimodal (CLIP) & OOD Robustness

- Goal: Explore whether multi-modal pretrain improves out-of-distribution generalization.
- Train SLIP and SimCLR on the Redcaps dataset and fine-tune on ImageNet, explore the effect of text encoder on OOD dataset (ImageNet-A, Stylized-ImageNet, and ImageNet-Sketch) by using different sizes of language transformer model
- Investigate OOD robustness of zero-shot CLIP model with different pre-train datasets (WIT, Redcaps, YFCC15M)
- Explore the transferability of OOD robustness under knowledge distillation, adopt different distillation methods,

¹ Webpage available at <https://cihangxie.github.io/>

² Webpage available at <https://ccvl.jhu.edu/>

including knowledge distillation, intermediate feature alignment, maximize disagreement between student and teacher models with AugMax augmentation, and accelerate model training with Google Cloud TPU Pod

Yang Xiao Research Group, HUST

Wuhan, China

Supervisor: Associate Prof. Yang Xiao

Jan.2022-Present

Topic: Multi-modal Adversarial Training for 3D Point Cloud Defense

- Design a simple multi-modal framework for point cloud adversarial examples detection with an accuracy of over 80%
- Render point clouds into a depth map, leverage points, and corresponding depth map for multi-modal learning
- Investigate the adversarial self-distillation paradigm by using CLIP-like contrastive objective function and adversarial training
- Discover depth map-based CNN are also vulnerable to gradient-free adversarial attacks to the original point cloud; under exhaustive search, the accuracy of depth map-based models can fall to 0%

College Students' Innovative Entrepreneurial Training Plan Program

Team Leader

Sep.2020-Jul.2021

Topic: UAV-based Pedestrian Detection

- Built Object Detection Models such as YOLO and Faster-RCNN and trained them on VOC2007 using Pytorch
- Collected more than 100 aerial images from the Internet as the test set for testing models' generalization performance in different backgrounds such as beaches, forests, and countries and labeled all of them by hand using open-source labeling tools

ICCV2021 Workshop - VisDrone2021 Object Detection Contest

Wuhan, China

Team Leader

Jun.2021-Jul.2021

- Build and trained object detection models such as YOLO, Faster-RCNN, RetinaNet, DETR, HDNet, and CornerNet based on the MMDetection framework
- Implemented data augmentation methods mentioned in the CVPR2019 paper *Patch-level Augmentation for Object Detection in Aerial Images* for data augmentation: generated hard negative pool by extracting object bounding box, which our model failed to detect, and pasted the generated object patch on other image canvas for augmentation

HONORS & AWARDS

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|---|--------------------------------|
| • Meritorious Winner, Mathematical Contest in Modeling (MCM) | <i>Feb.2022</i> |
| • National Scholarship, Ministry of Education of PRC (Highest Honor, Top 0.2%), TWICE | <i>Oct.2020 & Oct.2021</i> |
| • Merit Student of HUST (Top 7%), TWICE | <i>Sep.2020 & Oct.2021</i> |
| • Excellent Undergraduate Student of HUST (Top 1%) | <i>Sep.2020</i> |
| • National First Prize, The Chinese Mathematics Competition (CMC) | <i>Oct.2020</i> |
| • First Prize, The Chinese Mathematics Competition, Hubei Division | <i>Oct.2020</i> |

SKILLS

- DL Framework: Pytorch, MMDetection, Sklearn
- Programming: Python, C, MATLAB
- Tools: Latex, Git, Google Cloud TPU