Shaoyuan Xie

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EDUCATION BACKGROUND

Huazhong University of Science & Technology (HUST) *Sep.2019-Jun.2023*

B.Eng in **Automation (Artificial Intelligence Concentration, School of Automation and Artificial Intelligence)**

- **GPA**: **3.97**/4.0 **93.5**/100
- **Rank**: **1st/79 (1st/212 before junior year)**

Nation University of Singapore (NUS) AI Remote Academic Summer Program *Jul.2020-Sep.2020*

RESEARCH EXPERIENCES

My research experience mainly focuses on Computer Vision, Object Detection, 3D Point Cloud, Adversarial Attack

CLIP & OOD Robustness Baltimore, United States

supervised by Prof. Cihang Xie, CCVL Lab, JHU *June.2022-Present*

- Train SLIP and SimCLR on Redcaps dataset and finetune on ImageNet, study the effect of text encoder on OOD dataset (ImageNet-A, Stylized-ImageNet and ImageNet-Sketch).
- Study OOD robustness of zero-shot CLIP model with different pre-train dataset.
- Working on to transfer the OOD robustness of CLIP to models trained from scratch.

Multi-modal Adversarial Training for 3D Point Cloud Defense Wuhan, China

supervised by Prof. Yang Xiao, Institute of Automation and Artificial Intelligence, HUST *Jan.2022-Present*

- Proposed project point cloud to depth map and utilize the multi-modal information for 3D point cloud classifier defense.
- Utilize non-overlap adversarial space between depth map and point cloud for improving robustness.
- Using CLIP-like contrastive loss for learning multi-modal representation for adversarial examples detection.

UAV based Pedestrian Detection Wuhan, China

College Students' Innovative Entrepreneurial Training Plan Program *Sep.2020-Jul.2021*

- Built Object Detection Models such as YOLO, Faster-RCNN and train it on VOC2007 using Pytorch.
- Collect more than 100 aerial images from the Internet as the test set for testing models generalization performance in different backgrounds such as beach, forest, and country. Label all of them by hand using open-source labeling tools.

ICCV2021 Workshop - VisDrone2021 Object Detection Contest *Jul.2021*

- Build and train object detection models such as YOLO, Faster-RCNN, RetinaNet, DETR, HRNet, CornerNet based on MMDetection framework on VisDrone2022 dataset..
- Implement data augmentation methods mentioned in CVPR2019 paper *Patch-level Augmentation for Object Detection in Aerial Images* for data augmentation. Generate hard negative pool by extracting object bounding box which our model fails to detect and paste the generated object patch on other image canvas for data augmentation.

COURSE PROJECTS

Infrared Small Object Detection

- Utilize MFvsFAcGAN model, apply two cGAN-like generator for balancing miss detection and false alarm rate.

Infrared Image Generation

- Utilize CycleGAN, Unit model for image style transfer from RGB image to infrared image.

IMDB Movie Review Sentiment Analysis

- Build LSTM, CNN, and Transformer for IMDB movie review sentiment analysis.

Pattern Recognition Algorithms Implement

- Implement algorithms from scratch using *Numpy*-- PLA, Linear Regression, Logistic Regression, Fisher, SVM, and Softmax.

Digital Image Process Algorithms Implement

- Implement watershed image segmentation algorithm of the paper *Determining watersheds in digital pictures via flooding simulations* with pure C programming language.
- Implement Image Augmentation Algorithms like Histogram Equalization, Homomorphic Filtering, Fourier Transform by MATLAB.

CONTEST

American College Student Mathematical Modeling Contest	Team Leader	*Feb.2022*
American College Student Mathematical Modeling Contest	Team Leader	*Jan.2021*
Mathematical Competition of Chinese College Students(CMC)	First Prize	*Sep.2020*
Mathematical Competition of Hubei College Students	First Prize	*Sep.2020*
Smart Car Contest in Huazhong University of Science & Technology	Team Leader	*Oct.2019*
Mathematical Modeling Contest in Huazhong University of Science & Technology	Team Leader	*Oct.2019*

HONORS & AWARDS

Meritorious Winner, Mathematical Contest in Modeling (MCM)	*Feb.2022*
National Scholarship (Awarded by ministry of Education of PRC, Top 0.2%), **TWICE**	*Oct.2020 & Oct.2021*
Outstanding Undergraduate Student of HUST **(**Top 1%**)**	*Oct.2020*
Merit Student of HUST (Top 7%), **TWICE**	*Oct.2020 & Oct.2021*
First Prize, The Chinese Mathematics Competitions (CMC)	*Oct.2020*
First Prize, The Hubei Province Mathematics Competitions	*Oct.2020*

SKILLS

- Deep Learning Framework: Pytorch, MMDetection
- Programming Language: Python, C, MATLAB
- Tools: Latex, Git