Liyi Yao

(213) 691-4925 yao-jianzhi@outlook.com LinkedIn Github Home Page

Education

University of Southern California **Jan 2023 – May 2024**
Master of Science in Computer Science *Los Angeles, CA*

Sichuan University **Sep 2018 – Jun 2022**
Bachelor of Engineer in Computer Science and Technology *Chengdu, China*

Work Experience

USC Institute for Creative Technologies **Mar 2024 – Present**
Researcher *Los Angeles, CA*

- Improved the training pipeline of Unsupervised Group Activity Recognition by a novel data synthesis method based on Feature Domain Matching and LSTM. Enhanced the classification accuracy of group behavior by about 10% on real-world video datasets.

DeepUSC **Mar 2023 – Dec 2023**
Research Intern *Los Angeles, CA*

- Developed a tool for massive ablation experiments using Pytorch and HuggingFace, and deployed it on Transformer-based models. Based on the results, summarized a Scaling Law of Transformer-based language models, and modified the architecture which reduced the perplexity score by > 10 on WikiText103 in terms of language modeling.
- Generated a dataset by processing the logic relationship in natural language text for reasoning training. Fine-tuned pre-trained GPT-like Large Language Models by Inductive In-Context Learning and enhanced the reasoning abilities from facts to rules by 10% accuracy.

Sichuan University **Aug 2020 – Jun 2022**
Research Assistant *Chengdu, China*

- Led a research project and proposed a novel unsupervised anomaly detection model based on knowledge distillation and auto-encoder, which could outperform $> 5\%$ AUROC score than SOTA-level models on industrial manufacturing benchmark datasets. Implemented the algorithm using Pytorch and integrated visualization functions. [paper link]
- Led a project and developed an end-to-end defect detection tool for railway system components based on generative model (GAN-based) and object detection (Yolo-based) technologies, achieving 95%+ accuracy and 93%+ mAP.

Pony.ai **Sep 2021 – Dec 2021**
Software Development Intern *Beijing, China*

- Trained and maintained models for traffic light recognition in a large-scale autonomous driving perception system based on C++ and Python and improved the detection accuracy more than 13% on certain scenarios including single light, flashing yellow light, etc.
- Optimized classification models' backbones by merging various models into multi-branch models. Reduced about 25% parameter scale and save the storage space of on-board chips, which improved the computation efficiency.
- Improved the training strategy by weighting each branch based on the gradients, which could avoid overfitting and enhance the model convergence.

Projects

YOLACT-based Vehicle Violation Detection and Management System

- Used YOLACT-based real-time segmentation algorithm to analyze vehicle video data and detect violation behaviors, which archived $> 95\%$ accuracy.
- Build PostgreSQL database system to manage vehicle video data and implemented the user graphical interface using JSP.

An FPGA-Based Adaptive Real-Time Enhancement System for Dental X-rays **paper link**

- Evaluated classic image enhancement methods, and implemented gamma transformation and CLAHE on Python, MATLAB, and FPGA separately.
- Designed and deployed an image quality evaluation method for dental X-ray data based on Signal-to-Noise Ratio and Local Image Variance, which better aligned with the expectations of clinical dentists.

Technical Skills

Programming: Python, C++/C, Java
Machine Learning: Pytorch, Tensorflow, Keras, HuggingFace, Scikit-learn, MATLAB, Matplotlib, Pandas
Web Technology:Flask, AWS, JSP, JavaScript
Development: Github, Linux, HDFS, Kubernetes, Conda, Unity