

Liyi Yao

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EDUCATION

University of Southern California

Master of Science in Computer Science

Jan 2023 – May 2024

Los Angeles, CA

Sichuan University

Bachelor of Engineer in Computer Science and Technology

Sep 2018 – Jun 2022

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 the scale of the parameters by about 25% and saved the storage space of the chips on board, which improved the efficiency of the computation.
- 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

[project link](#)

- 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

[project 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, Pandas, ROS

Web Technology: Flask, AWS, JSP, JavaScript

Development: Github, Linux, PostgreSQL, MongoDB, HDFS, Kubernetes, Conda, Unity