

Liyi Yao

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RESUME SUMMARY

Dedicated graduate student pursuing a M.S. degree in Computer Science at the University of Southern California. Experienced research assistant in machine learning, computer vision, natural language processing, and robotics. Adept at leveraging Python, C++, and frameworks like PyTorch, Tensorflow. Author of three research papers that demonstrate my strong foundation in machine learning. The experience as a research assistant and algorithm internship has honed my teamwork skills and adaptability to dynamic environments. Seeking a position as a machine learning/computer vision engineer.

EDUCATION

- University of Southern California** *Jan 2023 - now*
Master of Science in Computer Science GPA: 3.76
- Sichuan University** *Sep 2018 - June 2022*
Bachelor of Engineering in Computer Science and Technology GPA: 3.78

PUBLICATIONS

Liyi Yao, Shaobing Gao, "Dual-Student Knowledge Distillation Networks for Unsupervised Anomaly Detection," In: *arXiv:2402.00448*, 2024.

Liyi Yao, Jianhui Qiu, Shaobing Gao, et al. "Defect Detection in High-Speed Railway Overhead Contact System: Importance, Challenges, and Methods," In: *2021 International Conference on Security, Pattern Analysis, and Cybernetics (SPAC 2021)*, Chengdu, June, 2021.

Haoyang Sang, Junsong Zhang, **Liyi Yao**, et al. "An FPGA Based Adaptive Image Enhancement System for X-ray Images," In: *2021 International Conference on Electronics and Communication Engineering (ICECE 2021)*, Xi'an, December, 2021.

WORK EXPERIENCE

- Research Internship** *Mar 2023 - Dec 2023*
University of Southern California Los Angeles, USA
 - Supervised by Dr. Iordanis Fostiropoulos in DeepUSC research group.
 - Studied the scaling law of language models by performing experiments.
 - Implemented code for experiments about probing the reasoning abilities of language models.
 - Conducted literature review and code implementation of SOTA models in realms of dataset distillation and transfer learning.
- Perception Algorithm Internship** *Sep 2021 - Dec 2021*
pony.ai Beijing, China
 - Engaged in the development of an autonomous driving perception system (C++&Python) and focused on traffic lights recognition in specific scenarios.
 - Upgraded models based on the data-centric strategy.
 - Modified classification models into multi-branch architecture to reduce the parameter scale.
- Summer Internship** *June 2021 - Aug 2021*
Zhejiang University Remote
 - Supervised by Dr. Shuibing He in the Intelligent Storage and Computing Systems Laboratory.
 - Reproduced experiments on a study of intelligent memory system for large-scale machine learning application.
- Research Assistant** *Aug 2020 - June 2022*
Sichuan University Chengdu, China
 - Supervised by Dr. Shaobing Gao.
 - Designed unsupervised anomaly detection algorithms for industry inspection and performed experiments.
 - Conducted research in the field of underwater image enhancement.

TECHNICAL SKILLS

Previous research fields: anomaly detection, object detection, language modeling, image enhancement, robotics, etc.

Programming Languages: Python, C/C++, Java, C#, MATLAB

Machine Learning: Pytorch, Tensorflow, Keras, HuggingFace, Sklearn

DataBase: MongoDB, MySQL, PostgreSQL

Web Development: JSP, JavaScripts, HTML+CSS

Writing: Latex, Overleaf

Other: Linux, Github, FPGA/Verilog, HDFS, Kubernetes

PROJECTS

•X-Factor: Scaling law of language models

Oct 2023 - Dec 2023

The statistical relationship among different factors in model training.

- Designed and performed ablation experiments on Transformer-based models.
- Summarized a scaling law consisting of dataset size, model size, and model performance.
- Used the scaling law to estimate the performance of a larger model using the test results of a smaller model trained on smaller dataset, which could reduce the requirements of training large language models.

•Unsupervised Anomaly Detection via Knowledge Distillation for Industrial Inspection

Nov 2022 - Apr 2023

An improved Student-Teacher networks for anomaly detection

- Proposed a novel dual-student knowledge distillation framework for unsupervised anomaly detection and segmentation in industrial defects inspection.
- Employed feature embedding and multi-scale feature fusion technologies to improve the performance.
- Tested and evaluated the results on three benchmark datasets.

•YOLACT-based Vehicle Violation Detection and Management System

Sep 2020 - Dec 2020

Manage and analyze surveillance videos of vehicle behaviors by using real-time image segmentation technologies.

- Build a database system based on PostgreSQL to store and manage video data.
- Implement graphical user interface.
- Integrated the front end and back end and deploy the detection algorithm.

•GAN-based Defective Data Generation for Railway System Inspection.

Aug 2020 - Jan 2021

A data augmentation method for the data imbalance problem in security inspection in railway system.

- Proposed a framework based on conditional GAN to generate defective data in railway system to alleviate the data imbalance caused by the rareness of anomalies.
- Implemented object detection algorithms.
- Integrated models into an end-to-end detection system.

•An FPGA-Based Adaptive Real-Time Enhancement System for Dental X-rays

Nov 2019 - June 2020

A system integrating multiple processing algorithms for dental images

- Implemented and evaluated classic image enhancement methods including Gamma transformation, linear transformation, histogram equalization, CLAHE, etc.
- Deployed CLAHE on FPGA.
- Designed an image quality evaluation method that linearly integrated several metrics like signal-to-noise ratio and local image variance.

AWARDS

• First-Class Scholarship of Wuyuzhang Honor College

2021

• Second-Class Scholarship of Wuyuzhang Honor College

2020

• Second-Class Scholarship of Wuyuzhang Honor College

2019