

# Liyi Yao

Master of Science in Computer Science  
Viterbi School of Engineering  
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## RESUME SUMMARY

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Dedicated graduate student pursuing a M.S. degree in Computer Science at the University of Southern California. Experienced research assistant in deep learning, including computer vision and natural language processing. Adept at leveraging Python, C++, and frameworks like PyTorch, Tensorflow. Author of two 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

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- **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

## WORK EXPERIENCE

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- **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 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

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**Previous research fields:** anomaly detection, object detection, language modeling, image enhancement, 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 (Ubuntu), Github, FPGA/Verilog, HDFS, Kubernetes

## PROJECTS

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### •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.

### •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.

## PUBLICATIONS

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**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.

## AWARDS

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- First-Class Scholarship of Wuyuzhang Honor College 2021
- Second-Class Scholarship of Wuyuzhang Honor College 2020
- Second-Class Scholarship of Wuyuzhang Honor College 2019