Liyi Yao

Master of Science in Computer Science
University of Southern California
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GitHub Profile
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Education

•University of Southern California *Jan 2023 - May 2024*
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, 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 Assistant *Mar 2023 - Dec 2023*
University of Southern California Los Angeles, USA

- Data preprocessing.
- Literature review and academic writing.
- Code implementation, experiments and results analysis
- Research domain: deep learning, language models, continual learning, dataset distillation

•Computer Vision Internship *Sep 2021 - Dec 2021*
Pony.AI Beijing, China

- Trained models to recognize specific traffic lights and perform regression test.
- Modify classification models to multi-branch.
- Evaluate the detection results in real-world scenarios and analyze problems.

•Summer Internship *June 2021 - Aug 2021*
Zhejiang University Online

- Research domain: deep learning memory system
- Literature review, re-implemented specific experiments and analyzed results.

•Research Assistant *Aug 2020 - June 2022*
Sichuan University Chengdu, China

- Data preprocessing
- Literature review and academic writing
- Code implementation, experiments and analyzed results.
- Research domain: computer vision, image enhancement, anomaly detection, object detection

Research Projects

•Ablation Study on Transformer-based Models *June 2023 - Aug 2023*
Experiments to probe the contributions of each component of transformer-based models

- We studied the transformer and the derived models, and analyzed their contributions.
- We developed a tool for ablation experiments on the transformer, X-Factor, which will be open-sourced in the future.
- We performed ablation experiments on the selected novel components and tested them on WikiText2.
- Contributions: code implementation and experiments.

•Unsupervised Anomaly Detection via Knowledge Distillation for Industrial Inspection *Nov 2022 - Apr 2023*
An improved Student-Teacher networks for anomaly detection

- We proposed a novel dual-student knowledge distillation framework for unsupervised anomaly detection and segmentation in industrial defects inspection.

– We employed a feature embedding method for improvement and explored the association between different components through the ablation study.
– Contributions: the whole project.

•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.

– We proposed a novel framework using conditional GAN to generate defective data in railway system to alleviate the data imbalance caused by the rareness of anomalies.
– We tested the model on some components in the overhead contact system and this method could effectively improve the accuracy of defect detection.
– Contributions: Model design, code implementation, experiments, and result analysis.

•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

– We designed a dental image processing system based on FPGA that integrates functions of image quality evaluation, enhancement, sharpening, and denoising.
– For implementation, we proposed a novel fast contrast limited adaptive histogram equalization (FCLAHE) to accelerate the interpolation process.
– Contributions: the part of image enhancement, including literature review and code implementation.

Technical Skills and Research Interest

Programming Languages: C/C++, Python, Java, C#, MATLAB
Deep Learning: Tensforflow, Pytorch, Keras, HuggingFace, Sklearn
DataBase: MongoDB, MySQL, PostgreSQL
Web Development: JSP, JavaScripts, HTML+CSS
Writing: Latex, Overleaf
Other: Github, FPGA/Verilog
Research Interest: Deep Learning, Robotics, Reinforcement Learning, Machine Learning System, Computer Vision, Language Model, Anomaly Detection, Knowledge Distillation

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*