Yuelin Xin

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Education

University of California, Irvine *Irvine, CA*

Collaborative Research *Jun 2023 - Present*

- Research in computer vision, specifically on *3D medical image registration* and *learning with pseudo ground truth*
- Working with **Prof. Xiaohui Xie**

University of Leeds *Leeds, UK*

BSc in Computer Science *Sep 2022 - Present*

- First Class Student (projected), transferred from Southwest Jiaotong University (joint program)
- Research in *computer vision for medicine* with **Dr. Sharib Ali**
- Research in *low-level optimisation with machine learning* with **Prof. Zheng Wang**

Southwest Jiaotong University *Chengdu, China*

BSc in Computer Science *Sep 2020 - Jul 2022*

- First Class student, School Scholarship & Best Student Award
- Research in computer vision, specifically in *real-time video analysis* and *temporal representation*
- Working with **Dr. Zhiguo Long**

Research

Kernel Transformer: Swin Transformer's Evil Twin *Leeds, UK / Irvine, CA*

Project Lead & Project Liaison *Fall 2023 - Present*

- Working on a novel transformer backbone for dense prediction tasks, such as semantic segmentation and object detection
- Designed a sliding-kernel-based self attention mechanism that delivers more dynamic receptive fields and more efficient gradient propagation
- Uses ideas from Swin Transformer, but with a more flexible architecture
- Producing a paper in collaboration with 2 universities, code at: **GitHub link**

On-the-Fly Guidance Training for Medical Image Registration *Irvine, CA*

First Author *Summer 2023*

- Worked on volumetric medical image registration tasks using state-of-the-art methods
- Designed a unified training framework using the idea of On-the-Fly Guidance (OFG) to provide an alternative to weakly-supervised and unsupervised learning in medical image registration
- Achieved state-of-the-art performance on various benchmark datasets
- Summarised our method and experiments into a **paper** which is **submitted to MICCAI 2024**

Scene Separation & Data Selection: Temporal Segmentation Algorithm for Real-time Video Stream Analysis *Chengdu, China*

Project Lead & First Author *Summer 2022*

- Published a **paper** on a novel algorithm called 2SDS for real-time video scene separation and analysis. The work is featured and **orally presented in IJCAI 2022 workshop**.
- Built and trained a motherboard defect detection model based on YOLOv5 and 2SDS to track small objects in real-time sensor data. The structure of the backbone network was adapted to yield a much faster model
- Significantly improved the average inference speed (up to 25% faster), we benchmarked an average inference time of 4.4ms on Tesla P100 GPU

Projects

Hello Algorithm (English Edition) *GitHub*

Personal Project *Jan 2023 - Present*

- Leading translation author of the popular algorithm book *Hello Algorithm*
- This project aims to create a free, open-source, and beginner-friendly crash course for data structures and algorithms
- The original repository has 49k+ stars and 5k+ forks on GitHub

The Lisa Programming Language *GitHub / Leeds, UK*

Miracle Factory & University of Leeds *Dec 2022 - Present*

- An experimental programming language and compiler architecture designed for the simplest and easiest implementation of high performance AI/ML systems
- The language provides a simple syntax and performance similar to that of C/C++, with powerful features like JIT compilation, hardware adaptive optimisation, and so on
- More details will be available as the project rolls out to the public

The Hyper Speed Automatic Optical Inspection System (HSAOIS)

GitHub / Chengdu, China

Miracle Factory & Southwest Jiaotong University

Dec 2021 - Jun 2022

- An efficient and powerful automatic optical inspection system for the detection and analysis of motherboard defects on production lines. Light enough to run on IoT devices like NVIDIA Jetson Nano, powerful enough to detect tiny defects faster and more accurately than human eyes
- Collected, labeled and published the largest public dataset of motherboard defects available for PyTorch with 1000+ items
- Customized a new backbone for YOLOv5 to yield a much faster model without sacrificing accuracy, and we meticulously trained a family of more than 40 models on various specs & hyper-parameters
- Wrote a detailed technical & project specification document for the system which is more than 200 pages long

Community Works

The Miracle Factory Community

GitHub / Global

Co-founder, Community Administrator & Researcher

April 2022 - Present

- Building the Miracle Factory community, a non-profit AI development and research community that gathers creativity and innovation to solve real-world problems.
- We strive to build a community that cares about the ethics and social impacts of AI.
- We care a great deal about the development of our student community, and we are planning on building a platform to support them, with Campus Expert Seminars, student support services, and so on.
- Actively maintaining the Miracle Factory GitHub organisation, and other open-source projects.

Skills

Programming	• **Proficiency in:** C, C++, HTML5/CSS3, Python. • **Also knows:** Java, JavaScript, Hack Assembly, HDL, Mojo, Rust, Shell, SQL, Swift, YAML.
Technical Skills	• **System:** Linux(Ubuntu/CentOS/RedHat), Unix-like CLIs(Bash/Zsh), System Architecture, Hardware Basics. • **Development:** LaTeX, Markdown, Version Control, Unit Tests, Agile Development, Docker.
Soft Skills	Project & Team Management, Paper Writing, Documents Writing, Conference Presentation.

Memberships

IEEE	Member since Summer 2023
ACM	Member since Summer 2023
Miracle Factory	Member since Spring 2022
AAAS	Member since Spring 2021

Languages

English	Academic level proficiency
Chinese	Native proficiency

References & more info available upon request.