

Haoyu (Marco) Liu

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EDUCATION

University of California San Diego

San Diego, CA

Master of Science in *Computer Science* | GPA: **4.0/4.0**

Sep. 2023 – Dec. 2024

- Courses: Database Systems, Recommender Systems & Web Mining, Computer Architecture, Search & Optimization

The Chinese University of Hong Kong (CUHK)

Hong Kong

Bachelor of Science in *Computer Science* | GPA: **3.73/4.0**

Sep. 2019 – May 2023

- First Class Honor, Outstanding Academic Performance Award in 2021/22, Dean's List in 2020/21 & 2019/20
- Courses: Software Modelling & Design, Web Application Development, Mobile App Development, Machine Learning, AI Planning for Autonomy, Computer Vision, Operation Systems, Design & Analysis of Algorithms, Computer Graphics

SKILLS

Programming Languages: Java, Python, C++, C, JavaScript, TypeScript, SQL, HTML, CSS

Tools & Frameworks: React, Node.js, Express, Spring Boot, MongoDB, MySQL, Redis, ElasticSearch, MyBatis, AWS, Microsoft Azure, Linux, Docker, Kubernetes, RocketMQ, JUnit, Mockito, Adobe XD, Figma, Git, TensorFlow, PyTorch

WORK EXPERIENCES

CUHK Reliable Computing Lab

Hong Kong

Research Intern

May 2022 – Aug. 2022

- Integrated and customized 10+ spatio-temporal deep learning traffic prediction models (e.g., RNN, Seq2Seq) and dataset loaders into a systematic time-series forecasting pipeline ([Github](#)) with **Python/PyTorch**.
- Trained and evaluated models in a **Linux** environment and secured their adaptability across various datasets and tasks.

Surgical Robotics and Instrumentation Lab, CUHK

Hong Kong

Research Intern

June 2021 – Aug. 2021

- Improved the performance of a spatio-temporal LSTM network for cataract surgical instrument deblurring and segmentation by incorporating deep learning modules (e.g., attention modules) with **Python, PyTorch** and **TensorFlow**.
- Conducted model training and evaluation in a **Linux** server environment, leveraging **Docker** containers to ensure consistent, reproducible results across various platforms.
- Designed comparative model evaluations and a comprehensive dataset to demonstrate network novelty in special scenarios.

SELECTED PROJECTS

Video Analysis Module for *Tellus* AI Assessment Platform [Product Introduction](#) / [Website](#)

Sept. 2022 – April 2023

- Designed and developed a video analysis module to auto-evaluate interviewee's presentation skills.
- Designed and constructed E-R diagrams, UML class diagrams, and database schema based on use cases.
- Integrated **Microsoft Azure AI** Face Service and **Python** libraries/frameworks (e.g., **OpenCV, MediaPipe, DeepFace**) to facilitate facial, emotion, accessory, and body language analysis, boosting analysis accuracy by **30%**.
- Utilized **React, TypeScript**, and **Material UI** to create **real-time** camera calibration feature and visualization dashboard.
- Developed algorithms using **Python** for interviewee presentation skills auto-evaluation and cheating detection, achieving **93%** analysis accuracy and **40%** faster runtime.
- Employed **REST APIs** for video management and implemented **CURD** operations on evaluation results using **MySQL**.
- Designed **50+ unit** and **integration** tests using **Pytest** for application testability and security, keeping 80% code coverage.

VivaVend: A Distributed E-Commerce Platform [Github](#)

Nov. 2023 – Jan. 2024

- Built a distributed E-Commerce platform with **Spring Boot/MVC** and deployed the website on **AWS EC2**.
- Implemented **CURD** operations with **MyBatis** and **MySQL**, and secured **REST APIs** with **Spring Security** and **JWT**.
- Utilized Distributed Lock with **Redis** and **Lua** script to lock and revert the caching inventory with Try-Confirm-Cancel pattern, preventing overselling for sale events.
- Achieved peak load shifting for prime day sale with **RocketMQ**, being able to handle up to 100K QPS burst traffic as async jobs under **JMeter** stress test, reducing 95% invalid request reach to database.
- Boosted product search speed by 90% using **ElasticSearch** with inverted index search compared to **MySQL** fuzz query.
- Configured load balancing and microservices with **Spring Cloud Gateway, Consul**, and **OpenFeign**.

Diabetes-Home: A Diabetes Management Web Application [Website](#) / [Github](#)

March 2022 – May 2022

- Developed a web application for patient-clinician data management and deployed the website on **Heroku**.
- Designed and implemented frontend **UX/UI** using **Adobe XD, Handlebars, CSS**, and **JavaScript** with responsive design.
- Developed the backend using **Node.js** and **Express**, and managed data with **MongoDB**.
- Implemented authentication and authorization using **Passport.js** and role-based redirection upon login.
- Implemented **REST APIs** for patients and health records management, including searching, filtering, and pagination.

Media Personality Popularity Visualization Platform

March 2023 – April 2023

- Designed an interactive frontend with **React, ECharts** and **Tailwind CSS**, and backend with **Node.js/Express**, allowing users to track and compare popularity data fluctuations of selected individuals, and filter data by media source.
- Scheduled periodic data scraping and automated **DynamoDB** updates with **Cheerio, AWS Lambda**, and **Event Bridge**.