

# YIMIAN LIU

i@yimian.xyz | https://iotcat.me | 607-391-5915

## EDUCATION

### Cornell University

Master of Engineering in Electrical and Computer Engineering; GPA: **3.85/4.00**

Relevant coursework: Distributed Computing Principles, Fundamentals of Machine Learning, Embedded Operating System, Computer Networks, UNIX Tools and Scripting

Ithaca, NY

Aug. 2022 - Dec. 2023

### University of Liverpool

Bachelor of Engineering in Electrical and Electronics (Honor Degree); GPA: **3.83/4.00**

Relevant coursework: C/C++ Programming, Software Engineering, Image Processing, Neural Networks

Liverpool, UK

Sep. 2017 - July 2021

## SKILLS

**Languages:** Python, C/C++, TypeScript/JavaScript, Java, HTML/CSS, PHP, Lua, Bash, SQL, Assembly

**Frameworks:** Kubernetes, Kafka, Nginx, Express, Flask, React, MySQL, Redis, MongoDB, Elasticsearch, Keras

**Tools/Skills:** Linux, Git, Docker, Node.js, TCP/UDP, AWS, ChatGPT, OOD, RESTful, GraphQL, CI/CD

## PROJECTS

### Full-Stack Development and Management of High-Traffic Websites and Web Services

Ithaca, NY

*Individual Project*

April 2018 - Present

- Conceptualized, designed, and deployed various self-developed, purpose-specific websites and web services.
- Utilized cutting-edge technologies like Gatsby, **ReactJS**, **Sass**, Bootstrap, WebSocket, and **JQuery** for building interactive and responsive front-ends for websites, using GA4 for data-driven performance tracking and user interaction analysis.
- Efficiently handled back-end services using a mix of Node.js, **Express**, Python **Flask**, and **PHP**, showing flexibility and adaptability across different programming environments and requirements.
- Integrated **MySQL**, **MongoDB**, and **Redis** for effective data management and high-speed data caching.
- Created a highly popular public Random Image API using PHP, MySQL, and Redis, which has **over 90,000 visits** per day, demonstrating the ability to develop and manage high-performance web services.

### Deployment and Orchestration of a Robust Kubernetes Infrastructure

Ithaca, NY

*Individual Project*

Jan. 2023 - Present

- Engineered a scalable Kubernetes infrastructure with Kubeadm and Helm, efficiently managing high-traffic web services.
- Leveraged **Docker** for efficient application containerization, enhancing deployment across different environments.
- Orchestrated Docker containers using **Kubernetes** for effective load balancing and auto-scaling.
- Deployed **Nginx** Ingress to manage external service access, enhancing security and load distribution.
- Utilized Prometheus and Grafana to monitor system performance and health, optimizing resource utilization and stability.
- Established a centralized logging infrastructure using Elasticsearch, Logstash, Kibana (**ELK Stack**), and **Kafka**, thereby facilitating real-time log processing, comprehensive system monitoring, and efficient troubleshooting.
- Integrated DroneCI and Github for **CI/CD**, enabling streamlined updates and efficient bug fixes.

### Distributed, Linearizable, Sharded Key-Value Database

Ithaca, NY

*Course Project advised by Prof. Lorenzo Alvisi*

March 2023 - May 2023

- Designed and built a robust, sharded key-value store in **Java**, optimized for performance in distributed settings.
- Implemented and modified the **Multi-Paxos** protocol, a crucial algorithm to guarantee the database system's resilience and continued operation, given a majority of servers remain functional.
- Enhanced the system's functionality by streamlining the Multi-Paxos protocol into a simpler, more efficient **Raft**-like protocol, resulting in improved system performance and reduced complexity.
- Employed a strategic approach to optimize the key-value store by incorporating sharding across server groups. Each group was designed to execute the Paxos consensus algorithm, thus ensuring system-wide consistency and reliability.

## OTHER EXPERIENCE

- **Machine Learning:** Secured **2nd rank** out of 55 in an in-class Kaggle competition at Cornell by architecting a highly accurate CNN model using **Keras**, with data preprocessing and ensembling techniques applied to a noisy MNIST dataset.
- **Embedded Systems:** Built an access control system with **OpenCV** for facial recognition, Python **Multi-Processing**, touchscreen GUI, Raspberry Pi, servo, ensuring reliable user management, remote access control, and activity logging.
- **Compiler and Network:** Developed SD-IoT Network Operating System (NOS) for NodeMCU, enabling JavaScript to Lua code compilation and supporting **TCP**, **UDP**, and **HTTP** protocols for seamless IoT control and interaction.
- **IoT Systems:** Developed a reliable and secure smart home system with Arduino, ESP8266, CentOS7 server, mmWave Radar, and various sensors, incorporating **C/C++**, **MQTT**, **OTA**, and **SMS** notifications, operating safely for over 3 years.