Hon Hao Yuan (Brandon)

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Github LinkedIn

Profile

Beijing Institute of Technology (BIT) **Aug 2022 – Present**

General Track, School of Computer Science and Technology.

- GPA: **3.67** / 4.0
- Weighted Average Mark: **89.05** / 100.00
- A passionate Computer Science student dedicated to building impactful tools by observing real-world challenges and developing web and mobile applications that contribute to society.
- Strives for excellence in every task, ensuring that academic and personal responsibilities are completed with full dedication and effort.
- Believes in continuous self-improvement, staying prepared and adaptable to seize valuable opportunities when they arise.

Research Experience

Research Assistant (Beijing Institute of Technology) - GitHub **Nov 2023 – May 2024**

Worked on a research project under the guidance of my faculty advisor, focusing on analyzing published research papers to extract valuable insights while filtering out information from potentially unreliable sources. By leveraging data processing techniques, we evaluated publications based on key credibility factors such as citation count, publication location (e.g., US, China), and affiliated institutions or universities. The goal was to develop a systematic approach to assessing research quality, ensuring that only highly credible and relevant information was extracted for further analysis.

Technologies Used: Python, Elastic Search, Linux Shell Scripting

- Assisted professors with research projects by cleaning and analyzing academic patent and publication data.
- Utilized Elasticsearch to create and manage test indices for efficient data exploration with professors.
- Explored Python scripts to identify and remove duplicate entries within Elasticsearch indices.
- Evaluated the efficiency differences between single threading and multithreading in Python, proposing a multithreaded solution that increased data processing speed.

Project Experience

ProgressArc - GitHub, Demo Video **Dec 2024 - Feb 2025**

ProgressArc is a customizable hierarchy diagram tool designed to help users track project progress, organize study revisions, and visualize structures in a clear, structured format. Whether you're managing a software development roadmap, tracking revision progress for exams, or presenting a structured workflow, ProgressArc provides an intuitive way to map out dependencies and milestones.

Technologies Used: Flask, MongoDB, Vue3

- Designed and developed a **customizable hierarchy diagram tool** to track project progress, revision schedules, or structure visualization.
- Implemented **microservices architecture** using **Flask**, separating login, registration, and API calls into distinct microservices hosted on different Flask applications.
- Utilized **MongoDB** as the database for scalability and ease of management.
- Developed the frontend with **Vue3**, exploring a new framework beyond React based framework.
- Inspired by my experience with Kubernetes during the **NUS Summer Workshop**, applying concepts of service separation and scalability.
- The tool serves multiple use cases, including **revision tracking, project management, and presentations**.

EventEase (NUS Summer Workshop 2024 Cloud Computing Project) - Github **May 2024 - July 2024**

EventEase is an innovative event booking system designed to simplify and streamline the process of organizing and attending events. Our application leverages the power of Kubernetes to ensure scalable and reliable deployment.

Technologies Used: Kubernetes, Helm, Prometheus, Grafana, Grafana Loki, Docker

- **Kubernetes**: Deployed microservices and stateful applications using Deployments and StatefulSets.
- **Helm**: Managed Kubernetes applications and deployed Prometheus and Grafana using Helm charts.
- **Prometheus**: Set up for monitoring and alerting, including configuring exporters as sidecar containers.
- **Grafana**: Integrated with Prometheus for real-time data visualization.
- **Grafana Loki**: Implemented for log aggregation and querying, along with Promtail for log collection.

Food Bridge (**Zero to One Hackathon by Convex**) – GitHub, Demo Video **Feb 2024 – March 2024**

Food Bridge connects individuals and businesses with excess food to those who need it. Through a simple interface, users can either offer or claim hot, ready-to-eat meals. The app serves dual purposes: it enables regular consumers and F&B businesses to share their surplus, and it empowers consumers and food banks to easily access these meals.

Technologies Used: React Native, Convex, Javascript, NodeJS, Git

- Designed and developed the core user interface of the mobile app with the help of Figma
- Transitioned the designs into actual app UI using React Native with the help of React Native Paper library
- Setup the interaction between pages and information transfer to ensure a smooth app flow using Convex
- Setup a cron function to handle resetting order numbers just like how McDonalds do it with their order number at the kiosk machine.
- Worked with 2 other talented individuals via Git version control on this project

WhatsApp Chatbot - GitHub **April 2023 - May 2023**

The WhatsApp Chatbot was designed as an intuitive AI assistant for my family members, who were unfamiliar with emerging AI technologies like ChatGPT when it was first released in 2022. By integrating Twilio, Flask, and OpenAI's API, I created a seamless conversational experience that enabled users to ask questions directly through WhatsApp without requiring prior knowledge of AI chat platforms.

Technologies Used: Python, Flask, Twilio API, OpenAI API

- Developed and deployed a **WhatsApp chatbot** using **Twilio API** to handle and manage incoming messages.
- Integrated OpenAI's API to generate intelligent responses for user queries.
- Built the backend using **Flask**, ensuring a lightweight and efficient architecture for handling message requests.
- Designed the chatbot to support **multi-user interactions**, enabling a smooth conversation flow within family group chats.
- Created an intuitive experience where users could ask questions without needing to understand AI tools like ChatGPT.

Interests Area

- **Software Engineering & System Architecture**
- **Software Framework Design & Evolution**
- **Developer Tooling & Abstractions**
- **System Performance Optimization & Scalability**

Future Plans

While my experience has primarily been focused on application development, working across backend, frontend, and database frameworks, I am eager to expand my knowledge into the research side of software engineering. Understanding the underlying principles behind modern frameworks will help me not only build better applications but also grasp why frameworks are designed the way they are and what problems they aim to solve.

I was particularly inspired by a professor during the NUS Summer Workshop back in May 2024, who said, *"In my lecture, I don't just teach you how to use a tool; instead, I'll also teach you how to build the tool itself."* This shifted my perspective and solidified my desire to go beyond just using frameworks and instead understand how they are built and optimized. This realization has motivated me to pursue further education at NUS through the NGNE programme as a stepping stone toward a Master's degree or even potentially a PhD. I see this as an opportunity to bridge the gap between research and practical development, equipping myself with the knowledge to contribute to framework design, system architecture, and developer tooling in the future.

Skillset Breakdown

Programming Languages: JavaScript, Python, C++, C

Web & Backend Frameworks: ReactNative, Vue3, Flask

Cloud & DevOps: Kubernetes, Docker, Helm, Prometheus, Grafana

Database: Elastic Search, MongoDB, MySQL

Operating Systems: Windows, Ubuntu linux (via WSL)

Developer Tools: VS Code, PyCharm, JupyterNotebook

Languages: Fluent in English and Mandarin

Others: HTML, CSS/Bootstrap, Convex, Figma, Twilio

Relevant Achievements

Bronze Award - Malaysian Computing Challenge, 2019