XAVIER KOO

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EDUCATION

SINGAPORE MANAGEMENT UNIVERSITY (SMU)   Aug 2021 – May 2025
Bachelor of Science (Information Systems)

- Penultimate Undergraduate with Double Major in Information Systems (Digitalisation & Cloud Solutions) and Computer Science (Artificial Intelligence).
- **Coursework:** Data Management (SQL), Web Application Development (HTML, CSS, Bootstrap, Vue.js), Computational Thinking (Python), Object-Oriented Programming (Java), Enterprise Solution Development (Docker, AMQP, Systems Design)

EXPERIENCE

ASTERISK TECHNOLOGIES   Feb 2023 – Aug 2023
Software Engineer & Machine Learning Intern

- Architected independently an enterprise-level facilities management system (FMS), enabling a major private hospital client to oversee thousands of facility bookings and streamline admin for 1200+ employees, reducing task time by 50% with 0% booking error rate.
- Engineered automated facility access by integrating tablets as interactive booking displays with **Human Interface Devices**, seamlessly linked to the FMS and door relays verifying **QR Codes/TOTP** for user access, achieving a 95% reduction in manual access requests and 4% increase in employee productivity by eliminating manual security interventions.
- Spearheaded front-end development with **React**, **Bootstrap,** and **SASS**, building 12 reusable components and 13 dynamic web pages. Pioneered a one-click data export feature to CSV format, enhancing user data accessibility. Wrote comprehensive unit, integration, and end-to-end tests with **Jest**, **react-testing-library**, and **Cypress**.
- Constructed backend with **Express + Node** by building 49 **RESTful APIs** including email integration with the **SendGrid API**, and **MongoDB** for data storage. Users are authenticated with **JSON Web Tokens** and **QR Codes/TOTP** was generated securely leveraging a **Network Time Protocol** for precise time synchronization. Wrote unit and integration tests with **Jest.**
- Devised the FMS leveraging a **unified database architecture** for brand switching, centralized management, and user experience. Design choice reduces 95% of development work previously required for each new brand iteration for every new client deployment.
- Employed **Electron.js** to package the **React** based interactive booking display app for seamless tablet installation. Utilized **PM2** for a resilient, automatic local server with 99% uptime, ensuring continuous facility security and operations with no interruptions.
- Enforced code styling and quality via **ESLint.** Developed basic **CI/CD** pipeline for automated build, test and deployment. Authored a wiki for documentation of entire system. Manage new updates and fixes on live system via GitHub releases.
- **Computer Vision**: Created a license plate detection & character recognition tool with **YOLOv4 + Darknet** framework before switching to **YOLOv7.** Integrated **PaddleOCR** for Optical Character Recognition. Trained model with Region Based Convolutional Neural Networks, on sourced data annotated with **LabelImg**. Model achieved a mean Average Precision of 90%+.

PROJECTS

LEAPAHEADX – QUANTUM LEAP INC. CLIENT PROJECT: FORM MANAGEMENT SYSTEM (FMS)
https://github.com/xavierkoo/leapaheadx

- Collaborated with 4 developers to build an FMS for a client company to digitalize form management processes.
- Utilized **Vue.js/Vite, Bootstrap** and **SASS** for front-end and **Java Spring Boot** & **MySQL** for backend, built upon **OOP** principles for scalability & maintainability. **Docker** was used to containerize application for ease of deployment.
- Designed **UML, ERD** & **Use Case Diagrams** for a thorough understanding of project scope and requirements.

GREENVENTURE – MICROSERVICES-BASED ARCHITECTURE
https://github.com/xavierkoo/greenventure-main

- Collaborated with a team of 5 developers to construct a web app incentivizing and rewarding users to recycle.
- Devised and implemented a scalable microservices-based architecture with **React, Express.js, Node.js, MongoDB**, and **Docker**.
- Configured a messaging system using **AMQP** based **LavinMQ** message broker with **nodemailer** to send emails to users.

SUPPORT LOCAL – FULL-STACK WEB APPLICATION
https://github.com/xavierkoo/support-local-frontend

- Developed a full-stack web application to serve as an eCommerce platform for local businesses, employing **Bootstrap**, **SASS**, **Vue.js, Node.js, Express.js, MongoDB**. Application is deployed on **Netlify & Heroku.**
- Constructed web application backend independently by designing **21 RESTful APIs**, performed integration tests using **Jest**, formulated data storage and conducted static code analysis using **ESLint.**

LANGUAGES & TECHNOLOGIES

- **Languages:** HTML | CSS | SASS | JavaScript | Python | Java
- **Frameworks/Libraries:** React.js | Vue.js | Bootstrap | Express.js | Node.js | Electron.js | Spring Boot | Jest | Cypress
- **Databases/Tools:** MySQL | MongoDB | Docker | Git | ESLint | AMQP | Vite | Heroku | Netlify | Pm2 | OpenCV | YOLO PaddleOCR | CSPDarknet53 | LabelImg