Chengxuan Li

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Education

University of Alberta *Alberta, Canada*

Bachelor of Science, Computer Engineering *Sept 2019 - April 2023*

Relevant Course: Computer Architectures, Computer Interface, Data Structures & Algorithms, Database Management, Data Communication Network, Intro. to Software Engineering, Object Oriented Software Design, Operating System Concepts, Parallel and Distributed Programming, Search & Planning in AI, Reliable and Secured System Design

Skills

Programming Languages	Python, C/C++, Java, Typescript, HTML, CSS, C#, Lisp, Lua, VHDL, ARM Assembly
Frameworks & Libraries	Astro, Tailwind, Spring, Flask, Next.js, Django, Fastify, React.js, OpenCV
Automation Tools	JUnit, Locust.io, Shell Script, Powershell, Jest
Database	Firestore, Firebase Real time Database, MongoDB, SQLite, Redis, MS SQL Server
Other Tools & Operating System	Microsoft 365, Git, SSH, Docker, Android Studio, Unity, Vivado, Windows, Linux

Projects

Community Science Traffic Counter *Link to Project*

Tomorrow Foundation *January 2023 - April 2023*

- Developed a traffic counter on Jetson Nano to collect and store real time traffic data in various weather condition to Firebase Real-time Database
- Installed air cooling, network card and antennas, power switch, secondary storage, and secured casing on Jetson Nano
- Improved counting accuracy through training YOLO ML model and tuning OCSORT tracking algorithm. Accuracy was above 90% with clear camera vision compared to manual counting
- Created a web application with Next.js to display traffic counters on Google Map API and traffic data, and deployed in Vercel
- Implemented data export from Firebase to spreadsheet files using Firebase Cloud Function

Grocery and Meal Planning App - Nosh *Link to Project*

Sep 2022 - Dec 2022

- Developed an Android app for users to manage ingredients storage, recipes, meal plans, and grocery shopping list
- Used Figma to design UI and wireframes, and implemented the design with Android Jetpack
- Implemented MVC pattern using Java to manage separation between business logic and user interface
- Used Firebase API to implement simple CRUD operations of Firestore and Firebase Storage, and user authentication
- Created unit tests and intent tests for user interface with JUnit 5 and Espresso to locate potential flaws

Auto Scaling Web Services *Link to Project*

March 2023 - April 2023

- Used Python with Flask to implement a load balancer to monitor and manage Docker micro-services running in Cybera Rapid Access Cloud
- Implemented Queuing Theory to automatically scale up / down number of micro-services based on number of requests and response time.
- Implemented a web page with real-time line plot to visualize Docker swarm manger status using Fastify as backend and Chart.js
- Implemented a load testing client with locust.io to simulate different number of concurrent requests against Docker micro-services

Secured File System *Link to Project*

January 2023 - March 2023

- Developing a secured file storage with UNIX-liked file structures using Spring and Spring Shell, deployed in Cybera Rapid Access Cloud
- Developing a CLI to send HTTP request via commands to REST API to perform file operations
- Used Spring Security to implement user group and access right, authority control, and authentication for users' actions validation
- Implemented symmetric encryption and file integrity verification to ensure confidentiality and integrity of files and directories

Algorithm Analysis for Search and Planning in AI *Link to Project*

Sep 2022 - Dec 2022

- Used Python to implement 2D path finding solver for maps data from Moving AI Lab with different search algorithms (Dijkstra, Bidirectional Search, A-star, Meet in Middle)
- Used Python to implement a solver for Connects-4 based on Minimax Algorithm with Alpha-Beta Pruning
- Used Python to implement a Sudoku solver with AC3, forward checking and other heuristic methods
- Analyzed the performance of algorithms used in the three solvers above with scatter plots, profile and map with searching history