Brook Mao

github.com/BrookMaoDev | linkedin.com/in/brook-mao

Toronto, Canada | 416 655 8716 | brook.mao@mail.utoronto.ca

Skills

Technical Skills

- Proficient in Python, JavaScript/TypeScript, Java, C/C++, and PHP, developing apps such as ThreatTrace AI.
- Skilled at using PowerShell and Git Bash for various tasks across 10+ personal and school projects.
- Experienced with SQL databases and data modeling, building a full stack profile collection app leveraging MySQL.
- Familiar with NoSQL databases like MongoDB and Firebase Realtime DB, building apps such as MultiClock.
- Familiar with basic system design from engineering a multiplayer chess clock app with a 3-tier architecture.
- Clear documentation skills demonstrated through open-source contributions to the VSCode user documentation.
- Skilled at writing clean, object-oriented, and easily understandable code (by peers and TAs), as well as improving code through refactoring by applying modern design patterns, from U of T's software design course.
- Detailed in writing unit tests for personal projects and school assignments using frameworks such as doctest, unittest, Jest, and JUnit.
- Seasoned in cloud technologies, having deployed 3 apps via Amazon Web Services, Azure, and Google Cloud.
- Familiar with DevOps, using Docker and GitHub Actions to set up CI/CD pipelines in projects such as Portfoliify.
- Strong analytical skills, mining and visualizing raw CSV data using Python libraries including Pandas and Matplotlib to reveal insights and produce clear reports, through freeCodeCamp's data analysis certificate.
- Familiar with using TensorFlow to build machine learning models such as a malaria cell detection neural network.
- Skilled at implementing polished user interfaces using HTML, CSS, and front-end libraries like React, jQuery, Bootstrap, and Tailwind, as exemplified in the UI and UX design for ThreatTrace AI.
- Experienced in web development and building REST APIs using frameworks like Express and Flask.
- Familiar with client-side and server-side rendering, applying both techniques across 3 different web apps.
- Experienced in using the Git version control system with GitHub to collaborate across 4 different group projects.
- Familiar with static code analysis tools like Cppcheck to identify and resolve issues, enhancing code quality.
- Experienced in using Google Suite (Sheets, Docs, Slides) and Microsoft Suite (Excel, Word, PowerPoint) through tracking membership information for the Agincourt Chess Club and expenses for an eCommerce store.
- Familiar with A/B testing through running ads for an eCommerce store and tracking results with Google Analytics.

Soft Skills

- Experienced working in Agile and Scrum teams, leading a group of 6 as Scrum Master using Jira to build an artifact database Android app catering to client requirements for a final course project.
- Open communicator, facilitating standup meetings in software teams and with colleagues as a camp counselor.
- Collaborates effectively and quickly learns new skills to fulfill roles in hackathon projects and meet tight deadlines.
- Skilled at presenting complex ideas clearly and simply, through experience as a chess instructor.

Education

University of Toronto, Honors Bachelor of Science in Computer Science (Co-op) **Expected 2027**

Software Engineering Stream | Relevant Courses: Software Design, Computer Organization

Additional Certifications

- JavaScript Algorithms and Data Structures, freeCodeCamp.org

- Data Analysis with Python, freeCodeCamp.org
- Web Applications for Everybody Specialization, University of Michigan (Coursera)

Experience

Artifact Database Android App | *Android Studio, Java, Firebase, Jira, Agile & Scrum* **July 2024 - August 2024**

- Leveraged Firebase and Java to develop a mobile app that efficiently manages and organizes museum artifacts.
- Led a team of 6 as Scrum Master, facilitating standups and sprint planning, communicating tasks and deadlines, and enabling smooth collaboration on GitHub by resolving merge conflicts, earning a 5/5 peer evaluation score.
- Troubleshooted and resolved bugs for 3 team members, ensuring the artifact display page and report generation feature met requirements and kept the project on schedule.
- Implemented a vibrant, interactive UI by extending standard AndroidX fragments to create custom UI elements.
- Wrote maintainable and testable code by utilizing the Model-View-Presenter (similar to MVVM) architecture, and applying object-oriented design patterns including Singleton, Adapter, and Strategy.

3D Rendering Engine | *C++, Cppcheck, Make* **March 2024 - August 2024**

- Built an object-oriented computer graphics program in C++ to render 3D shapes, including cubes and tetrahedrons.
- Applied software design principles to ensure flexibility for future enhancements, such as adding new shapes.
- Implemented rotation, zooming, and panning functionalities using linear algebra and other mathematical techniques.
- Ran static code analysis with Cppcheck to identify and correct style issues, adhering to proper coding standards.

Portfoliify - Profile Management App | *PHP, MySQL, Apache, JavaScript, Azure* **December 2023 - July 2024**

- Implemented a full-stack application for managing online profiles using PHP, MySQL, and JavaScript, featuring login, sign-up, easy profile creation, and profile editing.
- Used knowledge in relational databases to design a data model with 5 SQL tables, efficiently storing users, profiles, educations, experiences, and institutions, while mapping their one-to-many and many-to-many relationships.
- Leveraged GitHub Actions to set up a CI/CD pipeline, automating Docker image builds on repository updates, making for faster deployments (≈ 30 seconds) to Azure Container Apps.

ThreatTrace AI - Malaria Detection CNN | *Python, TensorFlow, Flask, JavaScript, GCP* **October 2023 - July 2024**

- Collaborated with a team of 4 at Hack the Valley to develop a convolutional neural network that classifies cell images as healthy or malaria-parasitized with 95.45% accuracy, winning the Pulsar ML Challenge.
- Delegated tasks and ensured teammates were clear on their roles to deliver a prototype within a 36-hour deadline.
- Built the TensorFlow model with steps documented in a Jupyter notebook, training it on a dataset of 27,000+ images.
- Preprocessed dataset and user-uploaded images, ensuring consistent image sizes compatible with the model.
- Served the model using a Flask REST API, with Bootstrap and JavaScript on the client side, allowing users to try the model by uploading their images through a web app with a sleek, interactive user interface.
- Leveraged GitHub Actions to set up a CI/CD pipeline, automating Docker image builds on repository updates, making for faster deployments (≈ 2 minutes) to Google Cloud Run.

Python Data Analysis Certification | *Python, Pandas, NumPy, Matplotlib, Seaborn, SciPy, Unittest* **June 2024**

- Analyzed vast datasets with up to 70,000 data points using Pandas and visualized the data with Matplotlib and Seaborn to uncover traffic metrics and other insights about the freeCodeCamp website.
- Normalized and cleaned 2 datasets by removing outliers, improving the accuracy of results.
- Predicted future sea levels by conducting statistical analysis on historical data using SciPy.
- Produced clear, concise reports with visualizations for all 5 certification projects.
- Verified the accuracy of the results by passing 100% of freeCodeCamp's unit tests.

MultiClock - Multiplayer Chess Clock | *MERN, Tailwind, NGINX, Docker, Linux, AWS, GitHub CI/CD* **May 2024**

- Developed a full-stack web app using React for the front end, Node and Express for the backend, and MongoDB for the database, resulting in an easy-to-use tool that serves as a timer for multiplayer board games.

- Enabled use of the app on both desktop and mobile by implementing a responsive web design.
- Containerized each layer of the application with Docker, allowing for individual scaling of each component.
- Deployed the application on AWS using a Linux VM and configured NGINX as a reverse proxy, achieving HTTPS encryption, and ensuring secure, reliable access for users.
- Leveraged GitHub Actions to set up a CI/CD pipeline, automating Docker image builds on repository updates, making for faster deployments (≈ 2 minutes) to Amazon Web Services.

The Wacky Store - University Assignment | *C* **February 2024 - April 2024**

- Implemented data structures such as linked lists, trees, and graphs from scratch, applying relevant algorithms to simulate a store with a social network and product recommendation system.
- Wrote comprehensive tests ensuring robustness and memory safety, earning 100% grades across all 3 tasks.

Matrix Multiplication Calculator | *C, Cppcheck* **March 2024**

- Implemented a matrix multiplication algorithm as a console application to efficiently perform computations.
- Conducted static code analysis with Cppcheck to identify and address potential buffer overflow issues.

VSCode - Open-Source Contributor | *TypeScript, PowerShell, GitHub CI/CD* **March 2024**

- Improved the user experience by clarifying user documentation and finding the code segment to update.
- Shared ideas on GitHub Discussions and used code review feedback from Microsoft engineers to successfully merge a pull request and resolve a backlog issue.
- Successfully built the application from the source code on a local Windows machine using the terminal.

Ontario Bridges Data Analysis - University Assignment | *Python, Doctest* **November 2023**

- Analyzed a Government of Ontario bridge dataset containing 2,000+ bridges, focusing on metrics like Bridge Condition Index and last inspection date to assess bridge health.
- Developed an algorithm to automatically assign bridge inspectors to the nearest and highest-risk bridges.
- Thoroughly tested each function using Doctest, catching and resolving bugs to achieve 100% program functionality.

President | Agincourt Chess Club **September 2022 - September 2023**

- Effectively communicated with newcomers, leading to a 42% increase in membership from 33 to 48 members.
- Organized club documents such as membership information and permits using Google Drive and Sheets.

Camp Counselor | Meadowvale East Apostolic Church **July 2023 - August 2023**

- Collaborated effectively with colleagues, sharing ideas during standups to enhance the camper experience.
- Communicated effectively with parents to address any questions or concerns to promptly resolve any issues.

The Wildfire Network - Wildfire News & Predictions Website | *Python, Django, Feedparser* **August 2023**

- Collaborated remotely on GitHub with a team of 3 to develop a site featuring the latest wildfire news, hotspots, and a basic prediction algorithm within 36 hours at Ignition Hacks.
- Learned the Python Feedparser library on the fly to successfully collect and extract news data from CBC RSS feeds, making it possible to display real-time wildfire news articles on our homepage.

Java Brokers - Stock Trading Simulator | *Java, UML, Yahoo Finance API* **December 2022 - January 2023**

- Collaborated with a team of 3 to develop a stock trading simulator desktop app, featuring user authentication, stock search, buy/sell functionality, portfolio management, and more.
- Leveraged the Yahoo Finance API (a third-party API) to integrate real-time data for the top 50 NASDAQ stocks.
- Designed the software using UML diagrams, promoting maintainable code, and simplifying task delegation.