Brook Mao

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Education

University of Toronto, Bachelor of Science in Computer Science   Sep 2023 to Aug 2027
- CGPA: 3.97/4.0
- **Relevant Coursework:** Software Design, Numerical Algorithms, Computer Organization

Skills

- Proficient in Python, JavaScript, TypeScript, Java, C, C++, and PHP, developing apps like ThreatTrace AI.
- Skilled at improving code by applying object-oriented design patterns from UofT's Software Design course.
- Detailed in writing comprehensive automated tests for personal projects using testing frameworks like JUnit.
- Experienced in managing SQL and relational databases, building a profile management web app with MySQL.
- Familiar with NoSQL databases like MongoDB and Firebase, building apps like MultiClock.
- Familiar with DevOps, using Docker and GitHub Actions to set up CI/CD pipelines for 3 personal projects.
- Seasoned in cloud technologies, having deployed 3 apps on AWS, Azure, and GCP.
- Familiar with Windows PowerShell and Bash for automating tasks in 3+ personal projects.
- Comfortable in Linux/Unix environments, deploying a multiplayer chess clock web app on a Linux VM.
- Strong analytical skills, using Python libraries to analyze large datasets and generate reports.
- Familiar with TensorFlow for building machine learning models, such as a malaria cell detection neural network.
- Skilled at implementing sleek user interfaces using HTML, CSS, and frontend libraries like React.
- Experienced in web and API development with technologies like Express, Node.js, and Flask.
- Experienced with Git version control and GitHub for collaboration across 4+ group projects.
- Proficient in Microsoft Office, using it for tracking membership information for the Agincourt Chess Club.
- Familiar with Agile development, leading a group of 6 as Scrum Master to develop an Android app.
- Strong communication skills from leading group meetings and working as a camp counselor.
- Effective collaborator and quick learner, excelling in team hackathons with tight deadlines.
- Clear written communication skills demonstrated through open source contributions to VSCode documentation.

Projects

ThreatTrace AI   Link to Project ↗
- Collaborated in a team of 4 at Hack the Valley to develop a machine learning model using Python that classifies cell images as healthy or malaria parasitized with 95.45% accuracy, winning the Pulsar ML Challenge.
- Coordinated tasks and clarified roles for teammates to deliver a working prototype within 36 hours.
- Built the neural network using TensorFlow and trained it on a dataset of over 27,000 images, documenting the process in a Jupyter notebook.
- Conducted data preprocessing on the training data and user-uploaded images to ensure model compatibility.
- Deployed the model via a web app using HTML, CSS, Bootstrap, and JavaScript to create a sleek UI, and Flask to develop a REST API backend, allowing users to try the model out with their own images.
- Set up a CI/CD pipeline with GitHub Actions, automating Docker image builds and deployments to GCP.

Toronto Asian Art Museum Mobile App   Link to Project ↗
- Developed an Android app using Java and Firebase Realtime Database for efficient artifact management.
- Led a team of 6 as Scrum Master, facilitating standups and sprint planning, and achieving a 10/10 peer evaluation score.
- Troubleshot and resolved bugs for 3 team members, ensuring timely delivery of requirements.
- Implemented an interactive UI by extending AndroidX fragments to create custom elements.

- Applied object-oriented design patterns like Singleton and Adapter to write maintainable code.

MultiClock   Link to Project ☑

- Developed a multiplayer chess clock web app using React, Node.js, Express, and MongoDB.
- Designed a responsive UI to ensure the app works seamlessly on both desktop and mobile devices.
- Deployed the app on AWS using a Linux VM, configuring NGINX as a reverse proxy with HTTPS encryption, making the app accessible for anyone to use securely.
- Set up a CI/CD pipeline with GitHub Actions, automating Docker image builds and deployments to AWS.

Portfoliify   Link to Project ☑

- Developed a web app for creating and managing online profiles using PHP, MySQL, and JavaScript.
- Designed a data model using relational databases, featuring 5 SQL tables to efficiently store user data.
- Set up a CI/CD pipeline with GitHub Actions, automating Docker image builds and deployments to Azure.

Python Data Analysis Projects   Link to Project ☑

- Analyzed large datasets containing up to 70,000 data points using Python libraries like Pandas and Matplotlib.
- Crafted clear and easy-to-understand reports visualizing data from 3 datasets, providing insights into FreeCodeCamp traffic, causes of cardiovascular disease, and global demographics.
- Normalized and cleaned datasets by removing outliers to improve the accuracy of results.
- Predicted future sea levels through statistical analysis of historical data with SciPy.

3D Rendering Engine   Link to Project ☑

- Built an object-oriented graphics program in C++ to render 3D shapes like cubes and pyramids.
- Added zoom, pan, and rotation functionalities using linear algebra and other mathematical techniques.
- Applied software design principles to ensure maintainability and future flexibility.
- Used Makefiles to streamline the build process and conducted static code analysis with Cppcheck.

Bridge Inspector Assignment Algorithm

- Analyzed a Government of Ontario dataset containing over 2,000 bridges using Python, focusing on metrics like Bridge Condition Index to develop an algorithm that assigns inspectors to the nearest, highest-risk bridges.
- Wrote comprehensive automated tests, identifying and fixing bugs to achieve 100% program functionality.

The Wildfire Network   Link to Project ☑

- Collaborated remotely in a group of 3 on GitHub to develop a site featuring wildfire news, hotspots, and a risk prediction algorithm within 36 hours at Ignition Hacks.
- Learned the Python Feedparser library on the fly to successfully extract and display real-time wildfire news from CBC RSS feeds on the homepage.

Java Brokers   Link to Project ☑

- Collaborated in a team of 3 to develop a stock trading simulator using Java, featuring user authentication and easy portfolio management.
- Integrated real-time financial data using the Yahoo Finance API for the top 50 NASDAQ stocks.
- Designed the software using UML diagrams and applied object-oriented principles to promote maintainability.

The Wacky Store

- Developed a virtual store with a social network and product recommendation algorithm using C and data structures like linked lists, trees, and graphs.
- Wrote comprehensive tests to verify program correctness and memory safety, achieving a 100% grade.

Matrix Multiplication Calculator   Link to Project ☑

- Implemented a matrix multiplication algorithm in C as a command-line app to perform fast computations.
- Conducted static code analysis with Cppcheck to catch and fix buffer overflow bugs.

Experience

Open Source Contributor, Visual Studio Code – Remote   Mar 2024 to Apr 2024

- Shared ideas on GitHub Discussions and incorporated code review feedback from Microsoft engineers to successfully merge a pull request and resolve a backlog issue.
- Clarified settings descriptions and updated the TypeScript codebase to improve the user experience.

Camp Counselor, Meadowvale East Apostolic Church – Toronto, Canada   Jun 2023 to Aug 2023

- Collaborated seamlessly with colleagues and contributed ideas in standups to enhance the camper experience.
- Communicated effectively with parents to address questions and concerns, promptly resolving issues.

President, Agincourt Chess Club – Toronto, Canada   Sep 2022 to Sep 2023

- Effectively communicated with newcomers, leading to a 42% membership increase from 33 to 48.
- Organized club documents, including permits and membership data, using Microsoft Office and Excel.