Richard Bai

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EDUCATION

University of Waterloo Waterloo, ON

Bachelor of Computer Science *Sep 2021 – May 2026*
- Courses: Object-Oriented Programming, Functional Programming, Linear Algebra, Calculus, Statistics & Probability

TECHNICAL SKILLS

Languages: JavaScript, TypeScript, HTML/CSS, Python, C, C++, Java, Bash, SQL
Libraries/Frameworks: React, React Native, Next.js, Node.js, PyTorch, scikit-learn, styled-components, Tailwind
Developer Tools: AWS, Visual Studio Code, Cursor, Git, Docker, Jira, Confluence, Agile, Slack, Figma
Testing Tools: Jest, Cypress, Storybook, Postman, Junit

EXPERIENCE

Full-Stack Engineer May 2024 – August 2024

Savi Finance *Toronto, Ontario*
- Expanded user-base by **9,000+ MAU** and improved upload speeds by **17x** by remastering CSV/PDF upload system with **GPT-4o**, **LlamaIndex**, **AWS S3** and **Redis** to accurately parse/remap transactions in a concurrent, mutex-based worker
- Constructed **15+ GraphQL/JSON-RPC** endpoints and **2 AWS ECS** micro-services to securely sync transactional data from mobile to web platform, allowing users to visually compare their forecasted/actual finances in real-time with **d3.js**
- Automated **CI/CD** staging/production deployments for **3** micro-services using **Docker, Kubernetes, AWS EKS, AWS ECR** and **cron**, reducing deployment times by **60%+** and ensuring zero-downtime deployments
- Integrated **Plaid** financial accounts into a concurrent web worker for expensive computations, increasing front-end responsiveness by **2500ms+** while performing rigorous E2E-testing with **Jest** and **Cypress** in an **Agile** environment

Software Development Intern May 2022 – January 2023

Freedo Technologies *Remote*
- Innovated a patented process using **PyTorch** and **OpenCV** to identify and analyze different roof shapes and their respective dimensions and rebuild them in 3D space using **C++**, speeding up roof processing by **86%**
- Formulated an algorithm using **k-means clustering** to get an image of a building's color palette in **Python** using **Scikit-learn** and **NumPy**, providing a representative palette of colors with **95%+** accuracy
- Repurposed an unsupervised ML algorithm to condense satellite images of buildings to its most dominant colors, speeding up 3D modelling processing speeds by **40%+** and reducing project processing loads by an average of over **65%**

Vice President & Web Developer January 2021 – December 2023

Youthful Spark *Calgary, Alberta*
- Organized and hosted over **50** remote weekly lessons to teach over **300** students the fundamentals of Java, Python and C++, growing the non-profit's student base by over **220%** while recruiting **6** new tutors
- Coordinated summer camp initiatives for **3 years**, coordinating math and programming summer camps, teaching over **80** students the fundamentals of Python and Java and raising over **$7,100** for local food banks
- Designed and deployed the organizational website with **HTML**, **CSS** and **JavaScript**, managing a traffic of **2,000+ MAU**

PROJECTS

Tennis Tracker AI | *PyTorch, OpenCV, Python, Ultralytics, Roboflow* June 2024 - Present
- Fine-tuned an **Ultralytics YOLOv5l6u** object detection model using **Roboflow** datasets to analyze tennis matches, tracking player and ball movements to compute and provide key match analytics
- Customized a **convolutional neural network (CNN)** built with **PyTorch** and **OpenCV** to extract and map key-points to interpolate player and ball positions, converting them to relative velocities in real-time

Beacons | ⌂ *React Native, Express, MongoDB, Node.js, REST API, Git* February 2024
- Accomplished **Best Use of MongoDB** at **Deerhacks 2024** as a **Backend Developer**, building a mobile social-media application implementing core features like hosting group events, friend requests and a live event map interface
- Deployed a **Node.js** back-end API/database with **Express**, **MongoDB Atlas**, **Postman** on **Render**, allowing the **React Native** front-end to query and mutate user and event data.

codequery | ⌂ *Vite, Express, MongoDB, Node.js, REST API* January 2024
- Implemented a full-stack conversational chat-bot with **React** and **Node.js**, utilizing a fine-tuned **GPT 3.5 Turbo** model to provide personalized feedback to coding inquiries, serving **10+** users and **1,200+** inquiries monthly.
- Architected a cloud-based chat history feature which allows users to access, create and delete conversations using **MongoDB Atlas** for scalable data storage and fully run-on **AWS** ensuring **99.99%** up-time and global access.