Michael Xie

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EDUCATION

University of Waterloo *Waterloo, ON*
Bachelor of Computer Science(Co-op) **Expected Graduation:** June 2027
Relevant Courses: *Algorithms, Introduction to AI, Introduction to ML, Operating Systems, User Interfaces*

WORK EXPERIENCE

Software Developer Intern January 2025 – April 2025
Royal Bank of Canada*- Digital Development Security Team* Toronto, ON
- Developed an internal AI Assistant using **Langchain**, **RAG**, **PgVector**, and semantic chunking techniques to streamline documentation access, improving response relevance and reducing latency by **30%**.
- Built a **Spring Boot** sidecar service containerized with Docker and deployed on **OpenShift 4** to isolate fraud detection services, reducing duplicate code and simplifying streamlining integration for developers.
- Migrated CI/CD workflows from **Jenkins** to **GitHub Actions**, automating test, build, and deployment pipelines to reduce manual steps and cut pipeline times by **15%**, enabling faster and more reliable releases.

Software Developer Intern May 2024 – August 2024
Royal Bank of Canada*- Digital Development Security Team* Toronto, ON
- Built a web tool for decoding JWTs and internal RBC Security Tokens using **Angular** and **Spring Boot**, adopted by **1,000+** employees to speed up token analysis and reduce support requests.
- Reduced onboarding time by **20%** by creating and deploying a token onboarding portal across multiple development environments using **Redis**, **Docker**, and **Openshift 4**.

Technical Systems Analyst Intern May 2023 – August 2023
Royal Bank of Canada*- Law Group Technology Team* Toronto, ON
- Increased productivity by **25%** through automation of Power of Attorney document creation using **ASP.NET**, **Bootstrap** and **jQuery**.
- Automated repetitive data-sorting tasks in Excel using **Visual Basic**, reducing manual effort and saving analysts **10%** of their weekly processing time.

PROJECTS

NES Emulator | *Rust* GitHub
- Designed and implemented a Nintendo Entertainment System(NES) emulator from scratch using **Rust**, achieving accurate hardware emulation and game compatibility.
- Developed a precise emulation of the MOS 6502 microprocessor, replicating original timing and behavior, with built-in tracing to verify instruction accuracy and support debugging.
- Implemented the NES Picture Processing Unit (PPU) from scratch, accurately rendering background tiles and sprites per scanline while handling vertical blanking and scrolling to support visual effects in classic titles.

RPS CV | *Python, OpenCV, Keras, Jupyter Notebook, FastAPI, Angular* GitHub | Demo
- Built an interactive Rock-Paper-Scissors game leveraging computer vision to recognize hand gestures, utilizing **OpenCV** and a custom Convolutional Neural Network (CNN) model trained with **Keras**.
- Developed a full-stack application with a **FastAPI** backend for gesture processing and an **Angular** frontend for an engaging user interface, connected via a **RESTful** API.

Home Server Infrastructure | *Proxmox, Linux, Docker, Bash, FastAPI*
- Architected and managed a home lab server using **Proxmox** to run multiple **LXC** containers and VMs for service isolation, microservice testing, and OS experimentation.
- Implemented a secure, scalable internal network with **NGINX** reverse proxy, automated SSL certificate provisioning, and container orchestration via **Docker Compose**.

TECHNICAL SKILLS

Languages: Python, Java, TypeScript, JavaScript, Rust, Go, C/C++, C#, HTML/CSS
Frameworks/Libraries: Angular, React, OpenCV, Keras, Spring Boot, Node.js, Tailwind CSS
Developer Tools: Git, GitHub Actions, Bash, Nginx, AWS