

Charles Liu

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SUMMARY OF QUALIFICATIONS

Programming Languages: C++, C#, Python, JavaScript, C, SQL, Go, HTML5, CSS.

Frameworks and Libraries: ReactJS, NodeJS, ExpressJS, .NET, Bootstrap, PyTorch, YOLO, OpenCV, scikit-learn.

Tools and others:: Kubernetes, MongoDB, Docker, Bash, Git, Github, Visual Studio, Vim, Agile, STMCubeMx.

EDUCATION

University of Toronto, St. George Campus

Expected May 2026

Bachelor of Applied Science in Computer Engineering, Minor In Artificial Intelligence Engineering

Toronto, ON

PROFESSIONAL EXPERIENCE

Software Engineer Co-op, Embedded

May 2024 – Present

ecobee Inc.

Toronto, ON

- **Won company-wide hackathon** by designing a portable air quality sensor and engineering its **RESTful API** endpoints for cloud-based services and mobile app integration.
- Eliminated **100%** of human errors by developing a **ASP.NET**-based microservice client in **C#** that automates serial number replenishment. Leveraged **Test Driven Development** by writing unit tests with **XUnit**.
- Improved automated hardware testing precision by **56%** via revamping test infrastructure software with **.NET** framework and **OOP** best practices in **C++/CLI**. Used to produce **3 million+** smart thermostats
- Streamlined software release process by engineering a **Gitlab CI/CD** pipeline using **YAML** and **Powershell** scripts to automate artifacts generation, upload software bundle, and generating release notification emails to clients .
- Implemented firmware testing endpoints with **C++** and **BASH** scripting on **Yocto Embedded Linux**.
- Refactored dashboard web app backend persistence layer in **Python** to improve **MongoDB** query results.

Hardware/Firmware Engineer Intern

May 2023 – September 2023

Epic Safety Inc.

Vancouver, BC

- Architected production-grade **Windows** software with **C#** and **.NET Core** to conduct tests and store results.
- Wrote **Embedded Firmware** in **C** on a **STM32 ARM Cortex-M0** using Keil MDK and STM32CubeMx.

Web Developer, Freelance

May 2021 – August 2021

Karasik Auctions

Vancouver, BC

- Developed a collectibles-labeling web application using **ReactJS/NodeJS** that catapulted the company's efficiency by **200 %** by semi-automating the arduous process of hand-editing new grading labels.

OTHER TECHNICAL EXPERIENCE

Cloud Software Open Source Contributor

September 2024 - Present

CNCF Kubernetes Knative Project

Toronto, ON

- Enabled synchronous requests on Kubernetes Knative Eventing's asynchronous event-driven architecture by making the custom init container triggers for the RequestReply resource in **Golang**.

Autonomous Vehicle System Software Engineer

October 2024 - Present

aUToronto- University of Toronto's first-prize-winning autonomous vehicle design team

Toronto, ON

- Automated self-driving vehicle system fault recovery by implementing a diagnostics **Robot Operating System** node for a system watchdog in **C++** and converting cepton lidar driver nodes to use ROS 2's managed lifecycle.

PROJECTS

Seatbelt Detection Using Deep Learning

Aug. 2023 – Present

- **Preprocessed data** by merging, cleaning and converting COCO datasets from RoboFlow and Imagenet
- **Built computer vision model** by leveraging the **YOLO** object detection model for **transfer learning** and combining it with a fully-connected **ANN** classifier using **PyTorch**
- **Trained model** using **adversarial training** for improved performance, **CUDA** for expedited training time.
- **Evaluated model** by building a baseline **CNN** that achieved a **90.5 %** accuracy on validation dataset.