CHARLES LIU

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SKILLS

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:	Git, Github, Visual Studio, Vim, MongoDB, Docker, Bash, Kubernetes, STMCubeMx.

PROFESSIONAL EXPERIENCE

Embedded Software Engineer Co-op May 2024 – Present
ecobee Inc. *Toronto, ON*

- **C++ and C# OOP:** Improved automated testing precision by **56%** via revamping test infrastructure software with **.NET** framework and **OOP** best practices in **C++/CLI** and **C#**.
- **Embedded Linux:** Expanded sensor compatibility by engineering testing endpoints with **C++** and **BASH** scripting on a **Yocto Linux** distribution. Modified **CMakefile** and **.bashrc** to build and validate customized firmware.
- **Backend:** Refactored dashboard web app persistence layer in **Python** to improve **MongoDB** query results.
- **Software Release:** Released production software by leveraging **CI/CD** pipelines to be used for **3 million+** units.
- **Agile methodology:** Utilized **Jira** scrum boards to participate in sprint planning and progress tracking. Leveraged **Git** to practice **Version Control**. Create MRs/PRs and participated in code reviews with **Github/Gitlab**

Hardware/Firmware Engineer Intern May 2023 – September 2023
Epic Safety Inc. *Vancouver, BC*

- **Overview:** Expedited product QA by developing an automated test jig for **50k+** devices in an assembly line.
- **PC Software and Database:** Architected it with **C#** and **.NET Core** to conduct tests and store results on **AcessDB**.
- **Embedded Firmware:** Wrote firmware in **C** on an **STM32 ARM Cortex-M0** using Keil MDK and STM32CubeMx.

Web Developer, Freelance May 2021 – August 2021
Karasik Auctions *Vancouver, BC*

- **Full-Stack Development:** 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.

EXTRACURRICULAR EXPERIENCE

Software Developer Contributor September 2024 - Present
Cloud Native Computing Foundation Kubernetes Knative Project *Toronto, ON*

- **Kubernetes:** Developed an InitContainer to dynamically create pod-specific triggers, a core enhancement for serverless, multi-tier distributed systems, enabling synchronous request-response workflows in Kubernetes Knative Eventing.

Autonomous Vehicle System Software Engineer October 2024 - Present
aUToronto- *University of Toronto's award-winning autonomous vehicle design team* *Toronto, ON*

- **Robor Operating System:** Automated system fault recovery by ROS node implementing a dianostics ROS node for a system watchdog in **C++**.

PROJECTS

Seatbelt Detection Using Deep Learning - *4 contributors total* GitHub Link August 2023
OVERVIEW: Ensured vehicle occupant safety by detecting properly worn seatbelts on passengers using *Deep Learning*.

- **Data Pre-processing:** Merged and cleaned datasets from RoboFlow and Imagenet and imported with COCO format.
- **Model Building and Computer Vision**: Leveraged the **YOLO** object detection model for **transfer learning** and combined with a fully-connected **ANN** classifier using **PyTorch**.
- **Model Training**: Used **adversarial training** for improved performance, **CUDA** for expedited training time.
- **Model Evaluation**: Self-built a **CNN** for baseline comparison and achieved **90.5 %** accuracy on validation dataset.

EDUCATION

Bachelor of Applied Science and Engineering, Computer Engineering,
Minor In Artificial Intelligence Engineering
University of Toronto, St. George Campus Expected May 2026