Kyle Rebello

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Education

McMaster University — Hamilton, ON
Bachelor of Engineering in Computer Engineering — *Expected Graduation: April 2028*

- **Awards**: Deans' Honour List (2025), Faculty of Engineering Award of Excellence (2024)
- **Relevant Coursework**: Data Structures and Algorithms (C++), Microprocessor Systems, Digital Logic Design (VHDL, Verilog), Linear Algebra, Probability and Statistics, Circuits and Waves, Electronic Devices and Circuits 1
- **GPA**: 3.5/4.0

Experience

Software Developer (Machine Learning Team) — Nov 2025 – Present
McMaster Humanoid — *Hamilton, ON*

- Implement manipulation primitives for a simulated 12-DOF humanoid robot using the Genesis physics engine and **Vision-Language-Action (VLA) models**.
- Develop a **computer vision pipeline** to preprocess and resize visual input data for compatibility with VLA vision encoders.
- Deploy **PyTorch Reinforcement Learning** policies to a physical 12-DOF humanoid robot via an **NVIDIA Jetson Nano** and **CAN bus interface**.

Software Developer (Machine Learning Team) — Nov 2025 – Present
McMaster Underwater Robotics Team — *Hamilton, ON*

- Aided in the construction of a Remotely Operated Underwater Vehicle to compete in the MATE ROV Competition.
- Increased **target detection accuracy by 35%** by building an **AI-driven** automation and image-processing pipeline leveraging **OpenCV**, **TensorFlow**, and **YOLO**.
- Architected low-level robotics software, including PID control for stabilization and sensor fusion algorithms, bridging onboard microcontrollers with **ROS 2**.
- Achieved a **95% pre-deployment reliability rating** for underwater control algorithms by implementing a rigorous validation framework using **Gazebo** simulations and Hardware-in-the-Loop (HIL) testing.

Software Developer Co-op — Jul 2023 – Aug 2023
Career Education Council — *Virtual*

- Engineered a specialized iOS application using Swift aimed at improving the cognitive function of disabled children, successfully delivering the prototype within a **strict two-month development cycle**.
- Validated product market-fit by presenting the completed prototype to a panel of **5+ industry leads** from various fields, facilitating cross-sector feedback for future iterations.
- Selected as the **lead developer among 30+ candidates** to prototype a specialized iOS application in collaboration with Special Education board members.

Projects

Real-Time Flood Risk Prediction | *TensorFlow, Scikit-learn, AWS S3, Docker* — Dec 2025 – Jan 2026

- Developed a dual-model ensemble prediction system using **Scikit-learn (Random Forest)** and **TensorFlow (LSTM)** to achieve **over 80% accuracy** in flood risk forecasting.
- Implemented a robust feature engineering pipeline to process raw weather data from external APIs into time-series sequences.
- Managed model lifecycle by versioning and deploying trained models to **AWS S3**, enabling seamless model rollbacks.
- Integrated the ML engine with a **FastAPI** backend and Redis caching layer to deliver **sub-second risk predictions**.

Real-Time Drowsiness Detection System | *Python, OpenCV, MediaPipe* — Aug 2025 – Sept 2025

- Built a real-time **computer vision** application with **OpenCV and MediaPipe**to monitor user alertness while studying through the laptop webcam.
- Implemented facial landmark tracking to compute Eye-Aspect-Ratio (EAR) for blink duration detection at ∼**25-30 FPS**.
- Designed alert logic to trigger audio notifications during prolonged eye closure.
- Added automated session logging to quantify focus lapses and provide post-study performance reports.

Technical Skills

Languages: Python, C/C++, Java, Swift, SystemVerilog/Verilog, VHDL, MATLAB, JavaScript
Libraries: FreeRTOS, Pandas, NumPy, Matplotlib, OpenCV, ROS, React, PyTorch, TensorFlow, Scikit-learn, React Native, Node.js, Express.js
Developer Tools: Git, CMake, Bash, Linux, Docker, GDB, GCC, GCP, VSCode, Visual Studio, Eclipse, Postman, Github, Gitlab, AWS (S3, Cloudfront, Terraform, X-Ray), Spyder
Extracurriculars: Dragon Boat Competetive Rowing Team, Engineering Welcome Week Representative, Intramural Soccer

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