Kyle Rebello

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Education

McMaster University — Hamilton, ON
Candidate for B.Eng in Computer Engineering — *Expected April 2028*

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

Work Experience

Software Developer — 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.
- Built AI-driven automation and image-processing pipelines leveraging **OpenCV**, **TensorFlow**, **YOLO**, and other **ML models** to facilitate underwater target recognition and mission objectives.
- Architected low-level robotics software, including PID control for stabilization and sensor fusion algorithms, while bridging onboard microcontrollers with **ROS2** via custom communication layers and coordinate transformations.
- Validated control algorithms through simulations and Hardware-in-the-Loop (HIL) testing, ensuring system robustness and safety prior to physical deployment.

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, delivering the functional prototype to industry leads within a strict two-month cycle.
- Validated product market-fit by presenting the prototype to a panel of **5+** industry leads from various fields, facilitating cross-sector feedback.
- 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 | DeltaHacks Project | *TensorFlow, Scikit-learn, AWS S3, Docker* — Dec 2025 – Jan 2026

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

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

- Built a real-time **computer vision** application 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 and added automated session logging to quantify focus lapses.

Wearable Haptic Navigation Device | Course Project | *Arduino Nano, C++, LiDAR Sensor* — Feb 2025 – Apr 2025

- Developed a mobility assistance device, integrated into a compact fanny pack, for a client with severe visual impairment.
- Integrated VL53L0X **LiDAR** sensor with haptic feedback motors to convey proximity and approach speed in real time.
- Developed interrupt-driven motor control firmware achieving sub-20 ms response latency for tactile feedback.
- Designed and 3D-printed a compact enclosure in Autodesk Inventor; soldered and assembled full hardware system.

Intelligent Note Summarizer | *Personal Project* | *TensorFlow, Python, spaCy, FastAPI* — Jan. 2025

- Developed a deep learning model to automatically summarize long-form text using **TensorFlow** and **Keras**, utilizing an **LSTM** architecture.
- Cleaned and prepared text data using **spaCy** and **NLTK**, implementing techniques like tokenization and stop-word removal to improve model performance.
- Created a web-based **FastAPI** backend to handle user requests, allowing users to submit notes and receive summaries in real-time.
- Evaluated model performance using the **BLEU metric**, achieving a score of **0.65** and significantly reducing the time required to review study materials.

Technical Skills

Languages: Python, C/C++, Java, Swift, SystemVerilog/Verilog, VHDL, MATLAB, JavaScript
Libraries: **FreeRTOS**, **pandas**, **NumPy**, **Matplotlib**, **OpenCV**, **ROS**, **React**, **PyTorch**, **TensorFlow**, **React Native**
Developer Tools: Git, CMake, Bash, Linux, **Docker**, GDB, GCC, **GCP**, VSCode, Github, Gitlab, **AWS (S3, Cloudfront, Terraform, X-Ray)**, Spyder
Extracurriculars: McMaster Dragon Boat Competitive Rowing Team, Soccer Intramurals