Adham Elshabrawy

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Education

Queen's University — Kingston, ON
Mechatronics & Robotics Automation Engineering — *Sep. 2023 – May 2027*

IBM Certificate
Machine Learning with Python — *Apr. 2024 – June 2024*

Professional Experience

Mechatronics Design Intern — May 2025 – Aug. 2025
FYELABS — *Hamilton, ON*

- **Led a team of 5** to automate a food dispenser, defining client requirements and aligning with firmware, PCB, and mechanical teams.
- Designed and implemented embedded control logic in **C/C++** for a system integrating **8+ motors**, and **10+ sensors**, reducing operation time by **60%**
- Spearheaded the automation of a contact lens manufacturing process for an innovative glaucoma treatment, designing the full control sequence and achieving **97%** dispensing accuracy.

Mechatronics Design Intern — May 2024 – Aug. 2024
FYELABS — *Hamilton, ON*

- Integrated GPS modules, accelerometers, and gyroscopes with **Raspberry Pi platforms**, writing optimized drivers using **UART/I2C** to enable real-time speed and position tracking with **95% accuracy.**
- Designed an airtight battery enclosure in **SolidWorks**, ensuring zero air ingress/egress and protecting next-generation battery materials from environmental exposure.
- Assisted in the circuit design of an industrial automated machine for synthesizing a new plastic material, and validated the PCB using an **oscilloscope** and a **logic analyzer** to ensure precise and reliable operation.

Extracurricular Experience

Director of Autonomy — June 2025 – Present
Queen's Autodrive Team — *Kingston, ON*

- Leading **25+ students** across **4 subteams** within the Autonomy division to advance a Level-4 autonomous vehicle, managing development cycles using **Jira** and **Git**.
- Architectured **CI/CD** pipelines to automate unit testing and integration checks for **C++** and **Python** nodes, reducing deployement errors
- Implement machine learning algorithms in **C++** and **Python** including **D* Lite**, **Kalman/Particle filters**, and **Model Predictive Controller (MPC)** improving system accuracy and performance.

Projects

Autonomous Delivery Robot | *Python, C++, ROS2, Linux* — May 2025 – Present

- Engineered an autonomous hospital delivery robot on **Raspberry Pi 4**, utilizing sensor fusion for localization and obstacle detection in a live pharmacy.
- Achieved **93% path accuracy** by developing a custom **SLAM** node and **D* Lite** algorithm to efficiently transport medication.

ShopVision | *Python, PyTorch, CLIP, ChromaDB, OpenAI API* — December 2025 – Present

- Built multimodal e-commerce search using **CLIP** embeddings and **ChromaDB**, enabling text-to-image and image-to-image product retrieval
- Integrated OpenAI (ChatGPT) API for AI-generated product descriptions and visual Q&A, with retrieval evaluation **(Recall@K, MRR)**

S&P 500 Stock Predictor | *Python, Git* — July 2024 – Aug. 2024

- Achieved **60%** accuracy in predicting S&P 500 stock movements by engineering a machine learning classification model with **scikit-learn**, **NumPy**, and **pandas** on historical data.

Technical Skills

Languages: Python, C/C++, SQL, Bash, HTML/CSS, MATLAB, VHDL, Verilog, Assembly (NIOS II, ARM64).
Software Tools: Docker, CI/CD, Gazebo, SolidWorks, Altium Designer, Fusion 360, LTSpice, SimuLink.
Libraries: pandas, NumPy, Matplotlib, OpenCV, scikit-learn, PyTorch, TensorFlow.
Productivity Tools: Word, Excel, PowerPoint, Jira, Git.