Quinn Mazaris

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Engineering Experience

Vista Solutions, Windsor ON — *Machine Vision Engineer Co-op*

May 2025 - August 2025

- Built an ensemble machine-learning pipeline in Python (XGBoost, Random Forest) using HALCON output vectors, boosting model accuracy on difficult datasets from ~40% to ~84%, with most datasets achieving >93%.
- Automated threshold sweeps with precision, recall, F1, and custom cost functions; implemented k-fold validation to improve reliability of training results.
- Developed a HALCON MCP server by scraping documentation and examples, enabling syntax validation and semantic operator search, significantly reducing development time for engineers. This significantly enhanced AI models' ability to code in HALCON.
- Designed and 3D-printed precision enclosures and mounts for cameras and lasers in Fusion 360, iterating prototypes to achieve alignment and full integration.

Mitsubishi Steel, Chatham ON — *Controls Engineer Co-op*

May 2024 - August 2024

- Developed and implemented a search algorithm into an active machine, reducing changeover time by 1 minute. This update also integrated enhanced safety measures to prevent operator errors from causing machine damage.
- Developed and implemented an object detection system optimized for collecting data on failed parts, resulting in a 100% improvement in failure detection accuracy. This system captures images of various failure modes to enhance process understanding and reduce scrap, all achieved without adding hardware and by eliminating all moving parts.
- Created Python scripts to log tens of thousands of data points from an internal website onto a local PC establishing a robust data baseline to quantify the benefits of engineering changes. Additionally, I developed a companion script that displays real time pop-up alerts on the user's PC when a machine goes down, saving an estimated 2 hours per week for each user.
- Developed a scalable front-end HTML page providing a real-time overview of the entire factory, optimized for Google Chrome to work seamlessly between 25% and 400% scale. This modern interface ensures universal compatibility from large displays to phone screens, reducing information access time for over 100 users.

Mitsubishi Steel, Chatham ON — *Process Engineer Co-op*

May 2023 - February 2024

- Developed and enhanced standardized work instructions in Excel, incorporating clear visuals, detailed lockout/tagout procedures, and actionable feedback to ensure operator safety, enhance understanding, and reduce training times. Received positive feedback from 85% of operators while improving the document coverage by over 100%.
- Managed process improvement trials and conducted root cause analysis in production, focusing on compression, heat, and chemical application variables. Collected and analyzed thousands of data points, enabling data-driven decisions to resolve production issues in real time and implement targeted solutions for enhanced process stability.
- Analyzed data from monitoring systems to proactively identify trends in machine performance, enabling early detection and replacement of failing components.

Projects

Automated Hydroponic Tower, London ON — *Mechatronics Engineer*

August 2024 - Present

- Developed a vertical hydroponic tower with a high plant density, utilizing a 3D-printed design and a custom full-spectrum LED grow light configuration to ensure even light distribution over the vertical tower.
- Automated lights and water pumps using an ESP32, relay board and custom mosfet circuit. The ESP32 measures TDS, pH, and temperature while controlling four peristaltic dosing pumps.
- Integrated a Raspberry Pi as the main controller via MQTT, with a connected camera to monitor plant growth and log data for analysis.
- Implemented fallback code on the ESP32 to maintain operations if the connection to the Raspberry Pi fails.
- Designed a custom Peltier cooler module controlled by an H-bridge for precise temperature regulation, allowing both heating and cooling capabilities of the water to improve plant yield by 35% over room temperature.

Autonomous Sorting Robot, London ON — *Mechatronics Engineer*

January 2024 - May 2024

- Designed and programmed a fully autonomous robot with two custom ESP32 boards, integrating five gear motors, three servo motors, a color sensor, and an ultrasonic distance sensor to identify and collect only green gems from a randomly assorted play area. Achieved a top 5% score in competition, successfully collecting a designated colored gem and delivering it back to the home base without external assistance.
- Boosted sorting accuracy by 50% through adding an extra servo, removing a failure mode by clearing jams for uninterrupted operation.
- Developed a PID-based four-wheel-drive system for superior control and stability, achieving 5x improved distance accuracy over open-loop systems. This allowed for precise turns and predictable ground point alignment, enhancing the robot's overall navigation and reliability.
- Designed a custom 3D-printed chassis in SolidWorks with friction-fit motor mounts, enhancing durability and reliability for consistent performance in the competition.

Education

Western University, London ON — *Mechatronics Co-Op Engineering*

September 2022 - Present

- Maintaining a 4.0 GPA under full engineering course load.
- Excelled in a practical Engineering process class, leading a team to develop and optimize a part sorting procedure, significantly enhancing sorter performance by 200% and earning first place in a competitive project.
- CSWA certified in SolidWorks and proficient in AutoCAD complimented by hands-on experience in 3D modeling and printing.

Chatham-Kent Secondary School, Chatham ON — *High School Diploma*

September 2018 - June 2022

- Graduated with a 96% average and a CKSS letter given for high involvement.
- Engaged in hands-on automotive work, developing strong diagnostic and repair skills that contribute to efficient troubleshooting and problem-solving in technical environments.

Additional experience

St Angela's Retirement Lodge, Chatham ON — *Short Order Cook*

February 2022 - August 2022

- Efficiently managed high-volume kitchen operations at St Angela's Retirement Lodge, consistently serving meals to 50+ residents while handling closing tasks within tight schedules.
- Obtained food handler's certification and advanced from kitchen assistant to short order cook.

Western University, London ON — *Peer Tutor*

September 2023 - Present

- Provided over 100 hours of tutoring to support the academic success of first-year engineering students, working with 15+ students per semester to build foundational skills in complex engineering concepts.
- Tailored tutoring sessions to meet diverse learning styles, fostering a high level of student satisfaction and significantly boosting students' competence in technical subjects.
- Developed strong communication and mentorship skills by adapting explanations to suit individual needs, reinforcing the importance of clarity, patience, and approachability in technical instruction.

Technical Skills

- Programming (Python, C, C#, HTML, PLC, HMI)
- AI Development Tools (Cursor IDE, Claude Code, Codex)
- Design & CAD (SolidWorks - CSWA, CSWAS, AutoCAD, 3D Modeling/Printing)
- Embedded Systems & Circuit Design: ESP32 (sensor integration, automation), Raspberry Pi (control circuits, data logging), analog and power electronics
- Data Analysis (Excel, Python scripts)
- Microsoft Office (Excel, Word, Outlook, Teams)