

MEHARNOOR SINGH

☎ +1(647)-964-0549 ✉ m66singh@uwaterloo.ca [in LinkedIn](#) [G Github](#)

Education

University of Waterloo

Bachelor of Applied Science in Mechatronics Engineering Honours

May 2029

Waterloo, ON

Technical Skills

Mechanical: SolidWorks, SolidWorks PDM, AutoCAD, GD&T, FEA, DFM, 3D Printing, Machining

Programming: C++, Embedded C, Python, MATLAB, Arduino, Raspberry Pi, OpenCV, GRBL

Experience

Tigercat Industries

September 2026 – Present

Product Compliance Intern

Cambridge, Ontario

- Designed and developed a complete **chain-shot testing assembly** in **SolidWorks**, integrating drivetrain components and a custom-designed **chain-stopping** mechanism in accordance with **ISO** safety standards.
- Performed **structural FEA** on a custom chain-stopping mechanism and support frame under **50 kN** loading, identifying **stress concentrations** to guide design improvements.
- Evaluated mechanical and electrical systems through **risk assessments**, **failure analysis**, and **functional safety reviews** to identify potential failure modes and safety hazards
- Conducted **EMC**, **BCI**, **radiated immunity**, **emissions**, and noise testing on forestry equipment; audited **20+** technical documents against industry standards

Hartmann North America

June 2025 – August 2025

Production Intern

Brantford, Ontario

- Troubleshoot and optimized **automated production equipment** for egg carton manufacturing, reducing downtime by **10%** and improving synchronization across afterpress operations
- Collaborated with a team of **50+** production and engineering staff to improve production **KPIs** through **root-cause analysis** and **lean manufacturing**, contributing to a **15%** increase in operational efficiency
- Conducted daily **quality assurance** inspections on **1,000+** units using precision measurement tools and **process control** protocols, supporting **ISO-compliant** manufacturing standards and minimizing defects

Pioneer Cranes & Elevators

May 2024 – July 2024

Engineering Intern

Punjab, India

- Created detailed **drawings** and **3D CAD** models of crane components like **CT wheels** using **SolidWorks**, applying **DFM** and **GD&T** principles to improve machining accuracy and speed assembly by **15%**.
- Performed **structural simulations** and **finite element analyses (FEA)**, evaluating **weight distribution** on crane spans, ensuring designs met required durability and safety standards
- Established and maintained **5S** lab protocols by scheduling **equipment calibration**, organizing test stations, and documenting **maintenance logs** to ensure **safety** and traceability

Projects

Robo-Draw 🌀 | C++, Python, OpenCV, Arduino, GRBL

February 2026 - April 2026

- Designed and built a fully **3D-printed CNC plotter**, integrating NEMA 17 stepper motors, Arduino CNC shield (A4988 drivers), and **GRBL-based** motion control for precise **2-axis actuation**
- Developed an **end-to-end image-to-sketch** pipeline, converting raster images to physical drawings using Python, **OpenCV**, **contour extraction** and automated **SVG-to-G-code** generation
- Engineered **rendering** and **optimization algorithms**, implementing **adaptive hatching**, Perlin noise-based **stroke variation**, and toolpath optimization to enhance **realism** and reduce non-productive motion

Dual Biometric Lock 🌀 | Raspberry Pi, Python, OpenCV

June 2025 - August 2025

- Designed and **3D-printed** a custom **servo-actuated** locking mechanism, Raspberry Pi enclosure, and camera housing, integrating **GPIO-based** control with **biometric authentication**
- Developed a **real-time dual-biometric** authentication system using Python, OpenCV, and **speech recognition**, achieving **95%** facial recognition and **90%** voice verification accuracy
- Built and optimized a **facial recognition** pipeline using **500+** training images, improving authentication reliability through **real-time** image capture and preprocessing

Rescue Robot 🌀 | C++, Embedded C

October 2024 - December 2024

- Designed and integrated the **mechanical chassis** and **gripper assembly** of autonomous LEGO EV3 rescue robot, incorporating **ultrasonic**, **gyro**, and **colour** sensors for navigation and object handling.
- Developed autonomous navigation algorithms in **Embedded C/C++**, refining mechanical design and **sensor integration** through **30+** testing iterations to achieve approximately **80%** navigation accuracy.