

Keshav Malhotra

226-505-9512 | keshav.malhotra@uwaterloo.ca | linkedin.com/keshavxmalhotra | github.com/KeshavMalhotra10 | keshavmalhotra.com

EDUCATION

University of Waterloo

BASc, Mechatronics Engineering (Co-op)

2025 - Present

Waterloo, ON

SKILLS

Programming: C++, Python, Java, JavaScript, HTML/CSS, SQL

Machine Learning: PyTorch, OpenCV, pandas, NumPy, pydicom, YOLO, CUDA, RAG, LangChain, scikit-learn

Tools: Git, Linux, Bash, Flask, pytest, Jupyter, Matplotlib

EXPERIENCE

The Hospital for Sick Children (SickKids) - Neurovascular Lab

May 2026 – Aug. 2026

ML Research Intern

Toronto, ON

- Rebuilt a real-time x-ray angiography pipeline for **7×** lower latency (**350ms** → **50ms**): moved U-Net inference to GPU, restricted it to detected ROIs over full frames, vectorized preprocessing in NumPy, and dropped a redundant RTSP relay.
- Overcame the absence of labeled patient data by training a **PyTorch** ResNet34 U-Net on only **19 annotated simulated frames**, generalizing to a held-out real-patient cerebral AVM study at **0.80 Dice / 0.88 recall** with zero patient data in training.
- Eliminated manual ROI selection by designing an automatic-ROI feature on a ResNet34 U-Net, reaching **0.82 mean held-out recall** on fine-vessel segmentation, outperforming the prior YOLO prototype by **2×**.

The Hospital for Sick Children (SickKids) - AI/ED Lab

Jul. 2024 – Oct. 2024

Research Intern

Toronto, ON

- Shaped the conversational design of **SKAI (SickKids AI)**, the hospital's first patient-facing AI chatbot, translating qualitative findings from **100+ patient interviews** into LLM tuning recommendations on temperature and sentiment alignment resulting in friendly, clear, and concise answers.
- Prototyped a mobile autonomous robot for emergency department logistics, building ultrasonic-sensor navigation and Arduino-based control to move supplies through high-traffic clinical corridors.

FRC - Team 6141

Jun. 2024 – Jun. 2025

School Captain

Toronto, ON

- Developed a **Java-based control system** for a differential drive robot using WPILib, implementing Arcade Drive logic for intuitive teleoperated handling via Xbox controller.
- Mentored **30+ students** in **Git version control**, object-oriented programming, and sensor integration (ultrasonic/IR), establishing a standardized documentation pipeline.

PROJECTS

JobFit: AI Resume Analyzer ▶ Demo | Python, Flask, OpenAI, NumPy, JavaScript

Mar. 2026

- Engineered a RAG-powered resume analyzer (Flask, GPT-3.5-turbo) using OpenAI embeddings and cosine similarity to retrieve relevant resume chunks; validated the retrieval design via a 19-posting ablation study measuring 16.2% average prompt-token reduction with only a 1.84-point average match-score delta vs. a full-context baseline.
- Designed a JSON-structured prompt pipeline with input validation and automated response cleanup, achieving 100% JSON schema validity across all evaluated requests; backed by a pytest suite covering chunking logic and response schema, and structured per-request logging (latency, token usage, retrieval scores).

NavBot - Autonomous Hospital Navigation Robot ▶ Demo | C++, Git

Nov. 2025 – Dec. 2025

- Developed **autonomous navigation software** for a hospital delivery robot, handling real-time decision-making in dynamic indoor environments.
- Implemented **Dijkstra's algorithm** to calculate optimal global paths in a static map, integrated with real-time local path planning to navigate dynamic hospital environments.
- Experimentally tuned a custom PI controller for differential drive motors, achieving rotational accuracy within **1 degree error** and **linear precision within 5cm** using IMU and ultrasonic sensor feedback.