

Keshav Malhotra

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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

Focus: Deep Learning, Semantic Segmentation, Image Classification, Transfer Learning, Medical Image Processing

EXPERIENCE

The Hospital for Sick Children (SickKids) - PCIGITI/Neurovascular Lab Jul. 2026 – Oct. 2026

ML Research Intern

Toronto, ON

- Engineered AI Trace, a real-time contrast-dye detection system for fluoroscopy (DICOM X-ray) angiography, achieving **~50 ms** fluid-to-detection latency and real-/time throughput (**~13 FPS, 84% of frames under 100 ms**) across a 1,142-frame benchmark.
- Pioneered a novel automatic-ROI feature powered by a ResNet34 U-Net, achieving a **0.82 mean held-out Dice score** for fine-vessel segmentation, outperforming an earlier YOLO prototype by **2x**.
- Diagnosed label leakage (0.990 AUC via single-channel threshold) and a **6 %** mask-scale defect inflating validation Dice; wrote automated data-validation checks, confirmed to catch all 3 defects when independently reintroduced.

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

Jul. 2024 – Oct. 2024

AI Research Intern

Toronto, ON

- Contributed to the development and successful launch of **SKAI (SickKids AI)**, the hospital's first **AI chatbot**.
- Influenced LLM optimization for clinical deployment by synthesizing qualitative data from **100+ patient interviews** into actionable technical recommendations for model temperature and sentiment alignment.
- Prototyped a mobile **autonomous robot** for emergency department logistics, integrating sensor fusion and **Arduino-based control systems** to navigate high-traffic clinical environments.

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 —View Demo— | Python, Flask, OpenAI, NumPy, JavaScript Mar. 2026

- Engineered a **RAG-powered** resume analyzer using **Flask** and **GPT-3.5-turbo**, implementing **vector embeddings** and **cosine similarity** to semantically match resume chunks against job postings.
- Designed a **JSON-structured** prompt pipeline with input validation to minimize hallucinations, returning an ATS match score, missing keywords, and feedback via an interactive frontend.

NavBot - Autonomous Hospital Navigation Robot —View 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 bumper and ultrasonic sensor feedback.

Roboventure —View Demo— | Arduino, Git, Excel Aug. 2024 – Sept. 2024

- Spearheaded technical workshops for **50+ students**, delivering hands-on instruction in **Arduino** firmware development, circuit prototyping, and electrical safety practices .
- Scaled organization participation by **300%** within one month by architecting a targeted outreach strategy and executing high-engagement robotics demonstrations.