

VARUN PATHAK

📍 Toronto, ON ✉ pathav4@mcmaster.ca 🔗 in/v5run 🌐 github.com/v5run 📧 varunp.me/

Education

McMaster University

Expected Graduation: May 2028

Software Engineering and Management Co-op (B.Eng.Mgt.)

Hamilton, ON

- Dean's Honors List, **cGPA: 3.8/4.0**
- Relevant Courses: Machine Learning, Data Structures and Algorithms, Object-Oriented Programming, Software Design, Statistics

Technical Skills

Languages: Python, Java, SQL, JavaScript, Bash/Unix, C/C++

Frameworks & Libraries: Google ADK, LangGraph, LangChain, LlamaIndex, scikit-learn, PyTorch, TensorFlow, Pydantic

Databases: PostgreSQL (pgvector), BigQuery, MongoDB (NoSQL), Supabase, Pinecone, ChromaDB

Tools: Git, Linux, Google Cloud (GCP), AWS, Docker, Kubernetes, Airflow, Beam, GitHub, Bitbucket, Claude Code, Codex

Experience

Junior Data Scientist

Sept. 2026 – Present

The Home Depot

Toronto, ON

- Architected Agentic **RAG** pipelines in Python with LlamaIndex across **1,200+ enterprise documents** for an internal associate chatbot, tuning chunk size, metadata filters & top-k retrieval to improve relevance and **cut response latency by ~40%**.
- Built Airflow and Beam pipelines ingesting **structured and unstructured** web data into BigQuery & a pgvector database.

Data Science Intern

May 2026 – Aug. 2026

The Home Depot

Toronto, ON

- Built a company-wide AI chatbot used by **30,000+ users** for store operations, HR and product questions, leveraging Google ADK, **multi-agent orchestration workflows** with LLM-backed reasoning, tool-calling/MCP, and stateful session management.
- Took GenAI subagents from conception to launch, **growing chatbot interactions 10x and unique users 8.7x** in a week.
- Partnered 1:1 with Directors and presented to VP leadership, driving **100% of owned initiatives into pilot + production**.
- Led 0-to-1 development of a product compatibility RESTful API, owning a semantic search pipeline powered by vector embeddings, ontology modeling, & custom eval harnesses; presented findings and secured leadership's approval for further production.

Machine Learning Engineer

Oct. 2024 – Mar. 2026

McMaster Artificial Intelligence Society (MacAI)

Hamilton, ON

- Collaborated with a **multidisciplinary research team alongside Dr. Istvan David** to develop and evaluate human-guided multi-agent reinforcement learning (MARL) frameworks, improving coordination and agent decision-making by **up to 34%**.
- Designed and implemented custom MARL simulation environments using Python for benchmarking cooperative agent behavior, applying mathematical modeling of policy and reward shaping to achieve **42% faster convergence** than unguided baseline runs.
- Developed a reinforcement-learning-based traffic light control system using Python, **reducing idle times by up to 70.4% and CO₂ emissions by 30.2%**; **showcased to 340+ undergraduate students** at a Canadian AI Conference (Research Paper).

Personal Projects

Satellite Collision Risk Ranking – Python, scikit-learn, pandas, NumPy, Matplotlib

Sept. 2026 – Present

- Building a Random Forest ranking satellite collision risk **3 days ahead**, raising average precision **65%** over the baseline.
- Processed **199K+** ESA satellite conjunction messages in Python with pandas and NumPy into **147** leakage-safe features per event, trained and cross-validated three models in scikit-learn, and plotted precision-recall and calibration results in Matplotlib.

CMU TartanHacks Finalist | 🏆 – Python, FastAPI, React Native, Supabase

Feb. 2026

- Placed **Top 5** and presented on stage at **Carnegie Mellon University** among **1,100+ participants and 279 projects**.
- Built a passive networking application connecting like-minded people in the background via Bluetooth mesh, with a Python and FastAPI backend that embeds user profiles in Supabase and serves vector-based matches to surface relevant nearby connections.

Deltahacks XII Winner | 🏆 – Gemini, Firebase (Auth, Firestore), Vision OCR, Swift

Jan. 2026

- **Won Canada's largest student-run hackathon** building an emergency response platform for real-time medical coordination.
- Engineered a secure Firebase backend with cloud messaging and Firestore models to enable emergency broadcasts and verified medic workflows, integrating Gemini and ESP32-based fall detection to generate instant structured incident reports.