

VARUN PATHAK

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Technical Skills

Languages	Python, Java, SQL, JavaScript, Bash/Unix, C/C++
Frameworks & Libraries	LangGraph, LangChain, Google ADK, LlamaIndex, OpenAI, Pandas, NumPy, Pydantic, scikit-learn, PyTorch, TensorFlow, Matplotlib, asyncio, requests
Platforms & Infrastructure	Google Cloud Platform (GCP), AWS, PostgreSQL, MongoDB, Supabase, ChromaDB, Pinecone, FAISS, pgvector, Jupyter, Apache, Docker, Kubernetes, Git, GitHub, Bitbucket

Experience

Junior Data Scientist Sept. 2026 – Present
The Home Depot Toronto, ON

Data Science Intern May 2026 – Aug. 2026
The Home Depot Toronto, ON

- Enhanced a production-grade AI chatbot used by **30,000+ users** leveraging Google ADK, **multi-agent orchestration workflows** with LLM-backed reasoning, MCP/tool-calling, and stateful session management for internal processes.
- Owned specialized, reusable subagents and tool integrations using Agentic AI design patterns, enabling dynamic task decomposition and inter-agent communication across distributed GenAI pipelines.
- Partnered directly with Directors and cross-functional engineering, product, and operations teams to define requirements, presenting technical insights to VP leadership and driving **100% of scoped initiatives into pilot and production**.
- Created end-to-end Agentic Retrieval-Augmented Generation (**RAG**) pipelines with LlamaIndex & iterative prompt engineering; grounding LLM outputs in domain-specific enterprise data and reducing hallucination risk in production deployments.
- Led 0-to-1 development of a product compatibility 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.
- Designed and owned **ETL** Apache Airflow **DAGs** orchestrating ingestion of raw, multimodal web-sourced data into structured datasets in GCP BigQuery & PostgreSQL via Apache Beam pipelines, enabling reliable context retrieval for agentic systems.

Instructional Assistant Intern Sept. 2025 – Apr. 2026
McMaster University Hamilton, ON

- Led Python and Engineering Design labs for **600+ students** weekly, providing personalized support during office hours.
- Built a Python utility scanning **1100+** Inventor files for metadata irregularities, and **cutting manual review time by 80%**.
- Supervised **90+ teaching assistants**, coordinating grading and weekly meetings to ensure instructional consistency.

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's decision-making by **up to 34%**.
- Designed and implemented custom MARL simulation environments in Python to test policy/reward shaping methods, achieving **42% faster convergence compared to unguided baselines**.
- Conducted **over 200 training trials** comparing unguided vs. human-guided MARL, **demonstrating 21% higher collective task success and improved stability** in complex cooperative tasks.

Personal Projects

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, using vector-based matching to surface relevant connections in high-density environments.

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-backed backend with cloud messaging and Firestore models to support emergency broadcasts, personal information, and verified medic workflows.

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, Databases, Software Design, Agile Methodology, Probability and Statistics, Client Requirements.