Mankaran Rooprai

226-972-6339 | | | | Portfolio

Education

McMaster University Expected Graduation: April 2026

Software Engineering (B.Eng) (GPA 3.87/4.00) *Hamilton, ON*

- **Publication(s):** Integration of Blockchain in Smart Systems
- **Leadership:** Captain of Basketball Intramural Team, GDSC Open Source Backend Team Lead
- **Awards:** Engineering Award of Excellence ($3000), Dean's Honors List
- **Certifications:** AWS Certified Cloud Practitioner, Deep Learning Specialization
- **Relevant Coursework:** Digital Systems and Interfacing, Computer Architecture, Relational Databases, Software Concurrency, Software Design, Natural Language Processing, Linear Algebra, Probability and Statistics

Experience

IBM Consulting - EdgeAI Team Sep. 2024 – Present

Machine Learning Developer Intern *Toronto, ON*

- Led a team of interns to build a LangChain LLM and Streamlit service to generate summaries from COBOL.
- Implemented a tree data structure and a modified DFS algorithm to increase summary accuracy by **45%**.
- Boosted algorithm performance by **75%** through strategically implementing memoization in Python.
- Architected a weighted full-text search engine on a PostgreSQL DB, integrating into the website's search bar.
- Built a pipeline to extract tables from PDFs, output their JSON, and validate accuracy with a multimodal LLM.
- Integrated Human-in-the-Loop (HITL) in LangGraph to improve PDF table extraction results.
- Trained DocumentAI's custom extractor parser to extract columns of text from PDFs, achieving a **0.6 F-score**.

Questrade - Release Engineering Team May 2024 – Aug. 2024

DevOps Engineering Intern *Toronto, ON*

- Developed a package management service using Flask to enable the deletion of Artifactory packages from Slack.
- Deployed a logging system to production, offering visibility into **1000+ unauthorized package deletions**.
- Created a role-based authentication service using GitLab API, to prevent unauthorized access attempts.
- Delivered weekly tech talks to the team, fostering learning and knowledge sharing of new technologies.
- Received all **5-star ratings** from my manager, recognized as the top-performing intern on the team.

Telus - Wireless Networking Team Jan. 2024 – Apr. 2024

Software Engineering Intern *Toronto, ON*

- Automated email notifications for 5G node alarm changes with a Python script, boosting efficiency by **96%**.
- Deployed the script to production with a Cron Job, running every 2 hours to streamline processes.
- Reduced Splunk dashboard loading from **30 seconds to 5 seconds** (**83.3% faster**) via SPL optimizations.
- Migrated Splunk analytics to GCP Looker with Pulumi and BigQuery, improving dashboard creation experience.
- Presented new Looker dashboards to directors, **securing licenses for the team** to enhance data analytics.

Intelligent and Cognitive Engineering Laboratory Sep. 2023 – Apr. 2024

Machine Learning Research Assistant *Hamilton, ON*

- Published a SPIE paper on Python blockchain solutions for IoT, specifically real-time sensor data storage devices.
- Utilized Matplotlib for data visualization of network nodes, including CPU, RAM, and power usage.
- Employed scikit-learn's Isolation Forest algorithm to detect and address anomalies in 40% of the dataset.

RBC Capital Markets - Equity Derivatives Team May 2023 – Aug. 2023

Software Developer Intern *Montreal, QC*

- Engineered a C# .NET Web API to connect a cloud-based financial reporting service with external systems.
- Implemented MVC architecture in the Web API to streamline data handling through HTTP requests.
- Containerized the reporting service, deploying on Kubernetes and Jenkins, to scale for **100+ RBC traders**.

Skills

Programming Languages: Java, Python, C#, JavaScript, HTML/CSS, SQL
Tools: PyTorch, OpenCV, pandas, NumPy, NVIDIA RAPIDS, cuDNN, Flask, .NET, React.js, React Native, Node.js, Spring Boot, PostgreSQL, MySQL, Docker, Kubernetes, Jenkins, GCP, AWS, Linux, Bash, Jupyter, SDLC, Agile

Projects

DBAC Companion App | *React Native, Node.js, GCP*

- Collaborating with a frontend and backend team to develop an app that enables McMaster students to log their workouts and easily view gym machine availabilities in the David Braley Athletic Centre (DBAC).
- Implemented a Firebase Firestore DB to provide users gym occupancy levels and machine availability info in real-time.

High-Performance Image Classification | *NVIDIA RAPIDS, cuDNN*

- Developed a high-performance image classification system using NVIDIA RAPIDS for data preprocessing, cuDNN for fast deep learning training, and TensorRT for model inference optimization on NVIDIA GPUs.
- Integrated TensorBoard for real-time monitoring of model training metrics, enabling rapid debugging and optimization of the training process.

Custom GPU-Accelerated Convolution Operation | *C++, CUDA, cuDNN, OpenCV*

- Developed a custom GPU-accelerated convolution operation using CUDA and optimized it with cuDNN for high-performance image processing, leveraging low-level memory and kernel programming for acceleration.
- Validated the custom convolution implementation with comprehensive unit tests and benchmarked performance against cuDNN's built-in operations.

StyleFlow: Real-Time Neural Art for Live Video | *PyTorch, OpenCV*

- Built a real-time neural style transfer application using PyTorch and OpenCV, enabling high-performance artistic transformations on live video streams.
- Designed an efficient video frame buffering system to maintain seamless real-time processing at 30+ FPS on consumer-grade GPUs.

AI-Powered Research Assistant | *NumPy, FAISS, Hugging Face Transformers*

- Designed an AI-powered Research Assistant using RAG (Retrieval-Augmented Generation), LLMs, and FAISS-based retrieval, to automatically generate summaries, research papers, and citations based on user queries.
- Optimized the retrieval system by implementing a hybrid search strategy combining dense and sparse embeddings for improved query relevance.

Heart Disease Predictor | *Python, scikit-learn, Matplotlib, NumPy, Pandas*

- Developed a heart disease prediction model in Python with scikit-learn, achieving **88.52%** accuracy and using an 80-20 train-test split; preprocessed data with Pandas, extracting 14 predictive attributes.

Shortest City Pathfinder | *Java, Maven, JUnit*

- Architected a modular Java software suite with four services to generate and visualize 2D meshes, including island and interconnected city generation, using Voronoi Diagrams, Lloyd Relaxation, and Delaunay Triangulation for enhanced realism and complexity.
- Executed Dijkstra's algorithm on Graph ADT, incorporating JUnit testing to ensure algorithm correctness, to facilitate star network establishment; managed priority queue for efficient hub-city connectivity.

Stock Market Investment Simulator | *Java, Java Swing*

- Developed a paper-trading Java application, using OOP principles, that allows users to buy/sell shares.
- Implemented YahooFinance API to fetch real-time stock market data including bid and ask prices.
- Utilized Java's I/O classes to develop a login/sign-up flow by reading/writing user's data from a text file.
- Designed a graphical user interface on NetBeans to allow users to view their active and potential positions.

Plutus @ Hack the North | *React.js, HTML, CSS*

- Worked closely with 2 developers to produce a budget tracker webapp for students to track their expenses.
- Utilized React.js, HTML, and CSS to develop an adaptive, responsive, modern single-page application (SPA).
- Produced application in a timeframe of **36 hours**, working relentlessly to complete project before deadline.