Raj Shah

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Education

University of Waterloo *Sep 2024 to Apr 2029*

Bachelor of Computer Science (CGPA: 3.9/4.0)

Related Coursework: Algorithm Design and Data Abstraction (C), Techniques for Software Development (Unix, Bash, Git), Designing Functional Programs (Racket), Calculus and Linear Algebra

Skills

Languages: Python, Java, C, C++, C#, JavaScript/TypeScript, HTML, CSS, Racket, SQL, R, Haskell

Tools, Frameworks, & Libraries: React, Git, Flask, FastAPI, OpenCV, GCP, Cohere, Svelte, Linux, Next.js, Node.js, AWS, Scikit-learn, LangChain, Docker, NumPy, Apache, Vite, Tailwind CSS

Experience

Software Engineer | *MesoMat* *May 2024 – Aug 2024*

Remote

- Built and maintained **cloud-based** software solutions, developing **RESTful APIs** to facilitate seamless user access to **real-time** tire condition analytics.
- Implemented **predictive algorithms** for tire mileage tracking, leveraging **regression analysis** to forecast wear patterns, optimizing the performance model and improving prediction accuracy by **30%**.

Alumnus & Ambassador | *SHAD Canada* *Jul 2023 – Jul 2024*

Waterloo, ON, Canada

- Collaborated with **100+** professors and students to tackle complex **software engineering** challenges, leveraging Python, Git, SQL, and AWS for **data-driven** problem-solving in **competitive** team environments.
- Experimented with **ML software libraries**, using NumPy and OpenCV to prototype a **gesture language tracker** called GestoTrace aimed at improving the translation of sign language.
- Applied **logistic regression** and **decision tree models** to **binary classification** challenges assigned by professors, including spam email detection and sentiment analysis on **10,000+** social media posts.

Projects

PrepPal | *Python, Flask, OpenAI, Cohere, GCP, OpenCV, SQLite, SQLAlchemy, React.js, Tailwind CSS*

- Collaborated with a team of **4** to develop an **AI-driven** behavioural interviewer, generating **company-specific** questions and feedback based on the user's experiences.
- Architectured a scalable backend with **Flask**, integrating **LLM-powered APIs** including OpenAI and Cohere, to leverage **Retrieval-Augmented Generation** (RAG) and adapt responses based on contextual resume analysis.
- Implemented user performance metrics such as quantifying **eye contact** and **confidence** using OpenCV, Whisper, and Google Cloud with **95% accuracy**, storing **real-time** analytics in a **SQLite** database for users to access their feedback.

SolGuard - PrivateGPT | *Python, FastAPI, LlamaCpp, LangChain, ChromaDB, React.js, Tailwind CSS*

- Developed a fully **local AI chatbot** for Sun Life Insurance, integrating **LlamaCpp** to process website data and serve responses **offline** without external API calls, ensuring **100%** data privacy.
- Implemented a **RAG pipeline** with **LangChain** and **InstructorEmbeddings**, improving SolGuard's **data ingestion** efficiency by **40%**, tailoring responses to Sun Life data.
- Integrated **ChromaDB** to transform local embeddings into **vector representations** for **low-latency** searches.

PathVisor | *Svelte, TypeScript, Node.js, CSS, Vercel*

- Developed a pathfinding visualizer that allows users to explore **graph traversal** algorithms on an interactive grid.
- Designed A* using the **Manhattan distance heuristic**, and Dijkstra's algorithm leveraging a **min-priority queue**, both used to find the shortest path with the smallest cumulative weight cost.
- Implemented BFS to explore all paths layer by layer, and DFS to showcase exhaustive path exploration, emphasizing the differences in **time complexities** for each algorithm.