Raj Shah

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EDUCATION

University of Waterloo *Sep 2024 – 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

Tools, Frameworks, & Libraries: React, Git, Linux, Flask, FastAPI, LangChain, NumPy, TensorFlow, SciPy, REST, MongoDB, OpenCV, GCP, AWS, Node.js, Express.js, Chroma, Docker, Svelte, Next.js, Apache, Vite, Tailwind CSS

EXPERIENCE

Software Engineering Intern | *MesoMat* *May 2024 – Aug 2024*
Remote

- Built and maintained **cloud-based** software solutions, developing **REST APIs** to process and deliver real-time tire condition analytics for **10,000+** active users
- Deployed **containerized** microservices for tire pressure alerts using **Amazon ECS**, reducing response time by **30%**
- Developed **CI/CD** pipelines for continuous deployment of full-stack applications, reducing delivery times by **25%**
- Identified issues in MesoMat's data storage and created a **database application** with **MongoDB** and **Node.js** (Express), improving workflow efficiency for **100+** developers

Machine Learning Researcher | *SHAD Canada* *Jul 2023 – Aug 2023*
Waterloo, ON, Canada

- Engineered a 3D **convolutional neural network** (CNN) with TensorFlow and NumPy to monitor stock market trends
- Integrated **hierarchical clustering** with SciPy to convert a financial time series into images for the CNN to process
- Achieved a **6x** speed improvement compared to the prior K-means clustering, enabling **ultra-fast** image construction
- Expanded ML training data by **40%** by generating image datasets for **deep learning**-based trend classification

PROJECTS

SolGuard - PrivateGPT | *Python, FastAPI, LlamaCpp, LangChain, Chroma, React.js, Tailwind CSS*
- Built a local AI chatbot and navigation assistant for Sun Life Insurance, powered by **LlamaCpp**
- Reduced manual document retrieval time by **80%**, greatly improving Sun Life's internal search management system
- Implemented a Retrieval-Augmented Generation (**RAG**) pipeline with **LangChain** for document parsing, tailoring AI responses to Sun Life data while ensuring **100%** data privacy
- Created local embeddings with InstructorEmbeddings and stored the result in a **vector database** with ChromaDB
- Extracted context from vector representations using a **similarity search**, generating domain-specific AI responses

PrepPal | *Python, Flask, OpenAI, Cohere, GCP, OpenCV, MySQL, SQLAlchemy, Vercel, Render, React.js, Tailwind CSS*
- Shipped a full-stack AI behavioural interviewer (**100+** users), generating company-specific questions and feedback
- Integrated **LLM APIs** (Cohere, OpenAI, and Gemini) with **prompt engineering** to generate context-aware responses based on the user's resume
- Implemented user **performance metrics** such as quantifying eye contact, tone and confidence with **95% accuracy** using OpenCV, Google Cloud, and **AWS Rekognition**
- Stored **real-time** analytics in a **MySQL** database and processed data in **Recharts** to elegantly display user feedback

PathVisor - Pathfinding Visualizer | *Svelte, TypeScript, Node.js, Vercel*
- Designed **Dijkstra**'s algorithm using a **min-priority queue** and **A*** by adding the **Manhattan distance heuristic**
- 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
- Optimized graph traversal algorithms to find the shortest path with the smallest cumulative weight cost