Charul Rathore

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EDUCATION

M.S. in Computer Science, San Jose State University, CA (GPA: 3.9/4) **[Jan 2023 – Dec 2024]**
Coursework: Cloud Computing, Distributed Systems, Natural Language Processing, Machine Learning with Graphs, Design and Analysis of Algorithms, Advanced Parallel Processing, Graph Theory.

B.S. in Computer Science and Engineering, Mody University, India (GPA: 4/4) **[Jul 2014 – May 2018]**

SKILLS

Languages: C++, Python, Java, Javascript, SQL, HTML/CSS
Technologies: Microservices, RabbitMQ, Apache Kafka, REST APIs, Spring Boot, Flask, Redis, MongoDB, Spark, MapReduce, AWS, Docker, Kubernetes, Multi-Threading, LangChain, GraphRAG, Tensorflow, OpenCV, Git, CI/CD, Agile Framework, Linux

WORK EXPERIENCE

Software Engineer Intern | ThermoFisher Scientific Inc., South San Francisco, CA **[May 2024 - Aug 2024]**

- **Project 1 -** Built a Retrieval Augmented Generation **(RAG)** pipeline using **LangChain** and established a **CI system** (**AWS EC2** and **GitHub Actions**), leveraging **OpenAI APIs** to generate contextually relevant text by querying **ChromaDB** vector store sourced from team documentation, product manuals, and client JIRA tickets. Furthermore, a scalable **data ingestion pipeline** was developed, and performance was evaluated using the **RAGAS** tool.
- **Project 2 -** Developed a **distributed backend encryption service** in **C++** for the Digital PCR Absolute Q tool, focused on ensuring data integrity and safeguarding proprietary algorithms. Implemented **a dual encryption strategy**: an internal encryption mechanism for secure decryption and file processing within the tool, and **a third-party API integration** to generate encrypted files for external usage.

Software Engineer Intern | Valeo, San Mateo, CA **[Jan 2024 - May 2024]**

- Developed **a validation microservice** for detecting counterfeit 3D printed patterns using **Python, C++, OpenCV**, and Fourier Transformations, achieving 98.4% accuracy in production.
- Delivered **Python scripts** to automate parking spot coordinate extraction from point cloud data using DBSCAN and KDtree clustering algorithms. Developed scripts to generate maps using those coordinates in Xodr/XML format using ElementTree Python Library. Also, engineered and implemented a **C++ graph pathfinding solution** using the randomized color-coding technique for an in-house gaming product, and improved runtime with a multi-threading technique.

Software Engineer | Société Générale Investment Bank, Bengaluru, India **[Mar 2021 - June 2022]**

- Led the **low-level design** and development of a **C++** Value-at-Risk **simulation framework** using Monte Carlo methods, optimizing risk calculations for financial portfolios; Also, supported new equity products onboarding and **restructuring of the codebase**. Collaborated with cross-functional teams to gather requirements and understand the intricacies of risk management.
- Developed **an asset register microservice** using **C++** and **Python REST APIs**. Deployed the microservice to a **Kubernetes cluster**, utilizing an **API Gateway** to efficiently route and manage requests across multiple services. Developed a layered **C++ API stack** upon the **AMQP-CPP library** enabling seamless communication with **RabbitMQ server**. Led scrum meetings, presented design solutions and actively participated in architecture discussions and review meetings.

More Experience (2.5 years): **Data Scientist** at MirrAR, India **(1.5 years)**; **Software Engineer** at NCFLexE Labs, India **(1 year)**

ACADEMIC PROJECTS

AI teaches AI | Next.js, OpenAI APIs, Stripe APIs, MySQL, PineconeDB, Redis, Prisma, Clerk **[Aug 2024 - Ongoing]**

- Developing a **SaaS AI Companion** using **Next.js**, leveraging **Pinecone** vector DB for long-term memory retention and **Upstash Redis** for caching. Integrating **MySQL** and **Prisma** for companion data storage, with **Clerk** for user authentication and **Stripe APIs** for payments and subscription management.
- Using **Next.js App Router** for seamless **client-side routing**, optimizing the user experience with **React** and **Tailwind CSS.** Also, implementing **embedding-powered AI capabilities** for conversational experiences and memory recall.

FitFlair Clothing App | Kafka, Node.js, Spring Boot, React, Redis, MongoDB **[Jan 2024 - May 2024]**

- Designed a **distributed microservices architecture** in **Node.js** and **Spring Boot** with an **API Gateway** and **Apache Kafka** for async communication. Optimized product catalog API load times by **caching** inventory data in **Redis**, cutting response times from 500 ms to 150 ms, achieving a 65% runtime improvement.

Event Scheduler | AWS, Docker, Python, Flask, HTML/CSS **[July 2023 - Nov 2023]**

- Developed **a full-stack Flask app** with Google Auth for academic event scheduling, deployed on **AWS EC2** with **DynamoDB, S3,** and **Lambda** automation. Also, built an Auto Grader feature for automated solution testing and scoring.