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Jainil Rana

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- ancjainil

WORK EXPERIENCE

University of Ottawa   Ottawa, ON
Machine Learning Engineer (Research Assistant)   *Jan 2025 – April 2025*
- Refactored legacy Python scripts in a research lab to process multi-gigabyte time-series datasets, achieving a **35% reduction** in runtime and **2.4x improvement** in memory efficiency using **NumPy**, **pandas**, and **joblib**.
- Improved reproducibility and testability of ML workflows by implementing a modular codebase with **unit tests**, **CI-ready benchmarks**, and auto-generated profiling reports. Enabled 3x faster experiment iterations for the research team.

Aarogram Inc.   Vadodara, India
Software Engineer (Full-time, Internship)   *Jan 2023 – July 2023*
- Built ML pipelines to predict healthcare prior authorization outcomes using structured EHR data and unstructured clinical notes. Integrated **spaCy**, **BERT**, and **scikit-learn** for feature extraction and model training.
- Automated EHR data sync via **FHIR APIs** and deployed predictive services using **AWS Lambda** and **EC2**, leading to a **40% boost in ops efficiency** and a **22% increase in provider satisfaction**.

SKILLS

Languages: Python, Java, JavaScript, C++, SQL, Bash, MATLAB

Frameworks and Technologies: PyTorch, Scikit-learn, Flask, Spring Boot, ReactJS, HTML/CSS

Databases: PostgreSQL, MongoDB, Amazon RDS, Elasticsearch

Cloud Services: AWS (EC2, S3, Lambda, SageMaker, API Gateway), Azure (Blob Storage, App Services)

Tools and Concepts: Docker, Git, Linux, Pandas, NumPy, Transformers, TDD, Agile Development

Generative AI: LangGraph, Prompt Engineering, OpenAI (Embeddings, Chat Completions), Retrieval-Augmented Generation (RAG), Supabase + pgvector, LangChain

PROJECTS

- **VAR: Video Assistant Referee System for Soccer Foul Detection**: Developed a foul detection system utilizing **MViT, ResNet, and Two-Stream CNN** architectures to extract spatiotemporal features from multi-view football videos. Used the SoccerNet-MVFoul dataset for training and implemented **layer freezing** to cut training time by nearly **50%**. Followed SDLC principles for preprocessing, model evaluation, and deployment.

- **TalentMatchAI: Generative AI Job Matching & Outreach Agent**: Designed an intelligent job matching and outreach automation system using **LangGraph**, **OpenAI embeddings**, and **pgvector on Supabase** for semantic similarity. Integrated **multi-agent workflows**, **prompt engineering**, and Retrieval-Augmented Generation (**RAG**) to personalize job-to-resume matches and outreach messages. Ranked 50 jobs in under 3 seconds with over **90%** relevance in internal tests.

- **Data Engineering – YouTube Analytics Pipeline**: Built a scalable **ETL pipeline** to process high-volume YouTube data using **AWS Glue**, **Lambda**, and **Athena**. Implemented a layered **Medallion architecture (bronze, silver, gold)** with raw data on **S3** and business insights in **QuickSight**. Focused on modular and reusable transformations to allow fast metric updates. Applied data quality checks and schema evolution handling.

- **Prior Auth Predictor (Healthcare AI)**: Developed an AI model to predict prior authorization outcomes using **BERT-based NLP**, time-series trends, and classification models. Integrated with EHRs using **FHIR APIs** and deployed the system on **AWS EC2 and Lambda**. Applied **Test-Driven Development (TDD)** to ensure production-grade reliability. Improved approval prediction accuracy and reduced healthcare delays.

EDUCATION

University of Ottawa   Ottawa, CA
M.Eng.in Software Engineering [AI Concentration], GPA: 3.8/4.0   *Aug 2023 – April 2025*
Charotar Institute of Science and Technology   Gujarat, IN
B.Tech in Computer Engineering, GPA: 3.7/4.0   *Aug 2019 – April 2023*

AWARDS & ACHIEVEMENTS

- **uOttaHack-6 Hackathon** : Runners-up, 2024
- **Geeks-for-geeks problem of the day** : 2nd place (Jan-2024 to April-2024)