Apurva Patel

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Education

Columbia University **Sept 2023 – Dec 2024**

Master of Science in Electrical Engineering (GPA: 3.97/4.00) *New York, NY*

- **Coursework:** Applied ML(A+), Deep Learning(A+), Big Data Analytics(A), Statistics(A+), Generative AI(A), NLP(A)
- **Research:** Research on use of **VAEs** to control autonomous vehicles, also achieved a 32% reduction in data volume through data distillation.
- **Teaching**: Conducted classes and tutorials for 100+ students for **Big Data Analytics & Data Visualization**

Vellore Institute of Technology **Jul 2019 – May 2023**

Bachelor of Technology in Electronics and Instrumentation Engineering (GPA: 3.97/4.00) *Vellore, India*

- Dean's list merit scholarship holder for 4 consecutive years, ranked 4/155 students.

Professional Experience

Nokia (Nokia Bell Labs) **Jun 2024 – Aug 2024**

Artificial Intelligence/Machine Learning Intern *New Providence, NJ*

- Designed and developed an **Autoencoder** for 6G Channel data compression, and integrated **MLOps** practices & enhancing model performance with a **20% improvement** in regeneration over ViTs.
- Led the **end-to-end model development** following **SDLC principles** and used **Kubernetes, Docker** for system architecture and maintained **CI/CD** pipeline.
- Contributed to NokiaGPT, leveraging **LLM fine-tuning** to develop a **text summarization model** for 3GPP standards documents **reducing 25+ person hours** for the task.

Indian Space Research Organization (SAC) **Dec 2022 – May 2023**

AI Researcher *Ahmedabad, India*

- Developed a **FPGA** based high-throughput image data acquisition system, enabling faster and accurate space packet **data verification** at a capacity of 1.7 GB/s via **custom python scripts** in LabVIEW.
- Engineered a **CNN** based image processing architecture, achieving 95.73% accuracy while **reducing computation by 45%**, optimizing data processing workflows in mission-critical applications.

Indian Oil Corporation Ltd. **May 2022 – Jul 2022**

Network Intern *Vadodara, India*

- Analyzed network security of MPLS & SD-WAN and **performed A/B testing** and **reduced data losses by 10% and processing time by 25%**.

Technical Skills

Programming: Python, R, SQL, Pandas, NumPy, MATLAB, C, C++, Java
AI/ML: TensorFlow, PyTorch, Scikit-Learn, MLFlow, NLP, **LLM**(Hugging Face, LangChain, LangGraph, Transformers)
Data Analytics: Tableau, PowerBI, D3.js, matplotlib, seaborn, plotly, ggplot, **Big Data**(Hadoop, PySpark)
Cloud: **AWS**(Sagemaker, EC2, Lambda, S3, ELB, Redshift), **GCP**(Vertex AI, BigQuery, AutoML)
Tools and DevOps: Jupyter Notebook, Apache Airflow, Apache Spark, MLOps, Databricks, Git/Gitlab, CI/CD, Kubernetes, Docker, ETL, MS Office

Projects

Medical Chatbot with RAG Architecture and AI Agents | *Llama-3, Hugging Face, LangChain* **September 2024**

- **Developed a Retrieval-Augmented Generation (RAG) pipeline** for a Medical Chatbot by integrating finetuned Llama-3, Llama-2, Gemma 1.1, Mistral-7B, and DistilGPT2 with **LangChain**.
- Leveraged **Vector DBs** such as **Weaviate** to index and retrieve medical knowledge from the **PubMedQA** dataset, ensuring accurate and relevant context.
- Implemented **AI Agents** to handle complex queries, orchestrating retrieval, reasoning, and response generation for enhanced user experience.
- Achieved a **precision of 88.3%** and a **BERT score of 0.87** while maintaining memory efficiency at **4.1GB**, optimized for **low-cost compute environments**.

Suspect Recommendation System | *Python, Scikit-Learn, MLOps, R* **May 2024**

- Implemented **Random Forest** and **XGBoost** models, improving predictive accuracy by 20%, and delivering actionable insights for NYPD.
- Enhanced crime data analysis performance using **hyperparamter tuning**, resulting in a 15% boost in model performance over vanilla models.

SqueezeNet - CNN Design Strategies for Efficient Low-cost Computing | *Python, Scikit-Learn, GCP* **May 2024**

- **Optimized SqueezeNet** for mobile and edge devices, achieving 62x computational efficiency, offering a scalable solution for deep learning in low-power environments.
- Used **GCP** and **VertexAI** to deploy and make predictions and **achieved 76% test accuracy with $\leq$ 450K paramters.**

Time-Series Forecasting of Climate Change Data | *Python, TensorFlow, Apache Airflow, Spark* **December 2023**

- Developed predictive models using **MLP** and **LSTM** using **Apache Airflow**, achieving a MAE of 4.3%, enhancing and decision-making by 25%.
- Utilized **Hadoop, BigQuery** and **PySpark** for large-scale data processing, attaining an 88% success rate, demonstrating expertise in **distributed computing** for **big data**.

Leadership & Extracurriculars

1. **Professional Development & Leadership (PDL) Fellow**: Selected as 1 of 25 out of 3,000+ students at Columbia Engineering for outstanding leadership.
2. **Department Representative(EGSC)**: Led initiatives for 300+ students to solve academic and professional challenges.
3. **Volunteer(Blind People's Association)**: Led a team of 174 volunteers to teach math and economics in 45 tribal villages for 3000 students combined