Aravinda Raman Jatavallabha

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EDUCATION

Master of Computer Science (Data Science Track) | North Carolina State University, Raleigh, NC — Aug 2023-May 2025
Courses – Data Science, Natural Language Processing, Neural Networks, Database Management Systems — **CGPA: 4.0/4.0**

B. Tech in Information Technology | Manipal Institute of Technology, Manipal, India — Jun 2019-Jul 2023
Minor: Big Data Analytics; Courses - Data Mining, Machine Learning, Pattern Recognition, Algorithms — **CGPA: 8.64/10.0**

TECHNICAL SKILLS

- **Programming Languages, Technologies & OS:** Python, SQL, Java, Spring Boot, JavaScript (basic), Angular, Flask, Docker, Git, Linux, FastAPI, REST APIs, Power BI, Azure OpenAI, AWS (S3, Sagemaker, Lambda), Snowflake
- **Libraries:** Pandas, NumPy, Matplotlib, Scikit-learn, Keras, PyTorch, TensorFlow, NLTK, PyG, SpaCy, SciPy, LangChain
- **Machine Learning:** Time Series Analysis, Classification, Regression, Convolutional Neural Networks (CNN), Natural Language Processing (NLP), Graph Neural Networks (GNN), Retrieval-Augmented Generation (RAG), Large Language Models (LLMs), Prompt Engineering
- **Training & Certifications:** Deep Learning (deeplearning.ai), Machine Learning (Stanford Online), AI Summer School

WORK EXPERIENCE

Machine Learning Engineer Co-op | SmartProtect Public Safety Solutions, Wilmington, DE — May 2024-Current

- Developed and **A/B tested** time series **predictive models** (ARIMA, FB Prophet, LSTM) on **1.2M+ call records**; deployed real-time **FastAPI** inference endpoints that improved scheduling accuracy by 20% and reduced dispatcher wait time by 14%.
- Productionized **ML pipelines** using **Flask APIs**, **AWS SageMaker**, and **Snowflake**, cutting model retraining time by 35% via CI/CD orchestration; integrated **Azure OpenAI LLMs** for anomaly summarization and transcript Q&A.
- Built **internal ops dashboard** using **Spring Boot + Angular**, powering live analytics for shift forecasting, **LLM-driven alerts**, and scheduling KPIs — used daily by 6+ teams across 3 regional call centers.
- Designed **optimization algorithms** for staff coverage using call volume clustering and anomaly tags, lowering overtime by 18% and boosting resource utilization by 22%.
- Implemented **model monitoring** and **data drift detection** using statistical checks, version tracking, and pipeline alerts — increasing post-deployment reliability by 40% and enabling auditability for compliance.

Machine Learning Engineer Intern | Defence Research and Development Organisation, Bengaluru, India — Jan 2023-Jun 2023

- Engineered a **Temporal Graph Neural Network** (**GNN**), leveraging continuous temporal data and node features to predict future user interactions on online platforms, increasing model accuracy by 2% over current benchmarks [Paper].
- Developed and integrated **Incremental BERT** (**iBERT**) with Temporal GNN to capture semantic drift and enhance real-time semantic understanding of evolving text data, reducing data processing time by 40%.
- Achieved 3.19 perplexity (6% better than SOTA) in masked language modeling, published in **Springer ICPR 2024** [Paper].

Data Science Intern | Merkle Inc., Bengaluru, India — May 2022-Jul 2022

- Led a team of 4 in developing **predictive models** (XGBoost, LightGBM, LSTM) for revenue optimization by transforming transactional data, applying **SQL indexing** on 10M+ records, and leveraging **LLM-based embeddings** to cluster product descriptions for segment-specific targeting, resulting in a 10% increase in campaign profitability.
- Processed **16M+** rows of Home Depot sales data using **PySpark**, improving query performance by 40% through advanced data handling techniques, generating actionable pricing insights.

PROJECTS & PUBLICATIONS

- **Cold Email Generator** [Code] : Engineered a **RAG pipeline** with **LangChain**, **LLaMA**, and **ChromaDB**, automating job-skill matching. Improved **targeting precision by 40%** through JSON parsing and **vector-based retrieval**.
- **Multimodal Conversation Derailment Detection** [Paper]: Built a hierarchical **transformer** combining **BERT, Faster R-CNN, and GRU** for multimodal Reddit thread modeling, integrating text and visual cues. Achieved 71% accuracy and 78% AUC, outperforming text-only baselines by 6% in conversational derailment detection.
- **Legal Query AI Assistant** [Code] : Developed a **RAG-based chatbot** using **OpenAI GPT**, **LLaMA 2**, **LangChain**, and **Pinecone**. Boosted **QA accuracy by 30%** via semantic chunking and vector retrieval from legal documents.
- **COVID-19 X-ray Detection** [Code] : Built a **CNN model** on **3-class X-ray dataset** (Normal, Pneumonia, COVID-19), achieving 95.3% training and 89.5% validation accuracy. Deployed a **Flask app** for real-time COVID detection from uploaded X-rays.
- **Privacy-Preserving LLM Evaluation** [Paper] : Analyzed **GPT-3.5**, **GPT-4**, and Turbo models for **PHI/PII leakage** on synthetic healthcare and hiring datasets. Achieved 60–99% privacy reduction while retaining >85 BLEU score, supporting **HIPAA/GDPR-compliant** LLM use.
- **Fair Visual Recognition via Distillation** [Paper]: Developed Maximum Mean Discrepancy (MMD)-based Fair Distillation using **ResNet** and **ShuffleNet** architectures to mitigate **demographic bias** in **computer vision** tasks, achieving **54% bias reduction (DEO)** with competitive accuracy on UTKFace and CIFAR-10 datasets without extensive model retraining.