Aravind Balachandar

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WORK EXPERIENCE

Zummit Africa — Wilmington, United States
Machine Learning Engineer — *May 2024 – Aug 2024*

- Engineered and deployed a chatbot using fine-tuned **LLMs,** including **LLAMA 2** and **GenAI,** and applied advanced **NLU**, **NLP,** and **transformer** techniques, achieving a 90% accuracy in generating contextually relevant user responses.
- Achieved a 40% increase in user interaction rates by implementing **Retrieval-Augmented Generation** (**RAG**) techniques with **Pinecone** as a **vector database** and **Elasticsearch** for full-text search, driving a 15% revenue growth.
- Customized a **diffusion model** for image synthesis, optimizing generation time by 30% to streamline visual content creation.
- Designed **GAN** for data augmentation pipeline, boosting model robustness and accuracy by 12% on imbalanced datasets.

Quickplay Media | Client - AMD, Rogers Sports & Media — Chennai, India
Software Engineer | Python & Golang Developer — *Sep 2022 – Aug 2023*

- Enhanced **Couchbase DB** performance by 64% through query optimization and function refactoring, reducing application load time.
- Spearheaded the design and development of an EPG **REST API microservice** for an OTT platform, reducing program guide data retrieval time from 250 to 110ms and enhancing user-experience with seamless **HLS/DASH** streaming.
- Implemented real-time data streaming solution using **Apache Kafka** and **Spark Streaming**, improving data ingestion rates by 70% and enabling near-instantaneous processing of live OTT feeds.
- Facilitated **CI/CD** pipelines with **Jenkins** and **Docker**, reducing deployment time by 50%, enhancing software release efficiency.

Accenture | Client - British Telecom — Chennai, India
Application Development Associate | Python & Golang Developer — *Nov 2020 – Sep 2022*

- Collaborated with cross-functional teams to design and build a content aggregator using **Kafka**, **Java,** and **Spring Boot,** yielding 71% reduction in code churn and improving system scalability for high-volume data processing.
- Architected a high-availability custom caching system for **OAuth tokens** using **Redis** and **Nginx,** leading to 40% decrease in data access time and a 50% boost in system responsiveness.
- Streamlined JotForm processing using **AWS Lambda**, **S3,** and **API Gateway**, curtailing costs by 30% through elimination of an **EC2 instance** reliance and communicating cost-saving measures to stakeholders.
- Optimized telecom data processing efficiency using **Apache Spark**, boosting processing speed by 45% for real-time analytics, facilitating quicker decision-making.

TECHNICAL SKILLS

Languages: Python, Go, Java, R, SQL, NoSQL, C (Data Structures and Algorithm), C++, JavaScript, React, Node.js, Django, RUST.
Cloud & Databases: AWS (EC2, Lambda, SageMaker, RDS, EKS, IAM), HashiCorp, Azure, Postgres, MySQL, Redis, MongoDB.
OS & DevOps: Linux, Gitlab, Docker, Jira, Kubernetes, Jenkins, Kafka, Ansible, Redshift, Flask, Apache, Terraform, Power BI.
Machine Learning tools: LLM, PyTorch, TensorFlow, Spark, Hadoop, NumPy, NLP, Scikit-learn, Matplotlib, OpenCV, Tableau.

EDUCATION

University at Buffalo, The State University of New York — Buffalo, United States
Master of Science in Data Science | GPA: 3.92/4.0 — *Aug 2023 – Dec 2024*

Anna University — Chennai, India
Bachelor of Engineering in Computer Science | GPA: 3.8/4.0 — *Aug 2017 – Apr 2021*

PROJECTS

Traffic flow optimization using multi-agent RL | ***Tech stack: Reinforcement learning, DQN, A2C***

- Reduced vehicle wait time by 30%, increased traffic flow efficiency by 25%, and achieved 95% simulation accuracy using **SUMO**, OpenStreetMap and **Deep Q Network (DQN)** and **A2C algorithms.**

Netflix Movie and Show Recommender | ***Tech stack: Python, TF-IDF, Streamlit***

- Developed a content-based recommendation engine using **TF-IDF** and **cosine similarity**, generating an 8000-feature similarity matrix for personalized recommendations of top 25 contents.

Multimodal Emotion Recognition on Facial Expression and EEG | ***Tech stack: Computer Vision, Deep Learning***

- Built a real-time emotion recognition system achieving 30 FPS with **OpenCV's Haar cascades**. Applied **transfer learning** with **ResNet15V2** to achieve 94% emotion classification accuracy after optimizing model architecture and hyperparameters.

PUBLICATIONS

Adhithya S, Ganesh S, Aravind B. *Multimodal Emotion Recognition Based on Speech, Facial Expression and EEG*. IEEE 10th Annual International e-Conference on Information, Communication and Networking (eICICN), April 2021. Status: Yet to be published.