Dhanush Rathinavelu

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Professional Summary

Results-driven Machine Learning Engineer with a proven track record of building and deploying intelligent systems at scale. With hands-on experience in deploying production-ready ML solutions, I specialize in building end-to-end ML workflows, real-time data pipelines, and LLM-powered applications that drive measurable business impact. Core expertise in LangChain, vector databases, RAG systems, and scalable AI infrastructure with additional frontend capabilities for full-stack AI applications.

Technical Skills

AI/ML & GenAI: LangChain, LangGraph, RAG Systems, Vector Databases, LLMs, Hugging Face, Transformers, PyTorch, TensorFlow
Programming & Backend: Python, FastAPI, Node.js, RESTful APIs, Microservices, SQL, Database Design
Cloud & DevOps: Google Cloud Platform, AWS, Docker, BigQuery, Pub/Sub, Cloud Functions, Cloud Storage
Frontend (Secondary): React.js, Next.js, TypeScript, HTML5, CSS3
Data & Analytics: Pandas, NumPy, Matplotlib, Statistical Analysis, Data Pipelines

Professional Experience

Schnell Energy | **Website** July 2024 – December 2024
Data Science Intern *Coimbatore, India*

Cloud Data Engineer

- Implemented Google Cloud Functions (Python, Pub/Sub) for real-time smart lighting data ingestion, boosting operational efficiency
- Optimized BigQuery schema architecture and streamlined complex SQL workflows, improving query performance by **25%** on large-scale datasets
- Established scalable ETL pipelines and led IoT server migration, reducing manual effort by **30%** and improving system reliability and scalability by **50%**

Intelligent Chatbot Development

- Delivered a domain-specific AI chatbot using LLMs (OpenAI GPT-4) with custom RAG pipelines for smart lighting system support
- Orchestrated semantic retrieval systems using FAISS, embedding models, and advanced prompt engineering for accurate real-time responses
- Launched chatbot via FastAPI, Docker, improving field engineers' efficiency by **50%** through automated support across IoT systems

Key Projects

CLIMATEgpt: Open-Source Climate Intelligence Platform (*Mistral-7B, QLoRA, LoRA, FastAPI*) | GitHub

- Created an AI-driven platform leveraging Large Language Models (LLMs), fine-tuned using Mistral, QLoRA, and LoRA techniques, achieving **92%** accuracy in providing authenticated climate data insights
- Architected modular pipelines for data retrieval, query analysis, and AI-driven response generation, ensuring scalability, reliability, and real-time performance
- Implemented advanced fallback mechanisms and context-aware reasoning, improving response accuracy and robustness by **20%** on complex multi-hop climate queries

AI-Powered Real-time Speech Platform (*Python, Google Gemini AI, WebSockets, PostgreSQL*) | GitHub

- Developed real-time AI speech analysis platform with **Google Gemini AI** integration, supporting **50+** concurrent sessions with **<2s** feedback latency
- Implemented **WebSocket-based** real-time communication system for instant AI feedback and performance tracking
- Built comprehensive analytics backend with **PostgreSQL** database, tracking **15+** performance indicators and serving **100+** game sessions
- Optimized AI inference pipeline, reducing processing time by **40%** while maintaining high accuracy in speech evaluation

LanPaint-ComfyUI: AI Image Generation System (*Python, PyTorch, Stable Diffusion, ComfyUI, Docker*) | GitHub

- Developed production-ready **AI image generation platform** with custom **ComfyUI** integration for real-time image processing
- Implemented custom sampling algorithms for iterative refinement, delivering **15–20%** higher perceptual quality without model retraining
- Deployed scalable microservices with **Docker** containerization, supporting **5+** diffusion models and serving **1000+** daily requests
- Optimized model inference pipeline for real-time deployment, reducing generation time by **30%** while maintaining output quality

ML-Enhanced PSO-FA Portfolio Optimization (*Python, Dash, PyTorch, PSO-FA Algorithm*) | GitHub

- Designed a hybrid portfolio optimization framework combining PSO and Firefly Algorithm, improving asset allocation efficiency by **18%** and maximizing portfolio returns over baseline heuristics
- Incorporated LSTM, Random Forest, and ensemble models to enhance stock price and market trend predictions with higher accuracy
- Engineered scalable data pipelines for 10+ years of financial time-series data, optimizing feature extraction and transformations to cut training time by **25%**

Education

Coimbatore Institute of Technology 2021 – 2026

MSc in Artificial Intelligence and Machine Learning | ***Percentage: 80%*** *Coimbatore, India*

- **Relevant Coursework:** Machine Learning, Deep Learning, Natural Language Processing, Computer Vision, Real-time Systems, AI Deployment

Certifications

Google Cloud Platform: BigQuery and Pub/Sub Fundamentals - Cloud data analytics and real-time messaging systems
Google: Introduction to Generative AI - Foundational knowledge of generative AI technologies and applications
Cisco Networking Academy: Cyber Threat Management - Network security, vulnerability assessment
IBM SkillsBuild: Cybersecurity Fundamentals - Threat intelligence analysis and incident response methodologies

Leadership & Achievements

FOSS Club of CIT June 2022 – May 2023

Innovation Head & Technical Lead *Coimbatore, India*

- Led and managed a team of **30+** members, ensuring effective coordination and communication across multiple technical initiatives
- Devised and executed strategic plans for over **12+** events and social media campaigns, optimizing outreach and engagement by **60%**
- Coordinated logistics and activities for resource personnel and alumni involvement in the prestigious flagship event "**Ignatia**"
- Led and managed a team of **20+** members, ensuring effective delivery of technical concepts to students of CIT
- Conducted **50+** events successfully in a single academic year in online and offline modes, reaching **500+** participants
- Organized a Mega event named "**The Coding Season**" for **120+** students across various departments, handling multiple sessions on C language and Data Structures & Algorithms
- Lectured two Sessions in the workshop "**Demystifying OOPs**", attended by more than **50** participants

FOSS Club of CIT June 2021 – May 2022

Event Manager *Coimbatore, India*

- Coordinated activities for a team of **20** members and orchestrated **10+** online events aimed at imparting programming knowledge
- Managed an engaging event tailored for first-year students, attracting over **150** participants, fostering interaction and enjoyment
- Developed and executed event strategies that increased student participation by **40%** and improved technical skill retention