ATHIYAMAN M

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PROFESSIONAL SUMMARY

Backend Software Engineer with 1+ year of experience designing and shipping **production-grade Python backend systems**, AI/LLM-powered applications, and RAG pipelines. Currently building mission-critical national examination security infrastructure at **C-DAC (MeitY, Government of India)**, architecting FastAPI services that monitor thousands of client systems in real time. Previously contributed to **clinical software development** at **HTIC, IIT Madras**. Skilled in REST API design, distributed systems, and database optimization, with applied AI/ML expertise in LLMs, RAG, and explainable AI.

EXPERIENCE

Project Engineer - Backend Software Engineer
Aug 2025 - Present | Chennai, India

Centre for Development of Advanced Computing (C-DAC), Government of India

- Architected and shipped **FastAPI backend services** powering a **real-time security monitoring and risk-scoring system** deployed on **PXE servers**, enabling live monitoring of **thousands of client systems** during national SSC examinations.
- Built anomaly detection, device validation, and automated risk-assessment pipelines using **30+ security indicators** across **5+ data sources**, with severity-based scoring and **API-driven blocking** for real-time enforcement.
- Engineered **production-grade backend** logic in **Python with MariaDB and SQLite** - including regex-based **log parsing, structured logging, and boot validation** and deployed large-scale log analytics pipelines using **Elasticsearch and Kibana** for centralized security monitoring and forensic analysis.
- Prototyped **AI proof-of-concepts** in **financial document intelligence, research summarization, and explainable healthcare AI** using LLMs and RAG frameworks, optimized SQL/PostgreSQL for the **BharatDB** initiative and resolved **3 open-source PostgreSQL bugs**.

Project Intern - Healthcare Software Developer
Jun 2024 - Jul 2025 | Chennai, India

Healthcare Technology Innovation Centre (HTIC), IIT Madras

- Built clinical software for **Total Knee Arthroplasty (TKA)** surgical planning using **Qt, C++, VTK, and ITK,** supporting real-world surgical workflows.
- Developed medical **image-processing** pipelines for **CT-based bone segmentation** and **3D reconstruction**, improving accuracy for surgical planning.
- Integrated **REST APIs with MySQL databases** to automate healthcare data management and clinical workflows.
- Adopted **Azure DevOps, Git, CMake, and CI/CD practices**, streamlining collaborative development, testing, and deployment cycles.

PROJECTS

AuditShakti - AI Compliance & Audit Intelligence Platform | *Python, FastAPI, Next.js, scikit-learn, PyMuPDF, Tesseract OCR, Gemini, SQLite* **GitHub**

- Built an AI-powered compliance platform **automating** financial document review, **OCR**, and **regulatory validation** (Ind-AS, SEBI, RBI, ESG) using **FastAPI and hybrid RAG (SQLite FTS5 + semantic search)**.
- Delivered an **explainable decision-support system** with page-level evidence traceability, conversational AI, and exportable PDF/Excel/JSON reports, significantly reducing manual audit effort.

ExAI-PanC: Explainable AI Clinical Digital Twin for Pancreatic Cancer | *Python, PyTorch, XGBoost, SHAP, Streamlit, Plotly, scikit-survival* **GitHub**

- Built an end-to-end **explainable AI clinical decision-support system** for pancreatic cancer, combining VAE-based multi-omics feature learning, **XGBoost** detection, and Random Survival Forest analysis trained on **545 TCGA-PAAD/GTEx samples**, achieving 0.999 AUC-ROC and 0.857 C-index.
- Delivered a **SHAP-driven explainability engine** and an interactive **3D Clinical Digital Twin** - 11-organ risk heatmap with compartmental ODE disease-progression simulation via **Streamlit/Plotly dashboard**, generating evidence-based treatment recommendations across 4 chemotherapy regimens.

Research Paper Intelligence - Multi-LLM RAG System | *Python, Streamlit, LangChain, Groq API, Ollama, Llama 3.3, Gemma, PyMuPDF* **GitHub**

- Built a **multi-LLM research assistant automating** scientific paper **summarization and comparative analysis** via section-aware PDF parsing and domain-adaptive prompting.
- Improved summary quality by **98% (ROUGE-2 F1)**, factual consistency by **55%**, and section coverage by **33%** versus baseline, delivered through an interactive Streamlit application.

SKILLS

Programming: Python, SQL, C++

Backend & APIs: FastAPI, Flask, REST API Design, Microservices, Backend Architecture, ETL Pipelines

Databases: PostgreSQL, MariaDB, MySQL, SQLite, Elasticsearch, Pinecone

AI / ML / GenAI: LLMs, RAG, LangChain, LangGraph, NLP, Hugging Face, OpenAI API, Gemini API, PyTorch, scikit-learn, SHAP/LIME

DevOps & Tools: Git, GitHub, Docker, Linux, Azure DevOps, CI/CD, Kibana, Power BI

EDUCATION

B.E. Electronics & Communication Engineering (Hons. Artificial Intelligence)
Nov 2021 - May 2025 | Tamil Nadu, India

IFET College of Engineering, Anna University | CGPA: **8.71/10** | **Rank Holder** | First Class with Distinction

PUBLICATIONS

- Mental Health Risk Detection via Explainable AI (XAI): A Multi-Model Benchmark with Contextual Embeddings - **ICAITPR 2026 (Under Review)**
- AI-Based Analysis of Hospital Bed Utilization Patterns for Patient Readmission Prediction - **SAHITHYA 2025 (Accepted)**
- Design of PON for Hospital Building Management: Enhancing Data Transmission Using FSO - **ICHCSC 2025, Springer Nature (Accepted)**

ACHIEVEMENTS & AWARDS

Rank Holder Award • Academic Excellence Award • Best Student Award • Best Innovation Project Award (Project Expo 2025) • Best Presentation Award • Runner-up - CEMP Project Expo 2022 • LinkedIn Top Voice Badge (3×) • C-DAC Performance Recognition