

Amaan Mohammed

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EXPERIENCE

Machine Learning Intern | CNPC USA | Houston, TX

June 2025– August 2025

- Designed a **328K-parameter residual ANN** for ROP prediction on **16K+** samples, improving **R²** from **0.66** → **0.75** over a production XGBoost model.
- Tuned model performance via **Bayesian Optimization** (60 trials × 500 epochs) over architecture, dropout, and learning-rate.
- Reduced feature space from **52** → **21 features** using domain-driven selection, validated via permutation importance analysis.
- Built entire preprocessing pipeline (ColumnTransformer + encoding + scaling) enabling reproducible training and deployment.

Graduate Teaching Assistant | UMD | College Park, MD

January 2025– Present

- Graded **6,000+** coding and written submissions for **300+ students**, while delivering weekly hands-on lab sessions with live coding across *Health Data Analytics, Data Science, and Data Sources & Manipulation*

PROJECTS

BugSlayer - AI SWE Agent | [GitHub](#)

April 2026

- Built an autonomous **AI Software Engineering Agent** that reads GitHub issues, generates code patches, and validates fixes in an isolated environment.
- Designed a **6-node LangGraph** agentic pipeline replacing monolithic LLM calls with modular reasoning steps.
- Implemented a **ReAct-based** tool loop for code navigation, reducing irrelevant context retrieval by **~80% vs naive RAG**.
- Built a self-healing loop that injects live pytest failure traces as structured feedback and resets repository state via Docker, achieving **100% resolution** on benchmark issues.
- Designed a dual patch system (git apply and Python fallback) to handle hallucinated diffs
- Instrumented observability via **LangSmith** tracing and human-in-the-loop validation with Streamlit.

OneStopJob (GDG Hack Winner) | [GitHub](#)

March 2026

- Built a full-stack GenAI job automation platform (Next.js, TypeScript, Claude) processing job URLs into optimized applications.
- Orchestrated a **multi-stage LLM pipeline** (fit scoring → resume rewriting → cover letter generation → recruiter outreach) with structured JSON constraints, prompt chaining, and safe parsing fallbacks for reliability.
- Reduced manual application effort from **~15+ min** → **< 60 seconds** via end-to-end AI automation.
- Integrated Hunter.io and GitHub REST APIs; deployed on **Vercel + Firebase** (Auth + Firestore).

Agentic Travel Planner | [GitHub](#)

December 2025

- Built a hierarchical multi-agent system using **Google ADK** and **Gemini 2.0 Flash** for task decomposition and itinerary synthesis.
- Integrated **Google Search + OpenStreetMap** APIs for real-time grounding and hallucination reduction.
- Improved **retrieval accuracy** by **~35%** via prompt routing and tool selection strategies.

AI-Powered MCP Web Scraping | [GitHub](#)

November 2025

- Built a custom **Model Context Protocol (MCP)** server using **FastMCP**, for LLM documentation retrieval and structured scraping.
- Implemented async scraping pipelines (httpx, asyncio, Serper API) for specific content-extraction with LLM based HTML cleanup.
- Enabled persistent agent-tool interaction via **Claude Desktop** and **MCP Inspector** debugging.

Dental-Bot | [GitHub](#)

April 2025

- Created an interactive **RAG** chatbot using **Groq Llama-3.1-8B-Instant** and **LangChain** for clinical dentistry Q&A.
- Processed 1.3k+ PDF pages, embedded using **Hugging Face Embeddings (MiniLM)**, and stored in FAISS for semantic lookup.
- Reduced hallucinations by grounding responses in retrieved documents with source attribution.
- Developed a **Streamlit** UI with environment-based secret management, chat history and source-traceable responses.

SKILLS

- Programming:** Python, R, SQL, Go, TypeScript
- AI/ML:** PyTorch, TensorFlow, scikit-learn, XGBoost, Hugging Face Transformers, Random Forest, Keras
- GenAI Systems:** LangChain, LangGraph, LangSmith, ReAct, Multi-Agent Systems, MCP, Prompt Engineering, RAG
- Deployment & Fullstack:** Next.js14, Tailwind CSS, FastAPI, Firebase, Vercel, AWS, GCP, Azure Docker, Kubernetes, CI/CD
- Tools & Platforms:** Git, VS Code, MCP Inspector, pytest, httpx, asyncio, Streamlit
- Data & Retrieval:** FAISS, ChromaDB, Vector Embeddings, SQLAlchemy

EDUCATION

University of Maryland

College Park, MD

Master of Science in Applied Machine Learning

August 2024– May 2026

Vellore Institute of Technology

Amravati, India

Bachelor of Engineering in Computer Science (Minor in Artificial Intelligence)

August 2020– June 2024