

AFFAN AHMED KHAN

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PROFILE

AI Engineer specializing in Agentic AI, Tool Calling Agents, Agentic RAG System, MCP, HITL Guardrails, Multi-Agent LLM Pipeline with Self-Correction, Evaluation, and deep learning. Built end-to-end RAG pipelines with LangChain, LangGraph, & vector databases (Chromadb & Quadrant) covering ingestion, hybrid retrieval, security, caching, & deployment. MS in Artificial Intelligence (9/10 courses) & thesis in knee OA detection by CNNs & Vision Transformers.

TECHNICAL SKILLS

Agentic AI, RAG & LLM Systems: Agentic AI, LangChain, LangGraph, Agentic RAG, Qdrant, pgvector, Hybrid Search (Dense + BM25), Ensemble Retriever, Semantic Caching, Prompt Injection Guard, Token Budgeting, Model Routing

Deployment: FastAPI, LangSmith, Ollama (Phi-3, Nomic-Embed-Text, TinyLlama), Supabase pgvector

Deep Learning: PyTorch, CNN, RNN/LSTM, Swin Transformer, ResNet-50, Efficient Net, YOLO, U-Net, Transfer Learning (LP-FT)

PROJECTS

Tool Calling Autonomous Agents with HITL Guardrails

- Engineered a multi-agent pipeline using LangGraph, Groq, and Gmail APIs to autonomously classify message intent, assess urgency, and draft context-grounded email and WhatsApp replies.
- Designed strict LLM guardrails and a secure Human-in-the-Loop (HITL) approval queue using Streamlit and SQLite to prevent hallucinations and ensure zero-liability message dispatch.

Agentic RAG System

- Architected a multi-agent RAG pipeline in LangGraph (Planner → Retriever → Analyzer → Writer → post-process)
- Engineered a hybrid retrieval layer fusing dense embeddings (Sentence Transformers mx-bai-embed-large-v1, 1024-dim) with sparse BM25 keyword search
- Implemented Corrective RAG (CRAG) & Self-RAG post-generation checks for hallucination

End-to-End RAG Engineering with Agentic Workflows

Production-grade RAG system

- Architected a multi-node agentic RAG pipeline by LangGraph with conditional edge routing, self-corrective RAG
- Built the full ingestion stack | recursive and semantic chunking, dual-encoder hybrid search (dense embeddings + BM25)

Knee OA Detection via Cartilage Thickness | Deep Learning

Jan 2026 – Dec 2026

MS Thesis | NED University of Engineering and Technology

- Designed a deep learning pipeline to classify knee Osteoarthritis severity from X-Rays
- Benchmarked ResNet-50, EfficientNet-B3, and Swin-Tiny using transfer learning strategy on the Kaggle Knee OA

EDUCATION

MS in Artificial Intelligence | NED University of Engineering and Technology (CGPA: 3.65)

Feb 2024 – Dec 2026

- Coursework: NLP, Computer Vision, Intelligent Systems Design, Mathematics for AI, Machine & Deep Learning,

BE in Mechanical Engineering | NED University of Engineering and Technology (CGPA: 3.28)

Oct 2018 – Oct 2022

- FYP: Stress comparison in natural vs. TKR knee joint with & without cartilage using SolidWorks & Ansys

EXPERIENCE

Mechanical Lab Engineer | PNEC, National University of Science & Technology (NUST)

Sept 2023 – Present

- Deliver CAD and FEA simulation labs (ANSYS) for 120+ undergraduate engineering students across multiple cohorts

Trainee Mechanical Engineer | Alsons Industries Pvt Ltd

Feb 2023 – Sept 2023

- Managed precision manufacturing workflows applying FMEA, RCA, dimensional inspection, and CNC tooling optimization

ADDITIONAL

- Freelance AI & Simulation: Fiverr Level 1 seller; delivered biomechanical simulations international clients