Muhammad Bilal

AI/ML Engineer

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https://github.com/bilalsxadad1231231 | Portfolio : https://bilalportfolio-hazel.vercel.app/

PROFESSIONAL SUMMARY

Full-Stack Software Engineer and AI Developer specializing in Generative AI, LLMs, Agentic AI and NLP, with hands-on experience in LangChain, LangGraph, and LLMOps/MLOps for scalable AI deployment. Skilled in Python, FastAPI, SQL/MongoDB (backend) and React, React Native (frontend), with strong expertise in Computer Vision, Diffusion Models, and AI-powered automation. CI/CD, Docker, and cloud platforms (AWS, Azure), and continuously growing through certifications in AWS, Google IT, and Deep Learning.

EDUCATION

University of Engineering and Technology Mardan | 3.6 CGPA — Mardan, PK
Bachelor of Science in Computer Software Engineering — *Sep. 2022 - June 2026*

EXPERIENCE

Generative AI Intern — August 2024 - October 2024
ITSOLERA PVT LTD | Islamabad, Pakistan

Campus Ambassador – Devsinc Pakistan — *Mar 2024 - Present*
University of Engineering and Technology Mardan

PROJECTS

- ✓ **Multi-Document Chatbot on AWS**
  - Built a customizable chatbot with user authentication and persona-based interactions.
  - Enabled contextual chat across multiple PDFs using LangChain, FastAPI, and Streamlit.
  - Deployed via Docker to AWS ECS with CI/CD using GitHub Actions.
  - Integrated Groq Cloud for high-speed inference.
- ✓ **Smart Home with LLM Agent**
  - Created a voice-controlled smart home system using Groq Cloud's LLaMA model.
  - Controlled lights, fans, and DC motors via Arduino-based hardware.
  - Developed a Flutter app for real-time mobile control and automation.
- ✓ **AI-Powered Personal Assistant App**
  - Built a React Native app with FastAPI backend offering agentic AI capabilities.
  - Supported image/PDF processing, web search with citations, and personal task automation.
  - Enabled email handling, scheduling, and content recommendations based on user context.
- ✓ **Computer Vision & Image Processing Projects**
  - Trained and fine-tuned YOLOv5 on custom datasets for real-time object detection; applied augmentation and anchor box optimization for enhanced accuracy.
  - Developed OCR pipelines using Tesseract and EasyOCR for document digitization and license plate recognition, with preprocessing techniques to boost accuracy.
  - Implemented U-Net architecture for semantic segmentation on medical and scene datasets; improved performance through loss tuning and data augmentation.
  - Integrated SORT and Deep SORT tracking algorithms with object detection models for real-time identity tracking using Kalman filtering and Hungarian matching.
- ✓ **GAN Implementations with TensorFlow**
  - Implemented WGAN, CGAN, Pix2Pix, StyleGAN, and CycleGAN for image generation and translation tasks.
  - Optimized models using techniques like gradient penalty, conditional inputs, and loss tuning.
  - Achieved high-quality results in style transfer, domain adaptation, and synthetic image creation.
- ✓ **Diffusion Model Fine-Tuning (Custom Dataset)**

- Fine-tuned Stable Diffusion using DreamBooth-style training with custom tags and class-preserving loss.
- Focused on U-Net fine-tuning for efficient learning while preserving model generality.
- Achieved high-quality, domain-specific outputs with strong inpainting performance and stylized image generation.

✓ **LLaMA-7B Fine-Tuning for Multi-Class Classification**
- Fine-tuned LLaMA-7B on domain-specific datasets for multi-class text classification tasks using PEFT and LoRA.
- Achieved optimized inference performance through quantization and parallel processing.

✓ **Autonomous Research Agent**
- Developed an autonomous agent that performs web search and compiles structured research reports.
- Integrated browsing tools and summarization for targeted information retrieval and analysis.

✓ **Transformer from Scratch for Summarization**
- Implemented "Attention is All You Need" architecture in TensorFlow from scratch.
- Trained on text summarization datasets to validate functionality and model efficiency.

✓ **T5 Transformer from Scratch for QA (Question Answering)**
- Reproduced T5 architecture in TensorFlow for question-answering tasks using SQuAD-style datasets.
- Focused on encoder-decoder dynamics and span prediction optimization.

✓ **Autism Support Chatbot**
- Built a personalized therapy assistant for individuals with ASD using LangChain and Streamlit.
- Enabled document-based chat and emotional support features with Groq-powered LLM inference.

Skills

- ✓ **Programming Languages**: Python, C, C++, JavaScript, Java, SQL, Assembly Language
- ✓ **Web & Mobile Development:** React, React Native, Tailwind CSS, FastAPI, Flask, Web Scraping, API Development
- ✓ **Database Systems**: PostgreSQL, MySQL, SQLite, MongoDB, NoSQL, Pinecone, Chroma, Weaviate
- ✓ **Developer Tools**: Git, Github, Google Colab, VS Code, Jupyter Notebook, Linux, Kaggle, Postman
- ✓ **AI & Machine Learning:**, Scikit-learn, ML/DL, NLP, PyTorch, TensorFlow, Numpy, Pandas, Seaborn, Matplotlib
- ✓ **Generative AI & LLM Frameworks:** LangChain, LangGraph, LLaMAIndex, Crew AI, Ollama, LoRA, Agents, RAG / Agentic RAG, Chatbot Development, Model Quantization, Hugging Face, Prompt Engineering, LLM Finetuning
- ✓ **DevOps & Cloud:** AWS, Azure, DevOps, LLMOps, CI/CD, Docker, Kubernetes, , Infrastructure as Code, GitHub Actions
- ✓ **Hardware & Embedded Systems:** Embedded Systems, Arduino, IoT Integration, Automation
- ✓ **Academic Foundations:** Programming Fundamentals, Object-Oriented Programming (OOP), Data Structures & Algorithms (DSA), Design & Analysis of Algorithms, Database Systems, Operating Systems, Computer Networks, Software Engineering
- ✓ **Professional Skills:** Problem Solving, Teamwork, Communication, Leadership, Critical Thinking, Collaboration, Presentation Skills, Agile Methodologies

Certifications

- ✓ **AWS Fundamentals Specialization**
- ✓ **DevOps On AWS**
- ✓ **Google IT Automation with Python Specialization**
- ✓ **IBM AI Engineering**
- ✓ **LLMOps**
- ✓ **Databases for Data Scientists**
- ✓ **Machine Learning (DeepLearning.AI)**
- ✓ **Deep Learning**
- ✓ **Natural Language Processing**
- ✓ **TensorFlow: Advanced Techniques**