

Muhammad Hamza Azhar

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EXPERIENCE

Pattern Recognition Lab, PIEAS

Sept 2024 – June 2025

AI Researcher

Islamabad, Pakistan

DNN based DeepFake Video Detection using multi-modality features (Vision + TOI Spectrum)

- Conducted year-long FYP research.
- Conducted an in-depth literature review and reproduced several SOTA methods, synthesized a hybrid solution by combining complementary techniques from the papers to maximize generalization and performance.
- Ran large-scale experiments and ablation studies on a DGX workstation (4 × Tesla T4, 32GB GPUs) using DeepSpeed for multi-GPU training.

Agentic AI for Data Analysis

- Built intelligent data analysis agents by integrating agentic frameworks for data analysis with LLMs to enable natural language queries over structured datasets.
- Automated statistical analysis, generated interactive charts and dashboards, and delivered dynamic visual reports.
- Designed agentic workflows that combined LLM-driven reasoning with visualization and retrieval tools, enabling autonomous insights.

Profile Analyzer – Agentic AI Conversation Starter | LangChain, Streamlit, LangSmith [\[LIVE DEMO\]](#)

- Designed and implemented a multi-agent pipeline to scrapes LinkedIn & Twitter to generate professional summaries and social insights.
- Suggests interesting facts and ice-breakers to start meaningful conversations.
- Uses Proxycurl & Tweepy APIs with mock fallback for public demo access + DeepSeek R1 model via OpenRouter.

LangBot – LangChain Documentation Assistant | LangChain, Pinecone, BAAI embeddings [\[LIVE DEMO\]](#)

- Implemented a recursive “level-2” chunking strategy (can be changed to “level-5” agentic chunking) to split and index LangChain docs for optimal context relevance.
- Built query augmentation logic that retrieves top-K relevant chunks, appends them to the user prompt, and routes the combined context to LLM for accurate, source-grounded answers.
- Tuned embedding similarity thresholds and retrieval parameters to achieve 90%+ user satisfaction in internal testing, reducing irrelevant context noise.

EGeeks Global

July 2025 – Present

AI Engineer

Rawalpindi, Pakistan

Viva AI Tool | AI powered Interview Bot [\[LIVE DEMO\]](#)

- Team: 2 developers, 2 AI leads, 1 Senior AI expert (8-phase roadmap; Phase 1 completed).
- Contributed in delivery of phase 1 of Viva-bot, an enterprise-grade virtual assistant that provides professional-level interview and thesis defense coaching.
- Reduced LLM response latency in production environment by optimizing orchestration (OpenAI), STT (Deepgram).
- Researched open-source lipsync and video generation models (MuseTalk, Wav2Lip, Wan2.1 and Hallo3).
- Working on webRTC for real-time avatar streaming as a digital clone. Configured streaming APIs HeyGen, ANAM, Tavus and D-ID.

AI Calling Agent – Python Automation | Phone Call Management System

- Worked on a Flask based web application for managing outbound calls through VAPI.ai integration. The system includes user authentication, subscription management, and bulk call processing capabilities.
- Automated call scheduling, rescheduling, follow-up and timezone-aware logic for global customers.
- Integrated AI-driven transcript analysis for call outcome evaluation and dynamic workflow decisions.

PROJECTS

Skintegrity – DNN based DeepFake Video Detection using Multi-Modality Features [\[LIVE DEMO\]](#)

- Developed a deepfake video detection system leveraging Optical and Transdermal Optical Imaging (TOI) features.
- Designed a TOI feature extraction pipeline, generating hemoglobin concentration heatmaps (visualizing blood flow) to detect deepfakes.
- Implemented detection pipeline using insights from the ICCV paper “TALL: Thumbnail Layout for Deepfake Video Detection.”
- Utilized transformer-based architectures, including Convolutional Vision Transformer, Swin, TimeSFormer.
- Deployed the trained model as a real-time web app for seamless deepfake video classification.

Food Visionary – Advanced Food Classification System [\[LIVE DEMO\]](#)

- Developed a deep learning-based food classifier for multi-category identification with high accuracy.
- Implemented a custom CNN and fine-tuned pre-trained models for feature extraction and classification.
- Designed an end-to-end pipeline for image preprocessing, augmentation and real-time inference.
- Optimized training with parallelized data loading, mixed precision, learning rate scheduling, and regularization for faster convergence.

Disaster Tweets Classification using Deep Learning

- Implemented a binary classification system to detect disaster-related tweets using a labeled dataset.
- Built and evaluated multiple models including Naive Bayes, Dense Neural Network, LSTM, GRU, Bidirectional-LSTM, 1D CNN, and pretrained models.
- Achieved performance benchmarking across models using accuracy, precision, recall, and F1-score metrics.
- Fine-tuned pretrained models and experimented with reduced data training (10%) to test model generalizability.
- Applied text preprocessing techniques including tokenization, padding, stemming, and stopword removal for optimal input pipeline.

EDUCATION

Pakistan Institute of Engineering and Applied Sciences

Bachelor of Science in Computer Science, GPA: 3.75/4.00

Oct 2021 – June 2025

Islamabad, Pakistan

SKILLS & INTERESTS

Python, Machine/Deep Learning, Generative/Agentic AI, Automation, TensorFlow, Keras, PyTorch, Scikit-learn, Langchain, Crew AI, LLMs, Data Preprocessing, Data Visualization, WandB, OpenCV, Image Processing, Computer Vision, NLP, Neural Networks, Classification, MERN stack, SQL, FastAPI, HuggingFace, Vector Databases, Cloud Computing.

LEADERSHIP & AWARDS

- Received a Certificate of Appreciation for outstanding leadership in a technical course project.
- Awarded a merit-based scholarship for two years in college for academic excellence.