Asadullah Yousaf

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Education

Bahria University — Islamabad, Pakistan

Bachelor of Artificial Intelligence — *Sep 2021 – June 2025*

- **Majors:** Machine Learning, Deep Learning, NLP, Computer Vision, ANN, Generative AI

Experience

AI Engineer — Jan 2026 – Present

HospitALL (Healthcare Service Provider) — *Remote / Pakistan*

- Architected and deployed a HIPAA-aligned agentic AI workflow for automated medical triage using the Mastra framework, enabling structured symptom intake, AI-assisted pre-diagnosis, doctor recommendation, and intelligent appointment booking.
- Designed a multi-agent orchestration pipeline where specialized agents handle symptom analysis, risk stratification, medical report summarization, prescription explanation in patient-friendly language, and workflow routing under controlled decision boundaries.
- Integrated the triage system with mobile and web applications through secure RESTful APIs, implementing encrypted data handling, role-based access controls, and BAA-backed infrastructure services to ensure regulatory compliance.
- Implemented physician-in-the-loop behavioral validation, where AI-generated responses are monitored and guided by doctors to ensure clinical safety, accuracy, and adherence to healthcare standards.
- Collaborated closely with healthcare professionals to refine triage logic, validate AI outputs, and continuously improve system reliability for real-world clinical deployment.

Co-Lead AI Engineer — July 2024 – July 2025

Bahria University — *Islamabad, Pakistan*

- Conducted architecture-level benchmarking of GANs, GNN-based generative models, and Diffusion Models for text-to-floorplan synthesis, evaluating performance across fidelity, structural consistency, and rendering stability to identify the optimal model class.
- Engineered a production-ready Django AI pipeline by modularizing the backend architecture to handle REST API requests, manage model inference jobs, generate floor plan outputs, stream results to the frontend, and integrate a post-processing pipeline (image-to-vector DXF converter) within a unified application stack.
- Designed and implemented a vectorization subsystem that converts model-generated raster floor plans into CAD-compatible DXF files using geometric extraction, contour tracing, and polygon reconstruction algorithms.
- Coordinated task decomposition, version control workflows, and development sprints within the team, ensuring continuous integration, issue tracking, and alignment with project milestones.

Generative AI Intern — July.2024 - Aug.2024

Center of Excellence, Bahria University — *Islamabad, Pakistan*

- Developed **Assisted Writing Learning** app for early learners
- Built 60,000-image handwriting dataset across multiple categories
- Fine-tuned MobileNet/EfficientNet for handwriting classification
- Lead data preparation and model training for optimal performance
- Conducted literature review on floor plan generation for FYP

Publications

Floor Plan Generation From NLP Description | *IEEE IBCAST Conference 2025* — 2025

Projects

Multilingual RAG-Based YouTube Chatbot | *Flask, FAISS, Hugging Face, Gemini API* August 2025

Built a multilingual RAG-powered chatbot that enables users to query, summarize, and interact with YouTube videos through natural language using contextual transcript retrieval.

- Developed a Flask-based AI application that processes user queries and dynamically retrieves relevant video segments for accurate responses.
- Fetched and embedded video transcripts using FAISS vector indexing and Hugging Face multilingual embeddings to support Q&A, summarization, and semantic search.
- Implemented a **RAG (Retrieval-Augmented Generation)** pipeline powered by Gemini (gemini-2.5-flash) to generate context-aware and multilingual responses.
- Maintained active user sessions to support continuous, multi-turn conversations and improve video comprehension.
- Designed the system for educational, research, and content-analysis workflows, providing an intuitive interface for exploring deeper insights from video content.

Floor Plan Generation System | *Python, SQLite* July 2024 – June 2025

A Prompt-based AI system that transforms floor plan specifications into generated layouts using a fine-tuned diffusion model and provides CAD-ready vector exports (DXF/JSON) through a raster-to-vector processing pipeline for use in AutoCAD, Revit, Blender, and other design tools.

- Developed a two-module system comprising **Image Generation** (prompt-based diffusion model) and **Post-Image Processing** (raster-to-vector conversion).
- Implemented an intelligent prompt engineering pipeline to transform user inputs into structured formats for a fine-tuned **FLUX diffusion model**.
- Applied advanced image processing techniques to convert raster floor plans into precise vector representations.
- Extracted spatial metadata including room labels, dimensions, and color segmentation; stored this data in JSON for AutoCAD/Revit compatibility.
- Enabled direct PNG downloads with annotated dimensions for enhanced usability.

Story Generation Using LSTM and GRU | *Python (TensorFlow, NLTK)* June 2024

- Developed an AI model to generate complete stories from brief user-provided outlines using sequence modeling techniques.
- Preprocessed large-scale textual datasets and conducted a comparative evaluation of LSTM and GRU architectures for story generation, focusing on coherence, creativity, and training efficiency.
- Observed that GRU outperformed LSTM on short sequences due to faster convergence and a more efficient, simplified architecture.

Technical Skills

Languages: Python, C/C++, JavaScript, SQL, Bash
Frameworks & Platforms: PyTorch, TensorFlow, Keras, Hugging Face Transformers, LangChain, LangGraph
Tools & DevOps: Git, VS Code, Docker, Colab, Jupyter Notebook
Libraries & Data: pandas, NumPy, Matplotlib, OpenCV, Pillow, Scikit-learn
AI & Gen AI Skills: GANs, Diffusion Models, RNNs, LSTMs, GRUs, NLP, Computer Vision, Embeddings, Vector Databases (FAISS, Chroma)