

Muhammad Ahmed Rayyan

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SUMMARY

AI and Machine Learning student passionate about building intelligent systems that solve real-world problems. My work spans healthcare AI at AKUH, where I developed pediatric MRI segmentation models, to winning ML competitions and deploying LLM-based applications. I thrive at the intersection of research and implementation, turning complex data into functional, impactful solutions.

EDUCATION

Bachelor of Science Artificial Intelligence

Sept 2023 - Present

Shaheed Zulfikar Ali Bhutto Institute of Science and Technology (SZABIST), Karachi

GPA: 3.32 / 4.0

Relevant Coursework: Artificial Intelligence, Machine Learning, Artificial Neural Networks, Data Structures & Algorithms, Design & Analysis of Algorithms, Linear Algebra, Probability & Statistics, Database Systems, Agent-Based Modeling

Intermediate (Pre-Engineering)

Jul 2021 - Jul 2023

Govt. Degree Science & Commerce College, Gulshan-e-Iqbal Block-7, Karachi

TECHNICAL SKILLS

Programming & Web: Python, C/C++, Java, JavaScript, HTML5/CSS3, Flask, Streamlit, Gradio, NodeJS

Machine Learning & AI: PyTorch, TensorFlow, scikit-learn, XGBoost, Hugging Face Transformers, NLTK, nnU-Net, OpenCV, Stata

Tools & Platforms: Git/GitHub, n8n, MySQL, Microsoft SQL Server, Arduino IDE, Raspberry Pi, NetLogo, Netlify

WORK EXPERIENCE

Aga Khan University Hospital (AKUH)

Karachi, Pakistan

AI/ML Intern | Python, PyTorch, nnU-Net, NumPy, Pandas

Jul 2025 – Aug 2025

- Implemented nnU-Net for pediatric MRI segmentation (LISA Challenge), achieving mean Dice of 0.68 and IoU of 0.52.
- Conducted research on MRI super-resolution and deep learning segmentation techniques for medical imaging applications.
- Evaluated model outputs through quality control and explored emerging architectures such as MAMBA-based segmentation models.

PROJECTS

VitalCare-CustomGPT | Python, Streamlit, Hugging Face, Transformers | [Github](#)

- Built a multi-role medical AI assistant with fine-tuned Hugging Face models for domain-specific healthcare responses.
- Implemented role-based prompt engineering and keyword validation to enhance response relevance and medical domain accuracy.
- Developed an interactive chat interface with Streamlit, enabling real-time LLM inference and user-friendly medical assistance.

EEG Brain Signal Classifier | Python, scikit-learn, NumPy, Joblib | [Github](#)

- Developed a machine learning pipeline to classify EEG brain signals into actionable commands using feature extraction techniques.
- Implemented KNN and Random Forest classifiers with cross-validation for model selection and performance optimization.
- Processed EEG datasets stored in JSON format, transforming multi-channel temporal signals into ML-ready feature representations.

MediQuery-RAG | Python, Streamlit, LangChain, ChromaDB | [Github](#)

- Built a RAG pipeline (984 chunks, 8 FDA labels) with Groq's Llama 3.1 8B, delivering citation-backed, zero-hallucination responses.
- Evaluated via LLM-as-judge across 20 queries, achieving Faithfulness 0.82 and Answer Relevancy 0.78 (RAGAS-equivalent).
- Engineered a rephrase-then-retrieve chain with conversational memory to resolve multi-turn follow-up queries accurately.

ACHIEVEMENTS & ACTIVITIES

2nd Place – National AI Hackathon '26 (Karachi Regional)

atomcamp | May 2026

Built EduFlow, a 9-agent AI platform targeting Pakistan's education crisis covering automated grading, multilingual feedback, parent engagement, intervention planning, and ghost school detection, competing against ~60 teams (~176 participants).

First Prize – Machine Learning Competition

ZABEFEST, SZABIST | 2025

Developed an XGBoost-based pipeline to predict liver cirrhosis patient survival outcomes (Mayo Clinic dataset, 17 clinical features) using multi-class classification. Achieved a log-loss of 0.3557, securing 1st place on the competition leaderboard.

3rd Prize – AI Image Generation Competition (World No Tobacco Day)

Community Health Sciences Department, Aga Khan University | 2025

Created AI-generated public health awareness imagery discouraging tobacco usage, demonstrating creative application of AI for social impact and awareness. [Virtual Gallery](#)

Member – Tobacco Free Cities Coalition Initiative

Community Health Sciences Department, Aga Khan University | 2024 - Present

Contributed to public health awareness initiatives promoting tobacco-free environments through collaborative activities.