Maliha Tabassum

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IELTS Score : 8

Research Interests

Explainable AI, AI in Healthcare, Image Processing, NLP

Education

Bangladesh University of Professionals Dhaka, Bangladesh
Bachelor of Science in Information and Communication Engineering Nov 2021 – Sept 2025
CGPA: **3.96/4.00** (Highest in Batch)

Thesis: *Real-time Explainable Conversational AI for Early Diagnosis Using Large Language Models*
Relevant Coursework: Machine Learning, Artificial Intelligence, Data Warehousing, Data Mining,Linear Algebra & Fourier Analysis, Probability & Statistics, Calculus, Ordinary & Partial Differential Equations, Discrete Mathematics, Data Structures, Analysis & Design of Algorithms, Object-Oriented Programming, Database Management Systems, Signal and Systems

Technical Skills

Programming Languages: Python, Java, JavaScript, C++
ML Frameworks: Pytorch, TensorFlow, Keras
Tools & Libraries: CUDA, FAISS, OpenCV, Mediapipe, HuggingFace, Jupyter Notebook
Data & Visualization: Pandas, NumPy, Matplotlib

Research Experience

Manuscript under review at Heliyon

Towards Explainable Conversational AI for Early Diagnosis Using Large Language Models

- Developed an LLM-based explainable diagnostic chatbot using GPT-4o with RAG and structured chain-of-thought prompting for 14 common diseases and compared performance against traditional ML models
- Performed ablation studies and applied fine-tuning strategies to reduce hallucination.
- Designed a two-phase diagnostic pipeline (symptom-based diagnosis followed by lab-test–augmented evaluation of the top three predicted diseases), achieving 90% accuracy and 100% top-3 accuracy across 540 evaluated conversational turns. A web implementation of the system is available here: https://xaimedicalbot.azurewebsites.net

Supervised by Dr. M. Shamim Kaiser.

Ongoing Research
Towards a Causal Counterfactual Segmentation Framework for Disease Progression Modeling in Diabetic Retinopathy (estimated)

- Developing a causal counterfactual framework to improve causal consistency and disease-progression explainability using EyePacs-1 and Messidor-2 dataset

Supervised by Dr. Mohammad Abu Yousuf

Academic Projects

- **DR-XAI: Explainable Diabetic Retinopathy Diagnosis** ***GitHub***

  Developed a deep learning pipeline for Diabetic Retinopathy classification with integrated explainability using Grad-CAM. The system predicts DR stages from retinal fundus images and visualizes clinically relevant regions influencing each decision, enabling transparent and interpretable medical AI for research and screening applications.

- **Skin Disease Detection Using EfficientNet** ***GitHub***

  Developed a skin cancer classification system capable of detecting ten dermatological conditions using transfer learning on EfficientNet, achieving 70% accuracy. Created an interactive diagnostic interface and performed model training, evaluation, and fine-tuning as part of the Artificial Intelligence course.

Industry Experience

Software Engineer Nov 2024 – Sept 2025

Integrated Software and Technologies Ltd.

I started as an intern and later became a full-time employee. I worked on various projects, built API endpoints, and improved software performance by identifying and fixing bugs. A few relevant projects:

- **LLM-Based Legal Assistance Chatbot** | *FAISS, HuggingFace Transformers, LLaMA, Python*
  - Developed a LLaMA-based legal QA system using RAG and optimized prompts, producing consistently accurate intent detection with high-confidence outputs.
  - Built a hybrid query pipeline combining CAG for low-latency repeats and RAG for retrieval-based answers.
  - Implemented semantic search and domain-specific chunking for effective retrieval from unstructured legal PDFs.

- **Biometric Authentication Pipeline (E-Visa System)** | *Python, Mediapipe, Azure AI Vision*
  - Developed a unified biometric pipeline for face verification, liveness detection, passport OCR, and fingerprint extraction.
  - Improved reliability through normalization, denoising, and image-quality filtering.

Achievements

- Achieved the highest CGPA in my cohort in the Faculty of Science and Technology, BUP
- Awarded the BUP Merit Scholarship for all eight semesters for maintaining a GPA above 3.90
- Received the Dean's Appreciation Letter in the final two semesters
- Champion — INDCon 2024 Presentation Competition

Extracurricular Activities

Beta Student Ambassador, Microsoft Learn Jul 2023 – Present

Mentored peers through technical sessions, contributed to community-building initiatives, and participated in AI-focused projects, including an AI-based learning platform and an AI-based waste-sorting application.