Rezaul Haque

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EXPERIENCE

Research Assistant **Jan. 2024 — Present**

East West University Center for Research and Training (CRT)—Supervisor: Dr. Ahmed Wasif Reza *Dhaka, Bangladesh*

- Developed novel vision transformer architectures and feature fusion techniques for multimodal object recognition and clinical visual question answering, achieving over 95% accuracy in classification
- Applied ensemble learning and explainable AI methods to improve brain tumor diagnosis and cervical cancer recognition, increasing model precision and recall by 10-15% with Grad-CAM integration
- Implemented genetic algorithm optimization to achieve state-of-the-art performance in Parkinson's disease diagnosis and viral DNA sequence identification, improving model generalizability across diverse datasets
- Developed interactive web applications for cancer imaging tasks, delivering interpretable and real-time predictions to support clinical decision-making
- Trained over 300 undergraduate and graduate students in medical image analysis, trustworthy AI systems, research methodologies, and interdisciplinary collaboration

Research Engineer **Feb. 2023 — June 2025**

AI Division, Dataxense—Director: Dr. Md Junayed Hasan *Aberdeen, UK*

- Developed a multi-stage leukemia classification pipeline using Inception-ResNetv2, optimizing for sensitivity and precision in rare subtype diagnosis. Integrated the framework into clinical decision support systems for early detection
- Designed an RNN-based model with GloVe embeddings to process 215,000+ drug reviews, detecting nuanced sentiment variations. Developed a federated learning-based ensemble framework for breast cancer diagnosis
- Created a novel underwater object detection system, incorporating cross stage multi-branch and large kernel spatial pyramid modules. Improved mAP and detection speed on diverse datasets, outperforming 25 state-of-the-art models
- Integrated deep learning models into web-based tools for pharmaceutical feedback and privacy-preserving clinical decision support, improving real-time prediction and data security

Research Assistant **April 2022 — May 2023**

Applied Bahari Big Data Research House—Supervisor: Prof. Dr. V. P. Meena *Dhaka, Bangladesh*

- Applied Vision Transformer models for leather defect recognition and integrated it into a mobile application for quality control. Developed a pre-trained model for mango leaf disease detection for sustainable agricultural management
- Led the development of a smart manhole monitoring system with gas, water level, and GPS sensors, providing real-time updates via the Blynk app, improving urban safety and maintenance response times by 30%
- Presented over 15 papers at IEEE conferences in India, Bangladesh, Australia and the USA and earned 6 Best Presenter awards. Collaborated with interdisciplinary teams on trustworthy AI in biomedical and IoT projects

RESEARCH INTERESTS

- Bioinformatics & Medical Imaging
- Computer Vision & Deep Learning
- NLP & Social Network Analysis
- Multimodal & Trustworthy AI
- AI-driven Threat Detection
- Internet of Things (IoT)

TECHNICAL SKILLS

Programming: Python, SQL, NoSQL, Swift 5, PHP, C++, HTML/CSS, JavaScript

Specialty: Data Analytics, Image Processing, Signal to Image Conversion, Computer Vision, Data Ethics, Machine Learning, Transfer Learning, Explainable AI, Project Management, Technical Writing, Signal Processing, Classification, and Forecasting

Tools: Anaconda, PyCharm, Django, Flask, MATLAB, Tableau, Visual Studio, ASP.NET, Xcode, LaTex, Linux, Jira, GitHub

ML Libraries: Scikit-learn, SciPy, pandas, TensorFlow, PyTorch, NLTK, spaCy, Spark MLib, Statsmodel, Seaborn, Plotly

ACADEMIC CREDENTIALS

MS in CSE **Sept. 2025 – Present**

East West University *Dhaka, Bangladesh*

B.Sc in CSE **Sept. 2017 – Jan. 2022**

East West University *Dhaka, Bangladesh*

- **CGPA:** 3.07 out of 4.00
- **Thesis:** Multi-class Sentiment Classification on Bengali Social Media Comments Using ML (published in Q1)

PUBLICATIONS

Peer-Reviewed Journals **Markers: *Q1 and **Q2**

- Vision-Audio Multimodal Object Recognition Using Hybrid and Tensor Fusion Techniques, **Information Fusion***, 2025
- Multi-class Sentiment Classification on Bengali Social Media Comments Using Machine Learning, **International Journal of Cognitive Computing in Engineering***, 2023
- A Comparative Analysis on Suicidal Ideation Detection Using NLP, Machine, and Deep Learning, **Technologies***, 2022
- Explainable deep stacking ensemble model for accurate and transparent brain tumor diagnosis, **Computers in Biology and Medicine***, 2025
- Explainable Transformer Framework for Fast Cotton Leaf Diagnostics and Fabric Defect Detection, **IScience***, 2025
- Data-driven Solution to Identify Sentiments from Online Drug Reviews, **Computers***, 2023
- ViX-MangoEFormer: An Enhanced ViT-EfficientFormer and Stacking Approach for Mango Leaf Disease Recognition with XAI, **Computers***, 2025
- A Novel MaxViT Model for Accelerated and Precise Soybean Leaf and Seed Disease Identification, **Computers***, 2025
- Accelerated and Accurate Cervical Cancer Diagnosis Using a Novel Stacking Ensemble Method with XAI, **Informatics in Medicine Unlocked****, 2025
- Hierarchical Swin Transformer Ensemble with Explainable AI for Robust and Decentralized Breast Cancer Diagnosis, **Bioengineering****, 2025
- Advancing Early Leukemia Diagnostics: A Comprehensive Study Incorporating Image Processing and Transfer Learning, **BioMedInformatics****, 2024
- LMVT: A Hybrid Vision Transformer with Attention Mechanisms for Efficient and Explainable Lung Cancer Diagnosis, **Informatics in Medicine Unlocked****, 2025
- DepTformer-XAI-SV: A Novel Ensemble Transformer Model for Fast and Accurate Depression Emotion and Severity Analysis, **iScience*** (accepted)
- LightVTD: Lightweight Explainable Vision Transformer with Multi-Path Token Fusion for Drowsiness Detection, **Scientific Reports*** (accepted)
- Aspect-Aware Multimodal Sentiment Analysis of E-Commerce Reviews via Contrastive Graph Fusion for Business Intelligence, **Information Sciences*** (under review)
- Fin-TweetX: Multimodal Fusion for Stock Price Movement Prediction via Twitter Sentiment and Technical Indicators, **Applied Soft Computing*** (under review)
- MaizeFormerX: A Lightweight Vision Transformer with Cross-Scale Attention for Explainable Maize Leaf Disease Diagnosis, **Scientific Reports*** (under review)
- C^2-SHMN: Causally-Conditioned Spiking Hyper-Meta Networks for Low-Power Event Sensing and Inertial Fusion, **Access***(under review)
- Goldenhar Syndrome Detection with OD-Mamba Backbone for Explainable Rare Craniofacial Disorder Diagnosis, **Scientific Reports***(under review)
- Communication-Aware Federated Self-Supervised Learning for Intelligent IoT Intrusion Detection System, **Knowledge-Based Systems*** (under review)
- Explainable Token-Fusion Transformer for Early Drowsiness State Recognition in Safety-Critical Systems, **Array*** (under review)
- Explainable AI-Driven Hybrid Deep Learning Framework for Accurate Skin Cancer Diagnosis, **Digital Health**** (under review)

Selected Conferences **Marker: *Best Paper Award**

- Improving Drug Review Categorization Using Sentiment Analysis and Machine Learning, **ICDSNS 2023***
- Towards Automated Detection of Tomato Leaf Diseases, **ICEEICT 2024***
- Classroom Activity Classification with Deep Learning, **ICICACS 2024***
- Addressing Misinformation in Bengali Media: A Hybrid Deep Learning Solution, **ICCIT 2024***
- Bengali Emotion Classification Using Hybrid Deep Neural Network, **AIKIIE 2023***
- Deep Learning-Based Left Ventricular Ejection Fraction Estimation from Echocardiographic Videos, **EASCT 2023***
- Scientific Article Classification: Harnessing Hybrid Deep Learning Models for Knowledge Discovery, **AIKIIE 2023**
- A transfer learning-based computer-aided lung cancer detection system in smart healthcare, **SCS 2024**
- Data-Centric Approach for Leather Quality Control Using Advanced Vision Transformer Models, **INCIP 2024**
- Deep Learning for Multi Labeled Cyberbully Detection: Enhancing Online Safety, **ICDSNS 2023**
- Alzheimer Disease Classification Using Deep Neural Network, **UPCON 2023**
- A Novel Machine Learning Approach for Fast and Efficient Detection of Mango Leaf Diseases, **ICMI 2024**

HONORS/AWARDS

Best Paper, 27th International Conference on Computer and Information Technology, Dec. 2024
Best Paper, 7th International Conference on Contemporary Computing and Informatics, Sept. 2024
Best Paper, 3rd International Conference on Electrical, Electronics, Information and Communication Technologies, May 2024
Best Paper, International Conference on Evolutionary Algorithms and Soft Computing Techniques, Oct. 2023
Best Paper, International Conference on Ambient Intelligence, Knowledge Informatics and Industrial Electronics, Nov. 2023
Best Paper, 1st International Conference on Data Science and Network Security, July 2023

INVITED TALK

- Ensemble-Based XAI for Rare Medicinal Plant Conservation, ICINT, **Australia**, March 2025
- Hybrid ViT-based prostate and oral cancer segmentation, ECCE, **Bangladesh**, Feb. 2025
- ViT-based Esophageal disease diagnosis in low-resource Settings, BECITHCON, **Bangladesh**, Nov. 2024
- Misinformation Recognition in Bangladeshi Social Media, ICCIT, **Bangladesh**, Dec. 2024
- Scalable Pneumonia diagnosis via chest X-ray analysis, IC3I, **India**, Sept. 2024
- Hybrid transfer learning for sustainable agriculture, PEEIACON, **Bangladesh**, Sept. 2024
- Deep learning-based microorganism classification, ICEEICT, **Bangladesh**, May 2024
- IoT-enabled smart manhole management system, ISCS, **India**, May 2024
- Fast and efficient detection of mango leaf diseases, ICMI, **USA**, April 2024
- Applications of AI in education and traffic light control using reinforcement learning, ICICAS, **India**, Feb 2024
- Early detection of Alzheimer and Epileptic seizure, UPCON, **India**, Dec. 2023
- Automated plant leaf disease detection, ICIICS, **India**, Nov. 2023
- Scientific article and Bengali emotion classification, AIKIIE, **India**, Nov. 2023
- Transfer learning for LV ejection fraction estimation from echocardiographic videos, EASCT, **India**, Oct. 2023
- Machine learning-based drug review categorization and cyberbully detection, ICDSNS, **India**, July 2023

PROFESSIONAL SERVICE

- Reviewer, **Elsevier** (Biomedical signal processing and control, Computer speech & language, Computers & electrical engineering, Data in brief, Engineering applications of artificial intelligence, Heliyon, iScience, JoVE, Measurement), 2024-25
- Reviewer, **Springer** (Scientific Reports, Knowledge and Information Systems, Discover Applied Sciences, Memetic Computing, Journal of Big Data, Discover Artificial Intelligence, BMC Bioinformatics), 2025
- Reviewer, **MDPI** (Sensors, Life, Healthcare, Tomography, Bioengineering, Fractal, Entropy, Symmetry, J. Imaging), 2025
- Reviewer, **IEEE** International Conference on Intelligent Systems for Cybersecurity, 2024

FREELANCE RESEARCH CONSULTANTS

Multimodal Glaucoma Detection | *Collaboration: EWUCRT and Vision Eye Hospital* **Nov. 2025**
- Developed a semi-supervised self-attention model for calibrated multimodal fusion to enable real-time glaucoma detection in clinical settings.

Predictive Analytics for Mental Health Resilience | *Collaboration: EWUCRT and MindSheba Counseling* **Oct 2024**
- Developed a psychophysics-driven EEG framework for risk stratification of depression in EWU students, integrating stimulus-response tasks with EEG biomarkers and transformer based visualization.

Industrial Fabric Defect Detection | *Collaboration: EWUCRT and Knitasia Ltd.* **Aug. 2024**
- Developed a retrofit computer-vision system for real-time fabric fault detection and quality grading, with a web-based dashboard for factory deployment.

INTERPERSONAL SKILLS

- Collaborated effectively in diverse research teams
- Managed and resolved conflicts, ensuring project success
- Proficient in clear communication of research findings
- Ability to work under stress and result oriented

EXTRACURRICULAR

- Led 33 out of 49 research papers as first author, managing interdisciplinary teams and project timelines
- Collaborated with local organizations to address diverse community needs and promote volunteerism
- Organized AI-focused events for **EWU CSE Programming Club**, engaging over 100 students
- Served as **Community Lead** at Digital World 2022, leading 50 volunteers for event operations
- **Student Mentor**, East West University, Dhaka, Bangladesh (Feb 2022 — Sept 2023)