

Md Raihan Khan

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Research Interests

- Deep learning for emotion recognition from EEG signals
- Geometry-aware neural networks for biomedical signal interpretation
- Generalizable machine learning for diverse biomedical applications
- Computer vision for visual enhancement, recognition, and segmentation

Education

Khulna University of Engineering and Technology (KUET) Khulna, Bangladesh

B.Sc. in Electrical and Electronic Engineering

January 2019 - March 2024

CGPA: 3.71/4.00 (Top 16%, Rank 24/149)

Thesis title: Assessing Mental Stress Using Deep Learning Methods from EEG Signals

Khulna University of Engineering and Technology (KUET) Khulna, Bangladesh

M.Sc. in Electrical and Electronic Engineering

Expected graduation-2026

CGPA: N/A (Thesis research ongoing; coursework will begin next semester)

Proposed Thesis title: Local–Global Feature Integration in Neural Signals Using Dual

Path Deep Learning Models

Journal Publications

1. Dafnet: A Dual-path Attention Fusion Network for EEG Emotion Recognition via CNN and Graph-based Global Modeling

Array (Elsevier) (Published)

October, 2025

MR Khan, AA Tania, TA Bushra, J Pritha, M Ahmad

2. A Comparative Study of Time–Frequency Features Based Spatio-Temporal Analysis with Varying Multiscale Kernels for Emotion Recognition from EEG

Biomedical Signal Processing and Control (Published)

March, 2025

MR Khan, AA Tania, M Ahmad

3. Multiclass Liver Disease Prediction with Adaptive Data Preprocessing and Ensemble Modeling

Results in Engineering (Published)

April, 2024

AA Ahad, B Das, MR Khan, N Saha, A Zahid, M Ahmad

Conference Publications

1. Equivariant Geodesic Networks: Geometry Preserving Learning on Riemannian Manifolds

International Conference on Learning Representations, 2026 (Under review)

September, 2025

MR Khan, AA Tania

2. Autolumnet: A Bi-branch Exposure-aware Network for Low and High-exposure Image Enhancement

International Conference on Learning Representations, 2026 (Under review)

September, 2025

AA Tania, MR Khan, M Ahmad

3. Searching for the Best Polynomial Approximation for the Accurate Log Matrix Normalization in Global Covariance Pooling

International Conference on Learning Representations, 2026 (Under review)

September, 2025

MRU Rahman, MR Khan

4. Mental Stress Detection from EEG Signals using Comparative analysis of Random Forest and Recurrent Neural Network

IEEE International Conference on Advances in Computing, Communication, Electrical, and Smart Systems (Published)

MR Khan, M Ahmad

March, 2024

5. Recognition of Bengali Vowels from Auditory Evoked Potentials using CNN

IEEE International Conference on Signal Processing, Information, Communication and Systems (Published)

T Das, MR Khan, MM Hasan

November, 2024

6. Machine Learning Techniques for Brain Stroke Analysis and Prediction

IEEE International Conference on Signal Processing, Information, Communication and Systems (Published)

R Hasan, SMR Islam, MR Khan

November, 2024

7. Smart Classroom Automation: A Fusion of AI with Voice, Gesture, and Face Recognition Attendance System

IEEE International Conference on Advances in Computing, Communication, Electrical, and Smart Systems (Published)

MR Khan, AA Ahad, AA Tania, T Das, B Das

March, 2024

8. Custom Dataset-driven Unsupervised Low-light Image Enhancement using 2D CNN

IEEE International Conference on Quantum Photonics, Artificial Intelligence, and Networking (Published)

AA Tania, MR Khan, M Ahmad

August, 2025

Research Experience

Undergraduate Thesis Student

EEE, KUET

Supervisor: Dr. Mohiuddin Ahmad

Jan. 2023 - Mar. 2024

- **Responsibilities and experience**

- Developed deep learning models for EEG-based emotion recognition and mental stress detection.
- Proposed novel spatio-temporal and dual-path attention models tailored for EEG signal analysis.
- Collaborated on dataset preprocessing, model evaluation, and publication writing.

- **Publications**

- **A Comparative Study of Time–Frequency Features Based Spatio-Temporal Analysis with Varying Multiscale Kernels for Emotion Recognition from EEG**, *Biomedical Signal Processing and Control* (Published).
- **Mental Stress Detection from EEG Signals using Comparative Analysis of Random Forest and Recurrent Neural Network**, *IEEE International Conference on Advances in Computing, Communication, Electrical, and Smart Systems* (Published).

Research Collaboration

EEE, KUET

Project Supervisor: Dr. Md. Mahbub Hasan

May. 2024 - Jul. 2024

- **Responsibilities and experience**

- Developed an EEG dataset for imagined Bengali language tasks.
- Analyzed the data and built deep learning models for recognizing Bengali vowels and words.

- **Publications**

Recognition of Bengali Vowels from Auditory Evoked Potentials using CNN, *IEEE International Conference on Signal Processing, Information, Communication and Systems* (Published).

Graduate Thesis Student

EEE, KUET

Supervisor: Dr. Mohiuddin Ahmad

Nov. 2024 - Ongoing

- **Responsibilities and experience**

- Developed DAFNet, for local-global feature integration in EEG-based emotion recognition.
- Proposed AutoLumNet, a unified deep model for low- and high-exposure image enhancement.

• Publications

- **DAFNet: A Dual-path Attention Fusion Network for EEG Emotion Recognition via CNN and Graph-based Global Modeling, *Array, Elsevier* (Published).**
- **Autolumnet: A Bi-branch Exposure-aware Network for Low and High-exposure Image Enhancement, *International Conference on Learning Representations* (Under Review).**

Teaching Experience

Department of Electrical and Electronic Engineering, North Western University, Bangladesh

Lecturer

August 2024 – Present

- **Digital Image Processing (EEE-4255)**: Delivered lectures on fundamental theories, conducted lab sessions, designed assignments, and supervised student projects focusing on CV applications.
- **Digital Signal Processing (EEE-4135)** Taught theoretical concepts and designed assignments focused on biomedical signal analysis, including topics such as FFT and DFT.
- **Sessional on Digital Signal Processing (EEE-4136)**: Conducted lab sessions and designed assignments to digital signal processing and supervised student projects focusing on EEG signal processing.
- **Basic Electrical Circuits (EEE-1221)**: Taught theoretical concepts and developed assignments on fundamental electrical laws, theorems, and circuit analysis.

Awards

1. International Mathematics Competition (IMC), Blagoevgrad, Bulgaria

- Honorable Mention–Ranked among 589 participants worldwide
- Certificate – **First-ever** participant from Bangladesh in the 27th edition of IMC.

August 2–8, 2021
July 25-30, 2020

2. International Youth Math Challenge (IYMC)

- Gold Medal– Ranked in the top 1% of 15000 competitors globally.

2021, 2020

3. International Astronomy and Astrophysics Competition (IAAC)

- Silver Medal, Bronze Medal

2022, 2021
2020-2024

4. Academic excellence

Awarded the **University Dean's Scholarship** for maintaining a CGPA above 3.75 during the **2nd** and **4th** academic years.
Received the **University Merit Scholarship** seven times for ranking among the top students in the EEE department.

5. Best project award, Khulna University of Engineering & Technology, Bangladesh

2023

–Awarded for the **best project** in the Project Showcase of the Electrical and Electronic Project Design course.

6. Excellence Awards for IYMC Ambassador

2021

- Ranked 5th among 580 global IYMC Ambassadors

7. Best Paper Awards

November 1-2, 2024

IEEE International Conference on Signal Processing, Information, Communication and Systems, Khulna, Bangladesh
–Received for the paper “**Recognition of Bengali Vowels from Auditory Evoked Potentials Using CNN**”.

Technical Skills

- **Programming:** Python; C++; MATLAB
- **Tools:** PyTorch; TensorFlow; Keras; scikit-learn; NumPy; pandas; OpenCV;
MNE; matplotlib; seaborn; EEGLAB; SciPy; GitHub

References

Dr. Mohiuddin Ahmad, Professor

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Dr. Kalyan Kumar Halder, Professor

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Email: kalyan@eee.kuet.ac.bd