Mahan Choudhury

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Research Interest

Bio-Medical Image Processing, Medical Imaging, Clinical Decision Support, Computer Vision, Machine Learning

Education

McMaster University — Hamilton, Ontario, Canada
Incoming MASc Student in Biomedical Engineering — *Sep 2025 – Aug 2027*

Bangladesh University of Professionals — Dhaka, Bangladesh
Bachelor of Science in Information and Communication Engineering — *Jan 2020 – Dec 2023*

CGPA: **3.89/4.00** (3^{rd} Position)

Research Experience

Undergraduate Thesis — January 2023 – December 2023

- **Thesis Topic:** Detection of Sleep Apnea Using Scalogram Based Modified Transfer Learning Architecture with Single Lead ECG Signal.
  The research involved the processing of ECG data with a band-pass filter to remove noise, a transformation of the processed data to scalograms using Continuous Wavelet Transform, and the integration of a suitable pre-trained CNN architecture after comparing performance on multiple datasets.
  - Supervised by Dr. Mohammad Abu Yousuf

Journal Publication

- **M. Choudhury**, M. Tanvir, M. A. Yousuf, N. Islam, and M. Z. Uddin, "Explainable AI-driven scalogram analysis and optimized transfer learning for sleep apnea detection with single-lead electrocardiograms," Computers in Biology and Medicine, vol. 187, p. 109769, Feb. 2025, doi:10.1016/j.compbiomed.2025.109769.

On Going Research Topic

- An Interpretable AI-based Machine Learning Model for the classification of Parkinson's Disease using Grey Wolf Optimizer
  - Collaboration with Daffodil International University, Bangladesh

Undergrad Projects

Detection of Cardiovascular Disease using Ensemble Machine Learning Algorithm | *Python,JupyterNB*

- A majority-based ensemble technique was proposed, where the final classification decision is made based on the majority vote from the individual models, thereby improving the robustness of the predictions.
- Five different machine learning models had been used to improve the prediction accuracy of heart disease detection, showcasing the effectiveness of ensemble methods.

Departmental Website Development | *HTML, CSS, Bootstrap,JavaScript, NodeJS, Git*

- A full-stack departmental website was developed adhering to the software development life cycle. The system features separate sign-up systems for students, teachers, and administrators, enabling students to check grades and submit assignments, teachers to manage marks and research, and administrators to publish notices and access databases, with a centralized homepage for departmental information and publications.

Hospital Management System | *HTML, CSS, Bootstrap,PHP, Laravel*

- A basic full-stack HMS was developed featuring individual login systems for patients, administrators, and doctors, allowing patients to sign up and book appointments, doctors to manage their schedules and patient notes, and administrators to remove patients, doctors, or appointments as per requirements.

Blood Bank Management System | *Java, JFrame, MySQL*

- A Java-based BBMS was developed for blood donors and receivers, allowing donors to sign up with their contact details, blood groups, locations, and last donation dates, while receivers can check donor availability based on location and blood type; administrators manage the database, altering or deleting information as needed.

Industrial data Collection Form Development | *HTML, CSS, Bootstrap,PHP*

- An industrial data collection form was developed using HTML, CSS, Bootstrap, and PHP to gather information from university admission candidates across three pages-collecting personal details, academic records from junior to higher secondary school, and extracurricular activities, ensuring user data encryption in the backend.

Other Projects

- Implementation of the research article "AN IMAGE IS WORTH 16X16 WORDS: TRANSFORMERS FOR IMAGE RECOGNITION AT SCALE" with pytorch from scratch
- Implementation of the Transformer neural network based on the article "Attention Is All You Need"
- Multimodal Vision Language Model implementing Transformer, Vision Transformer (SigLIP), Contrastive learning, Numerical stability of the Softmax and the Cross Entropy Loss
- Biomedical Image Segmentation using PyTorch and U-Net
- Data analysis of static sales reports for a leading bike retailer using PowerBI
- Dashboard Development Project of a2i, ICT division
- KNN for breast cancer detection

Awards & Achievements

- Awarded a merit-based Vector Scholarship in Artificial Intelligence which is valued at $17,500
- Dean's Appreciation Letter for getting GPA 4.00 out of 4.00 in a particular semester
- BUP scholarship awarded for outstanding academic performance at the undergraduate level (Top 3%)
- Runner-up in Article Writing segment in World Arduino day 2021 on March 2021 organized by Bangladesh University of Professionals(BUP)
- Secured 12th position regionally in 'Digital Technologies' in International Assessments for Schools organized by UNSW Global in 2016
- Government scholarship in talent-pool for securing 12th merit position (Top 1%) in the Junior School Certificate Examination, 2014

Online Learning

Machine Learning and AI: Text Classification for NLP using BERT, Learning XAI: Explainable Artificial Intelligence, Data Mining in Python, and Deep Learning with PyTorch — LinkedIn Learning
Programming: PyTorch Fundamentals — Learn Microsoft, Python for Everybody — Coursera
Cyber Security: CNSS Certified Network Security Specialist — ICSI, Cybersecurity Essentials - EN 0118 — Cisco
Robotics: The Arduino Platform and C Programming — Coursera, Step into Robotic Process Automation — GUVI

English Proficiency

IELTS Academic: Listening: 8, Writing: 7, Reading: 7, Speaking: 6.5 — Overall: Band 7

Technical Skills

Languages: Java, Python, MATLAB, C, SQL, JavaScript, HTML, CSS, PHP
Developer Tools: Git, Visual Studio, PyCharm, IntelliJ, Eclipse, Netbeans, Codeblocks
Libraries: Pandas, NumPy, Matplotlib, PyTorch, scikit-learn, Seaborn
Miscellaneous: Latex

Industry Experience

Web Development Intern - Academic Internship Oct 2022 - Dec 2022
Business Automation Limited

- Built up an understanding of the industrial data acquisition process and the web development processes in accordance with the clients' needs
- Worked with the one-stop service team of the company and contributed to a project of ICT Division performing localization of Dashboard using Laravel

EXTRA CURRICULAR ACTIVITIES

Vice President- Operation Feb 2023 - Jan 2024
BUP Robotics Club

Community Developer May 2021 - July 2022
Microsoft Learn Student Ambassador Program

Corresponding Secretary Feb 2016 - Feb 2017
Scintilla Science Club