

MD JOBAYER

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RESEARCH INTEREST

Medical Image Analysis, Foundational Models, Generative AI, Self- and Semi-supervised Learning, Multimodal AI, Biomedical Signal Processing

EDUCATION

Master of Science, Linköping University, Linköping, SE

2025 - Present

Biomedical Engineering

Relevant Courses (incl. ongoing): Digital Image Processing, Medical Image Formation, Medical Information Systems, Biomedical Signal Processing, Biomedical Modeling and Simulation, Digital Twin & AI, Systems Biology

Bachelor of Science, BRAC University, Dhaka, BD

2019 - 2023

Electrical and Electronic Engineering, Major in Electronics

Relevant Courses: Machine Learning, Embedded Systems, Signal Processing, Linear Algebra, Statistics and Probability

PUBLICATIONS

- [1] **M. Jobayer**, M. M. H. Shawon, T. Mahmud, M. B. U. Antor, and A. M. Chowdhury, "Attentive Dilated Convolution for Automatic Sleep Staging using Force-directed Layout," *IEEE Access*, 2026. DOI: 10.1109/ACCESS.2026.3680836
- [2] **M. Jobayer**, M. M. H. Shawon, M. Rasheduzzaman, M. W. Rahman, and A. Doulah, "Progressive Semi-supervised Learning for Multimodal Pneumonia Diagnosis," *Biomedical Signal Processing and Control*, 2026. DOI: 10.1016/j.bspc.2026.109750
- [3] M. A. Hasnat, **M. Jobayer**, M. M. H. Shawon, and M. G. R. Alam, "Interpretable Heart Disease Prediction via a Weighted Ensemble Model: A Large-Scale Study with SHAP and Surrogate Decision Trees," *arXiv*, 2025. DOI: 10.48550/arXiv.2511.01947
- [4] **M. Jobayer**, A. Taylor, M. R. Hasan, K. A. Ahmed, and M. Z. Hossain, "Machine learning to predict gut microbiomes of agricultural pests," *Neural Computing and Applications*, 2025. DOI: 10.1007/s00521-025-10999-9
- [5] **M. Jobayer** et al., "FunnelNet: An End-to-End Deep Learning Framework to Monitor Digital Heart Murmur in Real-Time," *Applied Artificial Intelligence*, 2025, *in review. DOI: 10.48550/arXiv.2405.09570
- [6] I. Mahbub, A. Z. Zim, T. B. Imran, K. M. F. Mesbah, **M. Jobayer**, and M. M. H. Shawon, "Enhancing Medical Image Segmentation through Negative Sample Integration: A Study on Kvasir-SEG and Augmented Datasets," *bioRxiv*, 2025. DOI: 10.1101/2025.10.14.682445
- [7] U. M. Muna, M. M. H. Shawon, **M. Jobayer**, S. Akter, M. R. Hasan, and M. G. R. Alam, "SS-DPPN: A Self-supervised Dual-path Foundation Model for the Generalizable Cardiac Audio Representation," *arXiv*, 2025. DOI: 10.48550/arXiv.2510.10719
- [8] U. M. Muna, M. M. H. Shawon, **M. Jobayer**, S. Akter, and S. R. Sabuj, "SSTAF: Spatial-Spectral-Temporal Attention Fusion Transformer for Motor Imagery Classification," *IEEE Access*, 2025. DOI: 10.1109/ACCESS.2025.3605265
- [9] F. Uddin et al., "Soft Robotic Bellow-Controlled Arm Using Multi-DOF Control System," in *2025 Interdisciplinary Conference on Electrics and Computer (INTCEC)*, 2025. DOI: 10.1109/INTCEC65580.2025.11255648
- [10] F. Nafis, N. Akib, M. Hossain, M. Z. Farasha, **M. Jobayer**, and M. M. H. Shawon, "CNN and Transfer Learning-based Deep Learning Architectures for Alzheimer's Disease Detection from MRI Scan: A Comparative Analysis," in *3rd BECITHCON, IEEE*, 2024.
- [11] M. F. S. Naznin, A. I. Faruq, M. R. Tazwar, **M. Jobayer**, M. M. H. Shawon, and M. R. Hasan, "CSTRL: Context-Driven Sequential Transfer Learning for Abstractive Radiology Report Summarization," in *ACL*, 2024. DOI: 10.48550/arXiv.2503.05750
- [12] Z. Chen, **M. Jobayer**, M. R. Hasan, K. A. Ahmed, and M. Z. Hossain, "MutFusVAE: Mutational Fusion Variational Autoencoder for Predicting Primary Sites of Cancer," *Procedia Computer Science*, 2023. DOI: 10.1016/j.procs.2023.08.166
- [13] **M. Jobayer**, M. A. H. Shaikat, M. N. Rashid, and M. R. Hasan, "A systematic review on predicting PV system parameters using machine learning," *Heliyon*, 2023. DOI: 10.1016/j.heliyon.2023.e16815
- [14] M. S. Tahsin, **M. Jobayer**, M. B. U. Antor, M. Islam, F. F. Raisa, and M. A. H. Shaikat, "Predictive Analysis & Brief Study of Early-Stage Diabetes Using Multiple Classifier Models," in *12th Annual CCWC, IEEE*, 2022. DOI: 10.1109/CCWC54503.2022.9720736

[More on Google Scholar](#)

WORK EXPERIENCE

Researcher and Project Manager

May 2024 – Jul 2025

Biomedical Science and Engineering Research Center

BRAC University

- Worked on the diffusion model-based MRI image denoising technique
- Developed affordable, high-SNR-based biological physiological signal filters

Research Assistant

Dec 2023 – Jul 2025

Dept. of EEE, BSRM School of Engineering

BRAC University

- Proposed AttDiCNN model based on Kamada-Kawai layout for automatic sleep staging
- Worked on AI-based automated fall detection with portable devices, targeting elderly people

Research Assistant
Dept. of CSE, School of Data and Sciences

Nov 2024 – Jul 2025
BRAC University

- Developed EEG signal-based BCI-controlled gloves for neural rehabilitation for post-stroke patients
- Worked on the development of a low-cost 3D MEMS-based electronic stethoscope

Embedded System Engineer Intern
FactoryNext

Jul 2023 – Sep 2023
Dhaka, BD

- Developed an MQTT server-based factory monitoring module and a system-on-chip IR signal decoder by reverse engineering

Senior Researcher
Laboratory of Space Systems Engineering & Technology

Jul 2023 – Sep 2023
BRAC University

- Member of the nano camera development team for the 3U CubeSat; analyzed component requirements and their compatibility

Android Application Developer
Global Dream Pvt. Ltd.

Dec 2019 – Jan 2022
Rajasthan, India

- Designed the application wireframe and UI, and the API and database schema using PHP, MSSQL, and Firebase
- Built the complete application using Java & Kotlin with the native Android SDK

RESEARCH GRANTS

The research projects I am affiliated with have secured total funding of about 15k USD to date.

1. Advancing Sustainable Biosensing: A Self-powered Biosensor for Real-time and Wireless Health Monitoring
Funded by: RSGI, BRAC University **PI:** Md. Saif Kabir **My Role:** Co-PI
2. Brain-Computer Interface Driven Neural Rehabilitation for Motor Dysfunction Patients with Soft Robotic Gloves
Funded by: Ministry of Science and Technology, Bangladesh; RSGI, BRAC University **PI:** Md. Mehedi Hasan Shawon
My Role: Co-PI
3. Design and Development of a 3D-printed MEMS-based Stethoscope for Real-time Heart Monitoring and Cardiovascular Disease Prediction Using Machine Learning to Assist Medical Professionals
Funded by: RSGI, BRAC University **PI:** Prof. Md. Golam Rabiul Alam **My Role:** Research Assistant

RELEVANT PROJECTS

Chest X-ray Abnormalities Detection Using Pre-trained Model

- We achieved an overall accuracy of 96.4% using ResNet18
- The model was trained on 15,000 images from the VinDr-CXR dataset

MRI-based Alzheimer's Disease Prediction using Convolutional Network

- The model achieved 98% accuracy, surpassing three different pre-trained models
- We used the OASIS-I dataset of brain MRI scans to train the model

JOURNAL AND CONFERENCE PEER REVIEW

BMVC, Nature Scientific Reports, Biomedical Signal Processing and Control, IEEE SPL, IEEE THMS, IEEE Access

SKILLS AND TOOLS

- **Languages:** Python, C/C++, Java, Kotlin, MATLAB
- **AI Frameworks & Tools:** PyTorch, TensorFlow, Hugging Face
- **Medical Imaging:** MRI, CT, X-ray analysis; DICOM and NIfTI; ITK, pydicom
- **Signal Processing and Data Analysis:** EEG and ECG analysis, EDF+ data, MNE-Python, librosa, NumPy, pandas, SPSS, Matplotlib, seaborn, Plotly
- **Embedded Systems and Simulation:** STM32, ESP32, Android SDK, Simulink
- **Backend and Deployment:** APIs, Docker, CI/CD, Git
- **Other Tools:** Shell scripting, $\text{\LaTeX}$, Zotero, Inkscape

AWARDS AND COMPETITION

IEEE R10-HTC 2024 Innovation Challenge , Silver award <i>IEEE Humanitarian Technology Conference</i>	Oct 2024 Kuala Lumpur, Malaysia
Quality Journal Publication Award <i>Research Metrics Committee (RMC)</i>	Feb 2024 BRAC University
JAXA Kibo Robot Programming Challenge , 7th place globally <i>3rd Kibo RPC, in collaboration with NASA</i>	Oct 2022 Tokyo, Japan

TRAINING AND CERTIFICATION

CITI Program: Human Subjects Research (Data or Specimens Only) <i>Collaborative Institutional Training Initiative, MIT Affiliates</i>	Jan 2023 RID #53544887
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REFERENCES

1. Dr. Saifur Rahman Sabuj Research Fellow Department of Automotive Engineering Hanyang University 222 Wangsimni-ro, Seoul, South Korea Email: s.r.sabuj@ieee.org	2. Dr. Md Zakir Hossain Lecturer School of Systems & Computing University of New South Wales Campbell ACT 2612, Australia Email: zakir.hossain@unsw.edu.au	3. Dr. Md Rakibul Hasan Associate Lecturer School of Elec Eng, Comp & Math Sci Curtin University Perth WA 6102, Australia Email: Rakibul.Hasan@curtin.edu.au
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