Abdul Monaf Chowdhury

University of Dhaka, Bangladesh

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Education

Bachelor of Science in Robotics and Mechatronics Engineering Jan 2019 — Jan 2024

University of Dhaka, Bangladesh

CGPA: ***3.87/4.00****, Ranked* 2^{nd} ***place***

Relevant Coursework:

Artificial Intelligence, Introduction to Machine Learning, Digital Image Processing and Robot Vision, Digital Signal Processing, Human-Robot Interaction, Advanced Robotics

Skills:

Software: C, C++, Python, MATLAB, PyTorch, JAX, Flax, TensorFlow, LaTeX

Language: Fluent in both English and Bangla

Test Scores:

GRE: **318** (Quant 163, Verbal 155, Analytical 4.0)

IELTS: **8.0** (R 8.5, L 9.0, S 7.0, W 7.0)

Research Interests

Computer Vision, Multi-modal Learning, Machine Learning, Reinforcement Learning, Vision Language Models

Research Experience

Research Assistant Feb 2024 – Present

MAIM Lab, University of Dhaka *Dhaka, Bangladesh*

Funding: Wellcome Leap (In Utero, California, USA)

PI: Dr. Abhishek Kumar Ghosh, Co-PI: Dr. Niamh Nowlan

- Collaborated with **University College Dublin** on the **Wellcome Leap In Utero** funded project titled “Translation of a Wearable Fetal Movement Monitor towards Stillbirth Prevention”
- Implemented machine learning-based frameworks to overcome limitations of thresholding in fetal movement signal detection from biomedical multi-modal sensors
- Developed optimized ML/DL architectures for processing multimodal sensor features, improving fetal movement detection accuracy

Research Assistant Jan 2023 – Jan 2024

AVIoT Lab, University of Dhaka *Dhaka, Bangladesh*

Supervisor: Dr. Md Mehedi Hasan; [Project Report]

- Reviewed and analyzed SOTA computer vision papers from top CV conferences and journals for research direction refinement
- Designed a hybrid model combining modified 3D CNN and FFT-based action recognition for drone surveillance applications
- Built a lightweight deep learning pipeline using **MobileNetV2** + **BiLSTM** for edge-based human activity detection, significantly reducing inference time

Teaching Experience

Instructor May 2025 – Aug 2025

National Camp, Bangladesh AI Olympiad *Dhaka, Bangladesh*

- Instructed national camp students on Unsupervised Learning, Deep Learning, and Computer Vision algorithms and architectures
- Took relevant labs on the previously mentioned algorithms and problem sets, and illustrated Deep Learning evaluation strategies and techniques

- Planned, organized, and executed the AI problem challenge competition on Kaggle to select the final four candidate to represent Bangladesh in the International AI Olympiad 2026.

Publications

- *FFT-UAVNet: FFT Based Human Action Recognition for Drone Surveillance System* **[Paper]**
  Abdul Monaf Chowdhury, Ahsan Imran, Md Mehedi Hasan
  5th IEEE International Conference on Sustainable Technologies for Industry 5.0 (STI), 2023

- *U-ActionNet: Dual-Pathway Fourier Networks with Region-of-Interest Module for Efficient Action Recognition in UAV Surveillance* **[Paper]**
  Abdul Monaf Chowdhury, Ahsan Imran, Md Mehedi Hasan, Riad Ahmed, AKM Azad, Salem A. Alyami
  IEEE Access, 2024. IF - 3.4

Manuscript Submitted

- *T3Time: Tri-Modal Time Series Forecasting via Adaptive Multi-Head Alignment and Residual Fusion* **[Paper]** **[Code]**
  Abdul Monaf Chowdhury, Rabeya Akter Fariya, Safaeid Hossain
  40th Annual AAAI Conference on Artificial Intelligence, 2026

Research Project

Training Embodied Agents in Simulated Environments Mar 2025 – Present
Vision Language Model, Reinforcement Learning, Embodied AI

- Designed and integrated a **Qwen 2.5VL-3B** VLM driven "episodic reflection" module, automatically generating rich, natural-language self-assessments of each trial—highlighting successes and pinpointing failure causes—to provide the agent with human-like introspection
- Fused multimodal reward signals by combining these verbal reflections with CLIP-style vision–language feedback from task descriptions and goal images, crafting a dense, semantically grounded reward model
- Engineered a fast-converging **Soft Actor Critic**-based learning pipeline, where the enriched feedback loop accelerated exploration and policy refinement, consistently reducing training time and reliably converging on optimal behaviours across the Meta-World Environment for the Embodied AI tasks

Time Series Forecasting via Adaptive Multi-Head Cross-Modal Alignment **[Code]** **[Paper]** Apr 2025 – Oct 2025
Large Language Model, Deep Learning

- Architected an Adaptive Dynamic Multi-Head Cross-Modal Attention module with channel-wise residual skip-connections, enabling fine-grained alignment between temporal and auxiliary features and boosting representational capacity across modalities
- Engineered an **FFT**-based Frequency-Domain Processing pipeline, projecting real-valued spectra into learnable tokens and applying transformer-based attention with weighted pooling to extract robust spectral embeddings for each sensor channel
- Designed a Trainable Adaptive Rich-Horizon Gating Fusion to dynamically combine spectral and temporal encodings—replacing naıve concatenation—and beat the state-of-the-art benchmark on multivariate time-series forecasting

Proxemics & Social Interaction Patterns in ASD Children Sep 2023 — Jan 2024
Human-Robot Interaction, Deep Learning

- Formulated a **YOLOv8**-based system to determine the ideal proxemics of autism spectrum disorder (ASD) children in front of **NAO** Robot
- Examined and analyzed the behavioural responses of twenty children diagnosed with ASD in the presence of specific actions performed by the NAO robot

Automatic Stock Trading **[Report]** Aug 2022 — Nov 2022
Reinforcement Learning

- Implemented Approximate Q Learning for three Bangladeshi stocks to generate Buy, Sell, and Hold orders
- Achieved 11% return of investment for the 3 stocks beating the DSE 30 index

Awards & Scholarships

- Dean's Award - for best Undergraduate Result, University of Dhaka, 2024
- Engineering Faculty Undergraduate Merit Scholarship, University of Dhaka, 2024
- 5th, Dataverse Challenge - ITVerse, Bangladesh, 2023; Report
- 2nd, Intra-Department Soccer Bot Championship, University of Dhaka, 2019
- Sylhet Board Scholarship, Higher Secondary Certificate Examination 2018

Workshop/Conference Attended

- 5th International Conference on Sustainable Technologies for Industry 5.0 (STI), Dhaka

Reviewer

- IEEE Access
- AAAI 26

Leadership/Volunteer Activities

General Secretary Mar 2022 — Feb 2024
RMEDU Student Club, University of Dhaka

- Successfully organized and supervised frequent cultural events, sports events, and competitions
- Arranged and delegated paper reading sessions, workshops, and training sessions
- Addressed numerous concerns and issues of the student body and issued relevant responses

Academic Team Mentor Sep 2019 — Aug 2022
Bangladesh Robot Olympiad

- Developed questions for the National Robotics Olympiad and organized workshops
- Helped materialize the National Robotics Olympiad for 4 years

Program Co-Ordinator Jul 2021 -– Jun 2022
IEEE Robotics & Automation Society, University of Dhaka

- Directed and facilitated several webinars, interactive sessions, and expert talks
- Collaborated with other IEEE societies across the country and accelerated IEEE RASDU membership by 15%