Aranya Saha

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Education

BSc **Bangladesh University of Engineering and Technology (BUET)** *March 2025*
Department: Electrical and Electronic Engineering (EEE)
Major: Communication and Signal Processing (CSP)

- **CGPA: 3.87/4.00**
- **Relevant Coursework:** Artificial Intelligence and Machine Learning, Random Signals and Processes, Digital Image Processing, Digital Signal Processing, Linear Algebra, Probability and Statistics, Computer Programming, etc.

Research Interests

Multimodal LLM | Computer Vision | Visual Understanding | Multimodal Learning | Trustworthy AI | AI in Healthcare

Research Experience

Development of a Multimodal Medical Assistance Chatbot for Domain-Specific Applications *Dhaka, Bangladesh*
[Slides] *Nov 2023 Mar 2025*

- Developed a multimodal medical assistance chatbot for dermatology by fine-tuning a vision-language model on the Dermnet dataset; implemented GRPO and DPO for structured reasoning and conversational alignment, integrated DINOv2 and knowledge graphbased RAG for diagnostic precision, and applied structured pruning for efficient deployment, achieving 82% test accuracy and improved patient-like interactions.
- *Research Supervisor:* Dr. Mohammad Ariful Haque

Publications

* = Equal Contribution, **[P]** = Preprint, **[C]** = Conference, **[J]** = Journal

1. **[P] Aranya Saha***, Tanvir Ahmed Khan*, Ismam Nur Swapnil*, Mohammad Ariful Haque, *"CLARIFY: A SpecialistGeneralist Framework for Accurate and Lightweight Dermatological Visual Question Answering"*, submitted to *IEEE Transactions on Human-Machine Systems*. *[Preprint]*

2. **[P]** Ismam Nur Swapnil*, **Aranya Saha***, Tanvir Ahmed Khan*, Mohammad Ariful Haque, *"GRPO++: Enhancing Dermatological Reasoning Under Low-Resource Settings"*, submitted to *IEEE Journal of Biomedical and Health Informatics*. *[Preprint]*

3. **[P]** Tanvir Ahmed Khan, **Aranya Saha**, Ismam Nur Swapnil, Mohammad Ariful Haque, *"Compression Strategies for Efficient Multimodal LLMs in Medical Contexts"*, submitted to *Journal of Signal Processing Systems (Springer)*. *[Preprint]*

4. **[C]** Shadman Sobhan, **Aranya Saha**, Tanvir Ahmed Khan, Abduz Zami, *"Skin Cancer Classification Using Pre-trained CNNs: A Transfer Learning Approach Addressing Imbalanced Data Challenges"*, accepted at the *2nd Int'l Conf. on Next-Gen Computing, IoT and Machine Learning (NCIM)*, June 2025. *[Link]*

5. **[C]** Shadman Sobhan, Abduz Zami, Mohiuddin Ahmed, Tanvir Mahtab Zihan, Tanvir Ahmed Khan, **Aranya Saha**, *"A Multi-Stage Deep Learning Approach to Tuberculosis Detection with Explainable Insights"*, accepted at the *2nd Int'l Conf. on Next-Gen Computing, IoT and Machine Learning (NCIM)*, June 2025. *[Link]*

Selected Projects

Efficient Frame Selection for Long Egocentric Video Understanding [Ongoing]	GitHub	
EchoLens: Multimodal Conversational AI Engine	GitHub	
Autonomous Delivery Drone for Remote and Inaccessible Areas		Report
IoT-Based Patient Health Monitoring System	GitHub	Report
Multi-functional CNC: Pen Plotter, Cutter and Engraver		Report

Competition

- **1st Runner Up - Poster Competition (AI)**
  Poster Title: *AI-Powered Dermatological Assistant: Bridging Healthcare Gaps Through Multimodal Intelligence* [Poster]
  BEAR Summit - Bangladesh National Semiconductor Symposium 2025 [Certificate]

Professional Experience

Advanced Chemical Industries Ltd. [Website] *Dhaka, Bangladesh*
Machine Learning Engineer *Apr 2025 – Present*
Office Projects:

- *CV Sorter:* LLM-Powered automated CV evaluation system for scoring candidates.
- *Insight Explorer:* LLM-powered analysis of tabular data to uncover trends and patterns.
- *Bangla OCR:* Conversion of printed and handwritten Bengali text into machine-readable format.

Teaching Experience

Robotics Bootcamp 2025 [Website] *Dhaka, Bangladesh*
Institute of Robotics and Automation, BUET *June 2025*

- Delivered a lecture on *PID Control for Robotics*, introducing feedback control fundamentals, PID components, and tuning methods with practical analogies.
- Included interactive simulations and discussed common real-world issues like steady-state error, oscillation, and sensor noise.

Leadership Experience

Association for Computing Machinery (ACM) [Website] *Remote*
Student Executive, ACM SIGCOMM *Apr 2024 – Feb 2025*

- *Appointment:* First-ever Student Executive of ACM SIGCOMM, leading initiatives for thousands of networking professionals alongside Chair Dr. Matthew Caesar, Professor, CS, UIUC.
- *Technical Contributions:* Developed official SIGCOMM website under direct mentorship of the Chair.
- *Community Building:* Co-established official paper reading group; presented a research paper.

Technical Skills

- **Hardware:** Microcontrollers, IoT Devices, Sensors.
- **Programming:** Python, MATLAB, C/C++, Pandas, NumPy.
- **ML/DL/NLP:** PyTorch, TensorFlow, Hugging Face Transformers, CNNs.
- **DevOps & Tools:** Docker, FastAPI, Git, LaTeX, Microsoft Office.

Honors and Awards

- **University Merit Scholarship** (4 semesters) – BUET, for outstanding academic performance
- **Dean's List Award** (Years 1-2) – BUET, for high cumulative GPA achievement
- **29th Rank out of 10,000+** candidates in BUET Undergraduate Admission Test (2019)
- **31st Rank (Male Category) out of 300,000+** in Dhaka Board HSC; **Talent Pool Scholarship** recipient with 96.83% in Physics, Chemistry, Mathematics and 91.15% overall
- **Perfect Attendance Certificate** – Notre Dame College, for flawless attendance during Classes 11-12

References

Mohammad Ariful Haque, PhD [Profile]
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Bangladesh University of Engineering and Technology
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Relationship: Undergraduate Thesis Supervisor

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