

Aranya Saha

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🌐 Website

in Aranya Saha

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Research Interests

Multimodal LLMs | Medical Imaging | Efficient and Trustworthy AI | Model Optimization | Visual Learning | AI in Healthcare

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:** Microprocessor and Embedded Systems, Wireless Communication, Artificial Intelligence and Machine Learning, Random Signals and Processes, Communication Systems, Digital Signal Processing, Probability and Statistics, Computer Programming, etc.

Publications

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

1. **[P] Aranya Saha***, Tanvir Ahmed Khan*, Ismam Nur Swapnil*, Mohammad Ariful Haque, “*CLARIFY: A Specialist Generalist Framework for Accurate and Lightweight Dermatological Visual Question Answering*”, Under Review at *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*”, Under Review at *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*”, Under Review at *Journal of Signal Processing Systems (Springer)*. [\[Preprint\]](#)
4. **[C]** Shadman Sobhan, **Aranya Saha**, Tanvir Ahmed Khan, Abdur 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, Abdur 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. [\[Link\]](#)

Research Experience

Development of a Multimodal Medical Assistance Chatbot for Domain-Specific Applications

Dhaka, Bangladesh

Undergraduate Thesis

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 graph-based 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](#)

Presentation: [Slides](#)

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]
Machine Learning Engineer
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.
- Dhaka, Bangladesh*
Apr 2025 - Present

Teaching Experience

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

Leadership Experience

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

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]
Professor, Department of EEE
Director, Institute of Robotics and Automation
Bangladesh University of Engineering and Technology
Email: *arifulhoque@eee.buet.ac.bd*
Relationship: Undergraduate Thesis Supervisor
- Quazi Deen Mohd Khosru, PhD** [Profile]
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Email: *deen@eee.buet.ac.bd*
Relationship: Academic Advisor