

RASHEDUL ALBAB

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RESEARCH INTEREST

AI in Healthcare Computer Vision Behavioral AI AI-Driven Electromagnetic Systems NLP AI in Renewable Energy

EDUCATION

- B.Sc. in Electrical and Electronic Engineering (EEE)** January 2020 – June 2025
Sylhet Engineering College, Shahjalal University of science and Technology, Sylhet, Bangladesh
◦ CGPA: 3.45/4.00
Relevant Courseworks: Continuous Signal and Linear System Digital Signal Processing Artificial Intelligence and Machine Learning Fundamentals of Biomedical Engineering Renewable Energy Systems Random Signal and Processes Power Electronics Power System Protection Power Plant Engineering VLSI Control System Communication System Probability and Statistics Linear Algebra Deep Learning

RESEARCH EXPERIENCE

- Undergraduate Thesis (LesionNet: Lightweight CNN-Based Skin Lesion Classification)** 2025
Supervised by [Salman Fazole Rabby, Assistant Professor, Dept. of EEE, Sylhet Engineering College.](#)
 - **Proposed a lightweight and computationally efficient CNN (LesionNet)** for multiclass dermoscopic image classification using **28×28×3 inputs**, eliminating the need for heavy pre-trained models or full fine-tuning.
 - **Addressed severe class imbalance in the HAM10000 dataset (10,015 images)** through **data augmentation and oversampling**, ensuring balanced generalization across **seven skin lesion classes** with minimal computational overhead. [pdf: Click to view.](#)
- Research Assistant at Dept. of EEE, Sylhet Engineering College.** December 2024 – July 2025
 - Conducted research on explainable machine learning for multi-class power quality disturbance classification, implementing preprocessing pipelines, classical ML models (LR, SVM, RF, XGBoost), and a 1D-CNN architecture, **accepted at ICCIT(IEEE), 2025.**
 - Performed model interpretability analysis using SHAP and feature importance methods.
- Research Trainee (ML, DL & NLP) at Mahdy Research Academy** January 2024 – December 2024
Supervised by [Dr. Mahdy Rahman Chowdhury, Professor, Dept. of ECE, North South University.](#)
 - Phase 1 (Advanced ML & DL Foundations) - Mastered a comprehensive curriculum ranging from foundational statistical models to advanced architectures like Transformers and Explainable AI (XAI), with hands-on implementation using Python, TensorFlow, and scikit-learn. **LoR: Click to view.**
 - Phase 2 (Research Application & Scientific Communication) - Developed a novel AI research project through iterative methodology refinement, resulting in the authorship of a publication-ready journal manuscript and a professional technical poster. **LoR: Click to view.**

PUBLICATIONS

- M.F.Ahmed, **Rashedul Albab**, Md.Al Amin Chy, M.A.H Sakib Opu, Tahsin Hadi, Tanvir Ahamed. ICCIT(IEEE), 2025, “*Explainable Machine Learning for Multi-Class Power Quality Disturbance Classification Using SHAP and Feature Importance Analysis.*” (accepted)
- M.F. Ahmed, **Rashedul Albab**, M.A. Ahmad, Md. Al Amin Chy, S.N. Mehdi. ICCIT (IEEE), 2025, “*Quantifying the Relationship between Socioeconomic Status and Parent-Child Attach*” (accepted)
- M.F. Ahmed, R.A. Opi, **Rashedul Albab**, S.N. Mehdi, A.H. Tahsin, Md. S.Iqbal. ICCIT (IEEE), 2025, “*Enhancing Wind Farm Operational Efficiency Through Power Output Classification Using MLP and Ensemble Models.*” (accepted)
- Md.Al Amin Chy, S.A Chowdhury, **Rashedul Albab**, T.H. Tasneem, M. Mihad, Arif Ahammad. ICCIT(IEEE), 2025, “*Time Dependent Control of Voltage and Current via a Tunable Metasurface.*” (accepted)
- **Rashedul Albab**, Syed Nadim Mehdi, K.A. Jaygirdar, T.I.P. Miskat. “*Automated Multi-Class Classification of Mpox and Vesicular Skin Lesions Using Vision Transformers.*” (ongoing)

TECHNICAL SKILLS

- **Programming:** Python, MATLAB, C/C++, LaTeX
- **Tools & Frameworks:** PyTorch, TensorFlow & Keras DL framework, Scikit-Learn, Huggingface Transformers

- **Softwares & DevOps:** Simulink, Proteus, AutoCAD, FastAPI, Docker, Git, LangGraph,
- **AI/ML:** Core Machine Learning (Supervised and Unsupervised Learning), Deep Learning (Neural Networks, Transformer), Fundamentals of NLP, LLM, Multimodal LLM, Rag, Generative Models (GAN), Reinforcement Learning
- **Computer Vision:** Image Segmentation, Object Detection, Digital Image Processing (Feature Extraction, Enhancement), Optical Character Recognition (OCR), Vision Language Model (VLM)
- **Hardware Skills:** Arduino, FPGA

PROFESSIONAL TRAINING & TEACHING EXPERIENCE

- **Training Institute for Chemical Industries (TICI)** *January 2024*
Industrial Training – Central Training Institute of BCIC, Polash, Narsingdi, Bangladesh
 3-week intensive industrial technology course at TICI, covering advanced Electrical Engineering & Instrumentation, including motor control, substation distribution, DCS and PLC/SCADA systems. [Verified Certificate](#)
- **Visit – Kanaighat Electrical Substation** *February 2025*
 As part of academic training to gain hands-on exposure to power system operations, including control panels, fault detection, safety protocols, and equipment connections.
- **Physics, Mathematics and ICT Instructor** *2020 - Present*
Odommo Academy, Bright Teaching Home
 I have been teaching Physics and Higher Mathematics at the HSC level for 5 years. Designed exam questions to develop problem-solving skills and prepare students for competitive exams.

NOTABLE PROJECTS

- **Medibot AI: Retrieval-Grounded Clinical Assistant** *2025*
 Built a production-grade RAG-based clinical assistant that grounds LLMs in medical literature to reduce hallucinations, deployed on AWS with Docker, CI/CD, LangChain, Pinecone, and GPT. [GitHub](#)
- **Albab ExamAI – Real-time AI-powered Exam Management System** *2025*
 Developed an AI-powered Exam Management System using FastAPI, Groq Llama 3, and Docker for automated grading of MCQs and subjective answers. Implemented real-time feedback, anti-cheat security, and crash-resilient exam sessions. Deployed a scalable production-ready platform with background evaluation queues and CI/CD pipelines. [GitHub](#)
- **Multi-Agent Research Assistant(CrewAi)** *2025*
 Orchestrated a multi-agent Research Assistant Framework (MARA) using CrewAI and FastAPI to automate systematic literature reviews, data synthesis, and IMRAD-structured report generation. Implemented specialist AI agents for research, quantitative analysis, and technical writing, with Docker-based deployment and CI/CD integration for production-ready scalability. [GitHub](#)
- **BengalVision ALPR – AI-powered Bangla number plate detection and recognition System.** *2025*
 Engineered an AI-powered ALPR system for real-time detection and recognition of Bangladeshi vehicle number plates using YOLOv11. Implemented FastAPI dashboards with confidence tuning, session tracking, and Docker-based deployment. Optimized inference with PyTorch, ONNX, and OpenVINO, achieving ~92% accuracy in complex urban environments. [GitHub](#)
- **CourtVision:AI-Powered Tennis Match Analysis System** *2025*
 Developed a computer vision-based Tennis Analysis System using YOLOv12, fine-tuned YOLOv5, and ResNet-50 for player tracking, tennis ball detection, and court keypoint localization. Implemented geometry-based player filtering to accurately identify on-court players from match videos. [GitHub](#)
- **IoT-Based Environmental Data logger(ESP32)** *2024*
 Designed and implemented a real-time environmental monitoring system using ESP32 and multiple sensors, enabling cloud-based data logging and remote access through Google Sheets. [View report](#)
- **Feasibility Study for a Small-Scale Solar Photovoltaic (PV) Project in North Baghbari, Sylhet, Bangladesh** *2024*
 Performed a techno-economic feasibility analysis of solar PV and wind energy systems using NREL's System Advisor Model (SAM), integrating weather, location, and energy-yield data to evaluate system performance and local renewable energy viability. [View report](#)

ACHIEVEMENTS & CO-CURRICULAR ACTIVITIES

- **Organizing Secretary:** EEE Association(*March 2024-June2025*)
Served as Organizing Secretary, spearheading end-to-end logistics and coordination for 5+ departmental events and technical workshops, leading 15+ volunteers to ensure seamless execution for 200+ participants
- **Champion,**Engineer Football League(*December 2023*)&*Estrada:The- glory* IndoorFootball Tournament(*March 2024*)
- Played as Right Winger; contributed to the team's success in securing the championship title.
- **Social works:** Active Member of **SEC Blood Bank** – Regularly donated blood and manage emergency blood supplies as part of this volunteering organization.
- **Clubs:** Regular member of **SEC Debating Society** – Actively listened & participated in debates held by them ; **SECPA** – As member of phtotografhic association frequently uploaded my captured images for public demonstration.

HOBBIES

Photography & Videography ○ Reading Books ○ Competitive Football

REFERENCES

Md. Salah Uddin

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Sylhet Engineering College, Sylhet, Bangladesh
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Mahedi Kamal Ahmed

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