



ASHOK PAL EMON

Bachelor of Science in Electrical and Electronic Engineering

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EDUCATION

Bachelor of Science

Jan 2021 – May 2025

Electrical and Electronic Engineering

Premier University, Chattogram

Thesis: *A Comparative Analysis of Different Types of Deep Learning Object Detection Algorithms in the Case of Chest Diseases.*

Higher Secondary School Certificate

Jun 2016 – Apr 2018

Group: Science

Chattogram Biggan College, Chattogram.

EXPERIENCES/ EMPLOYMENT

Research Assistant - Robotry Bangladesh

Jan 2024 – Present

Dhaka, Bangladesh

As a Research Assistant at Robotry Bangladesh, I focus on deep learning, computer vision, and machine learning for robotics applications. My role involves optimizing different models for real-time edge deployment, conducting research in object detection and medical imaging, and contributing to publications through dataset curation and deployment pipeline development.

Intern Researcher – R&D Division — Insights Automata

Jan 2025 – Present

Halishahar, Chattogram, Bangladesh

In my position as an Intern Researcher at Insights Automata's R&D division, I explore LoRa networking technologies, AI model deployment, project development, and server management. I work on integrating networking systems with AI solutions, ensuring scalability, and contributing to projects that merge IoT, AI, and embedded systems.

Trainee — Training Institute for Chemical Industries (TICI)

Sep 2024 – Oct 2024

Narsingdi, Bangladesh

During my training at the Training Institute for Chemical Industries (TICI), I gained practical skills in industrial automation, process control, and safety management.

Trainer — Chattogram Trust PLC Training Center

Jan 2021 – Mar 2021

Chattogram, Bangladesh

My earlier role as a Trainer at Chattogram Trust PLC Training Center involved delivering technical sessions on PLC programming, motor control, and industrial automation.

AWARDS AND RECOGNITIONS

- IEEE Mexican Humanitarian Technology Conference (MHTC 2025)** May 2025
Invited to present the project "*IoT-Based EV Charging Authentication System Using LoRa Network*" at the Technological Projects and Prototypes Contest, Puebla, Mexico.
- IEEE CASS Student Design Competition 2025** Feb 2025
Champion, Bangladesh Round
- IEEE VTS Motor Vehicles Challenge 2025** Jan 2025
Recognized for the project "*Energy Management and Control of a Marine Electric Propulsion System*", focusing on sustainable energy solutions in marine transportation technology.
- IEEE R-10 HTC 2024, Malaysia** Oct 2024
Bronze Winner of The Innovation
- IEEE R10 Robotics Competition 2024** Jun 2024
Runner-up, Bangladesh Round

PUBLICATION(s)

- [1] **Ashok Pal Emon**, Mohammed Saifuddin Munna, Nazia Sultana Plabon, Dhruba Dey, Joy Dey, Indra Jit Barua, "Optimizing Faster R-CNN for Real-Time Rice Leaf Disease Detection: A Precision Agriculture Breakthrough for Food Security," *Proceedings of the 2025 International Conference on Quantum Photonics, Artificial Intelligence, and Networking (QPAIN)*, Rangpur, Bangladesh, Jul–Aug 2025. (in press)
- [2] Mohammed Saifuddin Munna, Nazia Sultana Plabon, **Ashok Pal Emon**, "Real-Time Multi-Class Pneumonia Detection in Chest X-Rays Using Optimized Deep Learning Methods," *Proceedings of the 2025 International Conference on Quantum Photonics, Artificial Intelligence, and Networking (QPAIN)*, Rangpur, Bangladesh, Jul–Aug 2025. (in press)
- [3] Nazia Sultana Plabon, **Ashok Pal Emon**, Mohammed Saifuddin Munna, Joy Dey, Indra Jit Barua, "Blockchain-Secured Federated Learning for Energy Forecasting in Steel Manufacturing," *Proceedings of IEEE R-10 Humanitarian Technology Conference (HTC 2025)*, [Accepted], 2025. (in press)
- [4] Nazia Sultana Plabon, **Ashok Pal Emon**, Mohammed Saifuddin Munna, Joy Dey, Indra Jit Barua, Anik Datta, "Multi-Agent Reinforcement Learning for Urban Traffic Control: A Case Study in Dhaka's Simulated Network," *Submitted to IEEE Conference 2025*.
- [5] **Ashok Pal Emon**, Mohammed Saifuddin Munna, Nazma Akther, Nazia Sultana Plabon, Joy Dey, Indra Jit Barua, "A Novel Deep Hybrid Learning Model for Automated Brain Tumor Detection in MRI Scans," *2nd IEEE Conference on Computing Applications and Systems (COMPAS 2025)*, [Submitted], 2025.
- [6] **Ashok Pal Emon**, Mohammed Saifuddin Munna, Abid Hassan Mahir, "A Comparative Study of Object Detection Algorithms for Real-Time Chest Disease Diagnosis," *2nd IEEE Conference on Computing Applications and Systems (COMPAS 2025)*, [Submitted], 2025.
- [7] Minhaz Uddin Hassan, Nazia Sultana Plabon, **Ashok Pal Emon**, Joy Dey, Indra Jit Barua, "MacRandomizer: Automated IEEE-Compliant MAC Address Randomization for IoT Privacy Protection," *2nd IEEE Conference on Computing Applications and Systems (COMPAS 2025)*, [Submitted], 2025.

PROJECT(s)

1. **Comparative Analysis of Deep Learning Object Detection Algorithms for Chest Disease Detection** *(Thesis)*

In this study, we conducted a comprehensive analysis and comparison of several state-of-the-art deep learning object detection algorithms. We examined their architectures, computational complexities, and the trade-offs between accuracy and performance. The evaluation was performed on medical imaging datasets under real-time constraints, with the aim of optimizing model selection for clinical deployment.

2. **CBAM-Integrated DenseNet-121 with Custom Classification Head for Histopathology Image Analysis**

A novel DenseNet-121 backbone was designed, integrated with CBAM attention modules and a custom classification head, optimized for multi-class separation in histopathology images. Performance gains were achieved through adaptive learning rate scheduling and loss function tuning.

3. **Machine Learning-Based Charging Forecasting for Unregulated E-Rickshaw Energy Demand**

We developed and optimized a forecasting algorithm based on XGBoost, incorporating Prophet for temporal load prediction. A predictive control framework was designed to enable dynamic pricing and peak load mitigation using real-time IoT data streams. Through hyperparameter tuning and feature engineering, we achieved reductions in RMSE and MAPE. This work was selected for the IEEE R10 Innovation Challenge 2025.

4. **IoT-Based Smart Watt-Meter for Real-Time Energy Monitoring** *(R&D Engineer, Insights Automata)*

Embedded algorithms were engineered for precise real-time watt-hour computation and overcharge detection in lead-acid battery systems. Firmware-level optimizations were designed for low-power, high-frequency data acquisition.

5. **IoT-Based Smart Solar-Powered Water Metering and Control System** *(R&D Engineer, Insights Automata)*

A sensor fusion and control algorithm were designed, integrating ESP32-based flow measurement with GSM communication for remote actuation. An energy-efficient scheduling mechanism was implemented for solar-powered operation in off-grid settings.

6. **LoRa-Based Human Counting System for Multi-Room Occupancy Monitoring** *(Ongoing)*

We developed a dual Time-of-Flight sensor algorithm to accurately detect bidirectional human movement, minimizing false counts through noise filtering and timing optimization. LoRa-based data aggregation was implemented with packet-loss handling for long-range, low-bandwidth transmission.

PROFESSIONAL TRAINING

1. **Python Programming** – *Google, Coursera*

Learned Python fundamentals, data handling, and automation for AI applications.

2. **C, C++, and Data Structures & Algorithms (DSA) with C++** – *Phitron*

Built strong algorithmic problem-solving skills for optimized model implementation.

3. **Machine Learning Specialization** – *Coursera (Andrew Ng)*

Covered supervised/unsupervised learning, deep learning, and ML engineering best practices.

4. **Advanced Machine Learning** – *Premier University, Chittagong*

Apr 2024

Hands-on training in NumPy, Pandas, KNN, SVM, and Python for model development.

5. **Engineering Design & Analysis with MATLAB** – *IICT, CUET*

May 2025

Applied MATLAB for simulation, modeling, and data analysis in engineering problems.

6. **Build a Startup Using Generative AI** – *Premier University, Chittagong*

Jun 2025

Explored AI-driven product development, model deployment, and algorithm optimization.

7. Project Management – American Corner Chattogram

Apr 2025

Trained in planning, executing, and managing research and technical projects effectively.

LEADERSHIP ACTIVITIES

- 1. Project Manager** – Premier University Robotics Club Feb 2024 – Feb 2025
Led multiple robotics projects, conducted technical workshops, guided students in building innovative projects, and applied problem-solving strategies to overcome design and implementation challenges.
- 2. Institute Representative** – Volunteer for Bangladesh Jul 2023 – Dec 2023
Promoted youth volunteerism, organized community initiatives, and facilitated problem-solving activities for student groups.
- 3. Campus Ambassador** – Scholarship School BD Jan 2023 – Present
- 4. Member** – IEEE Premier University Student Branch Apr 2024 – Present
Participated in technical events, workshops, and collaborative research-oriented activities.

PROGRAMMING/ FRAMEWORKS/ SOFTWARE EXPARIENCES

Programming	Frameworks / Libraries	Software / Tools / Environment
<ul style="list-style-type: none">• Python• C/ C++• R• MATLAB	<ul style="list-style-type: none">• PyTorch, TensorFlow, Keras• Scikit-learn, XGBoost, LightGBM• OpenCV, NumPy, Pandas	<ul style="list-style-type: none">• Google Colab, Jupyter Notebook• MATLAB Simulink• Hugging Face (Spaces & Transformers)• Docker (for deployment)

LANGUAGE SKILL

Bengali: Mother tongue

English: Fluent (speaking, reading, writing)

REFERENCES

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