Himel Saha

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Professional Summary

I'm a passionate **Machine Learning enthusiast** focused on developing intelligent automated systems that drive meaningful impact. With a strong research interest and hands-on experience in areas including—but not limited to—**automation**, **model optimization**, **distributed training**, and **LLMs for NLP, RAG pipelines, smart IoT, and healthcare applications**, I thrive on building scalable frameworks that tackle real-world problems and contribute to innovative AI projects.

Education

B.Sc. **Green University of Bangladesh**, Computer Science and Engineering (CSE)   Jan. 2020 – Dec. 2024
- CGPA: 3.52/4.00

Experience

Green Computing and Communication Lab, AI/ML Researcher   Dhaka, Bangladesh
June 2023 – Present
- Developed **resource-efficient** ML models for industrial IoT and smart healthcare.
- Optimized **autonomous LLM agents** to improve task efficiency in workplaces.
- Applied advanced frameworks and **real-world datasets** to improve performance.

Robo Tech Valley, ML Engineer   Dhaka, Bangladesh
May 2024 – Oct 2024
- Leveraged **data preprocessing** techniques (augmentation, normalization, denoising, etc.) and integrated the RoboFlow platform for efficient dataset management.
- Worked on real-time object detection tasks using the **YOLO model** and OpenCV.
- Optimized **model inference speed**, reducing latency for real-time applications.

Skills

Platforms:	n8n automation, Loveable, Node-Red, Docker, GitHub
LLMs:	GPT, Gemini, Claude, LLaMA, Mistral, Falcon
Programming Languages:	Python, C, Java
Python Libraries:	PyTorch, TensorFlow, LangChain, HuggingFace, NumPy, Pandas, OpenCV, Matplotlib, Scikit-learn
Web Programming:	HTML, CSS, JavaScript
Database:	MySQL, PostgreSQL, Pinecone, ChromaDB, FAISS
Toolchain:	LaTeX, Microsoft Office, VS Code, JupyterLab, MATLAB, Cisco Packet Tracer

Achievements

1. **[Best Poster Paper Award]** for the research titled *"ASFL: An Adaptive SplitFed Learning Framework for Industrial Internet of Things"*, presented at the **Idea Showcasing Contest, CSE Carnival 2024**, Green University of Bangladesh, Dhaka, Bangladesh.   October 2024
[View Online] ↗

Projects

Multimodal RAG for PDF Q&A using LLMs and VLMs
[GitHub Code] ☑
[Demo Video] ☑

- A multimodal RAG pipeline for PDFs integrating OCR-based text extraction, VLMs for image understanding, and an LLM-powered Q&A chain, supported by PineconeDB and Streamlit UI.
- **Core Tools:** TesseractOCR, LangChain, Gemini LLM & VLM, PineconeDB, Streamlit.

Real-time Bangladeshi Vehicle License-Plate Detection and Tracking
[GitHub Code] ☑
[Demo Video] ☑

- A real-time detection, recognition, and tracking of Bangladeshi vehicle license plates using YOLO, OpenCV, and OCR.
- **Core Tools:** OpenCV, YOLO, EasyOCR, Numpy.

Multimodal Automated CAPTCHA Solver
[GitHub Code] ☑
[Demo Video] ☑

- A Multimodal CAPTCHA Solver that decodes audio files and extracts texts from images for automated CAPTCHA processing.
- **Core Tools:** Whisper, EasyOCR, OpenCV, PyTorch, Pandas.

Agentic AI for Financial Document Compliance
[GitHub Code] ☑
[Demo Video] ☑

- An agent-based system that automates document compliance by extracting, validating, and cross-checking key fields across various document types.
- **Core Tools:** EasyOCR, NLP Library (HuggingFace), Local LLMs (Ollama/LLaMA).

Publications

Journal Papers (Q1)

1. **Himel Saha**, Md Nur Ahmed, Palash Roy, Md. Abdur Razzaque, Nafis Fuad Tanvir, Mohammad Mehedi Hassan, Md Zia Uddin, **Device and Data Heterogeneity Aware SplitFed Learning for Digital Twin Empowered Industrial Internet of Things**, *Computer Networks (Elsevier), Volume 270, 2025, 111478*. (Q1, IF: 4.6).
   DOI: 10.1016/j.comnet.2025.111478 ☑.
   June 2025
   [View Online] ☑

   - Reduced training time and energy consumption while improving accuracy in industrial IoT applications.
   - **Frameworks:** Federated Learning (FL), and SplitFed Learning (SFL).
   - **Models:** VGG-8, ResNet-18, InceptionV3.
   - **Datasets:** MNIST, CIFAR-10, ImageNet.

2. Jannatul Ferdeous, **Himel Saha**, Mohammad Sakib Mahmood, Muhammad Firoz Mridha, **IoT-Enabled Smart Workplaces with Autonomous LLM-Powered AI Agents**, submitted to *IEEE Internet of Things Journal, 2025*. (Q1, IF: 8.9).
   July 2025
   Under Peer Review

   - Improved task efficiency, context awareness, and multi-agent coordination with autonomous LLM agents in smart workplaces.
   - **Frameworks:** N8n automation, Node-Red, and IoT-enabled collaborative workspaces.
   - **LLMs:** GPT-4, GPT-3.5, Claude 3.5, Gemini 2.5, Llama 4.
   - **Datasets:** Self-created datasets simulating ambiguous workplace tasks.

Conference Papers

1. **Himel Saha**, Md Nur Ahmed, Palash Roy, Md. Abdur Razzaque, **ASFL: An Adaptive SplitFed Learning Framework for IIoT**, *IEEE Computer Society Bangladesh Chapter Symposium 2024 (IEEECSBDCS), Paper ID 109, November 22–23, 2024*.
   November 2024
   [View Online] ☑

References

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