

Jamal Hossain

PhD Applicant | AI/ML Researcher

 portfolio |  scholar |  github |  linkedin |  jamal37.ru.cse@gmail.com |  (+880)1829935140 |  Dhaka, Bangladesh

Experience

Lead Researcher, Research Den, Fairfax, VA, USA, Remote Dec. 2024 – Present
• Lead applied AI research and manuscript development on student mental health analytics, depression severity stratification, healthcare AI, and explainable machine learning.

Undergraduate Researcher, Imperial College of Engineering, Khulna Jan. 2025 – Dec. 2025
• Designed an interactive 3D decision space visualization framework to analyze misclassification patterns in machine learning driven network intrusion detection systems.

Senior Instructor, Ideal Cadet Academy & English Version Special Care, Khulna Dec. 2021 – Jul. 2025
• Delivered Mathematics and ICT instruction at the Higher Secondary level and supported Cadet College admission preparation through structured problem solving practice.

Education

• **B.Sc. in Computer Science and Engineering**, (CGPA: 3.50/4.00), University of Rajshahi Jan. 2020 – Nov. 2025
Completed the academic requirements at Imperial College of Engineering, Khulna, Bangladesh; degree conferred by the University of Rajshahi.

Selected Research Works

1. **Protecting Student Mental Health with a Context-Aware ML Framework for Stress Monitoring** 
Md Sultanul Islam Ovi, **Jamal Hossain**, Md Raihan Alam Rahi, Fatema Akter (QPAIN 26)
• Proposed a context-aware ML framework using wearable sensor data to monitor and classify student stress levels in real time.
2. **An Interactive 3D Decision Space Visualization Framework for Misclassification Analysis in ML-Driven Network Intrusion Detection Systems**, **Jamal Hossain**, Mazharul Islam, Krishna Debnath (Under Review)
• Designed a PCA/LDA-based 3D visualization framework over 150^3 voxel grids to analyze misclassifications across 8 base classifiers and 5 ensemble configurations on UNSW-NB15 and NSL-KDD.
3. **Psychometric Validation and Explainable Reduced-Item Depression Severity Stratification in Bangladeshi University Students**, Md Sultanul Islam Ovi, **Jamal Hossain**, Md Raihan Alam Rahi (Under Review)
• Built a full ML/XAI pipeline with nested cross-validation and ordinal classification to validate a reduced-item depression severity screening instrument.
4. **Lesion-Aware Explainable Federated Deep Learning for Multicenter Diabetic Retinopathy Detection and Severity Grading**, Md Abdullah Asrafee, **Jamal Hossain**, Ummeh Aisha (Under Review)
• Developed a lesion-aware, privacy-preserving federated learning framework for diabetic retinopathy detection and severity grading across multiple clinical centers.

Technical Skills

- **Programming & Scripting:** Python, Java, C#, C/C++, SQL, Bash
- **Data Science & Analytics:** Pandas, NumPy, Matplotlib, Seaborn, Tableau, Power BI
- **Tools & Distributed Computing:** AWS, Linux, Docker, Kubernetes, Git, MPI, CUDA
- **AI/ML Systems:** PyTorch, TensorFlow, Keras, Scikit learn, OpenCV, LangChain, RAG, Agentic AI, Model Optimization

Technical Projects

Bengali Handwritten Prescription Digitizer  *Computer Vision, OCR, Medical Text Recognition*
• OCR-based system extracting medicine names, dosage, frequency, and instructions from handwritten Bangladeshi prescriptions despite unclear handwriting and mixed Bangla/English terms.
• Designed a structured workflow spanning image upload, text recognition, manual verification, and information extraction.

Counterfeit Currency Detection Under Real Phone Camera Conditions  *Computer Vision, OpenCV*
• Vision model identifying suspected counterfeit currency from phone camera images under blur, low light, angle variation, and clutter.
• Built a practical detection pipeline covering preprocessing, feature analysis, inference, and structured prediction output.