Niloy Das

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RESEARCH INTERESTS

My research focuses on developing robust and interpretable AI systems for medical imaging and diagnostics. I am particularly interested in explainable machine learning for clinical decision support, efficient deep learning architectures for medical image analysis, and building deployable AI systems for resource-constrained healthcare settings.

EDUCATION

Noakhali Science and Technology University (NSTU) 2020–2025
B.Sc. (Engg.) in Information and Communication Engineering | **CGPA: 3.90/4.00**

- Ranked 1st in graduating class

Narsingdi Imperial College 2017–2019
Higher Secondary Certificate | **GPA: 5.00/5.00**

Brahmondi Kamini Kishore Moulik Govt. High School 2012–2016
Secondary School Certificate | **GPA: 5.00/5.00**

PUBLICATIONS

Peer-Reviewed Journal Articles:

[1] **Niloy Das**, Md Bipul Hossain, Apurba Adhikary, Avi Deb Raha, Yu Qiao, Md Mehedi Hassan, Anupam Kumar Bairagi. (2024). Enlightened prognosis: Hepatitis prediction with an explainable machine learning approach. *PLOS ONE*, 19(12), e0319078. doi:10.1371/journal.pone.0319078

Under Review:

[2] **Niloy Das**, Mirza Raquib, Farida Siddiqi Prity, Arafath Al Fahim, Saydul Akbar Murad, Mohammad Amzad Hossain, MD Jiabul Hoque, Mohammad Ali Moni. (2025). PSO-XAI: An optimized and interpretable approach for breast cancer diagnosis. arxiv:arxiv.org/abs/2510.20611 *Under review.*

[3] Shatabdi Acharjee, Mirza Raquib, Shourav Dey, **Niloy Das**, Mohammad Amzad Hossain. (2025). A hybrid approach for automated detection and classification of thyroid nodules using EfficientNet-B3-ViT with explainable AI. *Under review.*

[4] Sheikh Salman Hassan, Apurba Adhikary, **Niloy Das**, Tharmalingam Ratnarajah. (2025). Intelligent OTFS-ISAC scheduling in RHS-enabled LEO satellites: A transformer-based approach. *Under review.*

[5] **Niloy Das**, Sheikh Salman Hassan, Apurba Adhikary, Yu Qiao, Zhu Han, and Tharmalingam Ratnarajah. A Novel Edge-Assisted Quantum-Classical Hybrid Framework for Crime Pattern Learning and Classification *Under review.*

Manuscripts in Preparation:

[6] **Niloy Das**, et al. EMADNet: Enhanced multi-scale adaptive denoising network for image restoration. *Target: IEEE Trans. Image Processing, Nov 2025.*

RESEARCH EXPERIENCE

Undergraduate Researcher April 2023 – Present
Machine Learning & Biomedical AI

Explainable AI for Disease Prediction

- Developed an ensemble ML framework for hepatitis classification using feature selection and SHAP-based interpretability.
- Published findings in PLOS ONE (IF: 3.7); model interpretability enabled identification of clinically relevant biomarkers
- Conducted research on breast cancer detection by utilizing a PSO (Particle Swarm Optimization) optimizer for feature selection.

Diverse types of Image Restoration

- Designed EMADNet, a CNN architecture integrating multi-scale adaptive filtering with channel and spatial attention mechanisms for removing Gaussian, salt-and-pepper, and speckle noise
- Implemented in PyTorch with custom loss functions combining perceptual and adversarial losses

Quantum Machine Learning

- Implemented hybrid quantum-classical models using Qiskit for spatiotemporal pattern analysis
- Designed variational quantum circuits (VQE, QAOA) for hybrid models, feature extraction, and classification

Computer Vision for Environmental Applications

- Conducted research on environmental image analysis with a focus on flood detection and mapping through segmentation techniques.
- Processed and analyzed satellite imagery to delineate and quantify affected regions.
- Applied deep learning and computer vision methods for mask generation and extraction of environmental characteristics.

TECHNICAL SKILLS

Deep Learning & Computer Vision: PyTorch (primary), TensorFlow/Keras, custom CNN architectures, attention mechanisms, multi-scale feature extraction, image restoration, medical image analysis
Machine Learning & XAI: Scikit-learn, ensemble methods, SHAP, LIME, model interpretability
Quantum Computing: Qiskit (VQE, QAOA), PennyLane, hybrid quantum-classical models
Computer Vision Tools: OpenCV, custom denoising pipelines, image segmentation, medical imaging preprocessing
Programming & Scientific Computing: Python, C/C++, MATLAB, NumPy, Pandas, Matplotlib
Development Tools: Git/GitHub, Linux, Jupyter, LaTeX/Overleaf

ACADEMIC PROJECTS

Bachelor's Thesis: EMADNet – Enhanced Multi-Scale Adaptive Denoising Network 2024–2025
Supervisor: Tanvir Zaman Khan, Assistant Professor, NSTU

- Developed novel CNN architecture for image denoising, combining multi-scale feature extraction, adaptive filtering, and dual attention mechanisms
- Designed end-to-end pipeline for handling multiple noise types (Gaussian, salt-and-pepper, speckle) across diverse image datasets
- Implemented in PyTorch; manuscript in preparation for IEEE Transactions on Image Processing

Selected Coursework: Artificial Intelligence & Neural Networks, Machine Learning, Computer Vision, Digital Signal Processing, Quantum Computing Fundamentals, Digital Image Processing, Wireless Communications

PROFESSIONAL EXPERIENCE

Software Development Intern February 2024 – April 2024
Business Automation Limited, Dhaka, Bangladesh

- Developed full-stack web applications using Laravel (PHP), MySQL, and RESTful APIs
- Selected as top-10 intern; invited to final interview round

Telecommunications Training November 2024 – December 2024
Bangladesh Telecommunications Company Limited (BTCL)

- Completed training in network infrastructure, planning, and optimization

LEADERSHIP & SERVICE

Vice President, ICE Programming Club March 2024 – October 2025
Noakhali Science and Technology University

Volunteer, Flood Relief Operations August 2024
Manusher Jonno Manush Foundation

LANGUAGES

Bangla (Native) | English (Fluent)

REFERENCES

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