Nirab Debnath

Computer Science and Engineering, Leading University, Sylhet

+8801624480923 nirab200174@gmail.com LinkedIn GitHub Kaggle

Education

Leading University, Sylhet *Jan 2022 – 2026*
Bachelor of Science in Computer Science & Engineering (CSE)

Research Interests

- **Core Areas:** Machine Learning, Deep Learning, Natural Language Processing (NLP), Neural Network, Medical Image Analysis
- **Focus Domains:** Low-Resource Languages (Bengali), Mental Health Informatics, Explainable AI (XAI), Large Language Models

Publications

Conference Papers

- **N. Debnath**, et al., "AgriCast: Weather-Based Forecasting of Staple Crop Prices Using Machine Learning and Deep Learning," *International Conference on Computer and Information Technology (ICCIT)*, 2025.
- **N. Debnath**, et al., "Risk of Dengue Associated With Probability-Based Interpretations From Hematology-Guided Explainable AI," *2nd Undergraduate Conference on Intelligent Computing and Systems (UCICS)*, 2026.
- **N. Debnath**, et al., "BN-Cope: A Novel Dataset for Classifying Mental Health Coping Strategies in Bengali Text," *2nd Undergraduate Conference on Intelligent Computing and Systems (UCICS)*, 2026.

Manuscript Under Review

- **N. Debnath**, et al., "Explainable Machine Learning–Based Multi-Class Lymph Node Risk Assessment to Support Clinical Decision-Making in Esophageal Cancer," *Submitted to Computer Methods and Programs in Biomedicine*, 2026.

Research Experience

Undergraduate Researcher *2024 – Present*
Department of Computer Science and Engineering, Leading University

- Curated and manually annotated a novel Bengali mental health dataset, addressing the scarcity of resources for low-resource languages.
- Developed and fine-tuned Transformer-based models (BanglaBERT) and deep learning architectures (BiLSTM, CNN) for multi-class text classification.
- Applied Explainable AI (XAI) techniques to medical datasets to identify clinically relevant risk factors in Dengue and Esophageal Cancer.
- Led the preparation and submission of research manuscripts to IEEE-indexed international conferences.

Ongoing Research Projects

- **River Water Quality Assessment:** Designing an interpretable machine learning framework for data-scarce environments, focusing on river pollution analysis in Dhaka.
- **Dental Disease Detection:** Developing inflammation-aware Vision Transformer models for early detection and severity grading of gingivitis from intraoral images.

Technical Skills

- **Programming Languages:** Python, C++, Java, Dart, JavaScript, PHP, SQL
- **Machine Learning:** Scikit-learn, XGBoost, Random Forest, Support Vector Machines (SVM)
- **Deep Learning:** Artificial Neural Networks (ANN), Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN), LSTM, BiLSTM, Transformers, Vision Transformers (ViT)
- **NLP:** Tokenization, Text Classification, Sequence Labeling, Word Embeddings, BanglaBERT, Hugging Face Transformers
- **Frameworks & Libraries:** PyTorch, TensorFlow, Keras
- **Development:** Flutter, React.js, Firebase, Node.js, HTML/CSS
- **Tools:** Git, GitHub, LaTeX, Kaggle, VS Code, Jupyter Notebook

Selected Development Projects

HackGrid — Full-Stack Hackathon Platform *React, Node.js, MongoDB*

- Developed a full-featured hackathon management system supporting registration, team formation, and real-time submission tracking.

Explore Sylhet — Tourism Information Portal *PHP, MySQL, Bootstrap*

- Built a web-based tourism platform with authentication, profile management, and CRUD-based destination management.

CampusTalk — University Q&A Platform *Flutter, Firebase*

- Designed a mobile application enabling real-time academic discussion with authentication and push notification support.

QuizCrafter *Flutter, Firebase*

- Implemented a dynamic quiz application with real-time scoring and backend-driven user management.

Honors & Awards

- Prize Winner, *Machine Learning Research Bootcamp*, recognized for outstanding research methodology.
- Selected Presenter at multiple IEEE-sponsored international conferences (ICCIT, UCICS).

Academic Service

- Volunteer, CSE Gala Night 2023 and 4th Convocation, Leading University.