

**North East University Bangladesh (NEUB)**

**Telihaor, Sheikhghat, Sylhet-3100**

**Department of Computer Science & Engineering (CSE)**

**Project Proposal Summer 2025**

**Course Code: CSE-460**

**Course Title: Deep Learning Lab**

**Submitted by-**

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**Semester: 7<sup>th</sup>**

**Section: B**

**Project Name: Handwritten Digit Recognition System**

## ➤ Project Description:

This project aims to develop a robust system for recognizing handwritten digits using machine learning techniques. The project will cover all stages, from data collection and preprocessing to model training, evaluation, and deployment.

## ➤ Project Goals:

- Develop a system capable of accurately recognizing handwritten digits (0-9).
- Implement the project using Python and relevant machine learning libraries like TensorFlow/Keras or PyTorch.
- Achieve a high accuracy rate on a standard handwritten digit dataset (e.g., MNIST).
- Provide a clear and well-documented codebase.
- Potentially explore different model architectures (e.g., **Convolutional Neural Networks - CNNs**) to optimize performance.

## ➤ Project Deliverables:

- A well-documented Python codebase containing the complete implementation of the handwritten digit recognition system.

- A report detailing the project's methodology, results, and analysis.
- (Optional) A deployed version of the system (e.g., a web application or command-line tool).

### ➤ **Project Scope:**

This project will encompass the following key stages:

- **Data Collection and Preprocessing:** Utilizing the MNIST or a similar dataset, and performing necessary preprocessing steps such as normalization, resizing, and data augmentation.
- **Model Development:** Implementing a suitable deep learning model(**CNN**). This will involve defining the model architecture, compiling it, and training it on the prepared dataset.
- **Model Evaluation:** Evaluating the trained model's performance using appropriate metrics like accuracy, precision, recall, and F1-score. This will involve splitting the dataset into training, validation, and testing sets.
- **Deployment (Optional):** Exploring potential deployment options, such as creating a simple web interface or a command-line tool for users to input handwritten digits and receive predictions.

- **Documentation:** Providing thorough documentation explaining the project's methodology, code implementation, and results.

## ➤ Conclusion:

This project offers a valuable opportunity to gain practical experience in developing a Deep learning and Machine learning application for handwritten digit recognition. The project aims to achieve a high level of accuracy and provide a robust and functional system.