National University
of Computer & Emerging Sciences-Islamabad
Chiniot-Faisalabad Campus

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AI3002 –Machine Learning
Assignment No. 6

Assignment Submission Guidelines:

1. Submit your assignment in **soft form (Code + Report)** within the due date and time. Soft form does not mean submitting photos of the hardcopy. Late submissions will result in a deduction of marks.
2. The **report** must include a discussion, comments, and a conclusion about your solution. Submitting without a report will result in a loss of full marks.
3. Name the zip or other folder/file that you submit using the following format: **ML_A6_RollNo_FirstName**.
4. Ensure that you solve each task of the assignment on your own.
5. You are allowed to do your assignment in **groups of a maximum of two members**.
6. There is no restriction on the programming language used for the tasks.
7. For programming tasks, you are NOT allowed to use any built-in functions or libraries for specific tasks.
8. This assignment may hold more weightage comparatively.

Question No. 1: Convolutional Neural Network (CNN)

MNIST dataset, which is a set of 70,000 small images of digits handwritten digits, can be downloaded from the following website,

(https://www.kaggle.com/datasets/hojjatk/mnist-dataset).

Each image, in this dataset, is labelled with the digit it represents. There are 70,000 images, and each image has 784 features. This is because each image is 28 × 28 pixels, and each feature simply represents one pixel's intensity, from 0 (white) to 255 (black). Figure below shows some digits from the MNIST dataset:

Perform the following tasks:

a) Apply any two already developed convolutional neural networks like LeNet-5, AlexNet, VGG-16, etc.

b) Compare the accuracy of your architecture in previous assignment with the accuracies of the other two implemented CNN models in part (a) and discuss it in detail.