BT3041 – Analysis and Interpretation of Biological Data
Assignment 2

General Instructions:

- ✓ The goal of this assignment is understanding the concepts of Convolutional Neural Networks and classifying the given MNIST dataset.
- ✓ This is an individual assignment.
- ✓ You may use MATLAB or Python for your implementation.
- ✓ You have to turn in the well commented code along with a detailed report of the study.
- ✓ Your report should contain answers for all of the questions/cases asked below.
- ✓ Look at the end of the assignment for submission instructions.
- ✓ **Submission deadline: Thursday 26th April, 2022 (23:59).**

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1. Implement Convolutional Neural Network for classifying the given CIFAR-10 dataset. The given dataset contains both training data and testing data of animal images. Train the network and classify the images and then plot the loss and accuracy for the training and testing datasets.
   a) Convert the images into gray scale and perform 2D convolution operation in the convolutional layers. Please avoid usage of inbuild machine learning libraries (such as tensorflow/pytorch) (7 marks)
   b) Without converting into gray scale images (images from dataset as it is) perform 3D convolution. In this case you may use the inbuild libraries (However in your report please detail about the operation of each functions). (3 marks)
   Write a report on the following things for both the cases a) and b):
   a. Network architecture
   b. Number and type of Layers used
   c. Activation functions used
   d. Loss function
   e. Learning Algorithm
   f. Learning Rate
   g. Loss and accuracy for testing dataset.

Submission Instructions

Please enclose all your programs, plots and report in a single zip folder. Please submit a compressed zip or tar file named as <ROLLNO>_A2.zip by uploading it to the moodle.