DLOps
Class Assignment - 2 [40 Marks]
Time Slot: 4:00 PM-5:30 PM (17/03/2024)

Programming instructions:

1. Programming language: Python
2. Use of PyTorch is compulsory. Marks shall not be given for TensorFlow implementation.

Reporting instructions:

1. Please submit all your working codes as .ipynb files and colab notebook link.
2. The submission deadline is 5:28 PM. An extra 2 minutes are given to crosscheck whether your submission is correctly done. The portal will be closed automatically at 5:30 PM. We will not entertain anyone regarding any extra time.
3. Rename your notebook file in this format before submitting: **<RollNo>_DLOps_ClassAssignment_2_Q_<QuestionNo>.ipynb,** for example **M22CS057_DLOps_ClassAssignment_2_Q_1.ipynb.** You must submit the notebook (.ipynb) file. Also, do not forget to submit the link to your Colab file as a private comment. Ensure you permit the course instructors to execute the code on Google Colab.

General instructions:

1. You MUST follow the reporting instructions.
2. DO NOT plagiarize from the internet or your peers. The institute's plagiarism policy will be strictly enforced.
3. We recommend using Google Colab with GPU runtimes for this assignment.

Question 1: Multi-layer perceptron (MLP) and convolutional neural network (CNN) [2x10=20 marks]

- Implement and train an MLP and a CNN on the USPS Dataset.
- Compare the models in terms of accuracy, recall, precision, and confusion matrix.
- Use the Pytorch TensorBoard toolkit to show the precision-recall curve and loss function.

Question 2: Finetuning a pre-trained network and the optimizers [5+3x5=20 marks]

Finetune the pre-trained ResNet101 model (trained with the ImageNet dataset and made available on the PyTorch torchvision server) on the X dataset for classification tasks and plot curves for training loss and training accuracy. Report the final top-5 test accuracy. Perform the above task with any 3 optimizers from the following list.

1. Adam
2. Adagrad
3. Adadelta

4. RMSprop

X = STL10, if the last digit of your roll no. MOD 3 == 0
X = SVHN, if the last digit of your roll no. MOD 3 == 1
X = FashionMNIST, if the last digit of your roll no. MOD 3 == 2