Lab-5 and 6 (CNN)
CSL7670 - Fundamentals of Machine Learning

NOTE:

1. This assignment contains 2 problems. Please go through the references carefully before starting the lab assignment.

2. Objective of this assignment is to gain familiarity with convolutional neural networks.

3. Submit a brief report in the lab report template that is already shared.

4. **Deadline:** Sep 26, 2023, 10:30 PM.

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1. (**Simple CNN**) Go through the following tutorial to understand how to train a CNN classifier: `https://pytorch.org/tutorials/beginner/blitz/cifar10_tutorial.html` Now, (a) Understand the code completely and run it.
   (b) Explain the following Pytorch Functions: (i) conv2D (ii) MaxPool2d (iii) Linear (iv) Relu (v) linear.
   (c) Plot the loss function.
   (d) Edit the code to modify the CNN architecture in the following four steps (call it myCNN): (i) Instead of 6 activation maps in conv1, use 5 activation maps, (ii) instead of maxpool use average pool, (iii) Instead of 16 activation maps in conv1, use 10 activation maps, and (iv) Remove fc2 and change fc1 so that it projects to 100 dimensions instead of 120 currently. Rerun the experiment and compare CNN (original code) and myCNN (this code).

2. Understand how to use pretrained CNN for extracting features and fine-tuning using the following video tutorials and associated codes: `https://www.youtube.com/watch?v=15zlr2vJqKc`

   `https://www.youtube.com/watch?v=8etkVC93yU4`

   Code link: `https://github.com/madsendennis/notebooks/tree/master/pytorch`

   TAs will share train/test/validation images for two categories. Modify the code so that it works for the shared dataset. Report Test Accuracy.

End of Paper