Exercise - 2

1 Practical

In this task you are going to observe the effect of transfer learning on a (once) very popular architecture.

NOTE - Before getting started make sure you have the required packages installed along with a suitable IDE you want to work on. Also if your computer doesn't supports these installations, you can also work on Google Colab. Here Google provides computational capacity (to some extent) for running deep learning codes. These are same as Jupyter Notebooks.

1.1 Task

1.1.1 Transfer Learning from ImageNet

- Download and prepare CIFAR-10 dataset (it is already available in the above mentioned libraries)

- Use AlexNet as the model (Pytorch AlexNet)

- You have to perform two separate experiments-

  - Train the model for CIFAR-10 data, Report the test test accuracy. (also referred as fine tuning the model)

  - Use the pretarined weights of AlexNet, in other words use AlexNet as a pretrained network for image classification on CIFAR-10 data (also referred as Feature Extraction), Report the test test accuracy.

- In both the above cases remember to add an extra fully connected layer to the classifier with number of neurons = 10, because there are 10 classes in CIFAR-10 dataset. This layer will be trainable in both the cases.

- Explain (briefly!) what is the difference between the two runs and why there is a difference in performance.

1.1.2 Transfer Learning from MNIST

- Prepare a CNN of your choice and train it on the MNIST data. Report the accuracy

- Use the above model as a pretrained CNN for the SVHN dataset. Report the accuracy

- In the third step you are performing transfer learining from MNIST to SVHN.