Deep Learning Assignment 3.

Author: Yagna Kaasaragadda

Q1. How do you access the label? What method is called when you index into a Dataset? Is CIFAR10 a class that is derived from Dataset?

Answer:

print(train\_data[20][1]) #--- The second index should be 1 for label and 0 for data.

* When we index the dataset the function call is \_\_getitem\_\_(idx:int) will be called.
* Yes, CIFAR10 is a class derived from the Dataset class.

Q2. Please provide the inheritance tree for the CIFAR10 dataset in pytorch.

Answer: Inheritance Tree:

torch.utils.data.Dataset

└── torchvision.datasets.CIFAR10

Here torch.utils.data.Dataset is the base class for all the datasets which has the \_\_len\_\_ and \_\_getitem\_\_ methods. Now this base class is inherited by the torchvision.datasets.CIFAR10 class.

Q3. When you instantiate train\_data the second time, with the transform, try without download=True. Look at the API. What does it say?

Answer:

If the data load is already not done. It gives the error Dataset not found or corrupted. You can use download=True to download it.

Since we already downloaded the dataset, In the above cell if the download argument is not given or set to false the api gives no output or warning as we already have the train data loaded in the ./train/ folder. But if we give the download =True argument it says that Files already downloaded and verified.

Q4. What is the difference between training and testing transforms Why do you think the test dataset has a different transform?

Answer:

Training Data is to find the patterns and features in the data even if transforms are applied hence, we apply many transforms and use the final transformed dataset for training. Whereas testing data should have the different transforms as we may overfit the model with the same training and testing data transforms.

Q5. Why is your result different when you apply transforms? Elaborate why and how.

Answer:

When transforms are applied the image is becoming much darker as the contrast is increased. This is because we are adding a normalization transform to the dataset. The image is also flipped as it contains a random horizontal flip transform. The image format when we apply transforms, we get a tensor output. When we load the dataset without transforms we get a PILL.image class.

Q6. Cell 2 will replace the very last layer of the vgg model (why?)

Answer:

The last layer should be changed to nn.Linear(4096,10) as the final output layer for our CIFAR10 dataset is only 10. We cant classify 1000 outputs on CIFAR10

Q6. Please compare these two performances on CIFAR10. Why is one better than another?

Answer:

CIFAR10 with the vgg16 pretrained model is very accurate with around 90% accuracy, Where as the LNet5 gives a 60 percent accuracy without the validation dataset while training. This is because the Vgg model has a lots of layers while training where as the LeNet has only 5 layers which are 2 conv2d layers and 3 linear layers without any activation or non linearity function. The Vgg model has 30 sequential layers which has multiple conv2d layers which gave us much accuracy.