DI504 Assignment2(Due 18 January 2021)

In this assignment, you are expected to create a network that will do multiclass classification using convolutional neural network architecture. Your final work should be in ipynb format (with output showing clearly what you accomplish). In addition, you need to explain every step of your work *clearly*. You can use text blocks to explain your thought process.

Here are some guidelines and tips for training your network:

- User CIFAR10 dataset, available under the touch vision dataset module. CIFAR10[1] dataset contains ten classes with 50000 training and 10000 test images.
- Create a validation set using a 90/10 split. (i.e., your validation set should contain 5000 images)
- Transform your data if necessary. (Explain your reasoning in either case)
- Your network should contain at least two Conv and pooling layers. You can add other layers as you see fit. (Remember this is a 10-class classification)
- Create a training loop for your network while showing your validation results regularly.
- Select your hyperparameters.
- Train your network, then show your test accuracy.
- Save your network.
- Load your model and show that you loaded successfully by rerunning the training set.

Your final test accuracy should be higher than %50.

In addition, if you are adventurous:

- Try to implement an early stopping mechanism to determine your optimal number of epochs (i.e. if your validation loss/accuracy won't increase for a few epochs, stop the training loop and select the appropriate model)
- Fine-tune your network using weights and biases[2] (Be careful while doing fine-tuning each parameter will increase your training time exponentially)
- Try your network with Images from the web. (You may need to resize your images)

After completing your work, rename the ipynb file in "studentID_DI504_hw2.ipynb" format. Then upload your notebook and helper files. (don't forget your saved network)

[1] https://www.cs.toronto.edu/~kriz/cifar.html
[2] https://wandb.ai/site