CS 410/510: Deep Learning
Assignment 3
Winter 2022
Due Feb. 25th by 11:59pm

There are two parts to this assignment.

PART 1:

You will learn *transfer learning* where you take a pre-trained model and fit it to your classification problem.

Reading and sample code:

1. https://pytorch.org/tutorials/beginner/transfer_learning_tutorial.html
2. https://d2l.ai/chapter_computer-vision/fine-tuning.html

1. I want you to start with a pre-trained Resnet50 model. Next, replace the output layer with an output of 10 neurons. Randomly initialize the weights and biases coming into this layer from the previous layer (i.e., last hidden layer). When you train this network, **you need to freeze all parameters except the weights and biases coming from the last hidden layer to the output layer**.
    a. You will train this network on MNIST. I want you to train the network with train sizes of 10*10, 30*10, 50*10, 70*10, 90*10 (to explain, 10*10 means ten images of each of the ten categories). Use whatever learning rate you think is appropriate and as many epochs as you think is sufficient. Use cross-entropy loss. The goal is to get the highest **test** accuracy for each case. Plot the lowest test error vs size of train set. Plot the number of epochs for each to get the best test accuracy.
2. Repeat the above with VGG19

Notes: MNIST images need to be scaled up to 224x224

PART 2:

TBA