CMSC 510 – Fall 2020

Homework Assignment 4

Announced: 10/27

Due: Tuesday, 11/17, noon

Neural Networks

- The purpose of HW4 is to learn how to construct and train convolutional neural networks

- With the use of high-level APIs for pytorch and tensorflow

- Dataset: MNIST – all ten classes (i.e., not restricted to two selected digits)

Part A: pytorch

- Use pytorch **nn.Sequential** container (*https://pytorch.org/docs/stable/nn.html*) to build a Convolutional Neural Network (CNN) for 10-class MNIST problem.

  - Use Convolutional and Pooling layers, and explore using different parameters (e.g. # of filters).

  - Follow up the convolutional part of the network with a standard feedforward dense layers (nn.Linear + ReLU activation).

  - Explore the effect of using Batch normalization.

Part B: tensorflow

- Use **Functional API** from tensorflow Keras (https://www.tensorflow.org/guide/keras/functional) to build a CNN network similar to what you have built in Part A

Returning the Assignment

- Solution code should be written by you and you only (no web/book/friend/etc. code)

- Upload through Blackboard
  - A report in PDF
    - Description of the architecture of your networks
    - Plots of the loss on the training set through epochs of training
    - Accuracy of the final trained networks on the test set
  - Code in python