**[DS5660 Fall 2023] Model and Machine Learning II**

**HW4: Transfer learning and model fine-tuning In PyTorch**

## I. Purpose:

This assignment aims to perform a pretrained model with Pytorch implementation. A new grocery dataset will be used.

* Learn how to do data augmentation in PyTorch.
* Learn how to define the pretrained model in PyTorch.
* Learn how to partially design the model in PyTorch.
* Learn how to freeze the gradient calculation of model in PyTorch

II. Link of Data and Code:

<https://drive.google.com/drive/folders/14bdSznyeVxt-aENMG1SzTiTY1MB7CU6Y?usp=sharing>

## III. Description

Task 1: Pretrained model mobilenet v3 large

In this task, you will use the pretrained mobilenet v3 large model for the mini cifar-10 dataset. This dataset has 10 folders. Each folder includes images with the same label. All your functions will be completed in the notebook.

* Finish the data preparation. (detailed grading terms please see Grading and Submission)
  + Design your transformation function.
  + Load the images from folders.
  + Clip the value for display.
* Design your pretrain model. (detailed grading terms please see Grading and Submission)
  + Define the pretrained model.
  + Get the feature number of the pretrained model.
  + Freeze all the parameters in the model.
  + Modify the last block of the network.
  + Set up your criterion(loss) and optimizer.
* Train your pretrained model. (detailed grading terms please see Grading and Submission)
  + Run your training process and train your network.
  + Go through the ipynb and plot the loss and the accuracy.

## IV. Grading and Submission

* The assignment will be evaluated in a total of 100 points. The basic scores are generally given based on the following table.

|  |
| --- |
| Pretrained model mobilenet v3 (100 points)   * Design your transformation function. (10’) * Get the feature number of the pretrained model. (10’) * Define the pretrained model. (20’) * Freeze all the parameters in the model and modify the last block of the network. (20’) * Use optimizer to update parameters in your model (20’) * Plot the losses and accuracy of train/val dataset (10’) * Get the prediction with one-iteration images.(10’) |

For each scale.

100% = perfectly correct

80% = minor flaw

60% = mostly incorrect

40% = totally incorrect

20% = do something

0=not do anything

* The assignment should be submitted s:
  + 1. All source code should be submitted to Brightspace as a single zip file with last name and VUID (e.g., “Huo\_huoy1.zip”).
* The deadline of submission is on the course website :[https://hrlblab.github.io/cs4267.html](https://hrlblab.github.io/CS4267.html)