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

**HW4(Seq28): 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. **All the code will be implemented in the notebook.** **Please finish this homework using Google Colab**.

* 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

In this task, you will use the pretrained mobilenet v3 model for the grocery dataset. This dataset has 25 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.

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| --- |
| 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)