Assignment 1
Image Classification 100 Pts

In this assignment, we will apply transfer learning to solving image classification task on the Intel Image Classification dataset. The dataset contains approximately 25,000 images of size 150x150 distributed under 6 categories:

{'building' : 0, 'forest' : 1, 'glacier' : 2, 'mountain' : 3, 'sea' : 4, 'street' : 5}

The Train, Test, and Prediction data is separated in each zip files. There are around 14,000 images in Train, 3,000 images in Test, and 7,000 images in Prediction. You may either download the data by click on the Kaggle link (a simple registration may be required with your email), or directly download it from Canvas.

You are required perform the following tasks:

- Create datasets and dataloaders for the Train, Test, and Prediction splits. You may consider using ImageFolder utility or Customer dataset. Use appropriate transforms for each dataset as data augmentation.
- Prepare the optimizer, loss function, and train/test functions for the model training/testing pipeline.
- Choose any CNNs (i.g., ResNet, DenseNet, AlexNet, VGG) that are pretrained on ImageNet and perform transfer learning on the Train/Test splits. Make sure that you implement two forms of transfer learning:
    1. ConvNet as fixed feature extractor
    2. Finetuning the entire ConvNet

    Report results of both 1 and 2 on the Prediction set. Compare and analyze the performance. Provide some comments to discuss the results.
- Submit all code to Canvas. You may either use Python scripts or Jupyter/Colab notebooks for your implementations.