Big Data Lab Assignment-8
CH18B067

Q1. The CIFAR10 dataset was downloaded from here. The training and test photos were saved to the path datasetname/train/classname/ and datasetname/test/classname/, respectively, after unpickling the pickle files corresponding to each batch.
On the CIFAR10 dataset, the Mobilnet v2 model, which was pre-trained on ImageNet, was used to predict. The following are the predictions:

label	mobilenetv2 prediction
frog	rock_python
bird	pinwheel
truck	bearskin
automobile	mousetrap
truck	oil_filter
truck	thresher
frog	jaguar
truck	moving_van
airplane	waffle_iron
automobile	panpipe
frog	sidewinder
truck	airliner
automobile	maraca
truck	thresher
frog	clog
truck	thresher
truck	moving_van
frog	jersey
truck	thresher
cat	fire_screen
truck	thresher
truck	moving_van
frog	sidewinder
truck	tobacco_shop
frog	custard_apple

only showing top 25 rows

Q2. The predicted labels do not perfectly match the genuine labels since the CIFAR10 dataset has different label names than ImageNet. Since the CIFAR10 dataset contains low-resolution versions of some of the frequent classes in the ImageNet dataset, we can still use the predicted and true labels to determine whether a model trained on the ImageNet dataset performs well or poorly on the CIFAR10 dataset. We can look at the top 5 predictions for each true label from a subset of 2500 guesses.

```
 ####### Top 5 predictions for class airplane #######
               counts
moving_van          7
assault_rifle       4
chain_saw           4
rock_beauty         4
thresher            4


 ####### Top 5 predictions for class automobile #######
                counts
moving_van         244
thresher            47
chain_saw           41
amphibian           25
cassette_player     15


 ####### Top 5 predictions for class bird #######
                 counts
fox_squirrel         10
three-toed_sloth      8
rock_beauty           5
bearskin              3
patas                 3


 ####### Top 5 predictions for class cat #######
                 counts
EntleBucher          10
fox_squirrel          7
bearskin              5
Japanese_spaniel      5
rock_beauty           4
```

```
####### Top 5 predictions for class deer #######
                            counts
fox_squirrel                    13
barn_spider                      5
sorrel                           5
cardoon                          4
German_short-haired_pointer      3


####### Top 5 predictions for class dog #######
                  counts
Japanese_spaniel      33
Dandie_Dinmont        11
English_foxhound       9
EntleBucher            6
otterhound             6


####### Top 5 predictions for class frog #######
                counts
fox_squirrel        51
sidewinder          35
rock_python         30
cardoon             24
rock_beauty         17


####### Top 5 predictions for class horse #######
                              counts
sorrel                            86
thresher                          17
hartebeest                        12
black-and-tan_coonhound           10
German_short-haired_pointer        9


####### Top 5 predictions for class ship #######
                counts
speedboat            8
moving_van           5
yawl                 4
Madagascar_cat       2
milk_can             2


####### Top 5 predictions for class truck #######
              counts
moving_van       332
thresher         133
chain_saw         25
paddlewheel       19
tobacco_shop      16
```

As may be seen from the preceding results, moving vans outperform trucks, vehicles, and aeroplanes. The top prediction is a ship, followed by a speedboat. Japanese Spaniel is the best predictor for dogs. The horse was anticipated to be a sorrel, which is another horse breed. On the other side, a cat was paired with a dog breed. The predictions for the other courses are illogical.

We use ResNet50, DenseNet121, and VGG19 to make predictions for comparison. Rather than retrieving the top five predictions like was done earlier, we choose to look at the top match presented in the table below:

True class\model	Mobilenet v2	ResNet50	DenseNet121	VGG19
Airplane	moving_van	letter_opener	moving_van	chain_saw
automobile	moving_van	moving_van	moving_van	moving_van
Bird	fox_squirrel	Limpkin	fox_squirrel	fox_squirrel
Cat	EntleBucher	fox_squirrel	fox_squirrel	fox_squirrel
Deer	fox_squirrel	fox_squirrel	fox_squirrel	fox_squirrel
Dog	Japanese_spaniel	Japanese_spaniel	Japanese_spaniel	Japanese_spaniel
Frog	fox_squirrel	tailed_frog	fox_squirrel	fox_squirrel
Horse	sorrel	sorrel	sorrel	sorrel
Ship	speedboat	speedboat	speedboat	speedboat
Truck	moving_van	moving_van	moving_van	moving_van

ResNet50 appears to be the higher performing model in the table above for the following reasons:
ResNet50 correctly predicted the bird and frog classes, whilst other models failed to do so. It is also important to note that Limpkin is a bird.
• In ResNet50, the aeroplane was predicted as a letter opener due to the comparable structure of both objects; in other classes, the predictions were similar in ResNet50 and other models. ResNet50 is the superior performing model since the bird and frog classes turned out to be surrogate for a tiebreaker.
