Image Classification of Car Models

Developed by: Elizabeth Thorpe, Jason Ren, Babak Mehroziad, Tien Nguyen, Omkar Kawade

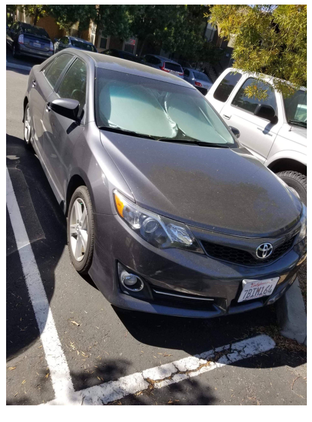
The Problem:

If someone takes an image of a car but has no idea what model it is, they can use our application to find the car model and year. Using image classification, it will provide the results along with how confident it is that the match is accurate.

The Dataset:

16,185 images of 196 classes of cars with labels describing make, model, and year. This dataset was downloaded from a devkit from Stanford. We used OpenCV to access the data.

The results:



```
Start processing image: data/test/JasonCar1.jpg
```

```
{'label': 'Toyota Camry Sedan 2012', 'prob': '0.6377'}
```

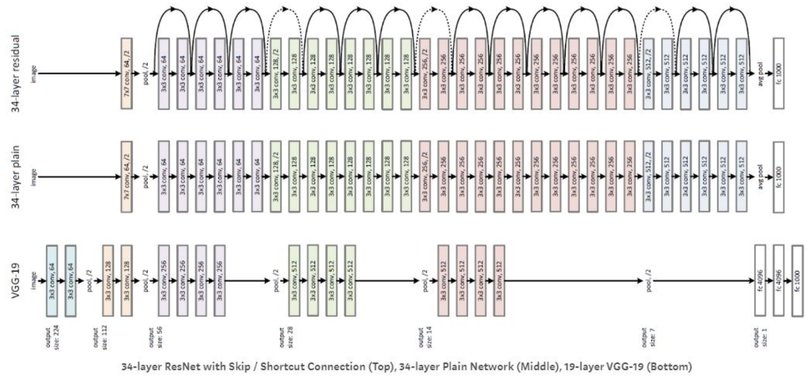
It was successfully classified as a Toyota Camry Sedan 2012 with an accuracy of 63.77%.

Preprocessing:

```
...

[[ 62  63  61]
 [ 57  58  56]
 [ 60  60  59]
 ...
 [ 73  73  73]
 [ 75  75  75]
 [ 92  92  92]]

[[ 57  58  56]
 [ 59  60  58]
 [ 59  60  58]
 ...
 [ 78  78  78]
 [ 82  82  82]
 [ 84  84  84]]

[[ 62  63  61]
 [ 56  57  55]
 [ 57  58  56]
 ...
 [ 77  77  77]
 [ 77  77  77]
 [ 76  76  76]]]
Processing and saving image: 08041.jpg at location: data/test/08041.jpg
```

The data is split into 8144 training and 8041 testing images and labels.

Training:



34-layer ResNet with Skip / Shortcut Connection (Top), 34-layer Plain Network (Middle), 19-layer VGG-19 (Bottom)

We used TensorFlow and Keras to train the model. On top of that, we used Resnet-152, a 152 layer deep neural network with a pretrained model on image classification.

Technologies:

TensorFlow, python, OpenCV, Keras, NumPy