Traffic Light Classification File

The purpose of the traffic light classification file, 'tl_classifier.py', is to determine whether a given traffic light is showing a red light or not. If the light is green, it is safe for the vehicle to proceed. If the light is yellow or red, the vehicle must come to a stop until the light changes. The main way a classification problem like this is approached is via neural networks. With a neural network for classification, the network is first fed test images of different traffic lights, with their ground truth labels, and the system is trained. This training is done on a large set of shuffled images so as to not incorporate bias in the data. Once the neural network has been trained, the weights are saved and the model can be used in 'tl_classifier.py' where a new image can be fed in real time and the light classification is performed. This classification has to be robust for both the simulator and Carla, the real-world Udacity autonomous vehicle.

The way we approached this problem was by using pretrained networks provided by tensorflow. This is done following the guidance from:

https://becominghuman.ai/traffic-light-detection-tensorflow-api-c75fdbadac62

and the githubs at:

https://github.com/level5-engineers/system-integration/wiki/Traffic-Light-Image-Classification

https://github.com/coldKnight/TrafficLight_Detection-TensorFlowAPI