# Draw Boxes around Traffic Lights in an image.
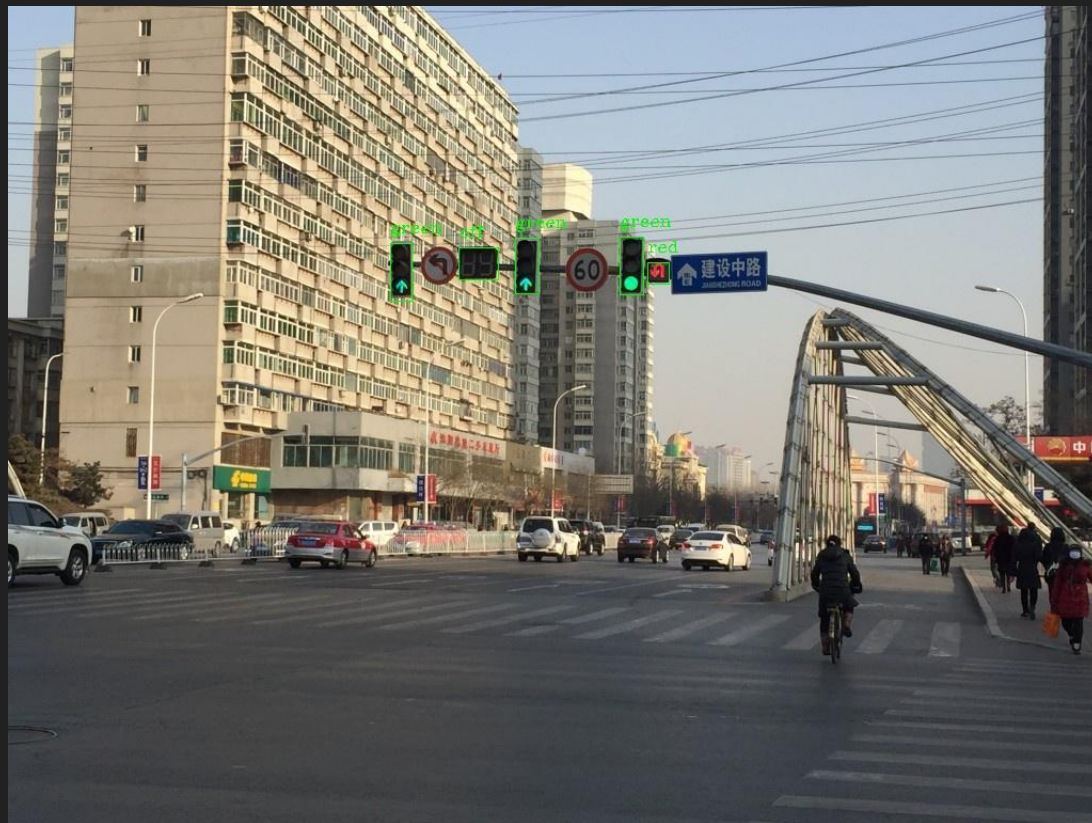
Using Python, OpenCV &
Faster R-CNN

Approach to the Problem

1. Since the number of images in the dataset are very few so I have used annotation tool to get the bounding box coordinates. The tool I've used is LabelImg.

2. Using the LabelImg tool I've generated xml files for each images.

3. Now I have used Two ways to perform the given task.
   - Using Python code that will take the input as image and its xml code.
   - Using the Faster R-CNN Model (Not so accurate due to small dataset)

4. At last we get the images with labelled state of Traffic Light

Some Output Generated
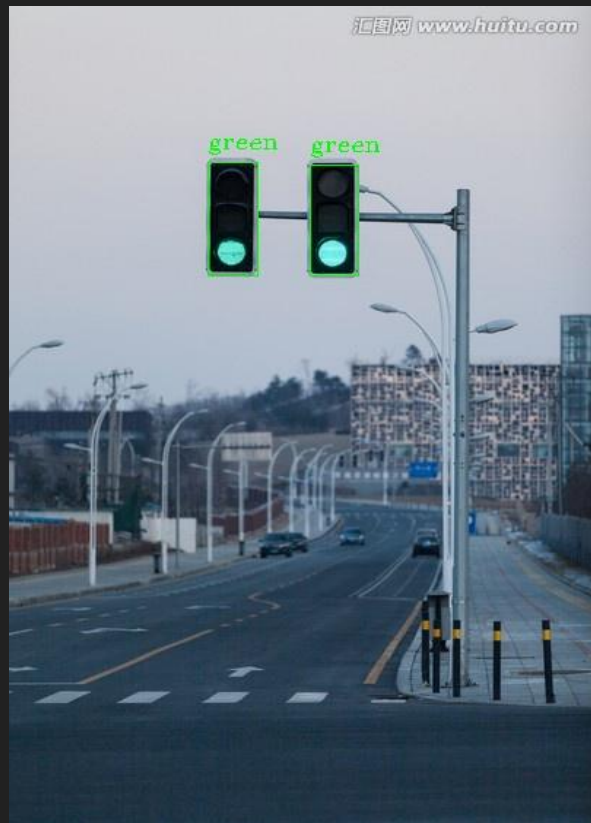
First Way to do the Task

Using Python and OpenCv

Step 1.

Using given Images and their respective xml files .I've extracted the state of traffic light and the coordinates of the rectangular box.

For extraction of data I've used following function in the code i.e,

1. extract_info() - Gives all the data into a list form.
2. chunks() - Divide the data into given by extract_info() into equal parts.

Step 2.

Using all the data we will create a DataFrame that will look something like this.

To do this we will take the use of preprocess_data() function.

	name	xmin	ymin	xmax	ymax
0	RedLeft	400.9011603007	127.5550920554	419.4872455661	172.6640828343
1	Green	603.8715360211	127.3617732319	624.9043196641	172.51887127
2	Green	970.7812671255	239.4006988086	990.4005182088	279.281341118
3	Green	1122.6516328224	192.340712575	1150.0883470575	248.0139010601

Step 3.

Using the DataFrame we will store all the values of xmin, ymin, xmax & ymax in the list format.

We will also store the state of traffic light using the DataFrame.

To achieve this we have used the min_max_values() function.

Step 4.

This is the final step where we are taking the xml file path and image path as input and simply using the OpenCV library we are displaying the image which contain

1. State of the light as text, that can be green,red,yellow or off as well.
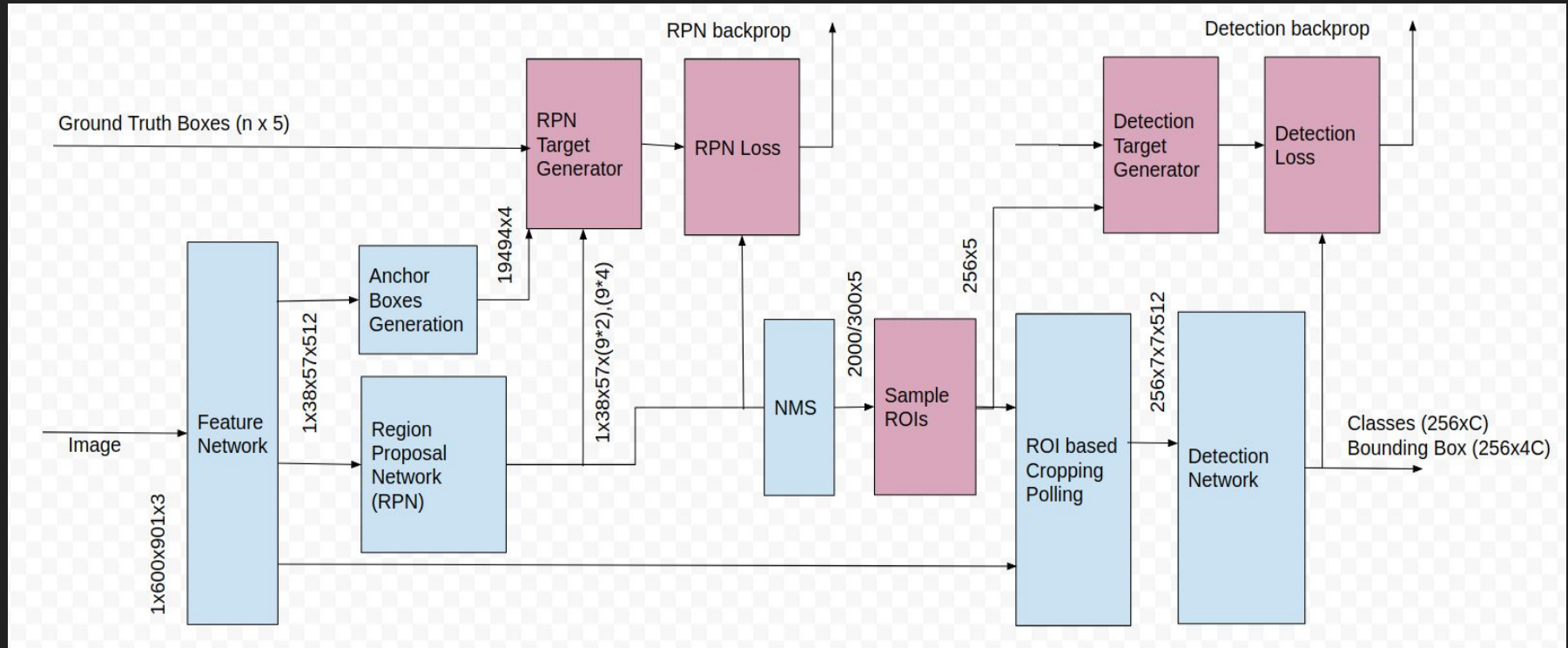2. A rectangular box around the light.

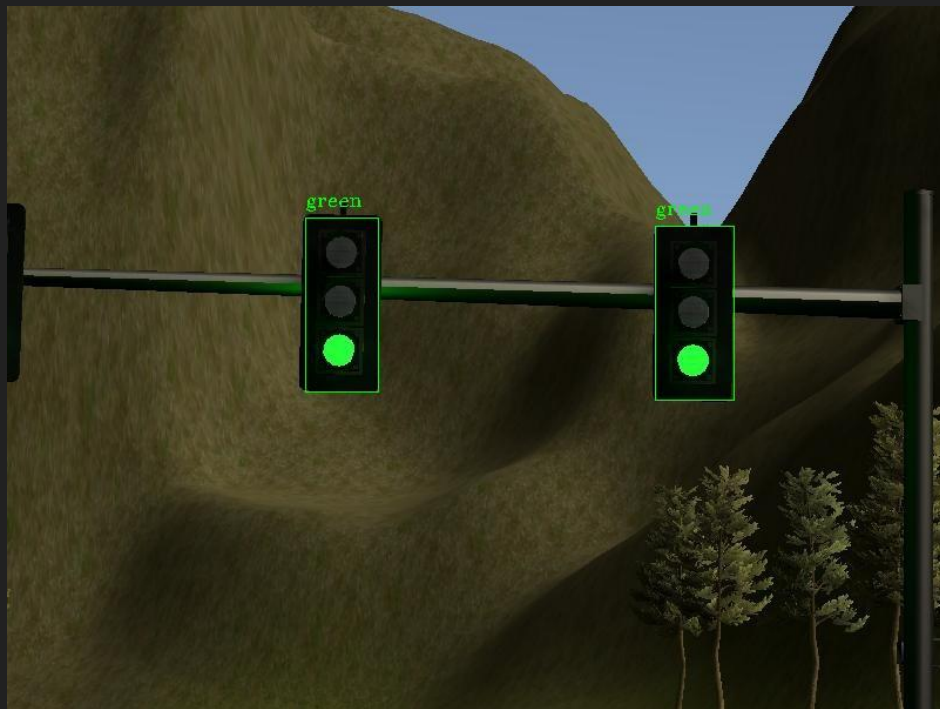# Second Way to do Task

Using Faster R-CNN

Architecture

Steps

1. In this all the preprocessing is done to get the DataFrame and all sort of things
2. After that I've make the dataset proper for the model
3. We have used Faster R-CNN pretrained model.

Some Outputs

Some Outputs

Thank You