```
In [81]: pip install opencv-python
```

Requirement already satisfied: opencv-python in c:\users\bita\anaconda3\lib\site-packages (4.6.0.66)
Requirement already satisfied: numpy>=1.17.3 in c:\users\bita\anaconda3\lib\site-packages (from opencv-python) (1.21.5)
Note: you may need to restart the kernel to use updated packages.

```
In [82]: pip install Pillow
```

Requirement already satisfied: Pillow in c:\users\bita\anaconda3\lib\site-packages (9.0.1)
Note: you may need to restart the kernel to use updated packages.

```
In [83]: pip install -U scikit-image
```

Requirement already satisfied: scikit-image in c:\users\bita\anaconda3\lib\site-packages (0.19.3)
Requirement already satisfied: packaging>=20.0 in c:\users\bita\anaconda3\lib\site-packages (from scikit-image) (21.3)
Requirement already satisfied: scipy>=1.4.1 in c:\users\bita\anaconda3\lib\site-packages (from scikit-image) (1.7.3)
Requirement already satisfied: PyWavelets>=1.1.1 in c:\users\bita\anaconda3\lib\site-packages (from scikit-image) (1.3.0)
Requirement already satisfied: numpy>=1.17.0 in c:\users\bita\anaconda3\lib\site-packages (from scikit-image) (1.21.5)
Requirement already satisfied: pillow!=7.1.0,!=7.1.1,!=8.3.0,>=6.1.0 in c:\users\bita\anaconda3\lib\site-packages (from scikit-image) (9.0.1)
Requirement already satisfied: imageio>=2.4.1 in c:\users\bita\anaconda3\lib\site-packages (from scikit-image) (2.9.0)
Requirement already satisfied: networkx>=2.2 in c:\users\bita\anaconda3\lib\site-packages (from scikit-image) (2.7.1)
Requirement already satisfied: tifffile>=2019.7.26 in c:\users\bita\anaconda3\lib\site-packages (from scikit-image) (2021.7.2)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in c:\users\bita\anaconda3\lib\site-packages (from packaging>=20.0->scikit-image) (3.0.4)
Note: you may need to restart the kernel to use updated packages.

```
In [85]: pip install python-resize-image
```

Requirement already satisfied: python-resize-image in c:\users\bita\anaconda3\l
ib\site-packages (1.1.20)
Requirement already satisfied: requests>=2.19.1 in c:\users\bita\anaconda3\lib
\site-packages (from python-resize-image) (2.27.1)
Requirement already satisfied: Pillow>=5.1.0 in c:\users\bita\anaconda3\lib\sit
e-packages (from python-resize-image) (9.0.1)
Requirement already satisfied: idna<4,>=2.5 in c:\users\bita\anaconda3\lib\site
-packages (from requests>=2.19.1->python-resize-image) (3.3)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\bita\anaconda3\li
b\site-packages (from requests>=2.19.1->python-resize-image) (2021.10.8)
Requirement already satisfied: charset-normalizer~=2.0.0 in c:\users\bita\anaco
nda3\lib\site-packages (from requests>=2.19.1->python-resize-image) (2.0.4)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\bita\anaconda3
\lib\site-packages (from requests>=2.19.1->python-resize-image) (1.26.9)
Note: you may need to restart the kernel to use updated packages.

```
In [86]: pip install -U albumentations --no-binary qudida,albumentations
```

```
Requirement already satisfied: albumentations in c:\users\bita\anaconda3\lib\si
te-packages (1.3.0)
Requirement already satisfied: numpy>=1.11.1 in c:\users\bita\anaconda3\lib\sit
e-packages (from albumentations) (1.21.5)
Requirement already satisfied: scipy in c:\users\bita\anaconda3\lib\site-packag
es (from albumentations) (1.7.3)
Requirement already satisfied: scikit-image>=0.16.1 in c:\users\bita\anaconda3
\lib\site-packages (from albumentations) (0.19.3)
Requirement already satisfied: PyYAML in c:\users\bita\anaconda3\lib\site-packa
ges (from albumentations) (6.0)
Requirement already satisfied: qudida>=0.0.4 in c:\users\bita\anaconda3\lib\sit
e-packages (from albumentations) (0.0.4)
Requirement already satisfied: opencv-python>=4.1.1 in c:\users\bita\anaconda3
\lib\site-packages (from albumentations) (4.6.0.66)
Requirement already satisfied: scikit-learn>=0.19.1 in c:\users\bita\anaconda3
\lib\site-packages (from qudida>=0.0.4->albumentations) (1.0.2)
Requirement already satisfied: typing-extensions in c:\users\bita\anaconda3\lib
\site-packages (from qudida>=0.0.4->albumentations) (4.1.1)
Requirement already satisfied: tifffile>=2019.7.26 in c:\users\bita\anaconda3\l
ib\site-packages (from scikit-image>=0.16.1->albumentations) (2021.7.2)
Requirement already satisfied: networkx>=2.2 in c:\users\bita\anaconda3\lib\sit
e-packages (from scikit-image>=0.16.1->albumentations) (2.7.1)
Requirement already satisfied: pillow!=7.1.0,!=7.1.1,!=8.3.0,>=6.1.0 in c:\user
s\bita\anaconda3\lib\site-packages (from scikit-image>=0.16.1->albumentations)
(9.0.1)
Requirement already satisfied: PyWavelets>=1.1.1 in c:\users\bita\anaconda3\lib
\site-packages (from scikit-image>=0.16.1->albumentations) (1.3.0)
Requirement already satisfied: imageio>=2.4.1 in c:\users\bita\anaconda3\lib\si
te-packages (from scikit-image>=0.16.1->albumentations) (2.9.0)
Requirement already satisfied: packaging>=20.0 in c:\users\bita\anaconda3\lib\s
ite-packages (from scikit-image>=0.16.1->albumentations) (21.3)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in c:\users\bita\anacon
da3\lib\site-packages (from packaging>=20.0->scikit-image>=0.16.1->albumentatio
ns) (3.0.4)
Requirement already satisfied: joblib>=0.11 in c:\users\bita\anaconda3\lib\site
-packages (from scikit-learn>=0.19.1->qudida>=0.0.4->albumentations) (1.1.0)
Requirement already satisfied: threadpoolctl>=2.0.0 in c:\users\bita\anaconda3
\lib\site-packages (from scikit-learn>=0.19.1->qudida>=0.0.4->albumentations)
(2.2.0)
Note: you may need to restart the kernel to use updated packages.
```

```
In [77]: pip install dimensions
```

```
Requirement already satisfied: dimensions in c:\users\bita\anaconda3\lib\site-p
ackages (0.0.2)
Note: you may need to restart the kernel to use updated packages.
```

```
In [79]: pip install python-math
```

```
Collecting python-math
  Downloading python_math-0.0.1-py3-none-any.whl (2.4 kB)
Installing collected packages: python-math
Successfully installed python-math-0.0.1
Note: you may need to restart the kernel to use updated packages.
```

```
In [80]: pip install image-processing
```

```
Collecting image-processing
  Downloading image_processing-0.0.1-py3-none-any.whl (379 kB)
Requirement already satisfied: matplotlib in c:\users\bita\anaconda3\lib\site-p
ackages (from image-processing) (3.5.1)
Requirement already satisfied: numpy in c:\users\bita\anaconda3\lib\site-packag
es (from image-processing) (1.21.5)
Requirement already satisfied: scikit-image>=0.16.1 in c:\users\bita\anaconda3
\lib\site-packages (from image-processing) (0.19.3)
Requirement already satisfied: scipy>=1.4.1 in c:\users\bita\anaconda3\lib\site
-packages (from scikit-image>=0.16.1->image-processing) (1.7.3)
Requirement already satisfied: PyWavelets>=1.1.1 in c:\users\bita\anaconda3\lib
\site-packages (from scikit-image>=0.16.1->image-processing) (1.3.0)
Requirement already satisfied: pillow!=7.1.0,!=7.1.1,!=8.3.0,>=6.1.0 in c:\user
s\bita\anaconda3\lib\site-packages (from scikit-image>=0.16.1->image-processin
g) (9.0.1)
Requirement already satisfied: tifffile>=2019.7.26 in c:\users\bita\anaconda3\l
ib\site-packages (from scikit-image>=0.16.1->image-processing) (2021.7.2)
Requirement already satisfied: networkx>=2.2 in c:\users\bita\anaconda3\lib\sit
e-packages (from scikit-image>=0.16.1->image-processing) (2.7.1)
Requirement already satisfied: imageio>=2.4.1 in c:\users\bita\anaconda3\lib\si
te-packages (from scikit-image>=0.16.1->image-processing) (2.9.0)
Requirement already satisfied: packaging>=20.0 in c:\users\bita\anaconda3\lib\s
ite-packages (from scikit-image>=0.16.1->image-processing) (21.3)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in c:\users\bita\anacon
da3\lib\site-packages (from packaging>=20.0->scikit-image>=0.16.1->image-proces
sing) (3.0.4)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\bita\anaconda3\lib
\site-packages (from matplotlib->image-processing) (1.3.2)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\bita\anaconda3
\lib\site-packages (from matplotlib->image-processing) (2.8.2)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\bita\anaconda3\lib
\site-packages (from matplotlib->image-processing) (4.25.0)
Requirement already satisfied: cycler>=0.10 in c:\users\bita\anaconda3\lib\site
-packages (from matplotlib->image-processing) (0.11.0)
Requirement already satisfied: six>=1.5 in c:\users\bita\anaconda3\lib\site-pac
kages (from python-dateutil>=2.7->matplotlib->image-processing) (1.16.0)
Installing collected packages: image-processing
Successfully installed image-processing-0.0.1
Note: you may need to restart the kernel to use updated packages.
```

```
In [160]: import cv2
          import numpy
          import pandas
          from PIL import Image
          from skimage import data, io, filters
          from resizeimage import resizeimage
          import matplotlib.pyplot as plt
          import matplotlib.image as mpimg
          import skimage
          from PIL.ExifTags import TAGS
```

```
In [161]: config_file = 'ssd_mobilenet_v3_large_coco_2020_01_14.pbtxt'
          frozen_model = 'frozen_inference_graph.pb'
```

```
In [162]: model = cv2.dnn_DetectionModel(frozen_model,config_file)
```

```
In [163]: classLables = [] #empty list of python
          file_name= 'Lables.txt'
          with open(file_name,'rt') as fpt:
              classLables = fpt.read().rstrip('\n').split('\n')
              #classLables.append(fpt.read())
```

```
In [164]: print(classLables)
```

```
['person', 'bicycle', 'car', 'motorbike', 'aeroplane', 'bus', 'train', 'truck',
 'boat', 'traffic light', 'fire hydrant', 'stop sign', 'parking meter', 'bench',
 'bird', 'cat', 'dog', 'horse', 'sheep', 'cow', 'elephant', 'bear', 'zebra', 'gi
 raffe', 'backpack', 'umbrella', 'handbag', 'tie', 'suitcase', 'frisbee', 'ski
 s', 'snowboard', 'sports ball', 'kite', 'baseball bat', 'baseball glove', 'skat
 eboard', 'surfboard', 'tennis racket', 'bottle', 'wine glass', 'cup', 'fork',
 'knife', 'spoon', 'bowl', 'banana', 'apple', 'sandwich', 'orange', 'broccoli',
 'carrot', 'hot dog', 'pizza', 'donut', 'cake', 'chair', 'sofa', 'pottedplant',
 'bed', 'diningtable', 'toilet', 'tvmonitor', 'laptop', 'mouse', 'remote', 'keyb
 oard', 'cell phone', 'microwave', 'oven', 'toaster', 'sink', 'refrigerator', 'b
 ook', 'clock', 'vase', 'scissors', 'teddy bear', 'hair drier', 'toothbrush']
```

```
In [165]: print(len(classLables))
```

```
80
```

```
In [166]: model.setInputSize(320,320)
          model.setInputScale(1.0/127.5) ## 255/2=127.5
          model.setInputMean((127.5,127.5,127.5)) ## mobilnet => [-1,1]
          model.setInputSwapRB(True)
```

Out[166]: < cv2.dnn.Model 000001EA1699F2F0>

```
In [174]: img = cv2.imread('yardbuses4.JPG')
```

```
In [175]: image_inf = Image.open('yardbuses4.JPG')
```

```
In [176]: # extract other basic metadata

          info_dict = {
              "Filename": image_inf.filename,
              "Image Size": image_inf.size,
              "Image Height": image_inf.height,
              "Image Width": image_inf.width,
              "Image Format": image_inf.format,
              "Image Mode": image_inf.mode,
              "Image is Animated": getattr(image_inf, "is_animated", False),
              "Frames in Image": getattr(image_inf, "n_frames", 1)
          }

          for label,value in info_dict.items():
              print(f"{label:25}: {value}")
```

```
Filename                 : yardbuses4.JPG
Image Size               : (840, 560)
Image Height             : 560
Image Width              : 840
Image Format             : JPEG
Image Mode               : RGB
Image is Animated        : False
Frames in Image          : 1
```

```
In [177]: # extract EXIF data

          exifdata = image_inf.getexif()
```

```
In [178]:    # looping through all the tags present in exifdata
             for tagid in exifdata:

                 # getting the tag name instead of tag id
                 tagname = TAGS.get(tagid, tagid)

                 # passing the tagid to get its respective value
                 value = exifdata.get(tagid)

                 # printing the final result
                 print(f"{tagname:25}: {value}")
```

```
In [179]:    print(type(image_inf))
```

```
<class 'PIL.JpegImagePlugin.JpegImageFile'>
```

```
In [180]:    image = skimage.img_as_float(img)
             plt.imshow(image)
```

```
Out[180]:    <matplotlib.image.AxesImage at 0x1ea156d00a0>
```



```
In [181]:    ClassIndex , confidece, bbox = model.detect(img, confThreshold=0.5)
```

```
In [182]:    print(ClassIndex)
```

```
[ 1 31  1  6 31 31  1  1 31  1]
```

```
In [183]: font_scale = 2
          font = cv2.FONT_HERSHEY_PLAIN
          for ClassInd, conf, boxes in zip(ClassIndex.flatten(), confidece.flatten(), bbox)
              #cv2.rectangle(frame, (x,y),(x+w , y+h),(255,0,0),2)
              #cv2.putText(img, text, (text_offset_x, text_offset_y), font, fontScale = for
              cv2.rectangle(img, boxes,(255, 0, 0), 2)
              cv2.putText(img, classLables[ClassInd-1] , (boxes[0]+10,boxes[1]+40) , font,
```

```
In [184]: plt.imshow(cv2.cvtColor(img, cv2.COLOR_BGR2RGB))
```

Out[184]: <matplotlib.image.AxesImage at 0x1ea0d10f220>
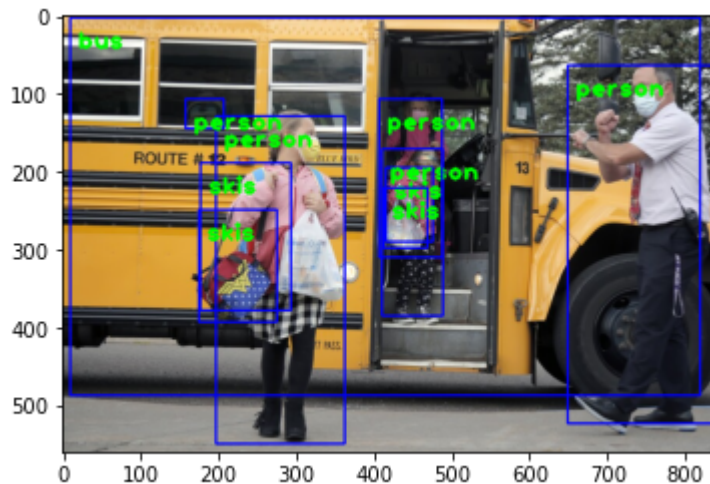

```
In [187]: cv2.imwrite("test.JPG",img)
```

Out[187]: True

```
In [ ]:
```