```
In [183... import cv2
         from matplotlib import pyplot as plt
         import numpy as np
         import imutils
         import easyocr
```

1. Read in Image, Grayscale

```
In [184... img = cv2.imread('../data/poor4.jpg')
         gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
         plt.imshow(cv2.cvtColor(gray,cv2.COLOR_BGR2RGB))
```
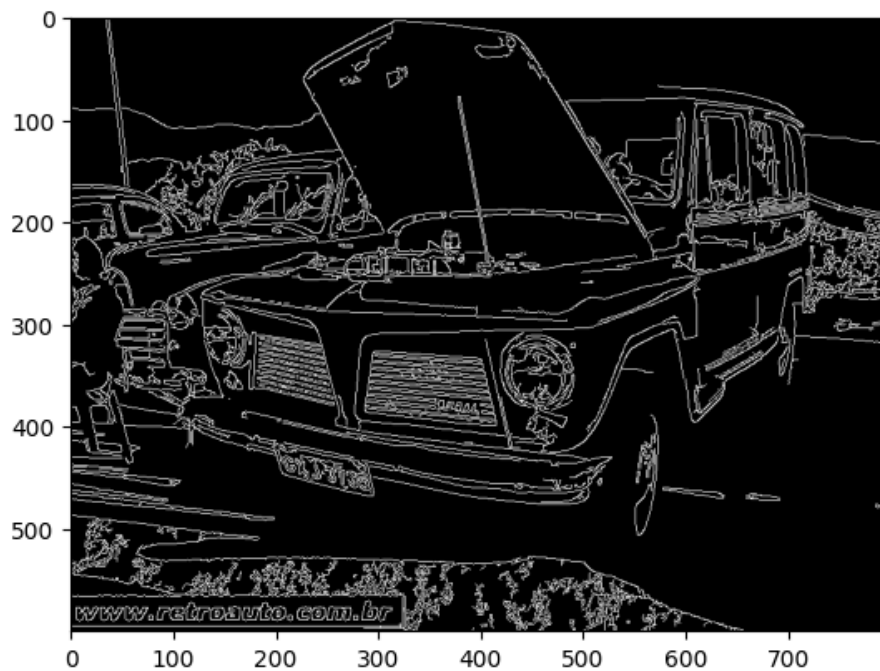
Out[184]:   <matplotlib.image.AxesImage at 0x2bdcaf8f0>

2. Apply filter and find edges for localization

```
In [185... bfilter = cv2.bilateralFilter(gray, 11, 17, 17) #Noise reduction
         edged = cv2.Canny(bfilter, 10, 200) #Edge detection
         plt.imshow(cv2.cvtColor(edged, cv2.COLOR_BGR2RGB))
```

Out[185]:   <matplotlib.image.AxesImage at 0x30c4be060>

3. Find contours and apply masks

```
In [186… keypoints = cv2.findContours(edged.copy(), cv2.RETR_TREE, cv2.CHAIN_APPROX_SIMPLE)
         contours = imutils.grab_contours(keypoints)
         contours = sorted(contours, key=cv2.contourArea, reverse=True)[:10]
```

```
In [187… location = None
         for contour in contours:
             approx = cv2.approxPolyDP(contour, 10, True)
             if len(approx) == 4:
                 location = approx
                 break
```
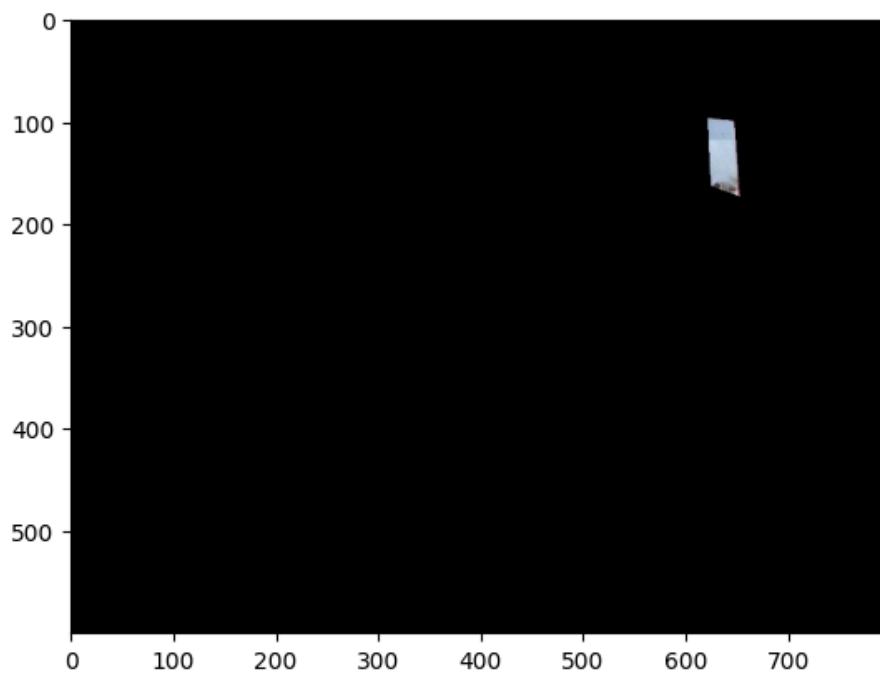
```
In [188… location
```

```
Out[188]: array([[[622,  97]],

                 [[625, 163]],

                 [[653, 173]],

                 [[647, 100]]], dtype=int32)
```

```
In [189… mask = np.zeros(gray.shape, np.uint8)
         new_image = cv2.drawContours(mask, [location], 0, 255, -1)
         new_image = cv2.bitwise_and(img, img, mask=mask)

         plt.imshow(cv2.cvtColor(new_image, cv2.COLOR_BGR2RGB))
```

```
Out[189]: <matplotlib.image.AxesImage at 0x3090696a0>
```
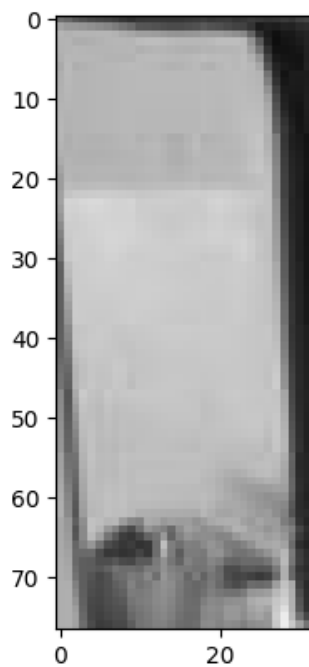
```
In [190... (x,y) = np.where(mask==255)
          (x1, y1) = (np.min(x), np.min(y))
          (x2, y2) = (np.max(x), np.max(y))
          cropped_image = gray[x1:x2+1, y1:y2+1]
```

```
In [191... plt.imshow(cv2.cvtColor(cropped_image, cv2.COLOR_BGR2RGB))
```

```
Out[191]: <matplotlib.image.AxesImage at 0x29e223320>
```


4. Use Easy OCR to Read Text

```
In [192... reader = easyocr.Reader(['en'])
          result = reader.readtext(cropped_image)
          result
```

```
Out[192]: []
```

5. Render Result

```
text = result[0][-2]
font = cv2.FONT_HERSHEY_SIMPLEX
res = cv2.putText(img, text=text, org=(approx[0][0][0], approx[1][0][1]+60), fontFace=font, fontS
                  thickness=2, lineType=cv2.LINE_AA)
res = cv2.rectangle(img, tuple(approx[0][0]), tuple(approx[2][0]), (0,255,0),3)
plt.imshow(cv2.cvtColor(res, cv2.COLOR_BGR2RGB))
```

```
---------------------------------------------------------------------------
IndexError                                Traceback (most recent call last)
Cell In[193], line 1
----> 1 text = result[0][-2]
      2 font = cv2.FONT_HERSHEY_SIMPLEX
      3 res = cv2.putText(img, text=text, org=(approx[0][0][0], approx[1][0][1]+60), fontFace=fon
t, fontScale=1, color=(0,255,0),
      4                       thickness=2, lineType=cv2.LINE_AA)

IndexError: list index out of range
```