```
In [45]:  import cv2
          from matplotlib import pyplot as plt
          import numpy as np
          import imutils
          import easyocr
```

1. Read in Image, Grayscale

```
In [46]:  img = cv2.imread('../data/image4.jpg')
          gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
          plt.imshow(cv2.cvtColor(gray,cv2.COLOR_BGR2RGB))
```
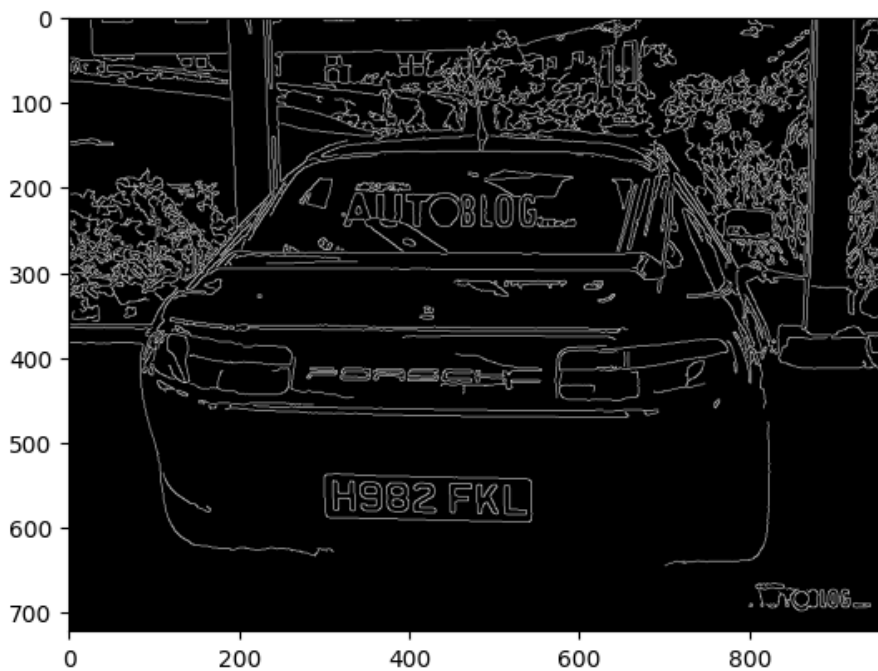
Out[46]: <matplotlib.image.AxesImage at 0x2adabec60>

2. Apply filter and find edges for localization

```
In [47]:  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[47]: <matplotlib.image.AxesImage at 0x2b501ec60>

3. Find contours and apply masks

```
In [48]:  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 [49]:  location = None
          for contour in contours:
              approx = cv2.approxPolyDP(contour, 10, True)
              if len(approx) == 4:
                  location = approx
                  break
```
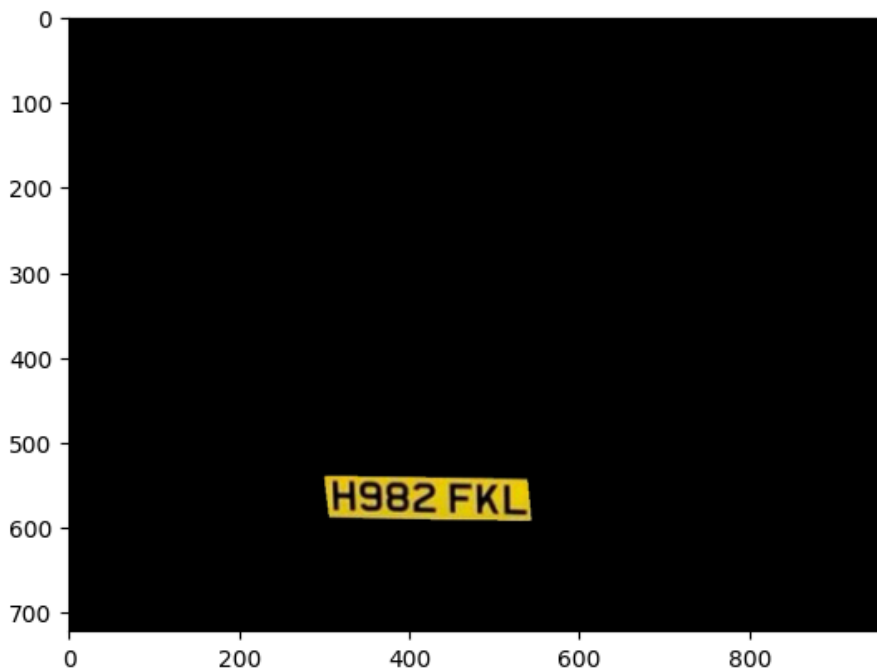
```
In [50]:  location
```

```
Out[50]:  array([[[300, 540]],

                 [[306, 589]],

                 [[543, 592]],

                 [[538, 543]]], dtype=int32)
```

```
In [51]:  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))
```
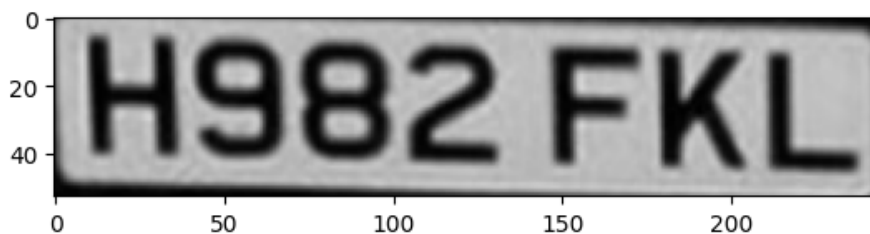
```
Out[51]:  <matplotlib.image.AxesImage at 0x2b50ba7e0>
```

```
In [52]: (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 [53]: plt.imshow(cv2.cvtColor(cropped_image, cv2.COLOR_BGR2RGB))
```

Out[53]: <matplotlib.image.AxesImage at 0x2b521b080>

4. Use Easy OCR to Read Text

```
In [54]: reader = easyocr.Reader(['en'])
         result = reader.readtext(cropped_image)
         result
```

Out[54]: [([[0, 0], [244, 0], [244, 53], [0, 53]],
          'H982 FKL',
          np.float64(0.9760790857510917))]

5. Render Result

```
In [55]: 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, fontSc
         res = cv2.rectangle(img, tuple(approx[0][0]), tuple(approx[2][0]), (0,255,0),3)
         plt.imshow(cv2.cvtColor(res, cv2.COLOR_BGR2RGB))
```

Out[55]: <matplotlib.image.AxesImage at 0x2ad9f1be0>