

OBJECTIVE

- To build a high recall Number Plate Detector System which will localize the number plate as the Region of Interest given the image of a Car/Vehicle.

ALGORITHM USED

1. Read the Image:-

```
image = cv2.imread(imagePath)
```



ALGORITHM USED

2. Convert Image to Grayscale:-

```
grayscaleImage = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
```



ALGORITHM USED

3. Noise Removal using Bilateral Filtering:-

```
noiseRemovedImage = cv2.bilateralFilter(grayScaleImage, 9, 75, 75)
```



ALGORITHM USED

4. Histogram Equalization for Improving Contrast:-

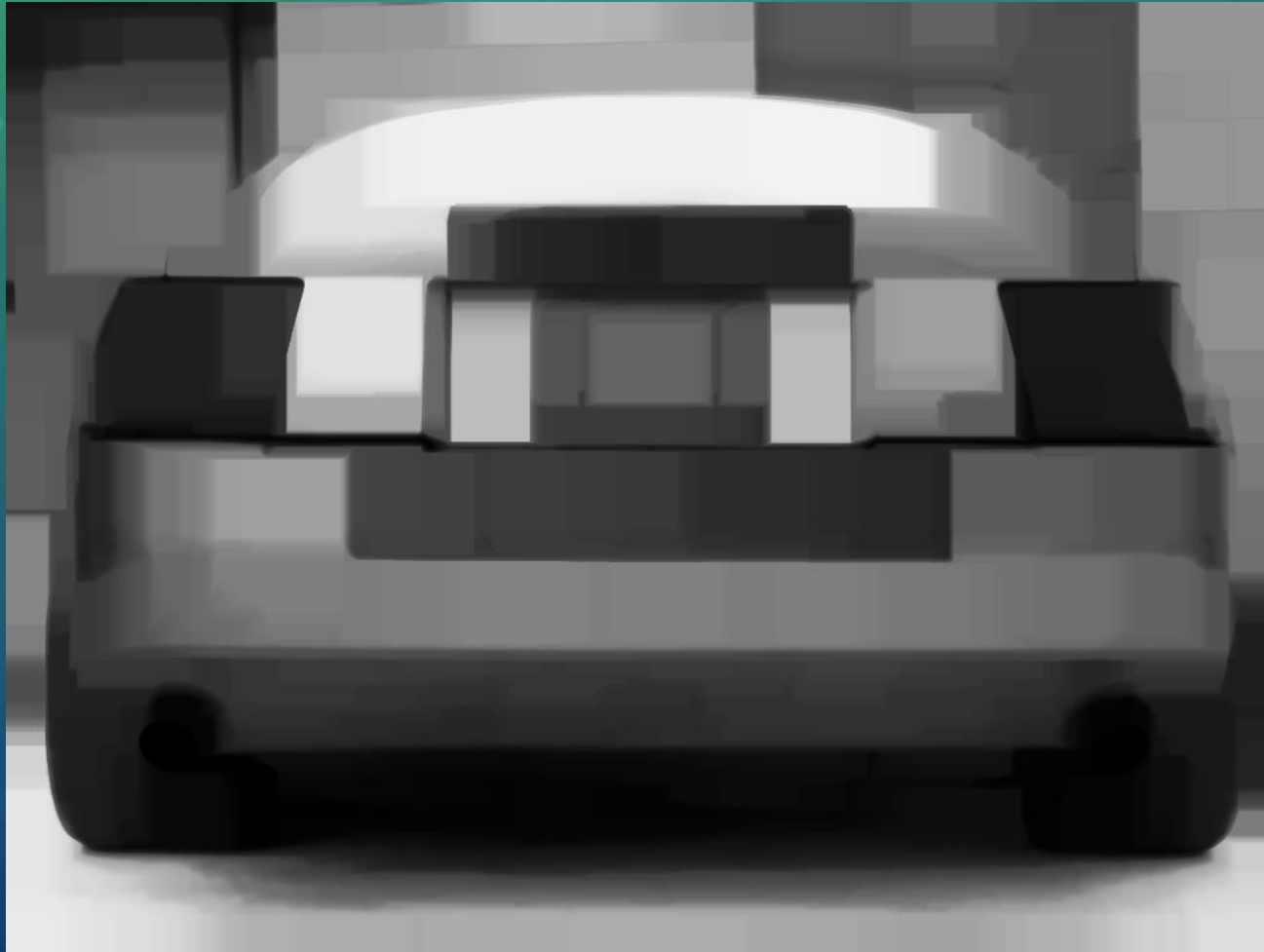
```
histEqImage = cv2.equalizeHist(image)
```



ALGORITHM USED

5. Morphological Opening of Histogram Equalized Image using 5x5 Kernel:-

```
morphImage = cv2.morphologyEx(histEqImage, cv2.MORPH_OPEN, structElem, iterations=15)
```



ALGORITHM USED

6. Subtracting the morphed image from Histogram Equalized Image:-

```
subtractedImage = cv2.subtract(histEqImage, morphImage)
```



ALGORITHM USED

7. Thresholding subtracted image:-

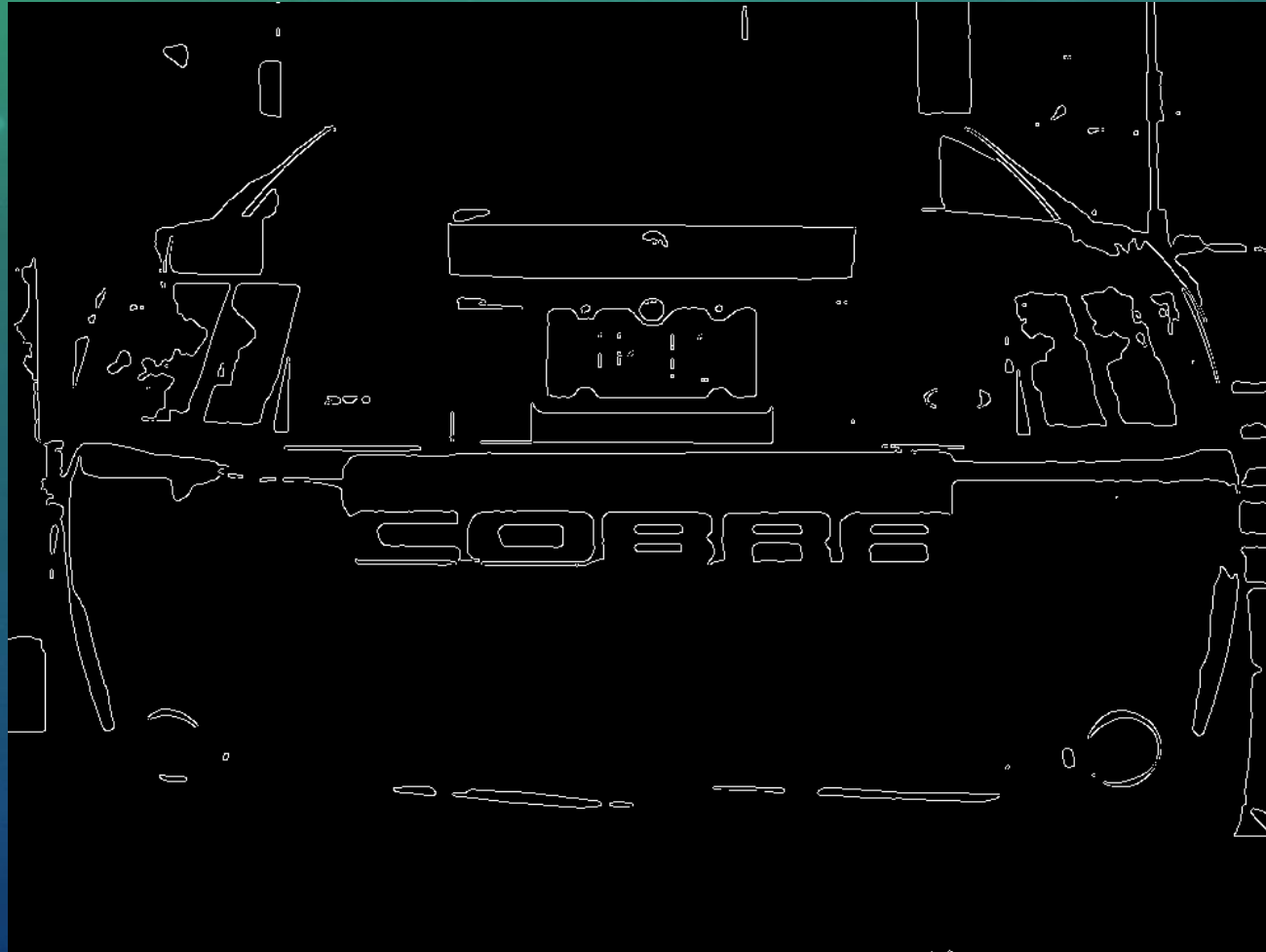
```
threshImage = cv2.threshold(subtractedImage, 0, 255, cv2.THRESH_OTSU)
```



ALGORITHM USED

8. Canny Edge Detection:-

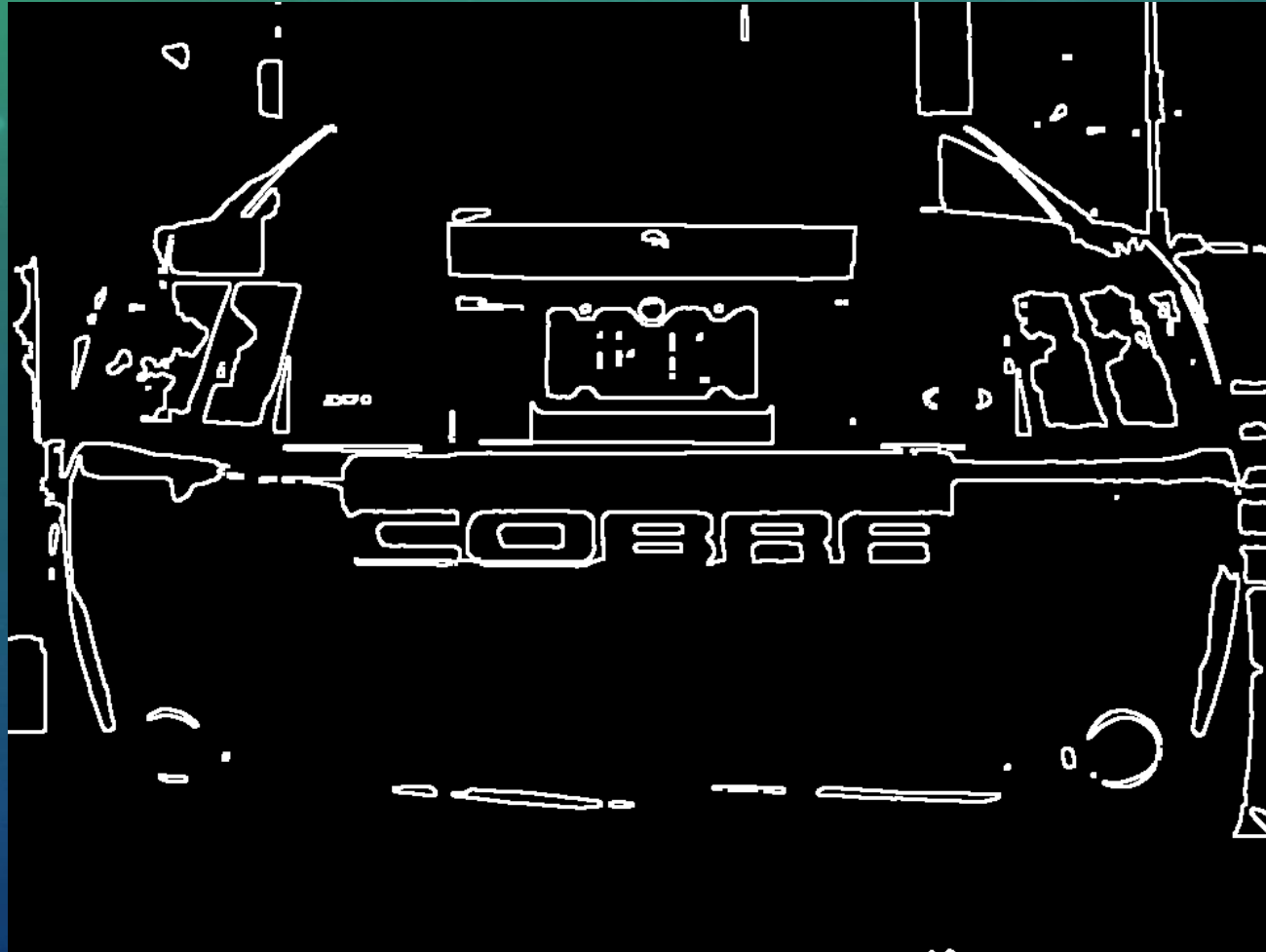
```
edgeDetectedImage = cv2.Canny(threshImage, threshold1=250, threshold2=255)
```



ALGORITHM USED

9. Dilation of Edges for better Contour Detection using 3x3 Kernel:-

```
dilatedImage = cv2.dilate(edgeDetectedImage, structElem, iterations=1)
```



ALGORITHM USED

10. Contour Detection and Polygon Approximation to find Number Plate:-

1. `contours = cv2.findContours(image, cv2.RETR_TREE, cv2.CHAIN_APPROX_SIMPLE)`
2. `approximatedPolygon = cv2.approxPolyDP(contour, 0.06*contourPerimeter, closed=True)`



The background is a gradient of green and blue, with a subtle pattern of white dots. On the left side, there are several white circular elements: a large semi-circular scale with degree markings from 140 to 260, and several smaller concentric circles with arrows indicating clockwise or counter-clockwise rotation. The text "THANK YOU" is positioned on the right side of the image.

THANK YOU