Project Report

Software Development

Topic: Vehicle Number Identification Using License Plate and Automatic Opening of Parking Gates

Group number – 31

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Design

An **Automatic Number Plate Recognition (ANPR)** is a computer vision project that detects and recognizes vehicle license plates from images or video streams.

The ANPR project typically involves capturing the license plate image using cameras, pre-processing the image (such as cropping, contrast stretching, and noise reduction), extracting the characters from the image, and finally recognizing the characters using **Optical Character Recognition (OCR).**

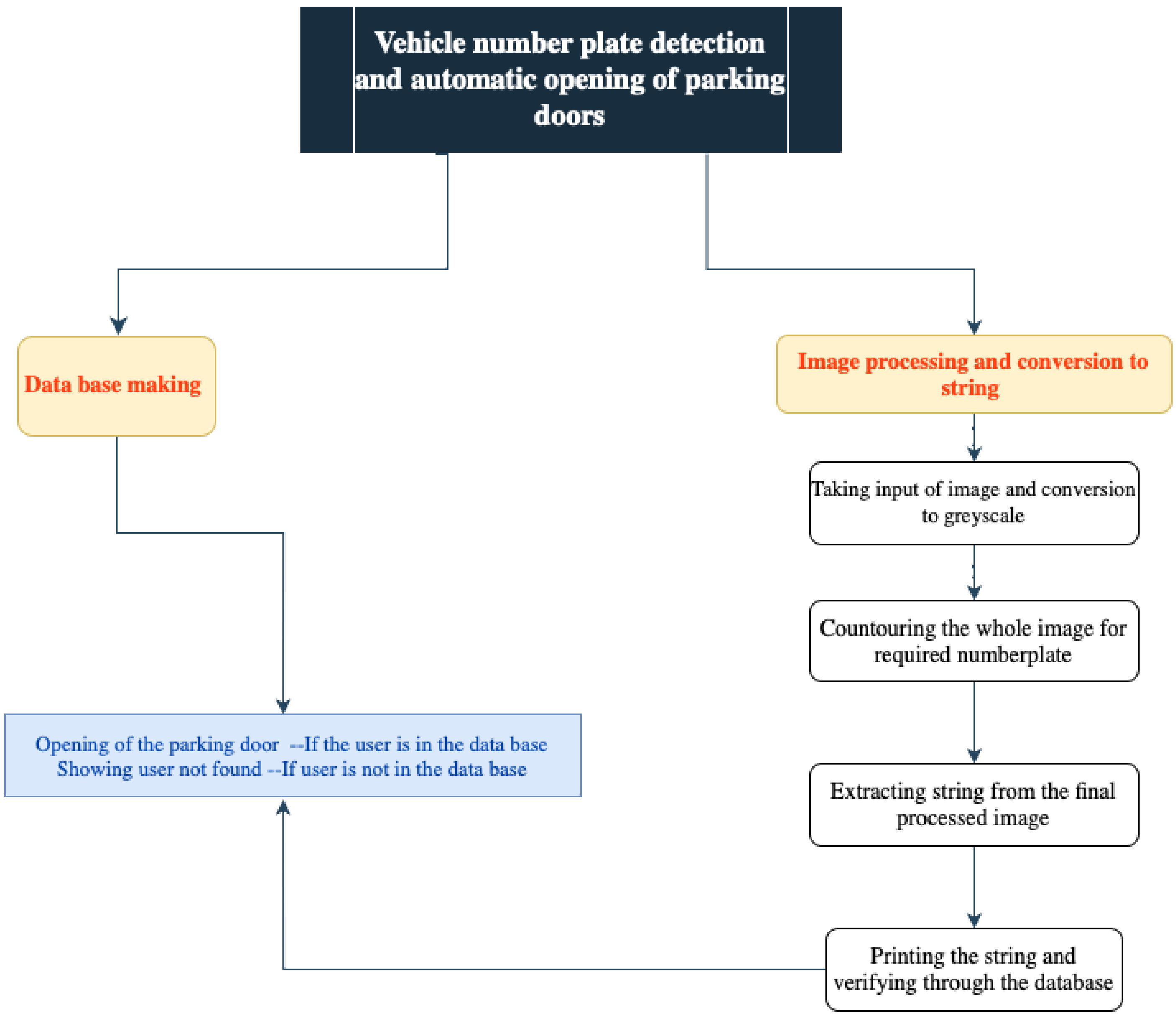
OpenCV is an open-source computer vision library that is used for image processing and computer vision tasks. It can be used to capture the license plate images, resize them, and apply various image processing techniques.

PyTesseract is a wrapper for the Tesseract OCR engine, an open-source OCR engine developed by Google. It can be used to recognize the characters from the license plate images.

Working of the Project

OpenCV is used to detect the contours of the number plate in the image and isolate it from the rest of the vehicle. After this, **Pytesseract** is used to recognize the characters on the number plate. These characters are then compared with the entries in the **SQL database**. If a match is found, it is assumed that the person is a registered user and **the parking gates are opened**.

Flowchart of the project


Vehicle number plate detection and automatic opening of parking doors
Data base making
Image processing and conversion to string
Taking input of image and conversion to greyscale
Countouring the whole image for required numberplate
Extracting string from the final processed image
Printing the string and verifying through the database
Opening of the parking door --If the user is in the data base
Showing user not found --If user is not in the data base

Codes

```
print("WELCOME TO VEHICLE NUMBER PLATE RECOGNITION AND AUTOMATIC OPENING OF PARKING
GATES")

import mysql.connector

cn = mysql.connector.connect(host = "localhost", user = "root",passwd =
"2003",database="licenseplate")
print("connected to:", cn)

c = cn.cursor()

def create_table():
    c.execute('CREATE TABLE VehicleDetails (Serial REAL, Brand TEXT,  Vehicle_Number
TEXT)')

def data_entry():
        c.execute("INSERT INTO VehicleDetails  VALUES(1 , 'MAHINDRA', 'MH 04 JM 8765')")
        c.execute("INSERT INTO VehicleDetails  VALUES(2 , 'FORD', 'MH12DE1433')")
        c.execute("INSERT INTO VehicleDetails  VALUES(3 , 'TATA', 'KL 65 H 4383')")
        cn.commit()

print("THE PARKING DATABASE")

def read_table():
    query="select * from VehicleDetails"
    c.execute(query)
    result = c.fetchall()
    for row in result:
        print(row, '\n')

create_table()
data_entry()
read_table()
```

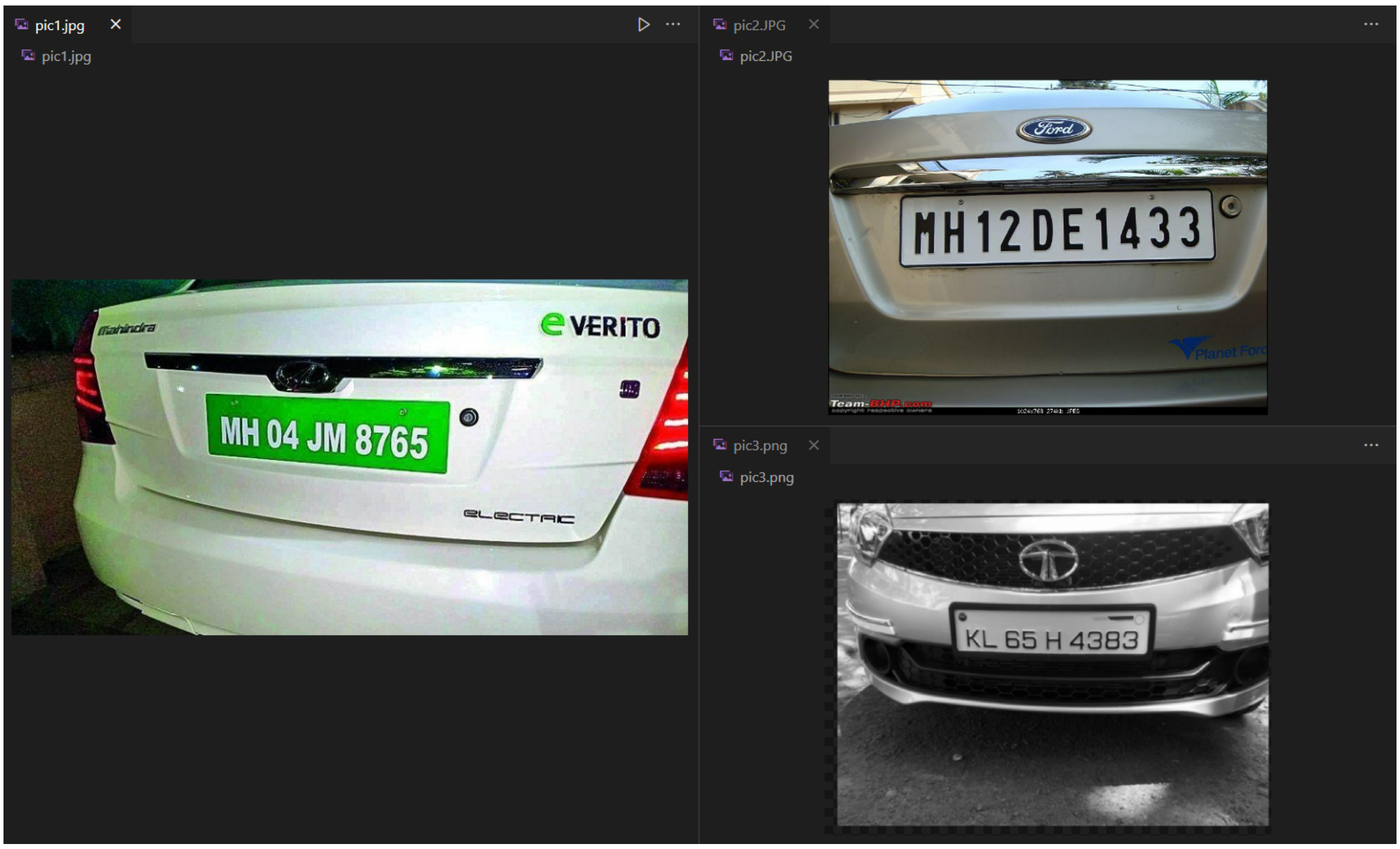
```
import cv2
import imutils
import pytesseract
```

```python
pytesseract.pytesseract.tesseract_cmd = "C:\\Program Files\\Tesseract-OCR\\tesseract.exe"

a=input("Enter name of the image file:")
b=input("Enter the file type(png/jpg/jpeg/JPG) of the image file:")

original_image = cv2.imread(a +"."+ b)
original_image = imutils.resize(original_image, width=500 )
gray_image = cv2.cvtColor(original_image, cv2.COLOR_BGR2GRAY)
gray_image = cv2.bilateralFilter(gray_image, 11, 17, 17)
edged_image = cv2.Canny(gray_image, 30, 200)
contours, new = cv2.findContours(edged_image.copy(), cv2.RETR_LIST,
cv2.CHAIN_APPROX_SIMPLE)
img1 = original_image.copy()
cv2.drawContours(img1, contours, -1, (0, 255, 0), 3)
cv2.imshow("img1", img1)

contours = sorted(contours, key = cv2.contourArea, reverse = True)[:30]

# stores the license plate contour
screenCnt = None
img2 = original_image.copy()

# draws top 30 contours
cv2.drawContours(img2, contours, -1, (0, 255, 0), 3)
cv2.imshow("img2", img2)

count = 0
idx = 7

for c in contours:
    # approximate the license plate contour
    contour_perimeter = cv2.arcLength(c, True)
    approx = cv2.approxPolyDP(c, 0.018 * contour_perimeter, True)

    # Look for contours with 4 corners
    if len(approx) == 4:
        screenCnt = approx

        # find the coordinates of the license plate contour
        x, y, w, h = cv2.boundingRect(c)
        new_img = original_image [ y: y + h, x: x + w]

        # stores the new image
        cv2.imwrite('./'+str(idx)+'.png',new_img)
        idx += 1
        break

# draws the license plate contour on original image
cv2.drawContours(original_image , [screenCnt], -1, (0, 255, 0), 3)
cv2.imshow("detected license plate", original_image )

# filename of the cropped license plate image
cropped_License_Plate = './7.png'
cv2.imshow("cropped license plate", cv2.imread(cropped_License_Plate))
```

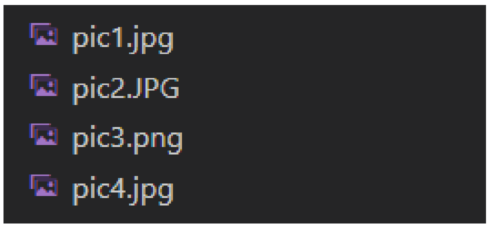
```
data = pytesseract.image_to_string(cropped_License_Plate, lang='eng', config='--psm 6')
print("\nDETECTED VEHICLE NUMBER IS:", data)

#PARKING GATE
print("vehicle number plate in database are the following:\n1. MH 04 JM 8765\n2.
MH12DE1433\n3. KL 65 H 4383")
user_entry=input("DETECTED VEHICLE NUMBER IS:")
if user_entry == 1 or 2 or 3:
    print("WELCOME TO THE PARKING LOT!! \n THE GATE IS OPENING FOR YOUR VEHICLE")
else:
    print("YOUR VEHCILE IS NOT ALLOWED \n AS IT IS NOT IN THE DATABASE, CONTACT ADMIN TO
ENTER THE PARKING LOT!")

cv2.waitKey(0)
cv2.destroyAllWindows()
```

Outputs

Sample plates we will use to test the code:

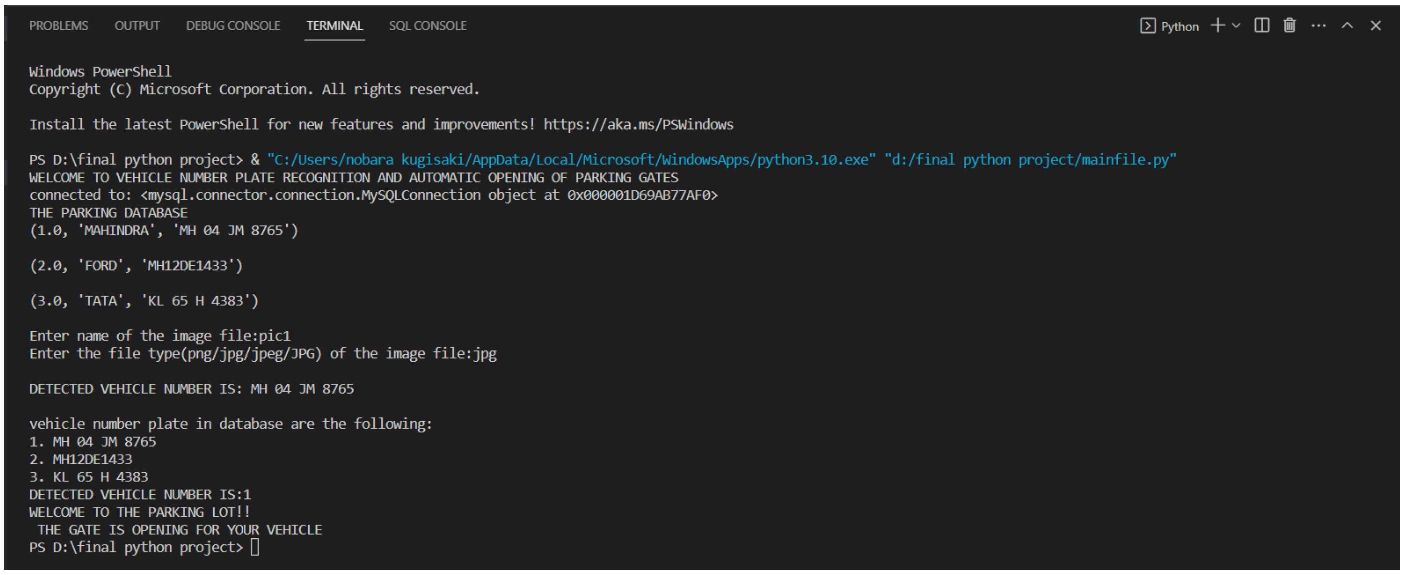


Sample plate file with their filetypes:



pic1.jpg
pic2.JPG
pic3.png
pic4.jpg

Final output of the code:



```
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS D:\final python project> & "C:/Users/nobara kugisaki/AppData/Local/Microsoft/WindowsApps/python3.10.exe" "d:/final python project/mainfile.py"
WELCOME TO VEHICLE NUMBER PLATE RECOGNITION AND AUTOMATIC OPENING OF PARKING GATES
connected to: <mysql.connector.connection.MySQLConnection object at 0x000001D69AB77AF0>
THE PARKING DATABASE
(1.0, 'MAHINDRA', 'MH 04 JM 8765')

(2.0, 'FORD', 'MH12DE1433')

(3.0, 'TATA', 'KL 65 H 4383')

Enter name of the image file:pic1
Enter the file type(png/jpg/jpeg/JPG) of the image file:jpg

DETECTED VEHICLE NUMBER IS: MH 04 JM 8765

vehicle number plate in database are the following:
1. MH 04 JM 8765
2. MH12DE1433
3. KL 65 H 4383
DETECTED VEHICLE NUMBER IS:1
WELCOME TO THE PARKING LOT!!
 THE GATE IS OPENING FOR YOUR VEHICLE
PS D:\final python project> 
```
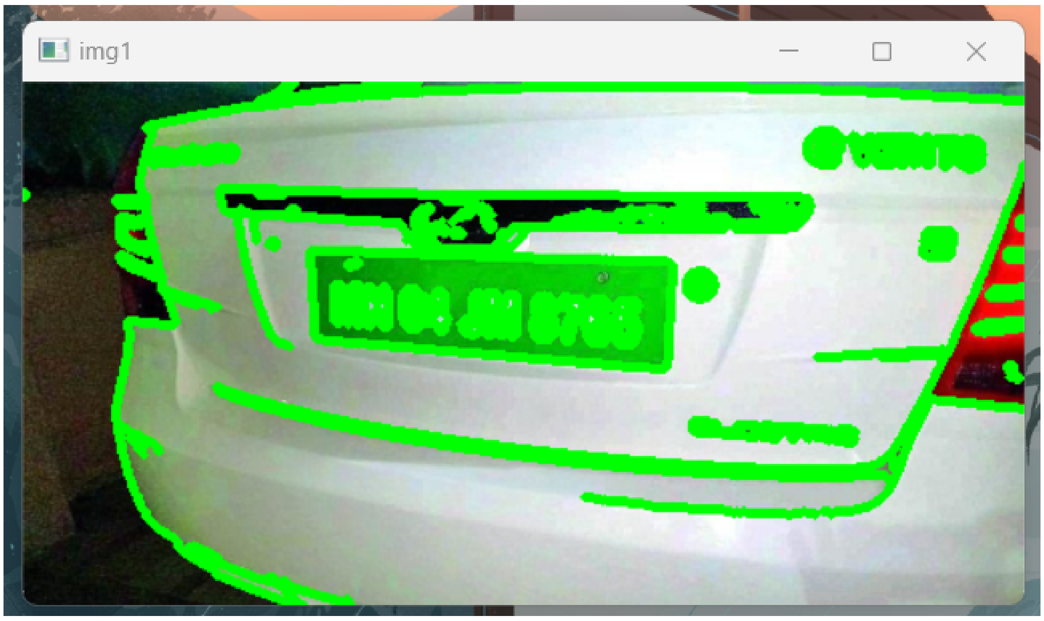
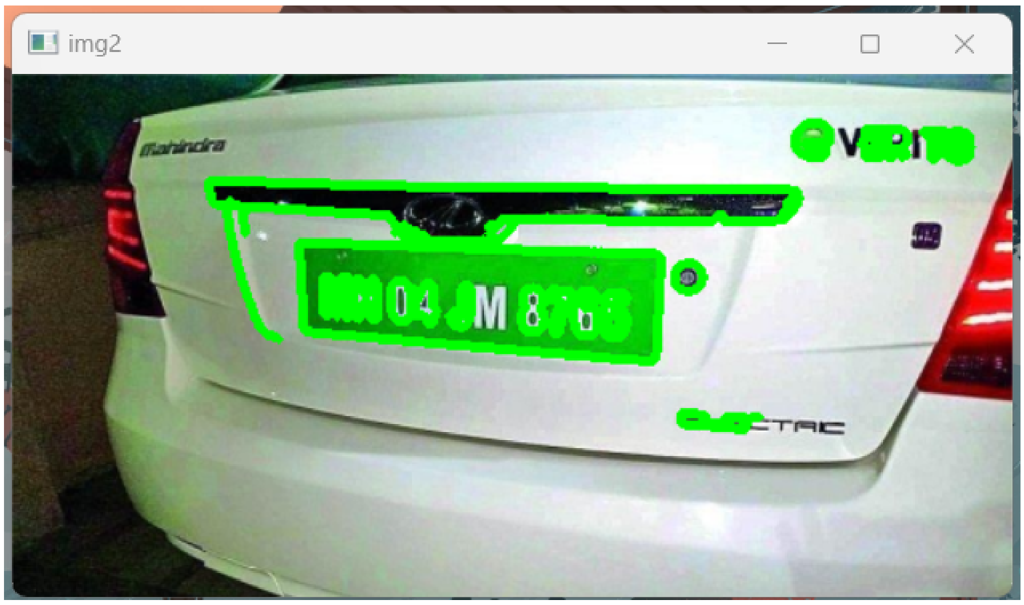

Steps of how the code extracted the number plate:

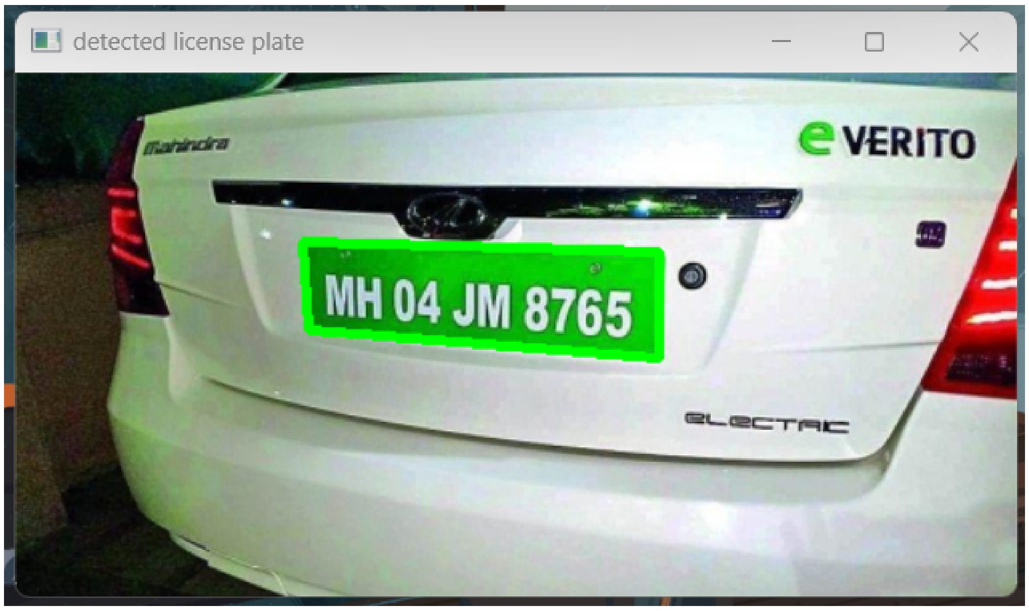
1. Finding the Contours



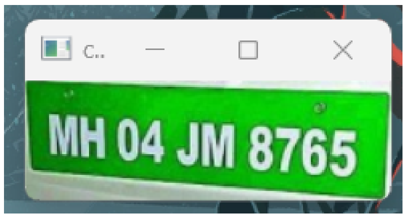
2. Sorting the Contours



3. Looping Over the Top 30 Contours and identifying the contour containing the number plate.



4. Displaying the final cropped license plate detected.


c..
MH 04 JM 8765