Digital Image Processing

Project

Project Name: Car Number Plate Recognition System

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Introduction on project
and its application

Introduction

Number Plate Recognition system is a technology for automatically reading vehicle number plates. It is used by police forces around the world for law enforcement purposes, including to check if a vehicle is registered or licensed. It is also used for

- o Parking lots

- o Controlling traffic over the roads
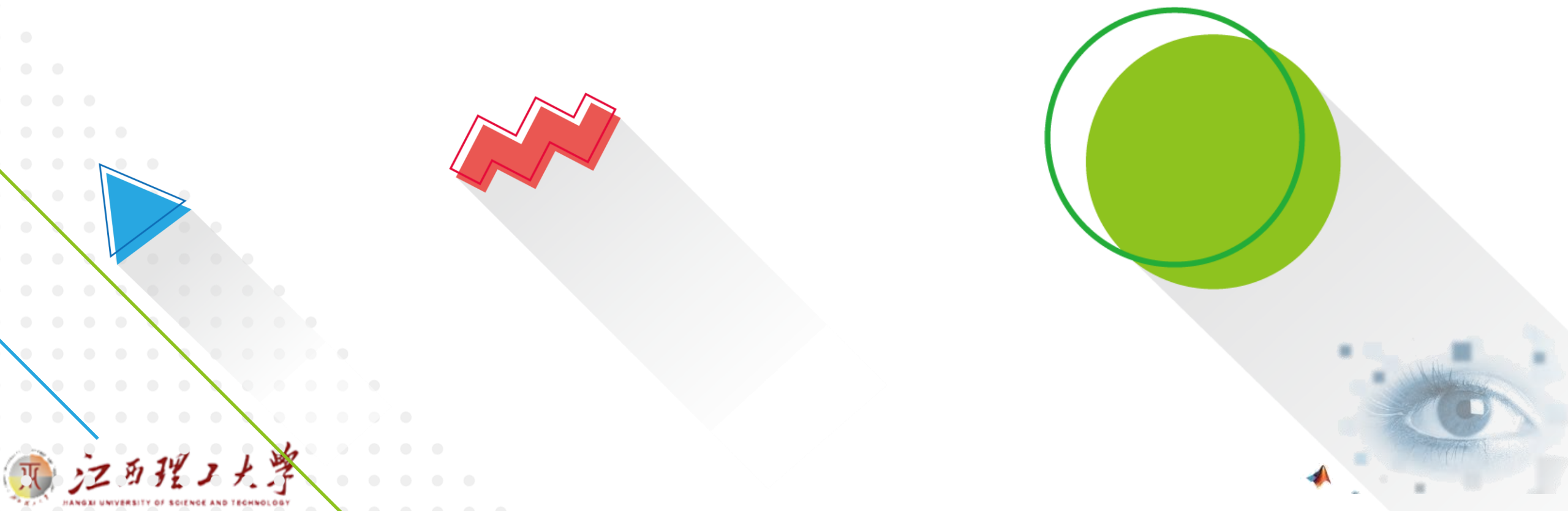
- o Petrol Pumps

- o Shopping Malls

- o Hospitals

- o Defense Military check points

- o Airports

- o Highways

- o Toll booths

- o Hotels

Introduction

I took approach for the recognition of number plate using MATLAB Image Processing. Many a times images are noisy, different countries have different patterns for license plates. This makes the task very difficult. So it becomes very important to select proper algorithm for this purpose.
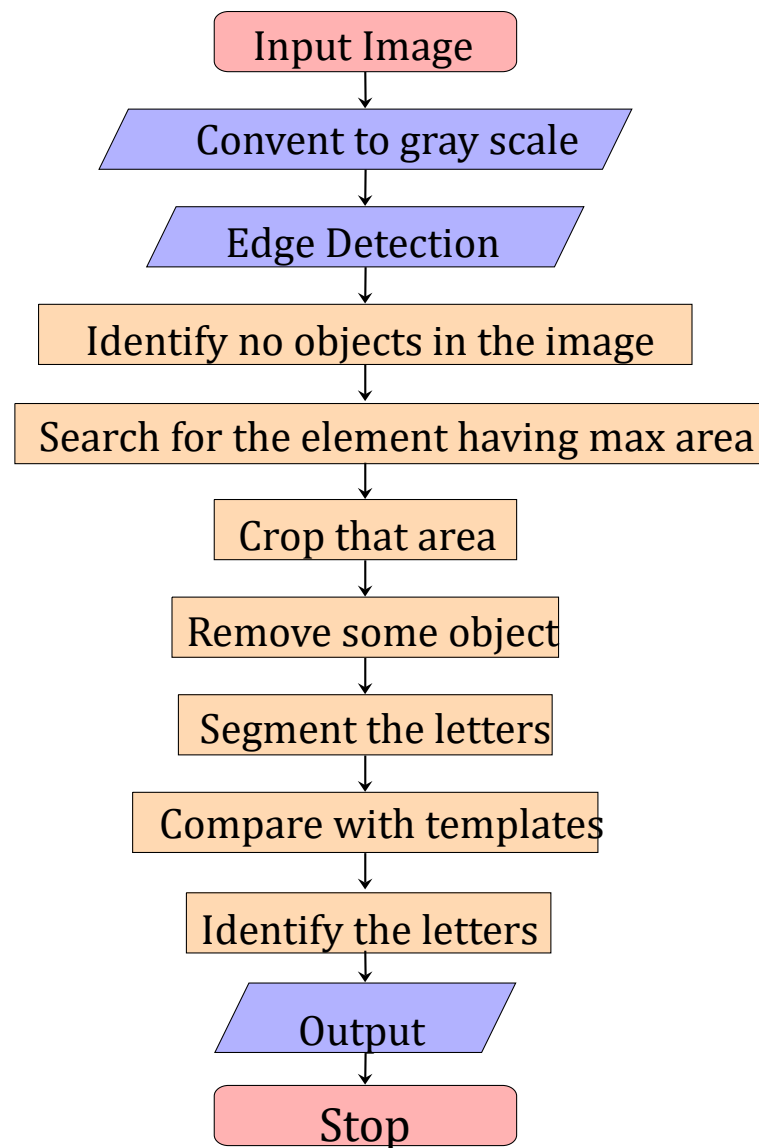
PART | 02

Project code
Project result and clips

Step of Get Result

Input Image
↓
Convent to gray scale
↓
Edge Detection
↓
Identify no objects in the image
↓
Search for the element having max area
↓
Crop that area
↓
Remove some object
↓
Segment the letters
↓
Compare with templates
↓
Identify the letters
↓
Output
↓
Stop

Methodology

I developed my own algorithm with the help of Matlab website (mathwork) and analyzing different built-in functions of MATLAB . There are three main steps:

| Localization of the plate | Segmentation of the characters | Detection |

Code

```matlab
R=im1(:,:,1);
G=im1(:,:,2);
B=im1(:,:,3);
imgray=(0.114 .*R)+(0.587 .*G)+(0.299 .*B);
subplot(222);imshow(imgray);title('rgbtogray image');
```
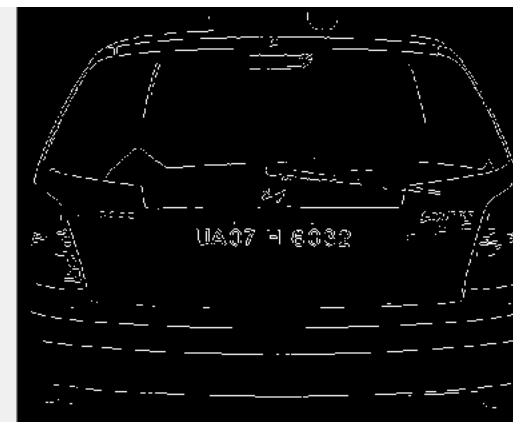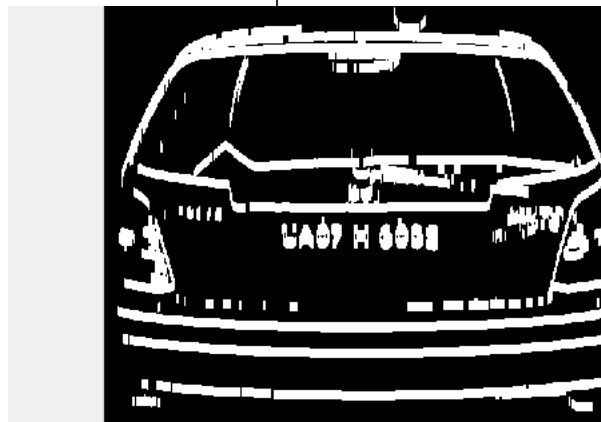

rgbtogray image

```matlab
Iprops=regionprops(imer1,'BoundingBox','Area', 'Image');
area = Iprops.Area;
count = numel(Iprops);
maxa= area;
boundingBox = Iprops.BoundingBox;
for i=1:count
    if maxa<Iprops(i).Area
        maxa=Iprops(i).Area;
        boundingBox=Iprops(i).BoundingBox;
    end
end
```

Code

```
im2 = imcrop(Z, boundingBox);
subplot(222);imshow(im2);title('P l a t e');
imbn = imbinarize(im2);
subplot(223);imshow(im2);title('Binary');
se_n = strel('disk',1);
```

```
op1 = imopen(imbn, se_n);
target1 = imcomplement(op1);
subplot(224);imshow(target1);title('Binary Enhanced');
```

P l a t e

UA07 H 6032

Binary Enhanced

UA07 H 6032

About Experimental Results

This section presents the simulation results of the developed CNPR system. Different images of cars having different colors and structure types are taken and stored in PC. The screenshot of the simulation and are displays below. Two original images of vehicle are shown:

PART | 03

**Important
Used function**

Important Function

1. imread() -This command is used to open the image into the MATLAB from the target folder.

2. rgb2gray() -This command is used to convert the RGB image into grayscale format.

3. imbinarize() -This command is used to Binarize 2-D grayscale image or simply we can say it converts the image into black and white format.

4. edge()- This command is used to detect the edges in the image, by using various methods like Roberts, Sobel, Prewitt and many others.

Important Function

5. regionprops()- This command is used to measure properties of image region.

6. numel() - This command is used to calculate the number of array elements.

7. imcrop() - This command is used to crop the image in the entered size.

8. bwareaopen() - This command is used to remove small objects from binary image.

PART | 04

Conclusion

Conclusion

i have implemented number plate recognition. My algorithm successfully detects the number plate region from the image which consists of vehicle number & then character segmentation, recognition .I have applied my algorithm on many images and found that it successfully recognition. The project was designed keeping in mind the automation of the number plate detection system for security reason that could replace the current system of manual entry. This project was a success in recording the number plate of a vehicle although it has got its own limitation of image processing and other hardware requirements

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