

**CSE-4019: IMAGE PROCESSING
J-COMPONENT PROJECT
REVIEW-3**

**RECOGNITION OF VEHICLE NUMBER
PLATE**

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We would like to thank our Dean, who provided us with the facilities required and conducive conditions for the project.

Finally, We would like to express our sincere gratitude to VIT University, which provided us with a platform to hone our skills.

CERTIFICATE

This is to certify that the project work entitled “**Recognition of vehicle number plate**” that is being submitted by “**Prashant Mehlawat(16BCE0910) and Aditya Firoda(16BCE2184)**” for Image Processing (CSE4019) is a record of bonafide work done under my supervision. The contents of this Project work, in full or in parts, have neither been taken from any other source nor have been submitted for any other CAL course.

Place: VIT University, Vellore

Date: 01/11/2017

Signature of faculty
Rajakumar K

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Abstract:

In Traffic surveillance, Recognition of the number plate from the vehicle is an important task, which demands intelligent solution. In this project, extraction and Recognition of number plate from vehicles image has been done using Matlab. It is assumed that images of the vehicle have been captured from Digital Camera.

We propose a method for the detection and identification of vehicle number plate that will help in the detection of number plates of authorized and unauthorized vehicles.

This approach is simplified to segmented all the letters and numbers used in the number plate by using bounding box method. After segmentation of numbers and characters present on number plate, template matching approach is used to recognition of numbers and characters.

Automatic vehicle identification systems are used for the purpose of effective traffic control and security applications such as access control to restricted areas and tracking of wanted vehicles. Number plate identification is helpful in finding stolen cars, car parking management system and identification of vehicle in traffic.

Introduction:

Number plate extraction is hotspot research area in the field of image processing. Many of automated system have been developed but each has its advantages and disadvantages. It is assumed the vehicle is stationary and images are captured at fixed distance.

An automated system is developed using MATLAB in which image is captured from camera and converted in Gray scale image for pre processing. After conversion, dilation process is applied on image and unwanted holes in image have been filled. After dilation, horizontal and vertical edge processing of has been done and passed these histograms through low pass filters. Low pass filters filter out unwanted regions or unwanted noise from image. After this filtering, image is segmented and region of interest is extracted and image is converted into binary form. Binary images are easily processed as compared to coloured images. After Binarization, each alphanumeric character on number plate is extracted and then recognized with the help of template images of alphanumeric characters. After this, each alphanumeric character is stored in file and whole number plate is extracted successfully.

Literature Survey:

1. Automatic Vehicle Identification by Plate Recognition by Serkan Ozbay and Ergun Ercelebi

This paper talks about the applications of recognition of number plates in the world. Its proposed algorithm consists of three major parts: Extraction of plate region, segmentation of characters and recognition of plate characters. For extracting the plate region, edge detection algorithms and smearing algorithms are used.

2.Tracking Number plate from Vehicle Using MATLAB by Manisha Rathore and Saroj Kumari

This paper talks about the method of implementing the template based method using MATLAB and assumes that the number plate is already extracted from the image and using template comparison it extracted the number of the vehicle.

It promises that about 90% of the 40 vehicles tested were showing correct result using the above method.

3.Recognition of vehicle number plate Using MATLAB by Ragini Bhat, Bijender Mehandia

This paper talks about extraction of the of the number plate region from the given image of the front or back of the vehicle using edge detection methods such as Sobel method and segmentation of the characters of the number plate using bounding-box technique.

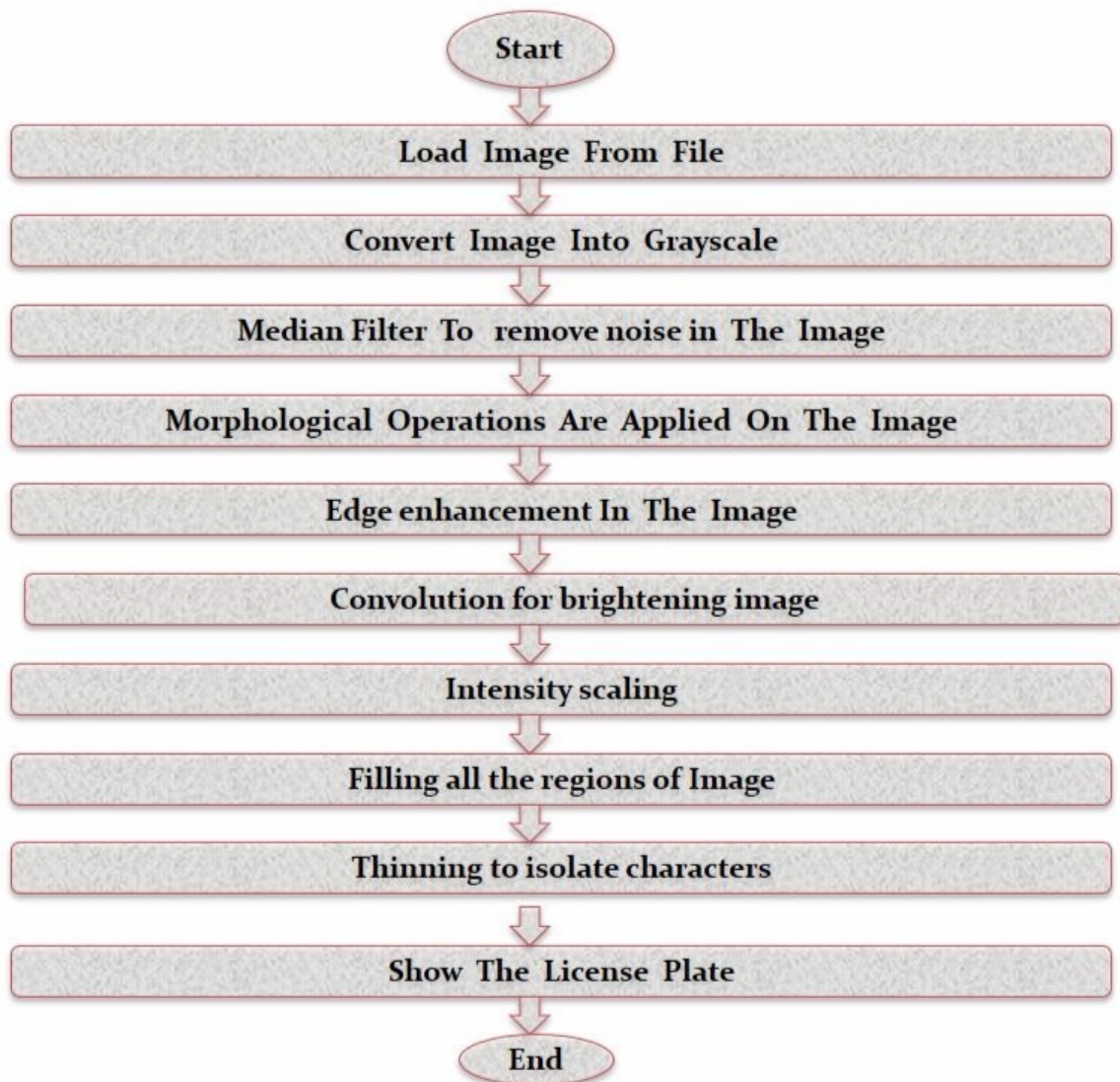
4.PC based number plate recognition system C. Coetzee, C. Botha and D. Weber

A simple yet highly effective rule-based algorithm detects the position and size of number plates. Characters are segmented from the thresholded plate using blob-coloring, and passed as 15/spl times/15 pixel bitmaps to a neural network based optical character recognition (OCR) system.

5Automatic number-plate recognition R.A. Lotufo, A.D. Morgan and A.S. Johnson

The objective of the research is to develop a computer-vision based automatic vehicle identification system to achieve vehicle identification using optical character recognition (OCR) techniques. The work involves investigations into real-time automatic number-plate recognition and its extension to other aspects of road traffic monitoring and control.

Flow Chart of Extraction in MATLAB:



METHODOLOGY:

1. Load the image from system

Load any stored vehicle image from the system on which Number plate recognition can be performed.

2. Pre-processing

Preprocessing is very important for the good the performance of character segmentation.

Preprocessing consists of:

1. Resizing image
2. Rgb to gray
3. Noise removal (we used median filter)

3. Morphological Operations

- a. Filling Holes
- b. Dilation and Eroding
- c. Edge Enhancement

4. Thinning of image

Thinning of image is done to ensure character isolation.

5. Recognition of Individual Characters

For recognition of individual alphanumeric character, template based recognition is used. In this method, segmented image is compared with one image which is stored in database named as character image. In both images best matched similarity is compared.

6. Storing in file

After extracting, number plate is stored in file with complete information like characters on number plate and date on which it is extracted.

RESULT:

Fig:



Input Image

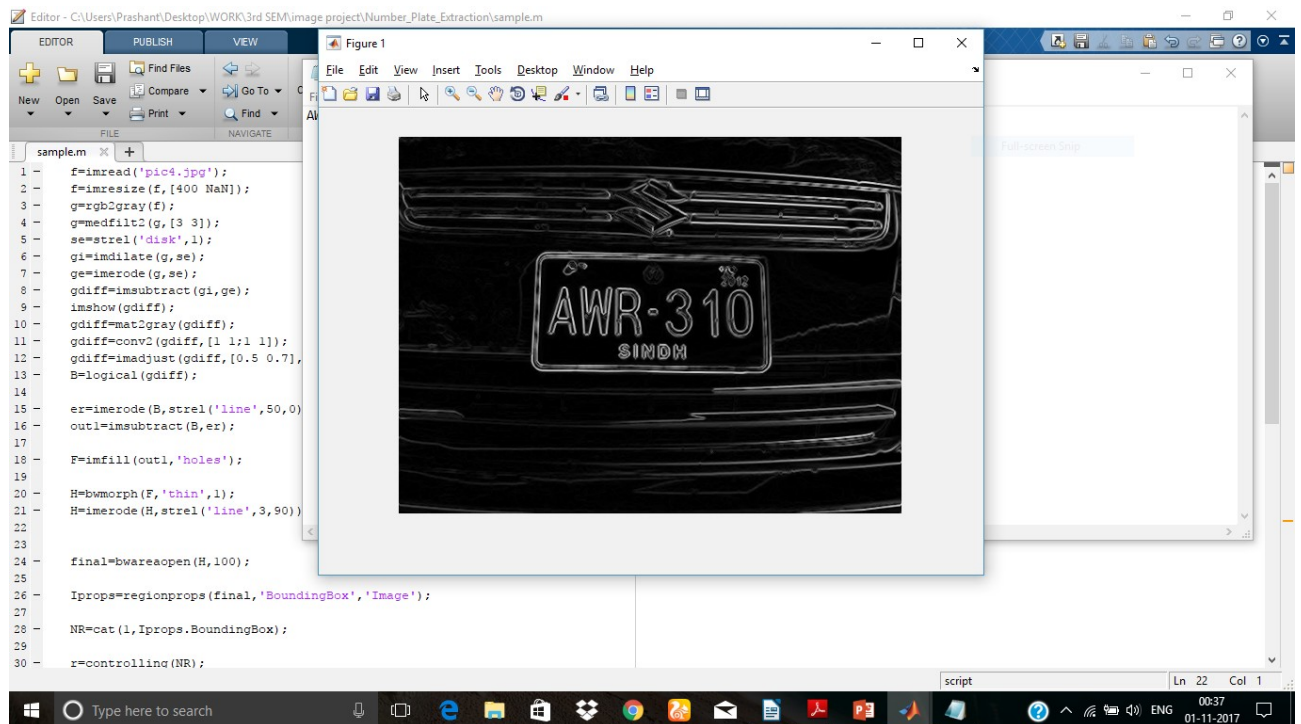


Fig: Image after morphological operations

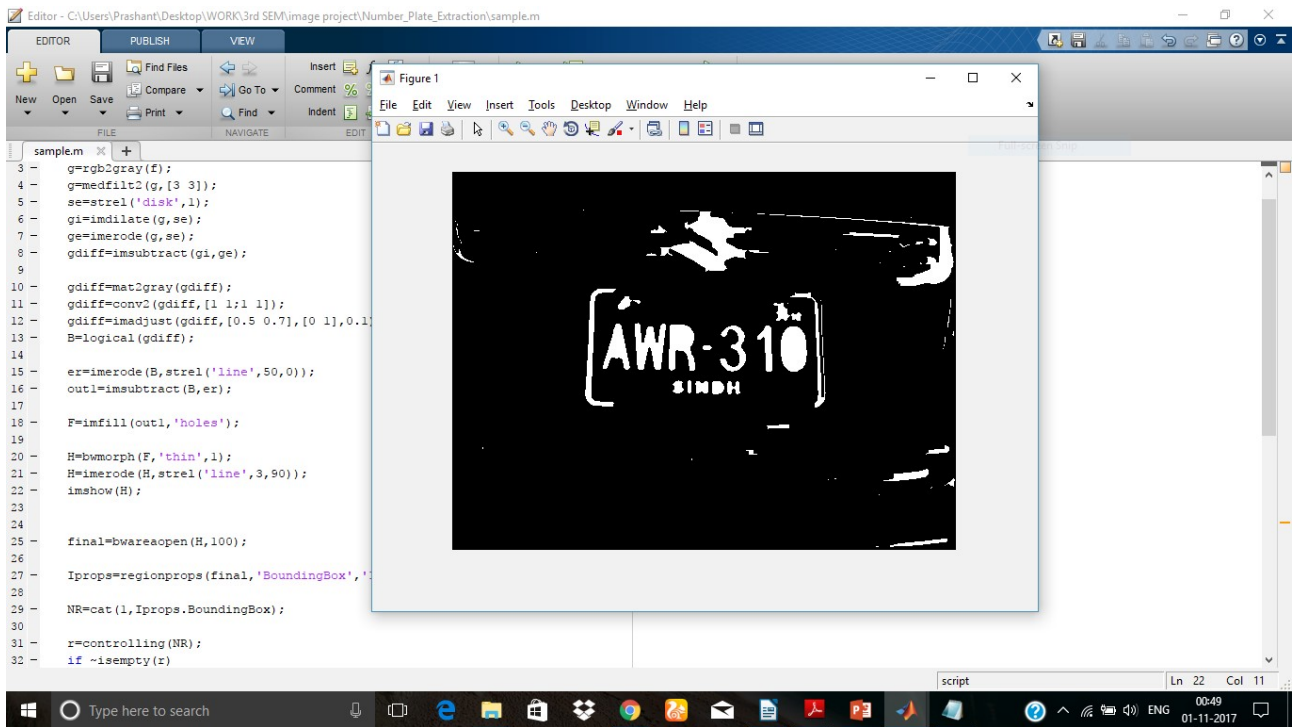


Fig: Image after thinning

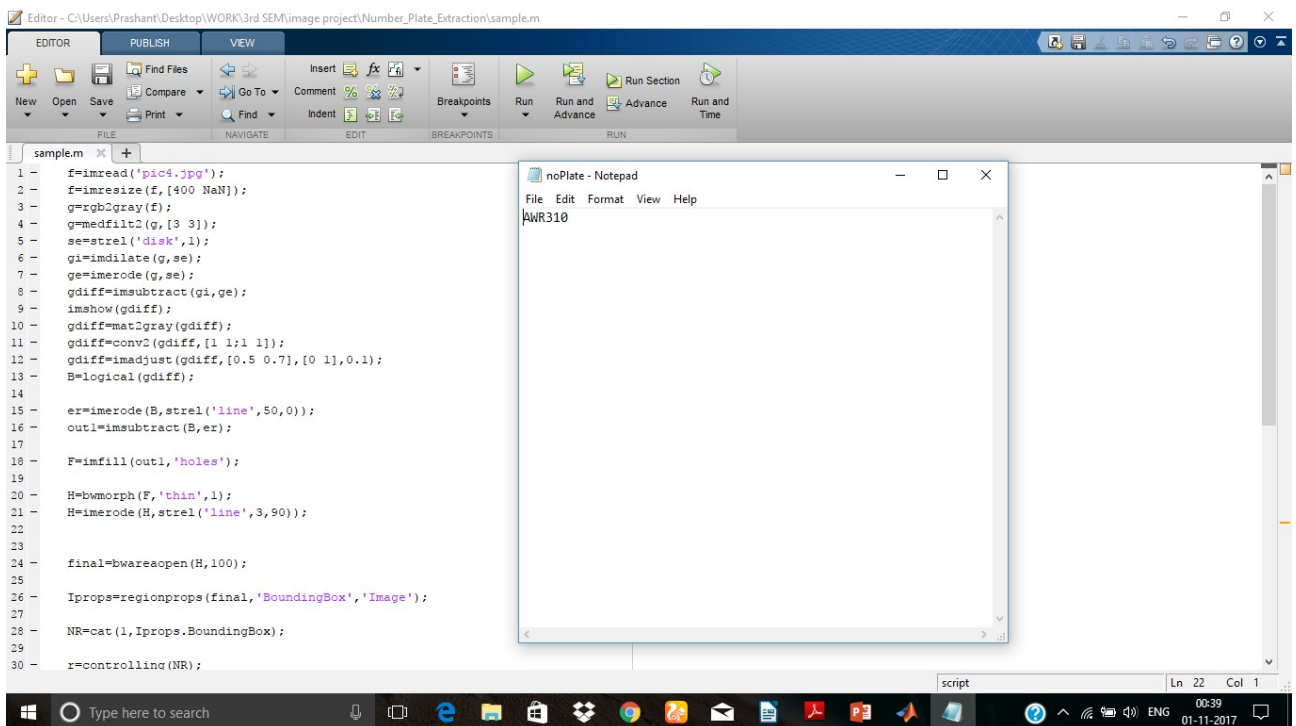


Fig: Final Output

APPLICATION OF NUMBER PLATE RECOGNITION:

1. Parking:- The NPR is used to automatically enter prepaid members and calculate parking fee for non-members.
2. Access control:- A gate automatically opens for authorized members in a secured area, thus replacing or assisting the security guard.
3. Tolling:- The car number is used to calculate the travel fee in a toll-road or used to double check the ticket.
4. Border Security:- The car number is registered in the entry or exits to the country and used to monitor the border crossings.
5. Traffic Control:- The vehicles can be directed to different lanes according to their entry permits. The system reduces the traffic congestions and number of attendants.
6. Airport Parking:- In order to reduce ticket frauds or mistakes, the NPR unit is used to capture the number plate and image of the car.

DIFFICULTIES:

Some of the common difficulties faced are:

1. Broken number plate.
2. Blurry images.
3. Number plate not within the legal specification.
4. Low resolution of the characters.
5. Poor maintenance of the vehicle plate.
6. Similarity between certain characters, namely, O and D; 5 and S; 8 and B, E; O and 0, etc.

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