



# Optical Character Recognition for Vehicle Number Plates Detection with Even, Odd Identification and State Detection

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**Abstract:** Controlling Traffic is challenging issue in most of the developed and developing countries. The traffic control system should be smooth to save time, create less pollution and easily accessible to reach at emergency services from road if there will be requirement. Optical character recognition (OCR) is the method which not only overcome the traffic problem but also helps to locate stolen vehicles and search the persons those are not obeying traffic rules from registration number plate of vehicle. There are many analyses done to detect the number of vehicles. But in this work, registration number is detected from number plate in video and algorithm is created, which is capable to identify whether the number is even or odd along with name of state. The complete information of number plate is saved in text file. After applying feature extraction and classification algorithm, the registration plates are detected by using the video camera in different locations for controlling traffic.

**Keywords:** Optical Character Recognition; Vehicle Number Plates Detection; Even and Odd Identification; State Detection; Mat Lab.

## 1. INTRODUCTION

Vehicle Registration Plate (VRP) detection and recognition system is a system used for detecting the registration plate affixed on Indian vehicles. There are many applications for registration plate detection such as highway electronic toll collection and traffic monitoring system. These type of application put high demands on the consistency of registration plate detection system. A lot of work has been already done regarding license plate recognition systems in Korean, European, Chinese and US license plates. Now, in this work is done on Indian number plate recognition system also on even and odd number detection as per recent trend in India to control traffic and pollution. The purpose of this research work is to develop an approach or application which senses and recognize Indian license plates from cars at a gate, for example at the entrance of the parking area.

## 1.1 IMAGE PROCESSING

Image processing is a technique for converting an image into digital form and performing operations, in order to get some useful information from it. It is a type of signal dispensation in which input is image or video frame and output may be image or characteristics associated with that image. Usually image processing system includes treating images as two dimensional signals then applying already set signal processing methods to them. Image processing basically include three steps, first is to import the image, second to analyze and manipulate the image including compression, enhancement and spot patterns and last is to analyze the image to get required output.[2]

Types of image processing:

- 1) Image Enhancement
- 2) Image Segmentation
- 3) Image Restoration

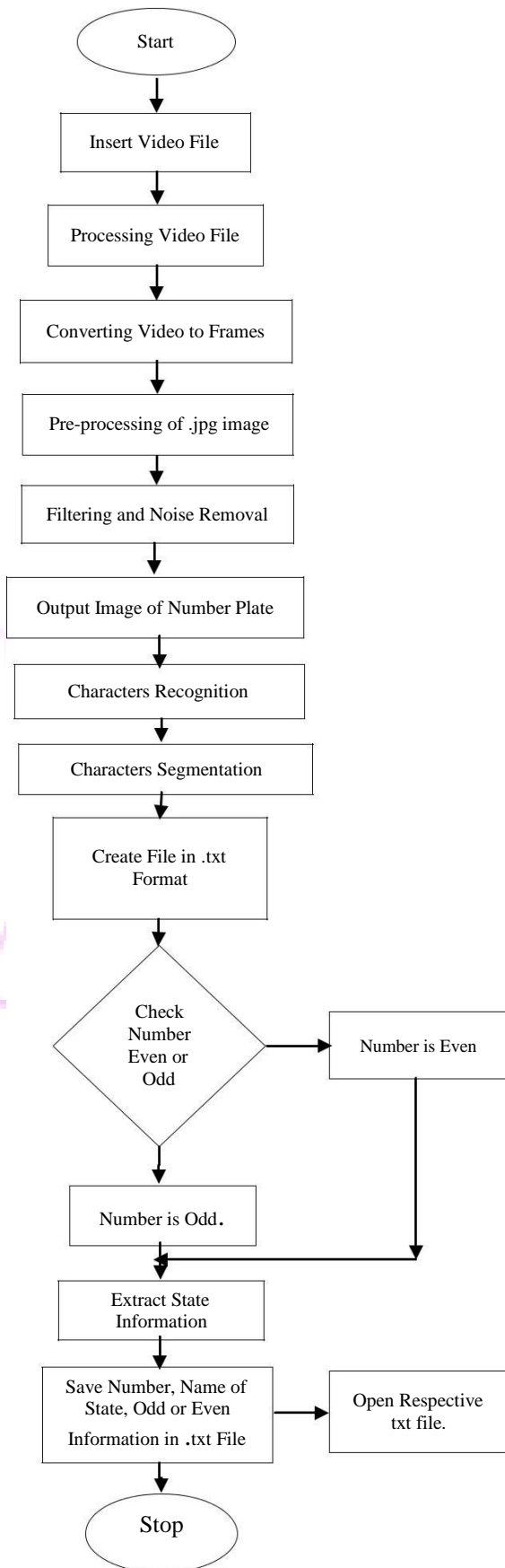
## 1.2 CAR NUMBER PLATE

All motorized road vehicles in India are tagged with a registration or license number. The Vehicle registration plate (commonly known as number plate) number is issued by the district transport office of the respective states - the main authority on road matters. The number plates are placed in the front and back of the vehicle. Number plates are often used to recognize the owner of the motor vehicles. So, it is necessary to design software which will automatically recognize information about car by observing a video file of road traffic. [5]

## 2. Methodology

**2.1 REGION-PROPS APPROACH:** Region-props algorithm is used to measure the properties of image regions. Region-props (BW, properties) return measurements for the set of properties specified by properties for each connected component in the binary image. Stats are struct array containing a struct for each object in the image. A region-prop is used in this work to identify the continuous and discontinuous regions. For the user is flexibility and ease of use GUI is developed using Mat Lab GUI Tool Box.

To achieve these objectives, optical character recognition for vehicle number plate detection with even, odd identification and state detection has been used and various steps have been followed for their implementation as shown in Figure 2.1. Create a video file containing the number plate and open in GUI. In RGB to Gray conversion, the pre-processing of the jpg image is done where colored image is converted into a gray scale image. For this, different color transform is used. In gray processing, the gray values of pixel is calculated according to the R,G and B value in the image as well as the gray scale image is obtained. Filtering and noise removal removes the salt and paper noise from the image. In this stage, the noise of the image is going to be removed i.e., while preserving the sharpness of the image after the successful localization of the number plate, optical character recognition will be done which involves the segmentation, feature extraction and number plate recognition. Output Image of number plate is received by characters recognition. Characters recognition is from 0 to 9 and from A to Z. Then create file in .txt Format which will check the number plate as an even or odd and extract the state information number either it is even and odd. Then all the data is saved as number, name of state, odd or even information in .txt File. Now we can open the respective txt file and get the result as show the digital image odd, even number plate and state information.



**Figure 2.1 Flow Diagram of proposed work**

### III. RESULTS AND DISCUSSION

Vehicle Registration Plate (VRP) detection & recognition system is one type of intellectual transport system and is of considerable interest because of its application in detecting the registration plate affixed on Indian vehicles. One of the specialties of registration plate detection system is the character segmentation. In this research even-odd detection, state detection and number extraction has been done.

```
manpreet.m
224 - title('eroded')
225 - gdiff=imsubtract(gi,gw); % Morphological Gradient for edges enhance
226 - figure,imshow(gdiff)
227 - title('subtracted')
228 - gdiff=mat2gray(gdiff); % Converting the class to double.
229
230 - gdiff=conv2(gdiff,[1 1;1 1]); % Convolution of the double image for brig
231
232 - gdiff=imadjust(gdiff,[0.5 0.7],[0 1],0.1); % Intensity scaling between the
233
234 - B=logical(gdiff); % Conversion of the class from double to b
235
236 - % Eliminating the possible horizontal lines from the output image of regio
237 - % that could be edges of license plate.
238
239 - er=imerode(B,strel('line',50,0));
240
241 - out1=imsubtract(B,er);
242
243 - F=imfill(out1,'holes'); % Filling all the regions of the image.
244
245 - H=bwmorph(F,'thin',1); % Thinning the image to ensure character isolation
246
247 - H=imerode(H,strel('line',3,90));
248
249 - % Selecting all the regions that are of pixel area
```

Figure3.1- Implementation of a program in image processing Tool Box of Mat Lab.

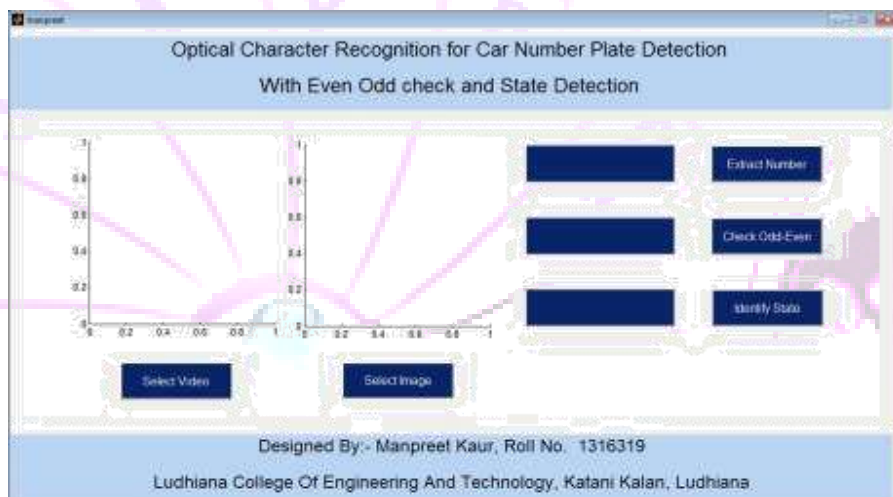


Figure 3.2- Basic GUI Components

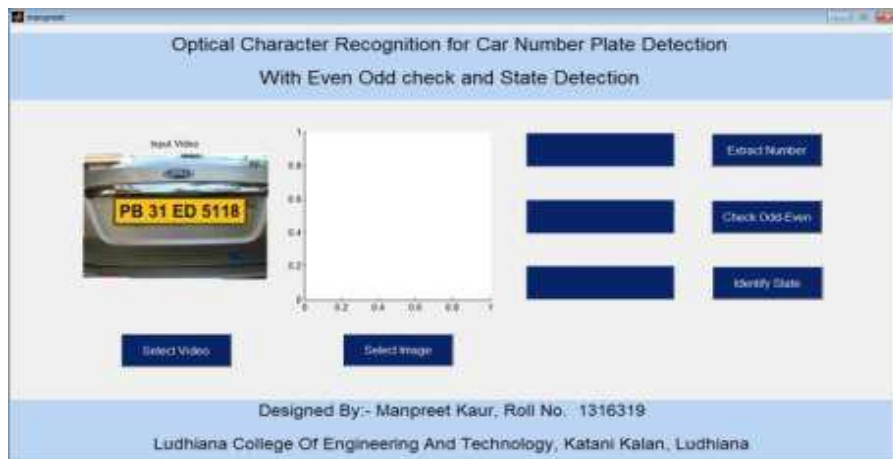
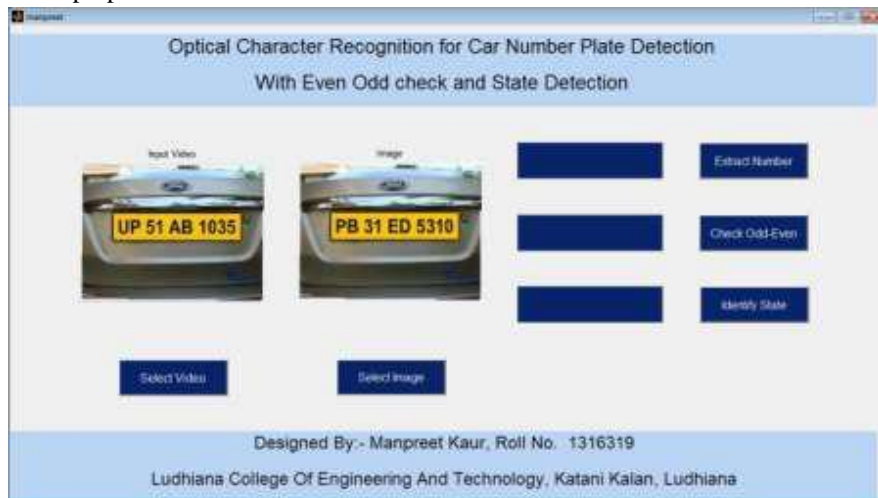


Figure 3.3- Choose input image from captured frames

In Figure 3.3, Input video is shown by clicking on select video button and select a video from Hard Drive location of PC or laptop. Same video will be seen on axis1 in GUI.



**Figure 3.4- Selected input image**

In Figure 3.4 Frames basically convert the video in separated image. The frames are created from video after video run in video player. To select the image click the image from frames folder.



**Figure 3.5- Extract number button**

As shown in Figure 3.5, click on Extract number button to get outputs. Car number will be shown on Edit Box.



**Figure 3.6- State and even-odd detection**

As shown in Figure 3.6, click on Check Odd Even button to get outputs. Whether the number is odd or even will be shown on Edit Box 2.



Figure 3.7- Identify State

Click on identify state button to get outputs. Identified state will be shown on Edit Box 3.

In Figure 3.8, the notepad file is created and respective parameter is also written in the text file.

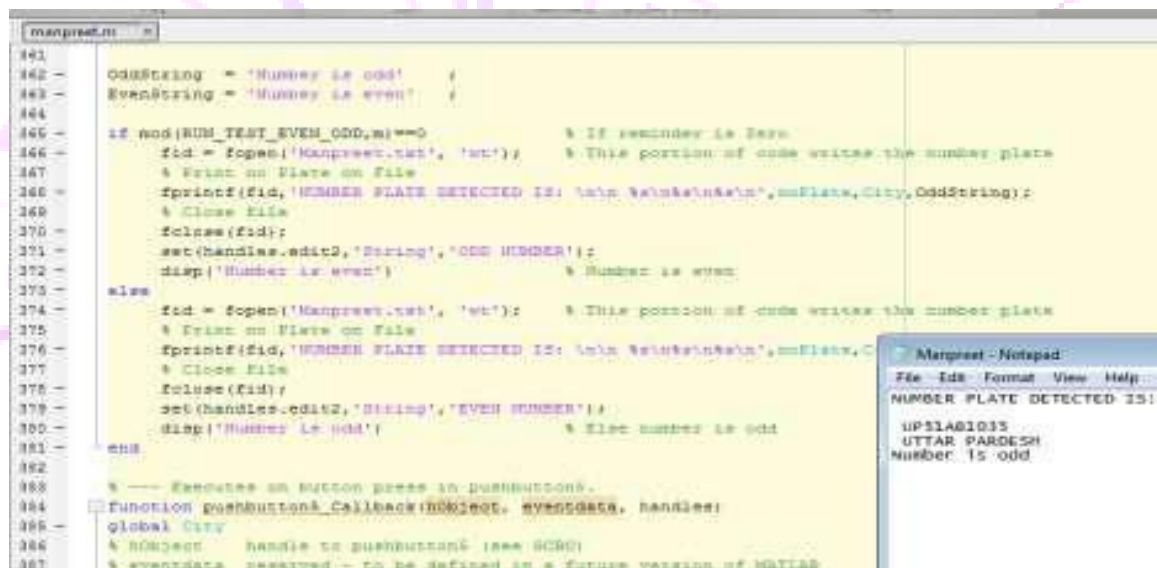


Figure 3.8 - Number detected in File

## IV. CONCLUSION

An algorithm for vehicle number plate extraction, character segmentation and recognition is present. Database consists of images with different size, background, illumination, camera angle, distance etc. The experimental results show that number plates are extracted faithfully. The performance of algorithms for license plate extraction, segmentation & recognition is acceptable range. The developed algorithms accurately extract and recognize in different location of the Indian license plate. The number plate is extracted and even-odd has also been checked. State of the car is also detected. In this thesis, optical character recognition for vehicle number plate detection with even, odd identification and state detection has been successfully designed.

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