# Locality Recognition Of Vehicle Number Plate using Image Processing Techniques

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## ABSTRACT

*In this research, The matching process for number plate recognition is modified with the help of multi-class RBF neural network optimization. An adaptive threshold method is applied to overcome the dynamic changes of illumination conditions when converting the image into binary. Connected component analysis technique (CCAT) is used to detect candidate objects inside the unknown image. A scale-invariant geometric relationship matrix is introduced to model the layout of symbols in any LP that simplifies system adaptability when applied in different countries. Moreover, two new crossover operators, based on sorting, are introduced, which greatly improve the convergence speed of the system. Color (RGB) to grayscale (GS)conversion is performed using the Filtering technique by eliminating the hue and saturation information while retaining the luminance Most of the CCAT problems, such as touching or broken bodies Edge-based techniques were also implemented to detect the plate based on the high density of vertical edges inside it Detecting license text and at the same time distinguishing it from similar patterns based on the geometrical relationship between the symbols constituting the license numbers is the selected approach in this research. These plates usually contain different colors, are written in different languages, and use different fonts. some plates may have a single color background and others have background images.*

***Keyword :*** *- License plate detection ,License plate recognition, canny edge detection ,gray prediction*

## *INTRODUCTION*

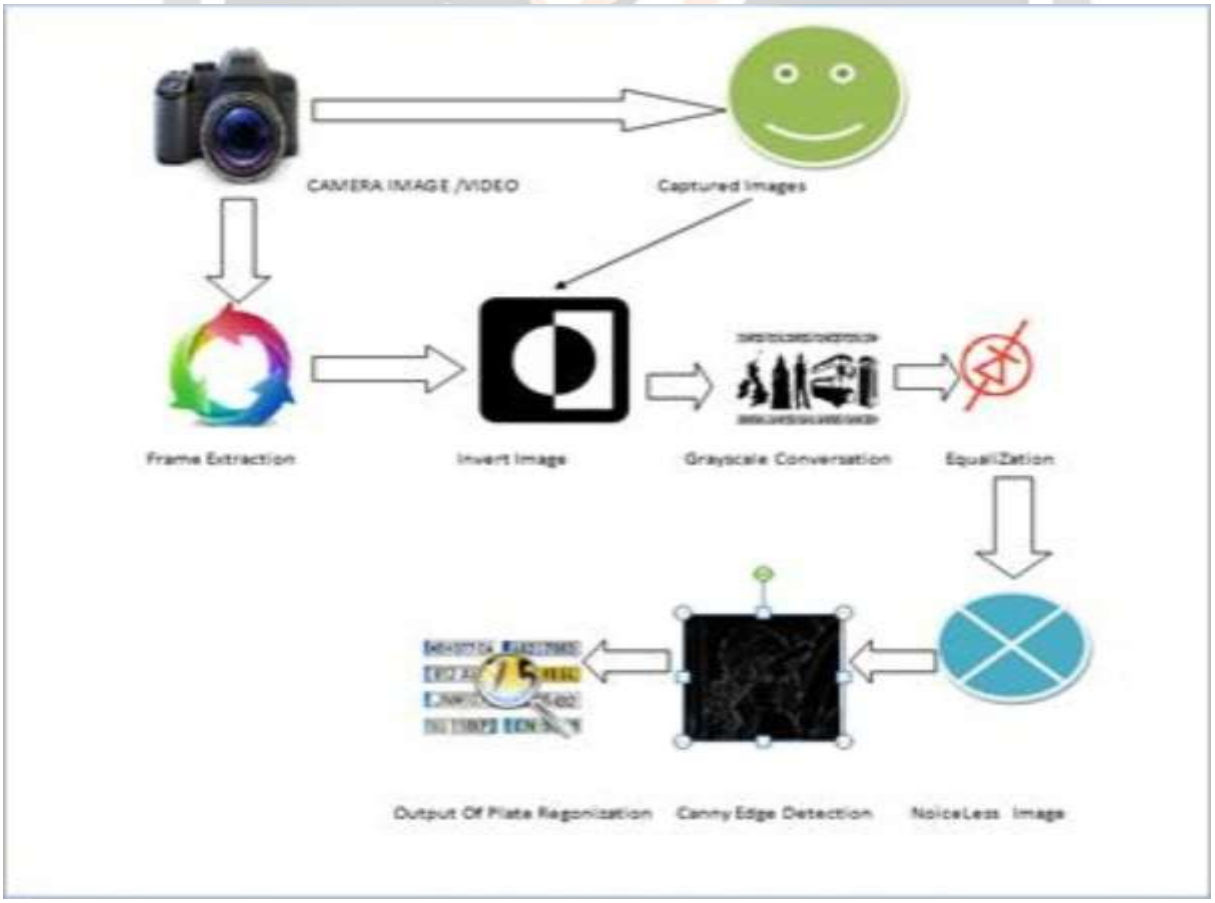
THE LICENSE PLATE RECOGNITION is a technology that uses optical character recognition on images in order to read the vehicle registration plates. All the vehicle around the world should have a license plate number for their identification. It is unique for all the vehicle around the world. It use the existing closed circuit television, road rule enforcement cameras, or cameras specifically designed for the task. It automatically reads the vehicle number plate .It can be used by the police forces all around the world for law enforcement purposes, including to check whether a vehicle is registered or licensed .It can be used in

toll gates ,intelligent transportation system, security system, traffic analysis ,police law enforcement, state border control, vehicle theft prevention and security monitoring of roads and checkpoints . license plate recognition is used to store the image captured by cameras . It is specially designed for tollgate system and parking system. Earlier method is based on neural technology but it requires high trained data. Present system make use of license plate recognition techniques. It captures the image , extract a plate and recognize the number from the extracted plate. Sensors are used to sense the vehicle and capture the image of the vehicle. The data's are stored in database. In the earlier system they store the image directly into the database. But the proposed system store only text of the license number plate. It reduces the manual work and reduces the waiting time of the vehicle in the tollgate.

The remainder of this paper has the details as follows .we are performing the following image processing techniques to extract the exact number from the license plate. This techniques is not only for extracting the number plate from image it is also applicable for videos.

## *PHASE-I*

In this Proposed System, number plate recognition is modified with the help of multi-class RBF neural network optimization. A new technique is introduced in this paper that detects LP symbols without using any information associated with the plate's outer shape or internal colors. The proposed system is composed of two phases: image processing phase and GA phase. A new genetic-based prototype system for localizing 2-D compound objects inside plane images was introduced and tested in the localization of LP symbols. In Proposed System, we can implement the Car License plate through image and videos.



∑ **Invert**

In photography, a negative is an image, usually on a strip or sheet of transparent plastic film. The lightest areas of the photographed subject appear darkest and the darkest areas appear lightest. A positive image is a normal image. Negative image is a total inversion, in which light areas appear dark and vice versa.

A negative color image is additionally color-reversed, with red areas appearing cyan, greens appearing magenta and blues appearing yellow, and vice versa.


**Purpose of invert**:

It can create a good model of the blurring function that corrupted an image. The quickest and easiest way to restore that is by invert filtering. Since the invert filter is a form of high pass filer, invert filtering responds very badly to any noise that is present in the image because noise tends to be high frequency. Converting a color image into negative is very simple. All we have to do is repeat 3 simple steps for each pixels of the image. Get the RGB value of the pixel.

Calculate the new RGB value as shown below.

R=255-R
G=255-G
B=255-B

Save the new RGB values in the pixel.

After applying invert technique the image is converter into negative form. It is nothing but the dark shades becomes light and light shades becomes dark. Invert technique is the one of the pre processing technique of image processing. The main purpose of applying invert technique on the captured images is to avoid the noise in the captured image.

**Converting to inverse invert:**

Converting a color image into negative is very simple. All we have to do is repeat 3 simple steps for each pixels of the image.Get the RGB value of the pixel.

Calculate the new RGB value as shown below.

R=255–R
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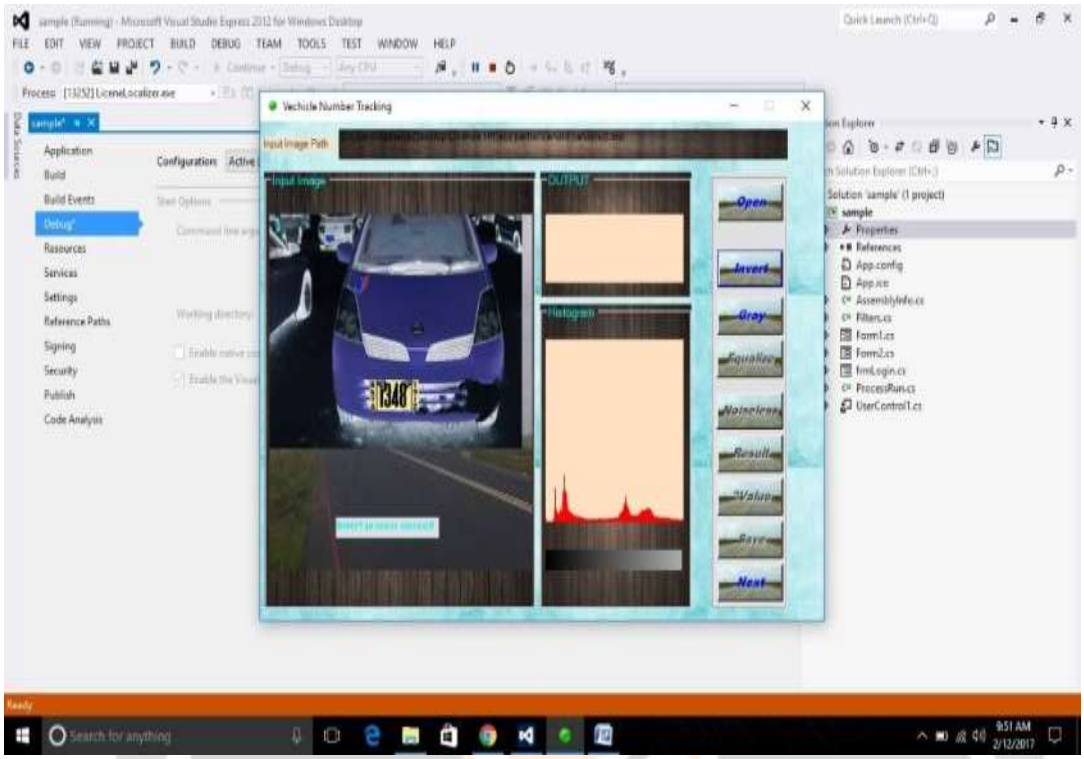



∑ **Grayscale**

It is an image in which the value of each pixel is a single sample. It carries only intensity information.

The image which contains only black , white & shades of gray.Image pixels are stored in binary, quantized form.

**Purpose of grayscale:**

Each pixel has a luminance value, regardless of its color.Luminance can also be described as intensity. It can be measured on a scale from black (zero intensity) to white (full intensity).

**Convert a image to grayscale:**

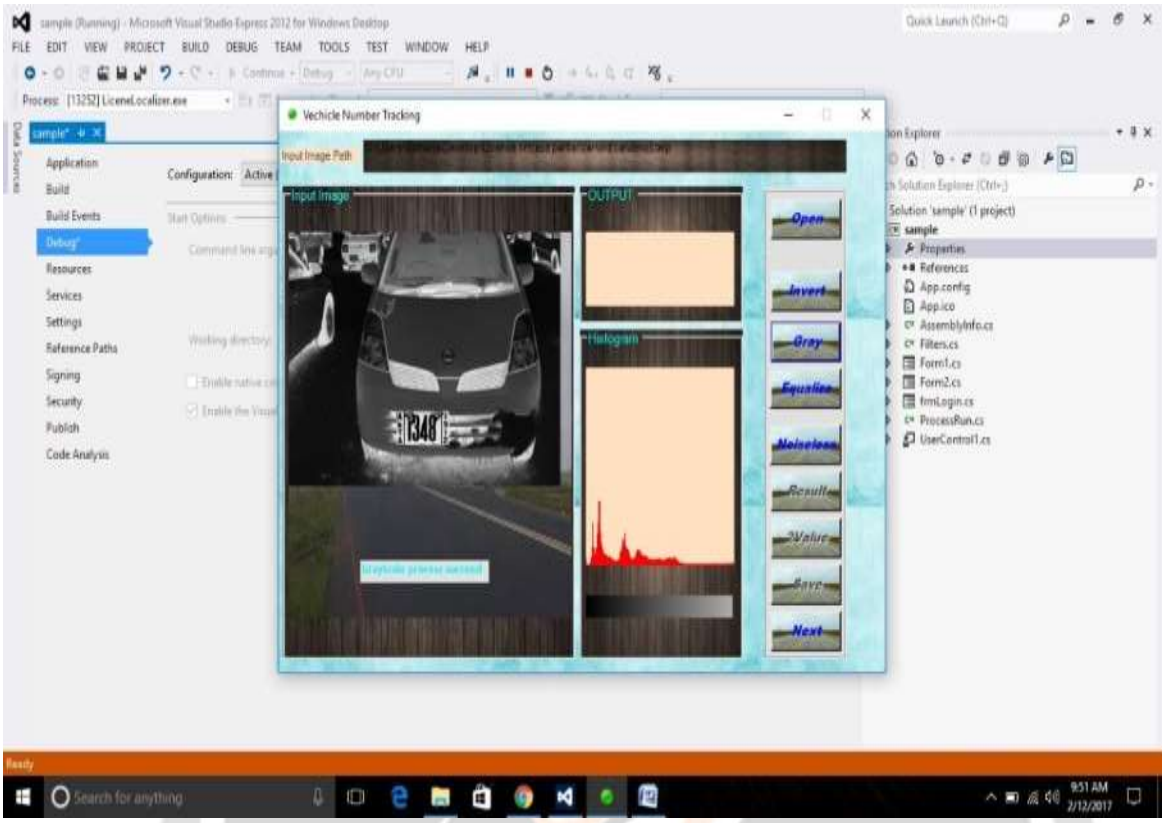
This process removes all color information.

Leaving only the luminance of each pixel.

Digital images are displayed using a combination of (RGB) colors. Each pixel has three separate luminance values.These three values must be combined into a single value when removing color from an image.

**Normalization**:

It is a process that changes the range of pixel intensity values. The pixel value is a single number that represents the brightness of the pixel.The most common pixel format is the byte image.This number is stored as an 8-bit integer giving a range of possible values from 0 to 255.




∑ **Equalize Technique**

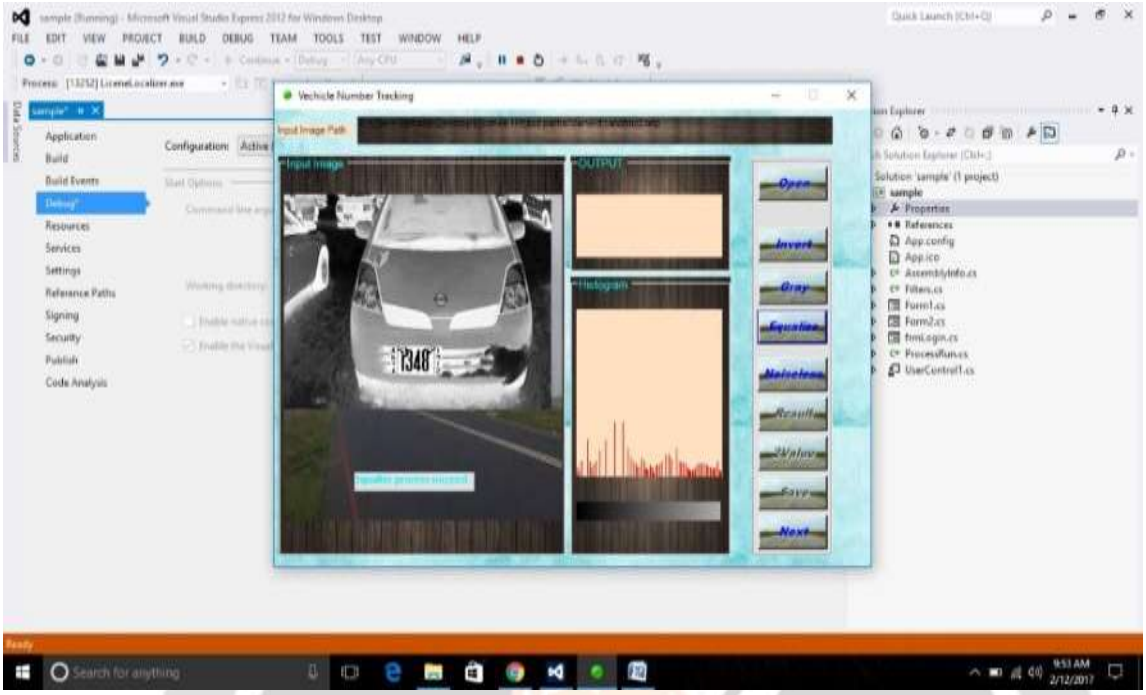
It is a method in image processing for contrast adjustment.Image must have the proper brightness and contrast for easy viewing.Brightness refers to the overall lightness or darkness of the image.Contrast is the difference in brightness between objects or regions.

**Histogram:**

It is the operation by which the occurrences of each intensity value in the image is shown. The histogram is a graph showing the number of pixels in an image.It shows each different intensity value found in that image.For an 8-bit grayscale image there are 256 different possible intensities.It graphically display 256 numbers showing the distribution of pixels amongst those grayscale values.

**Histogram Equalization:**

It is the technique by which the dynamic range of the histogram of an image is increased.It assigns the intensity values of pixels in the input image.The output image contains a uniform distribution of intensities.This technique can be used on a whole image or just on a part of an image.

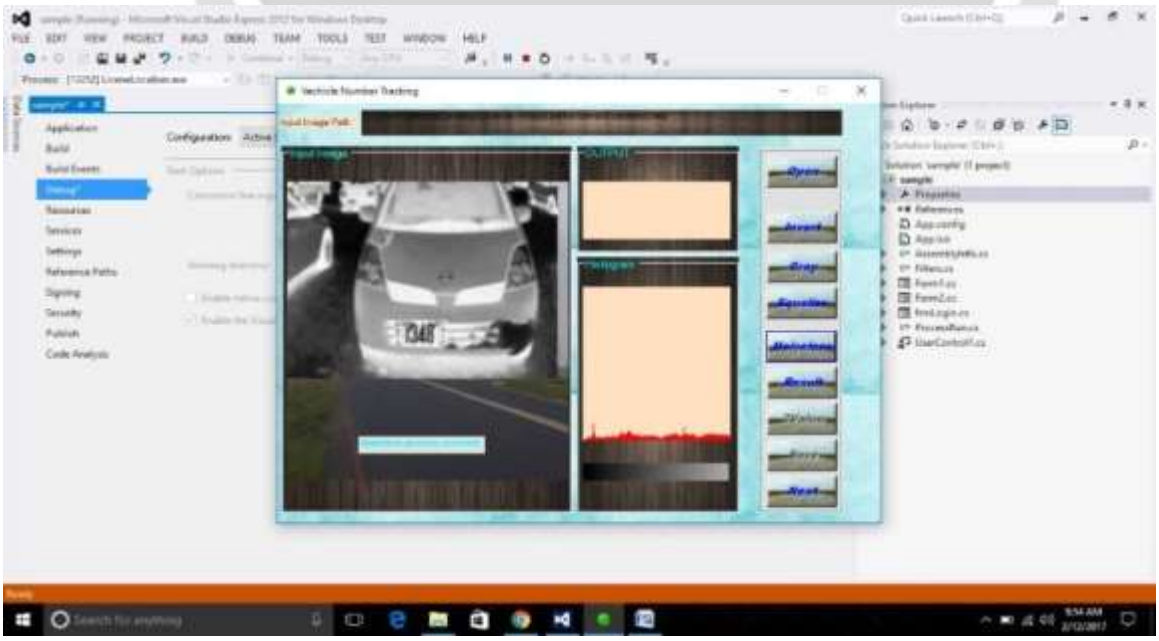



∑ **Noise Less Process:**

Noise is the result of errors in the image acquisition process .That result in pixel values that do not reflect the true intensities of the real scene.Gaussian filtering is used to blur images and remove noise. It uses a Gaussian function for calculating the transformation to apply to each pixel in the image.

**Gaussian filter:**

The task is to remove white noise, & maintaining salient edges.Noise exists at all frequencies equally. The edges exist in the high frequency range. In traditional noise removal via filtering, a signal is low pass filtered,It filters high frequency components in your signal.



**Purpose of gaussian filter:**

It act as a low pass filter but also allow high frequency components.Gaussian filter=noise removal + edge preservation.It is more effective at smoothing images.It helps to preserve the details of the images.

∑ **Morphology Edge Detection**

**Edge Detection**:

That aim at identifying points in a digital image.

The image brightness changes sharply or, more

formally, has discontinuities. The changes sharply are organized into a set of curved line segments termed edges.It is a tool in image processing, machine vision ,feature detection and feature extraction.

**Canny Edge Detector:**

It uses a multi-stage algorithm to detect a wide range of edges in images. It extract structural information from different vision objects.It reduce the amount of data to be processed.

The general criteria for edge detection includes:

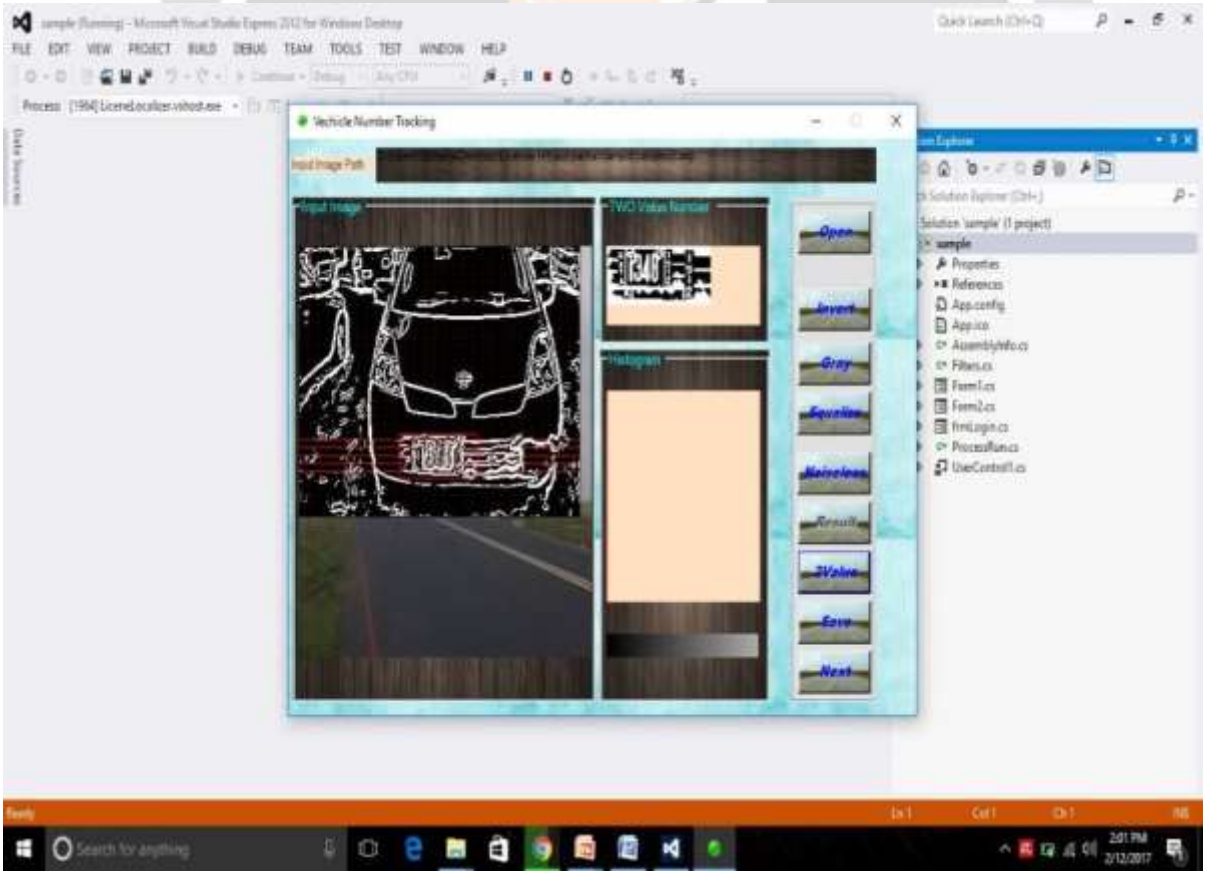
Detection of edge with low error rate, that the detection should accurately.It catch as many edges shown in the image as possible.A given edge in the image should only be marked once.

**The Process of Canny edge detection algorithm can be broken down to 5 different steps:**

Apply Gaussian filter to smooth the image in order to remove the noiseFind the intensity gradients of the imageApply non-maximum suppression to get rid of spurious response to edge detection

Apply double threshold to determine potential edges

Track edge by hysteresis



**Output:**

***PHASE -II***

Extracting the number plate from video by using open CV tool. Initially extract the corresponding key frame from the video and then process the extracted images. It capture the vehicle image from the certain distance to get the clear image of the vehicle and then applying various image processing technique to extract the number from the vehicle number plate.

∑ **Frame Extractions:**

In this module the car image have used for extract as input. The source image is predicted from our application. Input the source image and then it will fine the number from the vehicle number plate. Frames can be optioned from the video and then convert into images. To convert video frame into image.

∑ **License plate recognition works for video:**

It involves capturing videos of license plate and then process the captured license plate .They are processed by series of algorithm to get the exact number from the vehicle number plate and then it can able to convert the alpha numeric conversion of captured license plate into text entry.

∑ **License plate localization**

Vehicles are the moving object their velocity can be unique for each vehicle. The speed creates the complexity as the license plate image is angularly skewed and subjected to various issues due to light changes or under various environmental condition. Hardware component or certain types of filters are used to control for light fluctuation.

∑ **Character segmentation:**

It locates the separate alpha numeric character on the number plate. Different characters of equal size are portioned into equal segments. Segmentation separate the each character or number in the license plate and then it can be process further to get the text from the number plate.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∑ **License plate character recognition**

It the recognize the character from the license plate it translate the captured video image into an alpha numeric text. And then the text information can be stored into the database.


## *CONCLUSION*

This method of vehicle number plate recognition requires maximum degree of correctness. The automatic license plate recognition plays a important role in detecting security threat. This process use a series of image processing technique to extract the vehicle number from the number plate. The system robustness and speed can be increased if high resolution camera can be used. The major objective is to reduce the manual work and reduce the waiting time of the vehicle in toll gate. Distorted number plate images can be successfully detected.

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