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# Licence Plate Detection for Mall Parking Using Contour Analysis

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*Abstract: License Plate Detection System is an image processing technique used to identify a vehicle by its license plate. License Plate Detection is an effective way for automatic vehicle identification. Some of the existing algorithms based on the principles of image morphology and neural network takes a lot of time and even lacks in accuracy. As License Plate Detection System has many applications in traffic systems, tolling and parking, it has been intensively studied in many countries[2]. The proposed method is based upon sequence of algorithms like Grayscaling, Noise Reduction, smoothing, Thresholding, Erode and Dilation, Block detection and Contour Analysis. The system is divided into two steps, one is to detect the license plate number and second is giving empty parking slot to that vehicle.*
*Keywords: License plate detection, character segmentation, contour analysis, thresholding, allocation, template matching.*
*Introduction*

## I. INTRODUCTION

Present day enhancements, quick information exchange and minimum delay have now become the basic requirements of all the services. One such service offered to transport system is automated parking. Initially car parking was manual but now due to development in various fields it is slowly moving towards automation. License Plate Detection is used increasingly in automatic toll collection, secure parking and law enforcement. Automated mall parking usage image to identify vehicle for car parking. The application utilizes image processing and pattern recognition methods for car parking. This paper presents Mall Parking using number plate recognition. The proposed Vehicle License Plate Recognition techniques consist of sequence of algorithms and contour analysis.
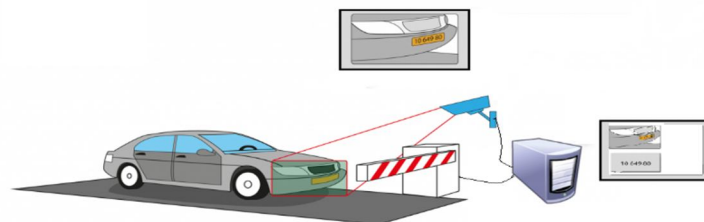


Fig.1 Overview Of System

## II. EXISTING SYSTEM

*A. The existing system of Number Plate Detection is Distributed Into Several Parts*

*1) Input rAw Image -* A camera raw image file contains minimally processed data from the image sensor of either a digital camera or image scanner

*2) Image Binarization -* The input image is initially processed to improve its quality and prepare it to next stages of the system. First, the system will convert RGB images to gray-level images

*3) Reduce noise using Median Filtering Method -* The median filter is a nonlinear digital filtering technique, often used to remove noise from an image or signal. Such noise reduction is a typical pre-processing step to improve the results of later processing (for example, edge detection on an image)

*4) Enhance Contrast using Histogram Equalizer –* Histogram equalization is the technique by which the dynamic range of the histogram of an image is increased. HE assigns the intensity values of pixels in the input image such that the output image contains a uniform distribution of intensities.

5) *Character Segmentation* : The Character segmentation is a procedure of change of information from a bitmap presentation into a type of descriptors, which are more appropriate for computers. The recognition of character should be invariant towards the user font type, or deformations caused by a skew

### III. PROPOSED METHOD

The proposed method is based upon sequence of algorithms like Grayscaling, Noise Reduction, smoothing, Thresholding, Erode and Dilation, Block detection and Contour Analysis. Once the vehicle number is detected system allots empty parking slot to that vehicle. It shows that empty slot no on the display.
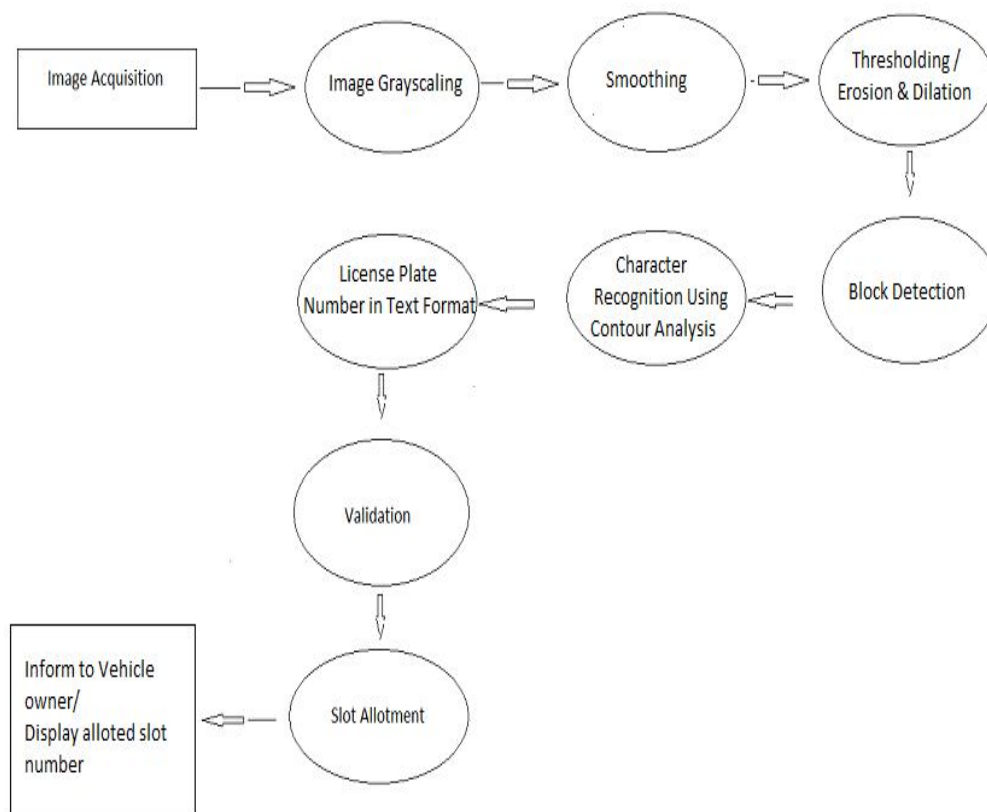The method classified as



Fig.2 Methodology of proposed system

1) Image acquisition or capturing the image.
2) Grayscaling of image – The RBG image in converted into grayscale image.
3) Smoothing - It is usually done to reduce noise and camera artefacts.
4) Thresholding – Thresholding is the simplest method of image segmentation. In the most straightforward execution, the output is a binary image representing the segmentation. Black pixels correspond to background and white pixels correspond to foreground (or vice versa).
5) Erosion and Dilation - As the result of thresholding operation gives black and white image. But this image contains lots of noise in it. To reduce the noise erosion and dilation operations are performed.
6) Block Detection – It detects the blocks of characters.
7) Contour Analysis - It is optical character recognition technique which detects the characters in the block.
8) Generate Number Plate String - This step will display all the characters and numbers on the screen. Now, then we have to rearrange all the characters and numbers in their proper order with the help of sorting algorithms. This will give us vehicle Number Plate.

## IV. RESULTS

We have run our proposed system on personal computer. It successfully extracted the license plate numbers from the image.
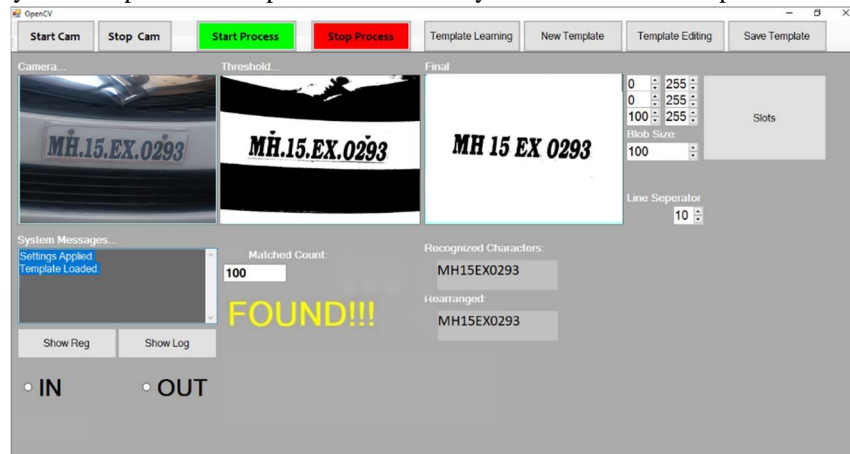


Fig.3  Result of the System

## V.  CONCLUSION AND FUTURE WORKS

A lot of research has been performed on detection and recognition of license plate. Different researchers provided different methods and techniques for this process. However, every technique has its own advantages and disadvantages. Contour Analysis is very powerful algorithm as it is robust and efficient enough so that it can be implemented on embedded platform. Extraction of number plate accuracy may be increased for low ambient light image in future.

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