



# Automatic Vehicle Number Plate Extraction And Maintenance System Using OCR Algorithm

Mrs. Kalaivani, M.E.<sup>1</sup>, Bhuvaneshwari G<sup>2</sup>, Hindu K<sup>3</sup>, Kaviyarasu A<sup>4</sup>

Professor, Department of CSE, Adhiyamaan College of Engineering(Autonomous), Hosur, Tamil Nadu, India<sup>1</sup>

Student, Department of CSE, Adhiyamaan College of Engineering (Autonomous), Hosur, Tamil Nadu, India<sup>2,3,4</sup>

**Abstract:** The technology is designed to keep track of cars entering and exiting NH and city roadways. The acquired picture will be processed using the OCR (optical character recognition) technique for automated number plate recognition. The car number is entered into a database. In the event of a centralized receiver, all of the entrance records are stored, and it will check for the existence of a stolen vehicle entering the NH highways, which will be detected and the vehicle picture and information will be captured and given to an authorized person through IMAP (Internet Message Access Protocol). The number is identified using the OCR technology. In addition, the system will check to see whether the entered car information is already in the database and will retrieve it.

**Keywords:** object detection, image segmentation, vehicle license plate detection, Extraction Of Numbers from license plate

## I. INTRODUCTION

One of the most onerous duties has become traffic management. As the number of automobiles grows, so does the number of crimes. Automatic number plate recognition (ANPR) aids in the investigation of crimes committed on public highways. In most regions of the world, ANPR is utilized. It lacks a standard operating procedure. To get better and quicker outcomes, numerous image processing techniques are introduced. Each strategy, though, offers advantages in certain scenarios. Image capture, noise removal, number plate localization, character segmentation, and character identification are the general phases in ANPR. The outcome is mostly determined by the image quality. When compared to the amount of approaches available for any other process, character recognition techniques are vast. Template matching is popular because it saves time. Gaussian filters are another way for extracting characteristics in OCR. The amount and quality of characteristics collected varies depending on the need. Not only is the Gaussian filter efficient, but it also has a high recognition rate. The mathematical morphology notion is quite useful in obtaining the number plate region. Digital image labelling and template matching can be utilized for number plate segmentation and identification.

## II. LITERATURE SURVEY

### A. Automatic Number Plate Detection in Vehicles using Faster R-CNN Author : N Palanivel AP Year : 2021

#### 1) Overview:

The fundamental technique to digital image processing is picture segmentation. Because of its easy computation, the Otsu technique is one of the most successful methods for picture threshold among all the segmentation methods. Otsu is a segmentation approach that uses an automated threshold selection zone. The binarization idea of Otsu's approach is used in this study. In addition, numerous improvement strategies such as grey scale modification, filtering, and Histogram Equalization are employed to improve a picture (HE). One of the most well-known picture improvement techniques is histogram equalization. Because it is easy and efficient, it has become a common approach for contrast enhancement. To avoid the formation of non-existing art facts in the output image, the input brightness of the image must be preserved in this scenario. These approaches may yield photos that do not appear as natural as the input ones, despite the fact that they retain the input brightness on the output image with a high contrast increase. There are three stages to the planned work The low contrast input image is first subjected to Histogram Equalization. Second, we use Otsu's binarization to create a bimodal picture. Finally, the binary picture is obtained using Otsu's threshold approach. The outcomes are superior than the state-of-the-art procedures used, according to the experimental study. We have given both subjective and objective comparative results. Visual quality and calculation time are subjective characteristics, whereas Peak signal to noise ratio (PSNR), Mean squared error (MSE), and Average Information Content (AIC) are objective measures (AIC).



## 2) Methodology:

The frame separation is a mixture of several techniques, such as item separation in the foreground and background. When a sparse matrix models foreground items and a low-rank matrix models background things To address the difficulties of detecting slow-moving objects, anchor frames are chosen . There are two types of background and foreground object detection methods: local and global. The video is detected on each pixel independently in the local technique. The Yolo is a useful model for image processing, and others use it to accomplish their job. Each picture is divided into  $S \times S$  grids, each of which predicts  $N$  bounding boxes and confidence. The assurance verifies the bounding box's accuracy and if it includes an item (regardless of class). In addition, YOLO calculates the arrangement score for each box during each training lesson. This may combine both modules to determine the chances of each class appearing in a forecast box. When compared to the Faster R-CNN, some people use the Fast R-CNN for detection .The drawbacks of RCNN to develop a fast object detection algorithm and it named as Fast R-CNN

## 3) Findings:

To build an ensemble of strong features vectors or trained network models as a detector to identify various NPs, the ELM classifier was used to classify and learn the ML-ELBP features. The output neurons are dependent on the number of NP classes in the training dataset and are represented by a feature vector with 710 dimensions. Further distorted photos (unseen data) were obtained under challenging situations, such as low/high contrast, cloudy, and rotated NPs, to evaluate the suggested approach . The detection, accuracy, and F-measure rate overall performance evaluations are 99.10 percent, 98.2 percent, and 98.86 percent, respectively, with an FP rate of 5%. The suggested method's experimental results were compared to those of various other NPD approaches that employed the same database. In terms of detection rate and efficiency, it beat existing approaches. Per vehicle picture, the average detection time was 0.98s. Under certain assumptions, several existing approaches employed simply the testing step with no pre-processing. Due to the utilisation of two independent testing and learning stages, this suggested technique works effectively without assumptions. Vehicle License Plate Detection Using Image Segmentation and Morphological Image Processing

**B.Author : Wasif Shafaet Chowdhury , Ashikur Rashid Khan, and Jia Uddin Year :2018**

## 1)Overview :

This paper describes an image segmentation approach for extracting a Region of Interest (ROI) from an image; the ROI in this case is the automobile license plate. An improvised Sliding Concentric Window (SCW) method was designed to execute the segmentation procedure in order to correctly detect the license plate. Vehicle photos were gathered for this suggested model, and the SCW method was utilized to segment off the ROI, followed by Morphological Image Processing techniques such as erosion and dilation to find the license plate. To test our suggested model, we employed a dataset in which the photos of the automobiles were shot from various angles, with natural backgrounds and diverse lighting conditions. The suggested model was found to have an accuracy rate of 86.5 percent for the dataset we evaluated. Furthermore, a comparison study was conducted to demonstrate the accuracy rate of two alternative ROI identification approaches (Improved SCW and Modified Bernsen Algorithm). The suggested model of VLP detection has been found to have a greater accuracy rate than certain other existing techniques.

## 2)Methodology:

The four main phases for vehicle license plate detection are picture capture, pre-processing, license plate localization, and license plate extraction. We use image segmentation and morphological image processing approaches for license plate location and extraction, respectively. As we all know, the most critical steps of VLP detection are license plate localization and extraction. As a result, we've suggested a better picture segmentation and license plate localization approach based on morphological image processing and Sliding Concentric window. The SCW algorithm scans the whole picture, changing the value of every pixel to 0 or 1 based on a comparison between a threshold value and the ratio of the statistical measures of both windows [4, 5]. As a result, the pixels that have the potential to be part of the ROI are kept by this method Furthermore, the morphological image processing techniques erosion and dilation employ structuring elements to recognize an object's shape in an image [6]. As a result, these techniques have been considered for the license plate localization process.

## 3)Findings:

The VLP detection procedure was broken into two phases. The first was picture segmentation, which used the Sliding Concentric Window technique to separate the ROI. The other component dealt with Morphological Picture Processing, in which the segmented image was dilated and then eroded twice utilizing the disc, rectangle, and line structuring elements, respectively. The testing findings reveal that the suggested VLP detection model was capable of correctly detecting the license plate from photographs with natural scenes and various lighting conditions. Furthermore, the suggested model is capable of detecting the ROI even when the angle of the taken picture is varied. Because the accuracy rate is high enough, this algorithm can be considered the best algorithm for detecting vehicle license plates.



### III. EXISTING SYSTEM

The current approach suggests using the Faster R-CNN to recognize the vehicle's number plate from security cameras installed in traffic zones and other locations. For improved results, the built system captures a video of the car and then uses frame segmentation and picture interpolation to recognize the number plate from the video. The method of optical character recognition is used to the resultant picture in order to recognize numbers .

Disadvantages:

- In this existing system it only detects the vehicle number plate.
- The System doesn't send notification to the authorized person about the vehicle's information and it doesn't have any application to effectively store and maintain the vehicle data and manipulate those data.

### IV PROPOSED SYSTEM

The suggested system would first capture a picture of the vehicle, and then extract the acquired images using the segmentation procedure. To obtain Number Plate Region, unwanted regions in the image are filtered using a Gaussian filter, and the image is segmented and resized. The characters are identified using the Optical Character Recognition (OCR) technique, and the data acquired is then compared to the data contained in their database. The use of a stored set of number plates for OCR is illustrated, and the output is compared to the valid plates to provide access in real time. To detect the characters in the plate, Bounding Box is used to this region. In the case of a centralized receiver, all of the entrance records are stored, and it will check for the presence of a theft vehicle entering the NH roads. If one is detected, the vehicle image and information will be captured and sent to an authorized person via IMAP (Internet Message Access Protocol).

Advantages:

- In our proposed system the vehicle number plate is detected by using OCR algorithm.
- The identified vehicle number plate and the vehicle images can be captured and database is maintained.
- A webapp is developed to search for the vehicle data and for surveillance.

### V ARCHITECTURAL DIAGRAM

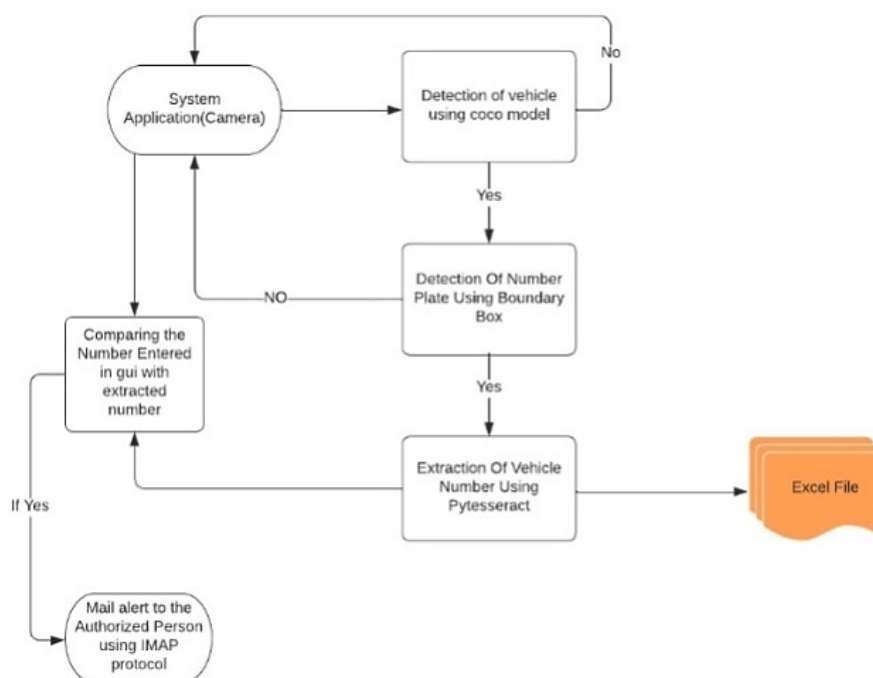


Fig. 5.1



OCR Process Flow

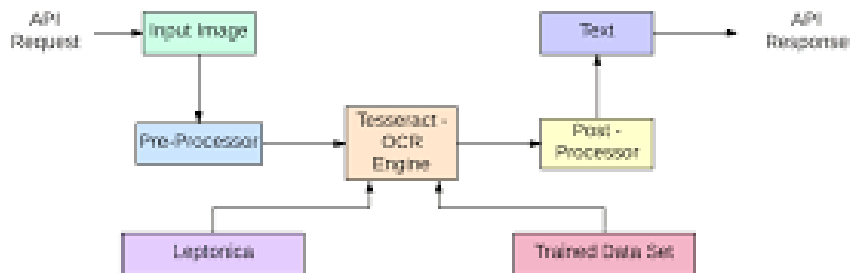


Fig 5.2

## VI CONCLUSION

The vehicle license plate is used to introduce an automatic number plate recognition system. For identifying the cars filmed by Camera, the system use machine learning algorithms. The method works well under a wide range of situations and with various types of license plates. Better number plate identification and character restructuring using conventional classifiers. The image of the recognized car is then saved in a local directory for future use. The retrieved data from the vehicle is saved in an excel file together with the device's time, date, and location. By inputting the car number, the user may get such facts.

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