Intelligent Number Plate Recognition System

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**Abstract:** Intelligent number plate recognition technology is a tool applied to smart cities in investigation and crime prevention. It has been widely used in parking management systems and toll booths on highways which have a rigid shooting angle and lighting surroundings. If the vehicle is an un-authenticate, then it becomes a very tedious and time-consuming task and very hard to search that vehicle. Recognized number plate displays on graphical user interface and stored in a database with time and date for further use. It will be beneficial to reduce the problem such as traffic violation cases and to enhance security in parking areas. Computer vision technology plays a very pivotal role in this project for moving vehicle number plate character recognition. Images from video sequences are taken to recognize the plate characters. Character recognition technique from the number plates based on aforementioned system recognizes and differentiates between genuine and fake number plates. In the project that we present number plate characters are easily identifiable from the machine learning algorithms incorporated in our system.

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## INTRODUCTION

Traffic control and vehicle owner identification has become major problem in every country. Sometimes it becomes difficult to identify vehicle owner who violates traffic rules and drives too fast. Therefore, it is not possible to catch and punish those kinds of people because the traffic personal might not be able to retrieve vehicle number from the moving vehicle because of the speed of the vehicle. Therefore, there is need to develop Intelligent Number Plate Recognition (INPR) system as a one of the solutions to this problem. There are numerous INPR systems available today. These systems are based on different methodologies but still it is really challenging task as some of the factors like high speed of vehicle, non-uniform vehicle number plate, language of vehicle number and different lighting conditions can affect a lot in the overall recognition rate. Most of the systems work under these limitations. In this paper, different approaches of INPR are discussed by considering image size, success rate and processing ­­­­­­­­time as parameters.

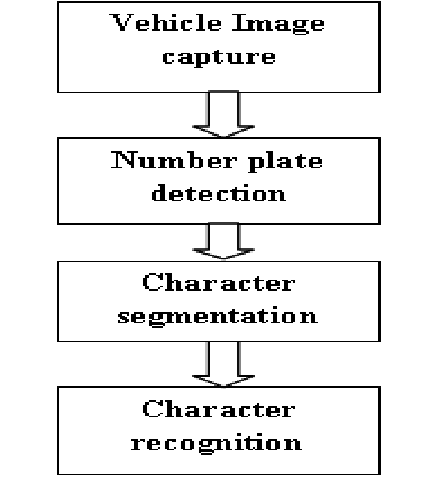


Fig .1. Conventional INPR system

The need for residential parking spaces, entails as profession management driven approach is rising unfettered. A very large number of the worlds population live in cities and in turn require secure and easy parking spaces which they are use daily. The authorized vehicle registered in the parking management system along with owner information is stored in this system. Every time the vehicles enter or leave the parking lot, will trigger real time data reflecting the ingression of said vehicles.

1. **Modules**

## Methodology

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## Image Acquisition

Typical INPR system consists of four steps these are Image Acquisition, License Plate extraction, character segmentation, and character recognition. Image Acquisition The initial step is the Acquisition of an image i.e., getting an image using the digital camera associated with the PC. These Caught images are in RGB format so it can be further process for the Number Plate Extraction. The database system contains the personal information of the vehicle proprietor and a few plates vehicle images, abbreviations and acronyms

**B. Image Processing**

The captured image is influenced by many elements like: Optical system distortion, system commotion, lack of presentation or over the top relative motion of camera or vehicle and so forth result is the degradation of a captured vehicle image and the unfriendly influence to the further image processing. Therefore, before the main image processing, pre-processing of the captured image ought to be taken out which include converting RGB to gray, clamor evacuation, and border enhancement for brightness.

**C. Plate Localization**

The Basic stride in recognition of vehicle Number Plate is to identify the plate size. By and large number plates are rectangular plate mat lab toolbox function gives a function called region props. It quantifies a set of properties for each marked region in the matrix. We used bounding box to gauge the properties of the image region. In the wake of labeling the associated components, the region will extricate from the input image.

**D. Plate Segmentation**

Segmentation Number plate segmentation assumes an imperative role in INPR system. The essential thought after region growing is to remember one or more criteria that are quality for the wanted region. Subsequent to establishing the criteria, the image is looked for any pixels that satisfy the necessities. At whatever point such a pixel is experienced, its neighbors are checked, and if any of the neighbors likewise parallel the criteria, both the pixels are measured as have a place with the same region. We get individual character and number image by using, vertical and horizontal scanning technique.

**E. Character Recognition**

This is the most essential and basic phase of the INPR system. It displays the techniques that were used to order and then perceive the individual characters. The classification is based on the extracted features. These features are then arranged using either the statistical, syntactic or neural methodologies.

Distinctive strategies were used for character recognition, letters and characters in the paper. Finish the identification by calculating the likeness of features. For the comparable characters, make the second identification with the technique for highlight point matching Another methodology is that Once the lines in an extracted vehicle number plate are separated, the line separation procedure is presently connected segment savvy so individual character can be separated. The separated individual characters are then stored in separate variables. The extracted characters taken from number plate and the characters on database which we have stored are presently coordinated.

1. **Proposed Methodology**

To recognize number plate first of all add templates from A-z and 0-9 and add them into mat file. After that read the image and change over that image into gray scale. Presently the following stride is to find out threshold estimation of the image. In the wake of finding T-esteem change over that image into binary.

As shown in the figure, the block diagram of the proposed procedure is appeared. In the proposed outline the input image is changed over to gray scale and on the gray scale image procedure of morphological scanning is actualized which will check the image and identify number plate part from the auto. The distinguished number plate will be given as input to split segmentation which will split every single character and each character will be coordinated with the existing dataset. The most extreme coordinated will identified which will be merged to create final result.

**//result**

**4. Conclusion**

In this paper, the Intelliegent number plate recognition system using vehicle license plate is introduced. The system utilizes image processing techniques for recognizing the vehicle from the database stored in the computer by user. The system works agreeably for wide variation of conditions and distinctive sorts of number plates. The system is actualized and executed in MATLAB and performance is tried on genuine images. In the existing work, work has been done on contorted number plates. This method has an issue of commotion and image is taken from separation. In proposed work a novel system has been proposed for denoising and for the better character reorganization using standard classifiers of neural networks and give better body detection.

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**5. Summary**

It is quite clear that INPR is difficult system because of different number of phases and presently it is not possible to achieve 100% overall accuracy as each phase is dependent on previous phase. Certain factors like different illumination conditions, vehicle shadow and non-uniform size of license plate characters, different font and background color affect the performance of INPR. Some systems work in these restricted conditions only and might not produce good amount of accuracy in adverse conditions. Some of the systems are developed and used for specific country, which is summarized in table 3. The systems in which there is no mention of country are not included in table 3. As per table 3, it is evident that very few of the INPR [34], [7] are developed for India. So there is a wide scope to develop such system for the country like India. This paper provides comprehensive study of recent development and future trends in INPR, which can be helpful

to the researchers who are involved in such developments.

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