

# Automobile Number Plate Recognition And Extraction Using Optical Character Recognition

Raja Vikramdeep Singh, Navneet Randhawa

**Abstract:** Automobile Number Plate Recognition and Extraction System using Optical Character Recognition Methodology is one of a kind Intelligent System and is of considerable interest because of its potential applications in highway electronic toll collection and traffic monitoring system. This type of application puts high demands on the reliability of the System. A lot of work has been done regarding license plate recognition systems for Korean, Chinese, European and US license plates that generated many commercial products. However, little work has been done for Indian license plates recognition systems. The purpose of this research is to develop an application which recognizes license plates from vehicles. The system takes images of automobiles as input and processes them. Once a license plate is detected, its digits are recognized and displayed on the User Interface. This work focuses on the design of a single algorithm used for extracting the license plate from a single image, isolating the characters of the plate and identifying the individual characters.

**Index Terms:** Automobile Number recognition, Car number detection, Indian Vehicle registration plate recognition, License plate detection, Optical Character Recognition, Real-time License plate recognition, Registration Number recognition, Vehicle recognition.

## 1 INTRODUCTION

Automobile number plate recognition and extraction is an image-processing technology used to identify automobiles by their license plates. The vehicle number plate recognition was invented in 1976 at the Police Scientific Development Branch in the UK. This technology is gaining popularity in security and traffic installations. In a sense, the automobile number plate recognition with OCR is a combination of integrated hardware and software that will read vehicle license plates without the need of humans to do it. The concept of the system is to identify properly and locate the vehicle they are looking for. It is a type of technology, mainly software that enables computer systems to read automatically the registration number (license number) of vehicles from digital pictures. Reading automatically the registration number means transforming the pixels of the digital image into the ASCII text of the number plate. Systems use infrared lighting to help the camera take the picture at any time during the day. This light is used because the retro-reflective plates reflect this kind of light very well and it is undetectable for the human eye. This combination works fine during day and night and provides constant good image quality. The number plate recognition technology tends to be location-specific, due to variation in plate format from place to place.

## 2 STRUCTURE OF PROPOSED WORK

The system presented is designed to recognize number from license plates from the front and rear of the automobile. Input to the system is an image sequence acquired by a digital camera that consists of a license plate and its output is the recognition of characters on the license plate. The system consists of the standard four main modules in the Automobile Number Plate Recognitions and Extraction System viz. Image acquisition, Automobile Number plate extraction, Automobile Number plate segmentation and Automobile Number plate recognition.

- *Raja Vikramdeep Singh is currently pursuing M.Tech in Information Technology in Punjab Technical University, Jalandhar, Punjab, India, PH-9988105077. E-mail: [rajavikramdeepsingh@gmail.com](mailto:rajavikramdeepsingh@gmail.com)*
- *Navneet Randhawa is currently working as Associate Professor at AIET, Faridkot, Punjab, India.*

The first task acquires the image. The second task extracts the region that contains the license plate on the automobile. The third task isolates the characters, letters and numerals (total of 10 digits), as in the case of Indian License Plates. The last task identifies or recognizes the segmented characters.

### 2.1 Image Acquisition

This is the first phase in an Automobile Number Plate Recognition and Extraction System. This phase deals with acquiring an image using an appropriate method for acquisition. In our proposed system, we used a any resolution input image.

### 2.2 Automobile Number Plate Extraction

Automobile Number Plate Extraction is an important step in an automobile number plate recognition system. The accuracy of the system is significantly influenced at this stage. This phase extracts the license plate from the image that had been acquired in previous stage. The proposed approach involves:

- converting the RGB into gray scale,
- Binarization of the image, and
- finding and filtering the noise from the image.

### 2.3 Automobile Number Plate Pixelation and Segmentation

Automobile Number Plate Pixelation and Segmentation, also known as Character Isolation, takes the number plate from image and attempts to divide it into individual characters.

### 2.4 Automobile Number Plate Recognition

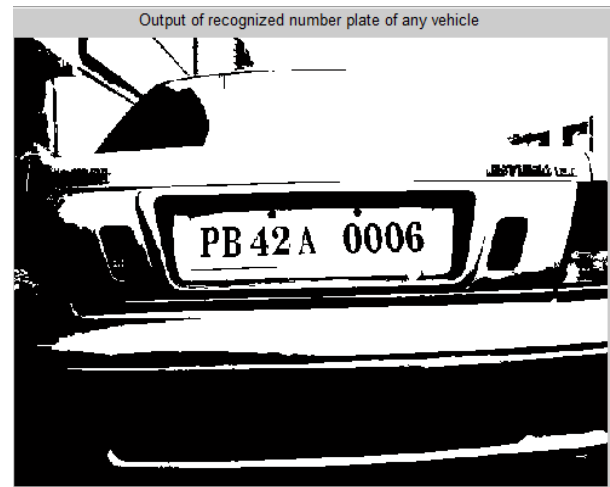
The last phase in Automobile Number Plate Recognitions and Extraction system is to recognize and identify the individual isolated characters. After the extracted license plate has been split into individual character images, the characters in each image can be identified. There are many methods used to recognize isolated characters. In the proposed system we are using Optical Character Recognition in MATLAB.

## 3 RESULTS

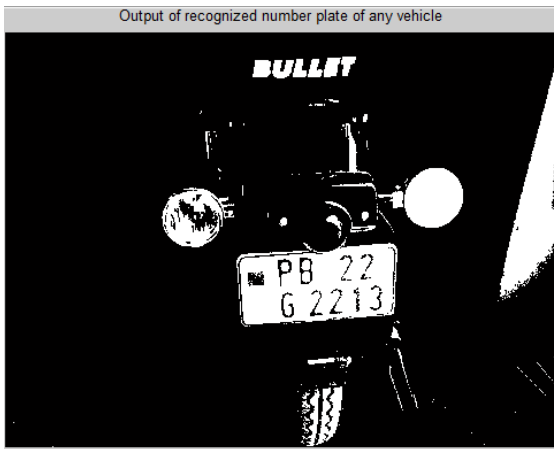
The algorithm was implemented and tested on some number plates. The results obtained on the sample pictures of number plates input to the system are as follows:



**Figure 1. Input Image**



**Figure 4. Output –recognized Number**



**Figure 2. Output Image**

**Figure 2. Output –recognized Number**



**Figure 3. Input Image**

#### 4 CONCLUSION

The process of Automobile Number Plate Recognition and Extraction System implemented in this system has successfully optimizing the speed and efficiency of the system by reducing the image recognition algorithm for alphabets and number reading into one algorithm only which easily and efficiently reduces the complexity of splitting and merging the image of the extracted number plate. It has also reduced the noise from the final output image and provides an output which is noise free and the background suits the font color of the number on the automobile license plate. We get an overall efficiency of 98% for this system. Though this accuracy is not acceptable in general, but still the system can be used for vehicle identification. It may be concluded that the project has been by and far successful. It can give us a relative advantage of data acquisition and and can provide a much faster automobile number recognition as compared to previously available systems.

#### 5 FUTURE SCOPE

The process of Automobile Number Plate Recognition requires a very high degree of accuracy when we are working on a very busy road or parking which may not be possible manually as a human being tends to get fatigued due to monotonous nature of the job and they cannot keep track of the vehicles when there are multiple vehicles are passing in a very short time. To overcome this problem, an effort can be made by the researchers across the globe by taking the systems image input using online hardware and specialised cameras installed at appropriate location where the automobile number plate recognition system is implemented. Though we have achieved an accuracy of 98% by optimizing various parameters, it is required that for the task as sensitive as tracking stolen vehicles and monitoring vehicles for homeland security an accuracy of 100% cannot be compromised with. Therefore to achieve this, further optimization is required. Also, the issues like stains, smudges, blurred regions & different font style and sizes are need to be taken care of. This work can be further extended to minimize the errors due to image capturing.

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