Abstract

The License plate tracking system is used to provide high speed security as well as monitoring systems. License plate recognition (LPR) is a system where car plate is recognized and identified automatically. Car License plate identification plays very important role in Data Driven Intelligent Transportation System. Car is identified uniquely by its number plate. Identification of authorized car number plate, providing controlled access to restricted areas, and law enforcement. In the proposed system the license number of the car is checked against the database of authorized users and only authorized vehicles will be allowed to enter the college campus. Character extraction and database matching plays the important role in identification process. The performance of the system depends upon feature extraction technique. It is necessary to select and extract relevant features for improving the performance and accuracy of the whole system. License plate recognition (LPR) is a system where car plate is recognized and identified automatically. The advantage of this approach is success full recognition of a moving vehicle. This project focuses on processing the image in Matlab software for number plates. First, the number plate area is detected using Boundry Detection, Segmentation using regionprops function and then the characters are identified using optical character recognition (OCR).OCR can identified the characters directly from the image of the license plate. In this paper these system has made the ownership of vehicles. The proposed algorithm is based on Template matching.
I. INTRODUCTION

ALPR is the rapidly growing field of computer science which is increasing its demands rapidly. AUTOMATIC license plate recognition (ALPR) plays an important role in real-world environment. Vehicle owner detail identification is the challenging and interesting tasks. An efficient approach have been suggested for number plate detection and recognition system based on the proposed algorithms. Accurate segmentation of number plate will produce appropriate recognition results. NPR is an challenging task because number plate is in different size, shape and also written in different font style. When a vehicle enters an input gate, number plate is automatically recognized and stored in database. In a vehicle-related crime, law enforcement agencies usually require searching and monitoring a suspicious vehicle from millions of traffic images and we proposed intelligent transportation system to automatically recognize car number plate and car owner details from a single image taken by a mounted traffic camera along parking lot. access to vehicle registration, it is convenient to identify a fraudulent license plate by referring to registered information in the database, the morphological operation is used to segment the characters and recognition is done using template matching method. More number of effective methodologies has been decided for number plate detection and recognition system. The more effective and robust manner is introduced in this paper for achieving the quick and accurate recognition results. The ANPR work is generally framed into the steps Number plate extraction and character recognition. From the entire input image, only the number plate is detected and Based on the selection of prominent features of characters, each character is recognized, in the character recognition phase. Number Plate recognition carries an important role in different applications such as traffic monitoring on highway, automatic toll fee collection, parking ticket collection, Border control, owner details identification, car make and model identification. ANPR system was first initiated in 1976 in UK police station. Intelligent Transportation System (ITS) announces vehicle use only standard number plates. So, Now a days the standard number plate is very easy to recognize. But, in existing system it is very complex to identify if it has no standard size and pattern. From the car image, only the number plate is detected and processed further in the next step of character recognition. Individual character is recognized, in the character recognition phase. ITS can be widely used in many countries for the purposes are speed enforcement and tool collection to management of parking lots, theft car identification. It can also be used to detect and prevent a wide range of unregistered vehicles, car theft and for security control of a highly restricted areas like army zones or area around on dominant government offices. ALPR systems generally consist of a high speed camera with an infrared (“IR”) filter one high resolution digital camera and one IR camera to capture images of license plates a processor capable of performing sophisticated optical character recognition (OCR) to transform the image of the plate into alphanumeric characters, he transformed license plate characters to databases of license plates and a user interface to display the images captured, the results of the OCR transformation, and an alert capability to notify operators when a plate matching an agency’s “hot list” is observed. The precise configuration of
ALPR systems varies depends upon the equipment and the appropriate operational deployment.

In this paper, we propose an optical character recognition approach and Template matching to perform the highest recognition rate. Recognition process is one of the efficient processes involved in the design of owner details identification and fine collection. We implement our approach to number plate Recognition in Intelligent Transportation System (ITS). In this system, an ANPR system is intend for the detection of number plate of vehicles using their number plate. At the first stage plate location is extracted using morphological operation then cropped the plate characters individually by using OCR. Finally template matching is applied with the use of correlation for character recognition.

II. LITERATURE SURVEY

License Plate Recognition (LPR) is an Digital image processing technique, which uses license plate to identify the vehicle. The System which is used to design an registered and Unregistered vehicle identification system by using the vehicle (car) number plate which uses license plate to identify the vehicle. The system was able to identify the location of number plate it did not recognize the character. An automatic method is followed for analysis and recognizes the number plate within an estimated time under existing illumination condition. This paper presents an efficient and fast computing technique for identifying vehicle number plate was proposed in (Khalil M. Ahmad Yousef et al. 2014)[1].The work is part of the recognition and identification of vehicle number plate that will help the authorized and unauthorized vehicles. This work proposes a method boundary box and slobal edge detection method. This work mainly focuses to locate the number plate region properly to segment all the number and letters to identify each number and character. The influence of this approach is boom full recognition of a moving vehicle. It is complex to detect the boundary of the Number plate from the input car images. The proposed system shows the number plate of the vehicle and also the date on which the image of the vehicle is captured (Michael Kisangiri et al. 2014)[2]. Number plates coming in various font styles and colours, the technique needs to be refined to increase its efficiency. The focus of the project is to analyse and create image processing algorithm for ANPR system that takes vehicle number plates in Malaysia. Simplicity is reflected in the algorithm as the end product targets vehicle details. After segmenting the number plate area, the characters are then recognized through OCR by correlation method. This is because correlation is straight forward and cheaper. First, the image is converted to black and white. Then, objects that are bigger or smaller than the characters in the number plates are removed. The characters are then separated individually. Each character is then compared with a set of template using correlation. The template with the highest correlation coefficient corresponding to the image defines its identity was described (Ng Simin1 2013)[3]. This work considered to develop and test high performance algorithms that address some complexity that occur in real-world applications. The image analysis is performed using cell classification and pattern recognition. We analyse video frames, since multiple license plates might be detected at the same time, we group the detected plates based on their location of the car image. Once we
have merged the plates, we can use the algorithm that follows the expectation scheme (Jennifer A et al. 2012)[4]. Numbers and characters are segmented and compared with data bases cover up totally used different technique and recognized it properly. Preprocessing steps and binarization of the car image number plate. Connected component analysis method that analyzes the smallest rectangular region containing these cropped number plate components. High resolution of the image forms an important a part of this technique thus preprocessing the image helps in rising the standard. Real time system can be developed at low cost and high performance. The proposed system use Fuzzy logic has been applied to the problem of locating license plate (Ragini Bhat et al.2014)[5]. In number plate recognition system our algorithm detects the number plate region from the car image which consists of vehicle number plate region and then character segmentation, recognition. We have applied our algorithm on many images from the videos and found that it successfully recognition. The system use set of image processing techniques for identifying the vehicle from the database stored in the PC. The system is implemented in Matlab and it can be tested on real images. The recognition results shows that the system detect and find the vehicle using license plate against different illumination conditions and can be implemented on the college entrance (Anu Agarwal et al. 2014)[6]. Text selection from an image is a most important area of research. In this work, vehicle number plate information is cropped from vehicle's image or from sequence of images without direct human work. A simple approach based on efficient morphological operations is proposed. Then, all the letters and numbers are used in the number plate are segmented by using a bounding box method and then template matching approach is used to find the alphanumerical (Riazul Islam et al.2016)[7].In this paper, we proposed a method mainly based on detection of edges, morphological operation and reducing the noise and then performing the character matching. For the implementation of vehicle number plate recognition system, many plate detection and segmentation algorithms have been proposed. The algorithm for detection can be classified into the following three types: on the basis of edges, on the basis of color, on the basis texture. Edge based technique for detecting the location of the plate depends on the high contrast between the region containing the text and the background. Color based approach uses the color or gray scale characteristics of the text in the proposed work (Wong Weng Keong et al.2013)[8]. The extracted characters are then recognized and the output is displayed in the notepad. Character recognition in ALPR systems may have some difficulties that font size and style variation. Due to the camera zoom factor to overcome this problem, the extracted characters do not have the same size and the same thickness. Resizing the characters into one size before recognition helps overcome this problem. The characters font is not the same all the time since different license plates use different fonts. Extracted characters have some noise or they may be broken (Sathiyanarayanan D et al 2007)[9]. This work introduces novel method of license plate verification for ALPR systems was implemented and tested on the set of 147 images. Since verification of cropped was used after detection part, those plates were checked on correspondence of their measurement to its real value. This method found 25% of the remained false positive candidates without
any false negatives. The accuracy rate of the method is suitable for ALPR systems for the improved algorithm used in the proposed system (Shan Du et al.2015)[10].

III. PROPOSED SYSTEM

The proposed framework for car plate recognition system for brand detection and owner details identification is shown in Figure 3.1

![Proposed Framework Diagram](image)

1. **Feature Extraction**: F-SIFT (Fast-SIFT) consists of the same four major stages of SIFT: (a) scale-space detection, (b) keypoint localization, (c) orientation assignment and (d) keypoint descriptor and feature vector quantized into visual words and the feature vector is significantly smaller than the standard SIFT feature vector. The frequency of each visual word is then recorded in a histogram for each tile of a spatial tiling. The final feature vector for the image is a concatenation of these histograms
   - Feature Extraction
   - Character Recognition
   - Image cropping
   - Segmentation
   - Database

2. **Character Recognition**: These are the pre-processing steps often performed in OCR. Usually presented with a gray scale image, binarization is then simply a matter of choosing a threshold value. Remove isolated specks and holes in characters, can use the majority operator. Check connectivity of shapes, label, and isolate Matlab `bwlabel` and `regionprops` functions. Difficulties with characters that aren’t connected, e.g. the letter i, a semicolon, or a colon.

3. **Segmentation**: Segmentation is by far the most important aspect of the pre-processing stage. It allows the recognizer to extract features from each individual character. In the more complicated case of handwritten text, the segmentation problem becomes much
more difficult as letters tend to be connected to each other. The data extracted from the image is displayed separately.

4. **Image Cropping**: Image cropping is a number plate recognition process whereby it will extract the smallest rectangle which will contain the edge of the number plate and number plate itself. As the number plate surrounding is not so important, number and characters are more important. This cropping process will highly increase the speed of image processing. In order to facilitate the next process smoothly and reducing the processing time in MATLAB.

![Figure 2: Image Cropping](image.png)

5. **Database**: It is a collection of information or data which it is being orderly organize, thus it can be accessed easily and updated. Database can be in the form of text, contents and images and is needed to make sure that the image space can contain enough characters which have been extracted and the vehicle number plate number stored in the excel sheet for the purpose of comparison. The database would be large enough in order to improve the accuracy and better chances of obtaining the correct result. The class recognition will check if the computed ratio is correct. If the class has match correctly, it will be compare with data set in the predefined database and provide an output if the image is recognized correctly car brand and owner details will be displayed.

**IV. EXPERIMENTAL STUDY**

The proposed system had been analysed to measure the performance and accuracy of the number plate detection and owner details identification. The system was tested by 150 car number plates under several illumination conditions. The characters and numbers were clearly and correctly identified in different weather conditions, new plate that played an easy role for identification. The identification was 92%. The failed identification came from mostly motion blurred or overlapped by other Vehicle’s body or slant, different font, different language and dirty in the plates.

**V. CONCLUSION**

This system was designed by SIFT and Template matching under Matlab software for recognizing a standard license plate in car image. A video stream at a real time was
advantage of this technique. The performance and accuracy were excellent (92%) and also
provide the better results for current and future work. Database was built by traffic
administration rules, so that the system could be applied as practical application. In this
system, an application software is designed for the detection of number plate of vehicles
using their number plate. At first plate location is extracted using morphological operation
then separated the plate characters individually by segmentation. Finally template matching
is applied with the use of correlation for recognition of plate characters.
Some of possible difficulties:
1. Broken number plate.
2. Blurry images.
3. Plate not within the legal specification.
4. Low resolution of the characters.
5. Poor maintenance of the vehicle plate.
The Basic Structure of the code , the number plate area segmentation and OCR code is
constructed. The project is then extended to target all types of vehicle.

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