A Novel approaches for Detection and Verification of Indian Standard High Security License number Plates of Stolen Cars using Matlab

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Abstract— Automatic Indian Number Plate Recognition System have the important role in modern travel and traffic system. Its helps to monitoring the urban traffic and to recognition the automobile thefts. In India the car number plate having the different shape and size. From past few years' automatic car number plate recognition is most interesting and challenging research topic. Different country having their vehicle number plates in different colour, so recognition is be more challenging. Every year many vehicle are be stolen, No any vehicle can be tracked. This automatic number plate recognition is the solution of such problems. There are many algorithms and methodologies are used to track the vehicle number, but it is more challenging task in some of factors like as different non-uniform font style and letter on plate which is effects in recognition process. The previous technology are not perfect for high speed vehicle. In this paper we presents a new fast and efficient algorithm in Matlab gui based rtos system , Which capable to extract number from vehicle number plate in various luminance conditions. We use a database of stolen vehicle for theft verification purpose. After extraction of number from number plates, Number will be verify with stolen vehicle database and activate an alert system. This paper presents this algorithm for Indian vehicle.

Keywords— Number plate Extraction, MATLAB, Recognition, Digital Camera, luminance condition.

I. INTRODUCTION

Each Number plates are unique for each vehicle, its takes the unique identification of each vehicle all over country. So its need to be monitor and recognize. We can track number plates in two ways firstly manually and second is automatically. In India traffic police noted manually the vehicle number plate. It is complex and not accurate reading. But automatic number plate recognition is the fast and efficient based system. Its helps to track the maximum number of system at a time with an accurate reading. Automatic number plate system uses the image processing system of Matlab. In India Indian car number plate recognition is very helpful to control the effective traffic surveillance and various security applications, such as tracking of the wanted cars, and restrict and authenticate in any area. This system is automatic and easier to track the vehicle identification, other system works in manually. Indian number plate is difficult to identify compare other foreign country number plate cause of different aspect ratio number plates in used in India and no standard colour and number plates are use. Past few years experimentation of number plate identification have developed many methods and its sill have a challenging task day-to-day. In this system investigates real time capture an input image to identify some local patches containing in number plates. In an input image plate can be exist anywhere in captured image with various colour and size. It is not possible to do easily to check every pixel of the car input image to detect and locate it. In parking area, number plates can be track and used to calculate the duration of car parking. When a cars enter in parking area of input gate, then number of plate is automatically detect and recognize from the database. We have a database of stolen car which is daily updates in online. This system is developed in platform of Matlab and we use GUI for user who can easily handle and control.

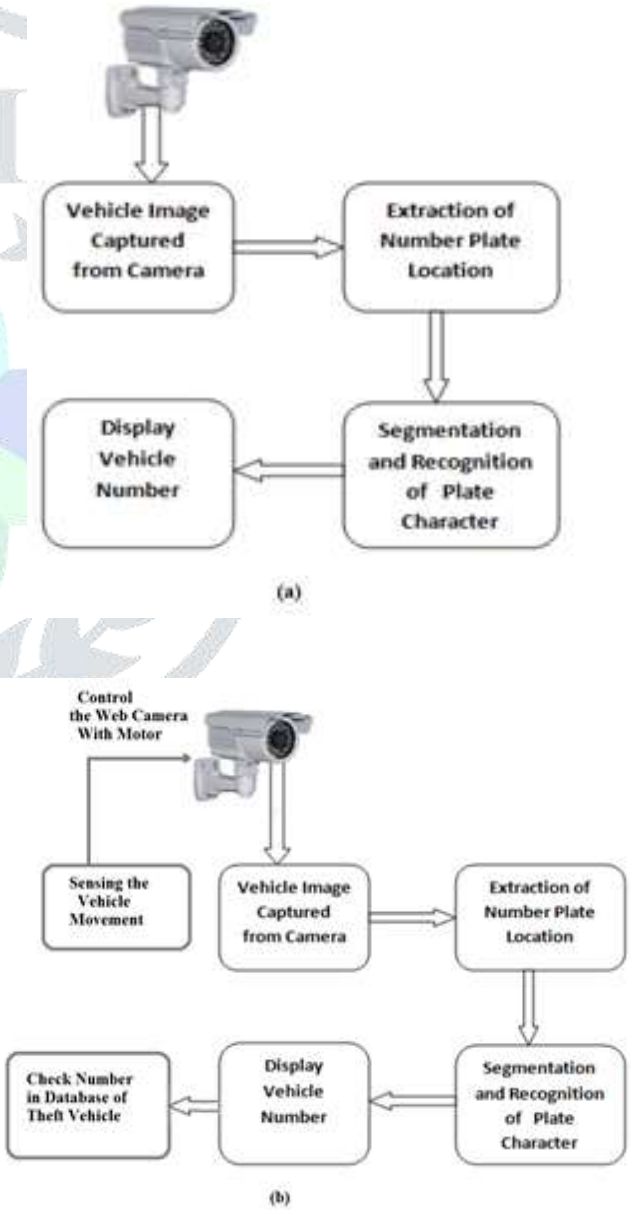

Figure 1: (a) Block Diagram of General Automatic Number Plate Recognition (NPR) (b) Block Diagram of real time Advanced Automatic Number Plate Recognition use in our system.

Objective:
The main objective of this paper is to design a system based on Matlab GUI (Graphical User Interface) , which can be detect the Indian car number plate and recognize the car is stolen or not. This system helps to traffic police and also be helps to people many entry system in authorized area. This system is compact and low cost. In this system a real time high quality camera capture the car images. The camera direction control by Arduino Uno and Servo motor. After the car images capture the Matlab GUI helps to detect and recognize the car status.

II. LITERATURE REVIEW

Vehicle number plate recognition has been an ongoing innovative research for over the last few years. Many researches have been carried out to identify the different type of vehicle such as a truck, car, bus or any four wheeler vehicle. In paper [14], the soble filter algorithm was used to address this issue to get the edges of the vehicle which is applied to detect and recognize the type of vehicle. The model of [11] the vehicle find out through in the use of SVM (Support Vector Machine) and contour let Transform. They showed many numerical results on data set of pictures. However, they could not be applied the any technique to real-time capture of video stream [2]. In the paper [16] monocular images technique are used for car recognition. They applied canny edge detection for detect edges to detect the presence of vehicle and their number plate and SVM classifier to recognize the vehicle number classification. In paper [12], recognition of the type of vehicle irrespective of scale, size and rotation variation of vehicles number plate where [7] we applied the filter, MACH filter and Log r-theta Mapping techniques.

In paper [8], OCR techniques was used [5], which is a commonly used technology for optical character recognition, which is used for translation of scanned images of printed text into format of machine encoded text. Basically an OCR technique is based on neural network fee-forward system. This is proposed for where two real character images, which is no-overlapping to each other, sets of data uses for training and training using neural network technology. ANN based neural network system used for pattern recognition. ANN generally used feed-forward neural network based intelligent computing architecture, which can be classify the inputs into a set of target categories. Neural network done work well and can achieve better performance to other even the size and colour of number plate be different it is also work under in the difficult environment.

III.AUTOMATIC INDIAN NUMBER PLATE DETECTION AND RECOGNITION AND APPROACHES

The proposed system contains various stages as image acquisition, pre-processing, number plate localization, character segmentation, character recognition. The system is designed in Matlab based GUI application.

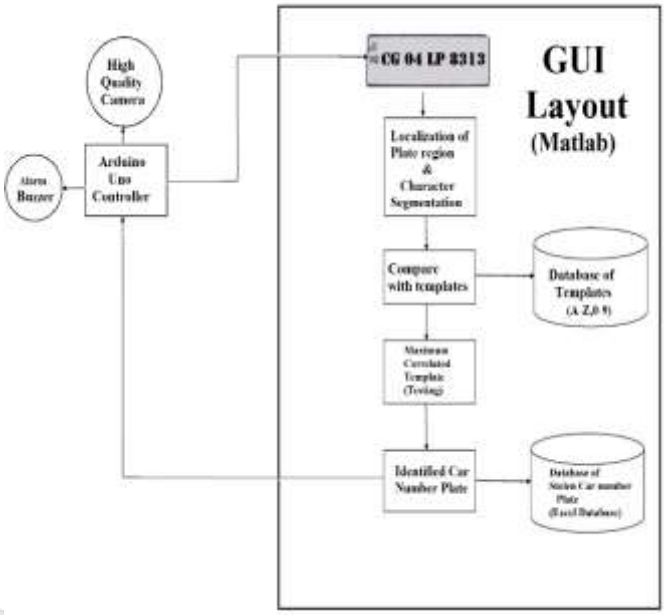

Figure 2: A GUI layout System overview of Indian Number Plate Recognition System

A. Car Image Captured By Camera
Arduino Uno attached with the motion sensor which detect the motion of car. Then the motor helps to rotate the camera for capturing the car images from real time videos [2]. We use the high resolution picture quality camera for image acquisition, identified is captured using high resolution digital camera.

B. Pre-processing
Firstly, we convert the input RGB colour image to a gray-scale images. To speed up the process, the image is first downscaled to 50% of the original. Here mathematical morphology [6] is used to detect the plate region and the sobel operator are used for calculation of the threshold value. After this system we will get a dilated image. Then we use imfill function for fill the holes, so that we can get a clear binary image.

C. Indian Number plate Localization
Pre-processing is the important technique to filtering and edges detection. The image is pre-processed, passing through gray scale filter and edge detection method is applied. Which applied to the isolate of the plate region of interest. Localization [1], [4] is an algorithmic function for identifying a number plate. By the use of localizing determines the aspect ratio of number plate of vehicle image. This algorithm search the similar background colour of in image unified proportion and mean contrast differentiate number plate objects on a vehicle.

(i) Edge Detection
There are many methods of which performing edge detection of image. We detected the edges of input image [6], here we using canny edge detector which used to takes a gray-scale image as its input of this system, and then returns a binary image of same size [11] as an output image, where the edge detection function finds the edges in the input gray image.

(ii) Character Segmentation
In the identified number plate region where character are segmented using function of region-props of Matlab, It is use to find the boxes bounding for each characters. This function returns the smallest bounding box, which [13] contains a character. So, we can use this method for obtain the bounding boxes of all character in vehicle number plate.

D. Character Recognition

Template matching is a technique of character recognition. It is method of finding the fixed location of a template (sub-image), which inside of captured image. Template matching having similarities [12] between a given template image and windows with same size in an image and that identifying the window, that produces highest similarity measure. It works with pixel-by-pixel comparison and each possible pixel displacement of the template image.

OCR Classification

The classification stage uses the features extracted in the feature extraction stage to identify the text segment according to pre-set rules. Classification is usually accomplished by comparing the feature vectors corresponding to the input character with the representative(s) of each character class, using a distance metric. Traditionally nearest neighbour classifier and binary classifier trees have been the two most commonly used classifiers. The nearest neighbour classifier is an effective technique [2] for classification problems in which the pattern classes exhibit a reasonably limited degree of variability. For a specific and clear machine printed text, the pattern of each class tends to cluster tightly about a typical or representative pattern for that class. Under these conditions, a nearest neighbour classifier can be a very effective approach to the classification problems. The nearest neighbour method compares the input feature vector with a library of reference vectors and the pattern is identified to be of the class of the library feature vector to which it has the closest distance. It, however, suffers from the twin problems of speed and memory.

OCR is often used to obtain text from image-only files for use in classifying them or in providing search ability. However, there are several limitations of OCR that result in inaccurate or missing text or make classification difficult:

Font Size: OCR may not convert characters with very large or very small font sizes. This can make the most important characters and words unavailable for text-based systems.

Uni-Dimensional: With OCR, individual words have one dimension, they're either before or after other words. OCR does not catalogue page coordinate information for characters even though page coordinates can be quite useful for classification and attribution.

Sequential Editing: OCR errors typically have to be corrected sequentially with the same errors being repeatedly being edited. Global spell checking can introduce other errors.

Case Sensitivity for Editing. The use of spell checking to correct OCR text will typically not permit the case of the letters to be considered, e.g., cat and CAT will be treated alike.

Non-Textual Glyphs: Many times there are important non-textual characters or glyphs that do not get converted to characters by OCR, leaving them invisible for text analytics or text-based retrieval, e.g., logos, or map symbols.

Languages. Many languages have special characters, and unless the correct OCR software is loaded, those characters can be lost or incorrectly recognized.

E. Identify the Stolen Car

The main purpose of this state that recognize and classification of binary images that have contains character which is received by previous stage. After doing this stage each character must have a valid label and having an error factor. If this error factor is greater than a predefined data value will be used for reject the false characters which passed from previous one. For the time of classification step some features must have collected data from the characters. This is use for because image to text into characters conversion. In number plate each individual character match from the completer alphanumeric database using template matching method. The matching process checked the template image to all possible positions in a input larger image and computes a particular numerical index which indicate that how the template is matches and what quality of matches the image in that position. After template is matched we having a valid vehicle number which is matches from the database of excel sheet automatically. If the stolen vehicle is detect then the alert system will be on.

III. LIMITATIONS OF THIS SYSTEM

We have some of limitations in this system. The vehicle number plate having the different languages character. Then this system failed in this field. It is cannot convert the different languages to English character. We need a good motion sensor with high resolution camera.

IV. DISCUSSIONS

In the current scenario people face many problem with their vehicle is stolen, parking etc. This system can be help to find and recognize the vehicle identification. We can be control the crime cause of vehicle stolen.

VI. EXPECTED OUTCOMES

We expected that we can be detect high speed vehicle using of best quality surveillance camera using motion sensor.

This system can be resolve the many of the previous issue of systems. This system can be handle large database of stolen vehicle.

VII. CONCLUSION

It can be concluded that proposed system will help to search stolen vehicle using traffic monitoring cameras. Camera are connected with motor which cover the 180 degree angle help of Arduino controller. The system will continuously detect and recognize the passing vehicles into database, if any stolen car will matched then the alert alarm is ON. This way we can find any stolen vehicle.

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