

## Affordable Mobile Application to Monitor Residential Society's Vehicle Activity.

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**Abstract:** The process involves the system has still images as the input, and extracts a string corresponding to the plate number, which is used to obtain the output user data from a suitable database. The system extracts data from a license plate and compare it with the user database if it matches the it will store the details of that vehicle and if it is not matched means that vehicle does not belong to that society then it will generated a message and send it to the administrator. License plate extraction is based on plate features, such as texture, and all characters segmented from the plate are passed individually to a character recognition stage for reading.

**Keywords:** License plate Extraction, Character Segmentation, Character Recognition.

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### I. Introduction

With the increasing number of vehicle in today's world it's not possible to manually keep a record of the entire vehicle. There need to be a man standing 24\*7 to note down the number. It's a time consuming process and require manpower. Furthermore the data stored manually is not readable after a long time. So to overcome all these limitations here we tried to develop a system which would automatically detect the number plate and store it in its database. Later on when the information is required one can get it and use it. This process also helps to get the correct result compared to manually one. The process of working involves that as soon as the vehicle enters the secured area the system automatically captures the images and stores it. The processing of the image is done through the software stored in the system. If the vehicle matches the already stored information then it's allowed to pass the gate. And if the vehicle is not recognized or if it's marked in the blocked list then it's not allowed to cross the gate and further checking process are followed.

### II. Related Work:

Most of the information these days is presented either on photographers/ videos form or in paper form. Applications may include, multimedia systems, geographical information system, libraries and information retrieval system. The main aim is the finding of image regions of text that are useful for the OCR (optical character recognition). The input is received in the form of images and significant text is the output. Images can be colored/gray scale, compressed/uncompressed. Text information extraction is divided into detection, enhancement and extraction, tracking, OCR and localization.

The process of text detection is for determining the text in frame by estimating the text accessible confidence in regions of native images by classification. To decide the text location in image and to generate the bounding boxes in text is the process of text localization. Text tracking can be used to cut back the time period for text localization. The image extracted and enhanced should be converted into binary image before sending it to OCR system. The segmentation of components from the background is the stage of text extraction. Text extraction enhancement is required as an outcome for text regions with less resolution and noise. Later, the images of extracted text are distorted in plain text after applying the OCR system The System allows the machine to identify the text repeatedly. It is a technology for functioning like human reading ability. Conversion of files/texts or captured images by digital camera, scanned paper documents into searchable and editable data. [1]

Automatic License Plate Recognition (ALPR) is a technique to extract the license plate number from a still image or a video of a moving or stationary vehicle. A typical ALPR system consists of four steps namely Vehicle image capture, Number plate extraction, Character segmentation and Character recognition. But since

our ALPR model is designed to work on videos, therefore, one more step is added at the beginning that is to split the video into frames. In general, the first step i.e. to capture an image of the vehicle is quite an exigent task as it is very difficult to capture image of a moving vehicle in real time, in such a manner that none of the components of vehicle especially the number plate is missed. But our implementation does not rely on single image, rather author's generated multiple frames (still images of which the video is composed) from the video and find possible license plate number corresponding to each frame. Then the registration number with maximum number of occurrences is chosen as the final output. The success of the fourth step of character recognition depends on how the second and the third steps are able to locate vehicle number plate and separate each character. [2]

Number plates are used for identification of vehicles all over the nations. Vehicles are identifying either manually or automatically. Automatic vehicle identification is an image processing technique of identify vehicles by their number plates. Automatic vehicle identification systems are used for the purpose of effective traffic control and security applications such as access control to restricted areas and tracking of wanted vehicles. Number plate recognition (NPR) is easier method for Vehicle identification. NPR system for Indian license plate is difficult compared to the foreign license plate as there is no standard followed for the aspect ratio of license plate. The identification task is challenging because of the nature of the light. Experimentation of number plate detection has been conducted from many years, it is still a challenging task. Number plate detection system investigates an input image to identify some local patches containing license plates. Since a plate can exist anywhere in an image with various sizes, it is infeasible to check every pixel of the image to locate it. In parking, number plates are used to calculate duration of the parking. When a vehicle enters an input gate, number plate is automatically recognized and stored in database. In NPR system spectral analysis approach is used where acquiring the image, extract the region of interest, character segmentation using SVM feature extraction techniques. The advantage of this approach is success full recognition of a moving vehicle. It is difficult to detect the boundary of the Number plate from the input car images in outdoors scene due to colour of characters of the number plate and Background of the Number plate the gradients of the original image is adopted to detect candidate number plate regions. There are also algorithms which are based on a combination of morphological operation, segmentation and canny edge detector. [3]

### **III. Proposed Work**

This paper presents a method of vehicle license plate Character recognition. The whole system into three following steps:

- 1- Plate location or finding location of plate in the vehicle image and cropping plate image from it.
- 2- Plate segmentation or cutting plate image to character's images.
- 3- Character recognition or convert character's images to final distinguished characters among them.

#### **Vehicle Image Capture**

The first steps to capture of image. The image is captured by electronic device such as digital camera or webcam. The image captured is stored in JPEG format. Later on it is converted into gray scale image.

#### **Pre-Processing**

Preprocessing mostly is necessary to facilitate further high performance recognition, in this proposed methodology, the character is binarized and the noise is eliminated in the preprocessing stage.

#### **Grey Conversion**

We have taken color image of car clearly showing its License plate for experiment. We firstly convert this RGB color input image to a 256 grayscale image using formula. The grey-scale could take every pixel of the picture to a number between 0-255 and the purpose of the binarization is to take every pixel into the number 0 or 255. To remove the tonal variation between Red, Green and Blue channels of input images and converting it into grey scale flatness to a single hue.

#### **Median Filtering**

It is inevitable for containing noises of original image. We use median filtering to eliminate the noises. Using median filtering not only can eliminate the noises, but also make the high frequency more concentrated. There by, it is beneficial for us to detect the edges in images. The salt and pepper characteristic of vehicle license plate is presented, So Median filter is best known choice for removing such noise

#### **Feature Extraction**

Feature extraction is a process of studying and extracting useful information from the filtered input patterns. The derived information may be general features, which are evaluated to ease further processing. For

example, in image recognition, the extracted features will contain information about the gray shade, texture, shape or context of the image. This is the main information used in image processing. Again, the methods of feature extraction and the extracted features are application dependent.

### **Character Segmentation**

Character segmentation is an important stage in many license plate recognition systems. There are many factors that cause the character segmentation task difficult, such as image noise, plate frame, rivet, and rotation and illumination variance. Object segmentation is an essential task in computer vision and object recognitions. Image segmentation is the process of partitioning a digital image into multiple regions or sets of pixels. These partitions represent different objects in the image, usually having the same texture or color. Segmentation is quite essential to image feature extraction and subsequent classification of the resultant features. This step is very significant due to overlapping characters that form the license plate. There are three main forms of characters that are overlapping vertically, ligature, diacritics, horizontal overlap, and two connected characters. The task will be more difficult for those different forms of which are joined.

### **Character Recognition**

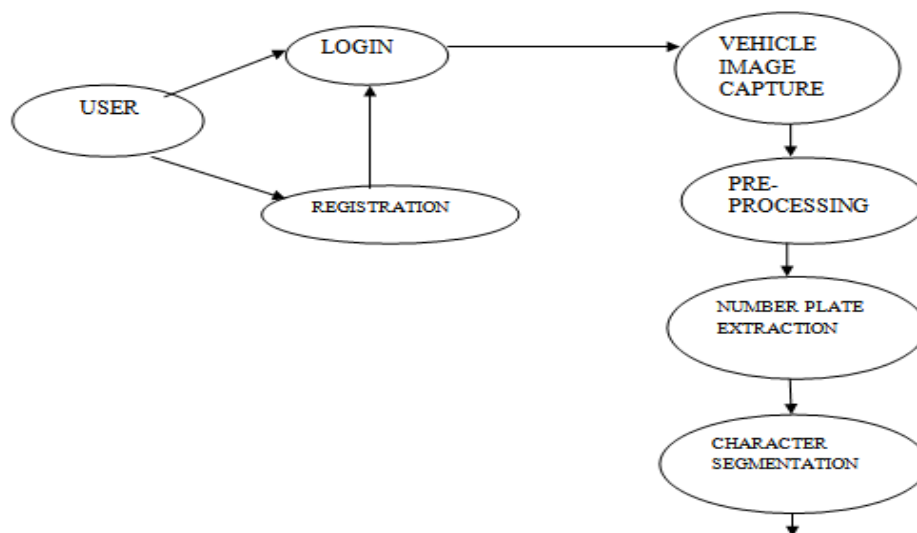
The two methods are template-matching method and neural network method. Here we are evaluating neural network method. Character recognition final step in vehicle license plate detection and recognition is reading of single characters and numbers. This step is very important for example at the entrance to car-park or for the police for stolen cars search. Single elements on license plate must be segmented and analyzed. The analysis is called as Optical Character Recognition (OCR) using ANN.

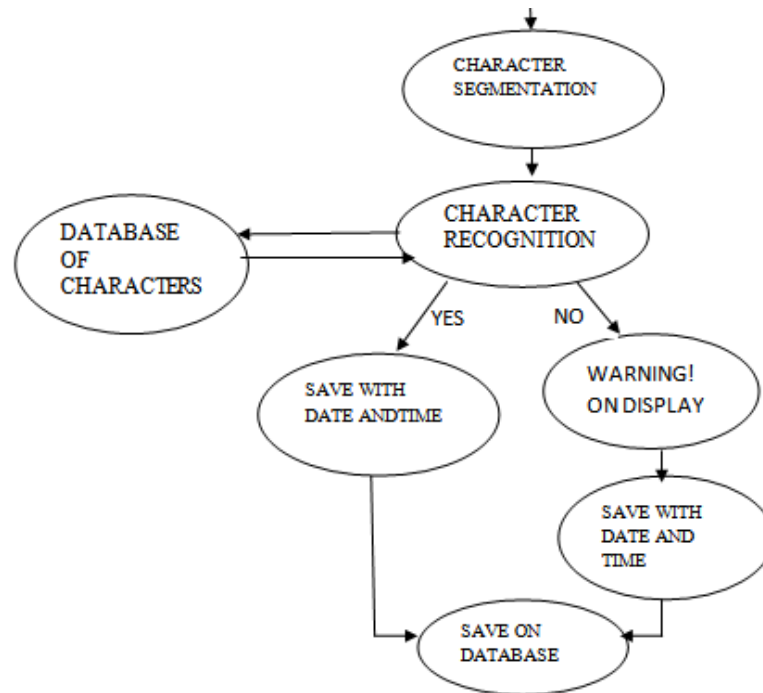
### **The Back Propagation (Bp) Algorithm**

The back propagation is a widely used algorithm, and it can map non-linear processes. It is a feedforward network with the one or more hidden layers. The elementary architecture of the backpropagation network has three layers. There are no constraints about the number of hidden layers. Back propagation is a systematic method for training multilayer artificial neural networks. It has a mathematical foundation that is strong if not highly practical. Using neural network has advantage from existing correlation and statistics template techniques that allow being stable to noises and some position modifications of characters on license plate. The network must memorize all the Training Data (36 characters). For the validation of the network we have built a program that reads the sequence of characters, to cut each character and resize it and put the result.

### **Optimal Character Reorganization**

Optical character recognition (OCR) is the process to convert the images of Handwritten or typewritten into machine encoded text. In previous researches, there are numerous methods such as simple Euclidean distance, Hidden Markov Model (HMM), Artificial Neural network (ANN), Support Vector Machine (SVM) and template matching, shows the various algorithms for OCR along with its strengths and weaknesses. The Tesseract OCR library was used as it can be integrated into Android SDK as well as it can provide two methods, including ANN and template matching.





#### **IV. Conclusion**

We have implemented number plate recognition. Our algorithm successfully detects the number plate region from the image which consists of vehicle number & then character segmentation, recognition. We have applied our algorithm on many images and found that it successfully recognition. The project was designed keeping in mind the automation of the number plate detection system for security reason that could replace the current system of manual entry. This project was a success in recording the number plate of a vehicle although it has got its own limitation of image processing and other hardware requirements.

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