

ABSTRACT

In real world environment the vehicles has been integral parts of the human activities. In transport, goods, personal or commercial uses depend on the vehicle. The RTO of the government will assign a unique number to recognize the owner of the vehicle, this number is known as the license plate number or just number plate of vehicle. The recognition of these license late umbers plays vital role in crime scenarios of the illegal movements in the city, highway etc. the use of the digital image processing technology like OCR, RIO based image segmentation has been in high as it uses simple and effective methods to locate extract and recognize the license plate which will be used in the later use by user.

KEYWORDS: ALPR, OCR, ROI**I. INTRODUCTION**

As the need of the transportation has been the major life part of many humans in modern life the need of the vehicles also has been in demand. The man uses the vehicle for the self-use, commercial use or any marketing uses. Moving objects, reaching locations etc. are main reasons why the need of vehicle is in high demand.

Every vehicle has to be identified by the government and local authority hence the need of unique marking known as the license number has been developed. as vehicle number increases the number variants also increased. In some cases detection and tracking o the vehicle based on the license number plays important role in as of theft, accidents or any illegal cases or for any needful information's. Hence many techniques has been developed in this route to locate, detect the license plate or number plate. The method is known as automatic license plate recognition (ALPR) or simply LPR.



Fig1.1 Vehicles having license plates

The process of ALPR can basically be divided into three parts

- To determine the region of interest in which the possible plate is assumed to be located
- The orientation of the plate must be determined so it can be adjusted and normalized in size.
- An OCR process reads the plate matches the registration number.

II. RELATED WORKS

- 1) In this paper [Application-Oriented License Plate Recognition] the author has proposed the need of the license plate recognition system based on the three major categories: access control, law enforcement and road patrol. Modules proposed for the license plate recognition like character segmentation recognition, Edge clustering, maximally stable extreme region (MSER) and bi-layer based classifier.
- 2) In this paper [Automatic License Plate Recognition (ALPR): A State of the Art Review] The concept of the proposed of license plate recognition is a simple process of passing the vehicle image and extracting the characters in the image to identify the license number of the vehicle which can be used in many applications like electronic payment systems, parking fee also in many traffic surveillance system. The system uses a dedicated system which uses the cameras for the capturing of the image.
- 3) In this [Detection and Recognition of License Plate Characters with Different Appearances] the author has collected the car images from the different angles and variations. The proposed work is capable of performing the concept of the vertical and horizontal images based on type different environment conditions. The images are captured and collected in the dataset initially and processed based on the different criteria of the user.
- 4) This paper [Saliency tree: novel saliency detection framework] proposes saliency tree. For the effective processing the system image is processed based on the adaptive color quantization and the image region segmentation which will convert the image into the primitive regions.
- 5) In this [unsupervised Joint Salient Region Detection and Object Segmentation] Author has proposed the unsupervised algorithm. For detecting the salient regions and also to segment out the foreground image based on the objects from the background image objects. The previous unidirectional saliency based for the background object detection and object segmentation methods, in which the only detected and stored saliency map has been used for the object segmentation. The proposed algorithm uses the detection and also the image segmentation.

III. SYSTEM ANALYSIS

3.1 PRESENT SYSTEM

The existing system for the recognition of the license plate is done manually. But the technology has been in interest as it gives higher accuracy and efficiency. In past years many methods has been proposed in detecting the vehicle license plate over the period of time, some of them as follows.

1. Fast Grey scale road sign modeling.
2. Adaboost Classifier.
3. Driver support System for vehicle license plate recognition etc.

Disadvantages of Existing System

As been explained above there are number of existing systems the use of the technologies has given rise to the work. Based on the feature of images but still it lacks in the following issues.

- The existing system does not support many text formats.
- The Recognition of classification is tedious and requires expert persons to manipulate.
- This method requires enough databases to be got trained before it starts the work.

3.2 PROPOSED SYSTEM

Recognition of vehicle license plate is propose by using primary features like text shape and numbers shape and based on segmentation for the license plate extraction in the given car image. We also use multilayer NN and OCR for classification of text and numbers and finally interpretation system, which translates the recognized road signs for the users, depends on their requirements.

IV. MODULES

The proposed work can be classified into the following main modules which have been used in the proposed system. it can be explained in briefly in the following

4.1 License Plate localization

The input image from the user database is a general car image which has to be transformed into the license plate image. For doing this the system should be able to locate the license plate from the input image. The locating LP can be done as follows,

Finds the LP region from image the plate area can be,

LP_MIN_AREA=2650

LP_MAX_RATIO=0.67

LP_MIN_RATIO=0.16



Fig 4.1: Localizing a license plate on a car image

The connected regions of the LP can be separated from the binary image is performed. The license plate has to be passed through the following assumptions of the system.

- Area > LP_MIN_AREA
- LP_MIN_RATIO ≤ height/width ≤ LP_MAX_RATIO
- Area ≥ max(areas of the candidates)/3.5

Finally the co-ordinates for the LP can be obtained as follows;

Lower_A=0.87 Lower_B=0.04
Upper_A=1.5 Upper_B=-0.125

LICENSE PLATE LOCALIZATION



Fig 4.2: license plate localization

4.2 Neural Network classifier

The recognition process for the characters has to be based on the well processed classifier as Feed Forward Neural Network. The NN is a classifier which will classify based on the knowledge of the previous layer of input. It can be demonstrated as follows.

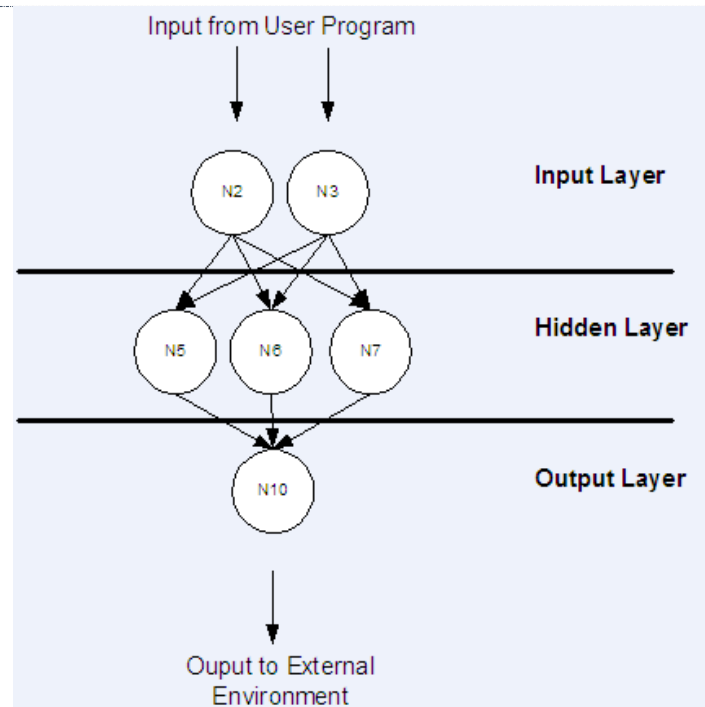


Fig 4.3: feed forward neural network with a single hidden layer

4.3 Optical Character recognition (OCR)

The OCR has been developed in the past for the sole purpose to detect and classify the characters from the input content and detect the characters present in it. OCR is developed based on the concept of the **Neural Network** technique having the following criteria's.

- Feed-forward network- 3 layers.
- It uses the 200 neurons in input layer
- 20 neurons in middle layer,
- 10 neurons in the output layer.

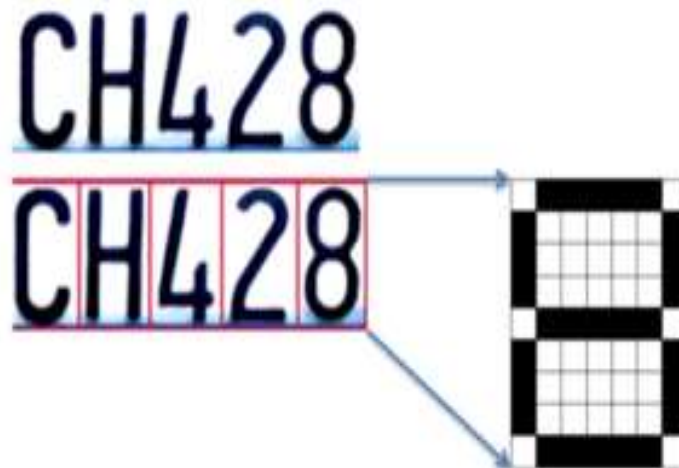


Fig 4.4: Recognition of the number

The main features are:

- Stability plasticity based behavior model
- Controlled system for the reliability threshold
- off-line - on-line based system learning
- Self-assessment
- High reliability due to the multiple feedback

V. EXPERIMENTAL RESULTS

The following figures showing the dataset used for the training and also for the testing of the proposed work.

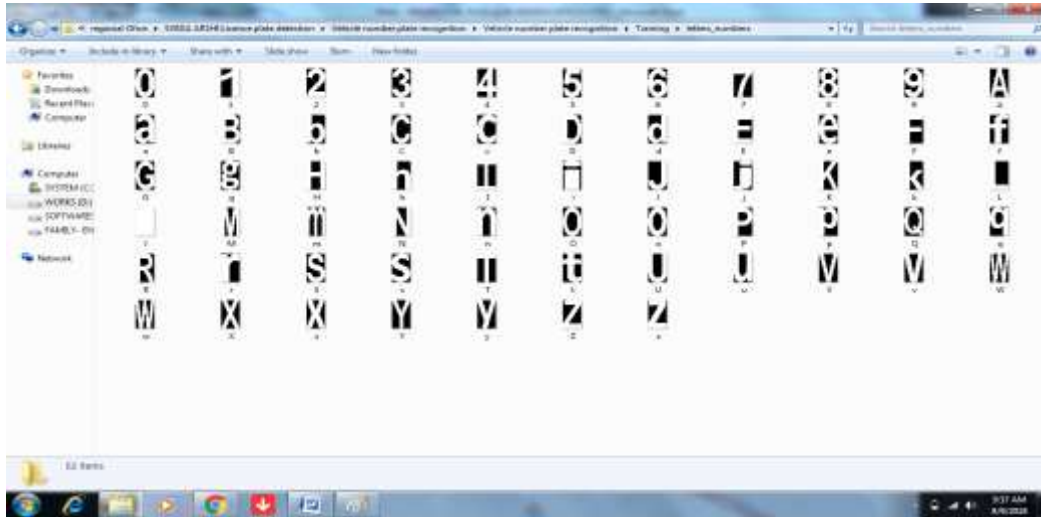


Fig5.1: Testing dataset

In the above figure the character, numbers fonts are passed to the training of the system. The dataset can be enhanced based on the multiple character styles also.



Fig5.2: Testing image dataset

The above mentioned image displays the images which are used for the real time testing. The data set size can be enhanced based on the user requirement.

Experiments have been performed to test the proposed system and to measure the accuracy of the system. The system is designed in Matlab 10 for recognition of license plates. The images for the input to the system are colored.

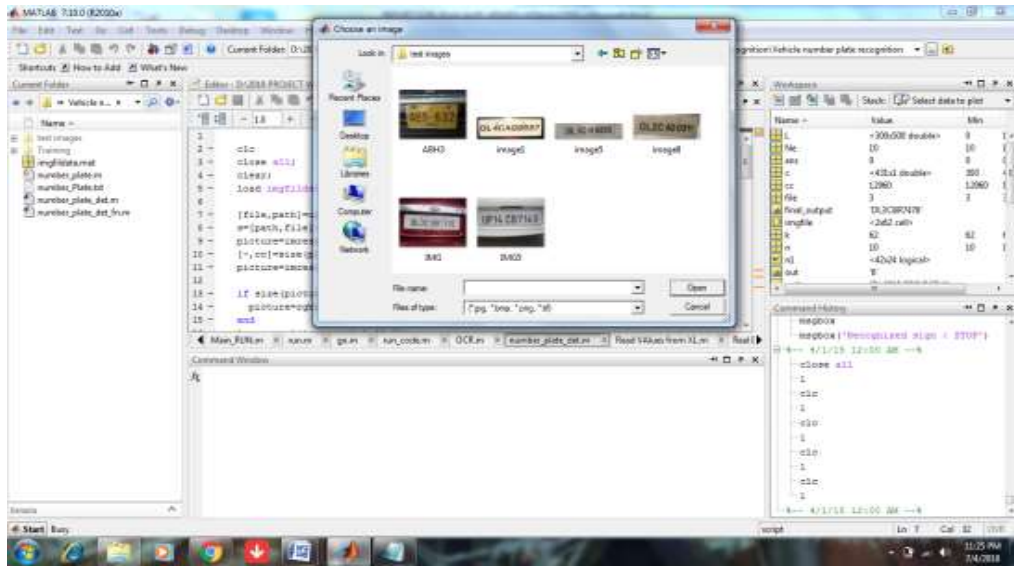


Fig 5.3(a) Results showing license plate input

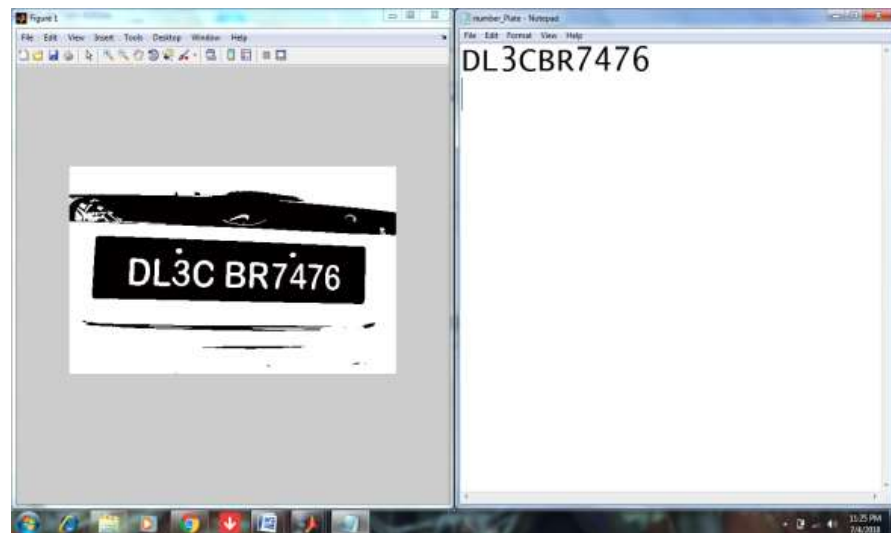


Fig 5.3(b) Result obtained in text pad

Images with the size of 1200-1600. The test images were taken under various illumination conditions. The results of the tests are given by Table I.

TABLE I
 RESULTS OF THE TESTS

Units of LPR System	Number of Accuracy	Percentage of Accuracy
Extraction of Plate Region	332/340	%97.6
Segmentation	327/340	%96
Recognition of Characters	336/340	%98.8

It is shown that accuracy for the extraction of plate region is 97.6%, 96% for the segmentation of the characters and %98.8 is the percentage of accuracy of the recognition unit. The overall system performance can be defined as the product of all units accuracy rates (Extraction of plate region, segmentation of characters and recognition of characters). Recognition Rate of LPR System = (Percentages of Accuracy).

VI. CONCLUSION

By the proposed work of automatic license plate recognition by the input car image is a new concept in the real world vehicle traffic applications. The use of the proposed system is generally can be found in the interceptors of traffic police vehicles. The ALPR system is effective way for not only to recognize the owner but also the locality of vehicle in real time theft or accidents.

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