A Learning Based Improved Classification of Number Plate Image Using Text Identification

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Abstract— **A learning based improved classification of number plate image using text identification is a method used for automatic number plate identification. This system also shows the vehicle is authorized or not.The main steps in this system are identifying the location of the number plate, region property,and optical character identification.This system is also very useful in verity of areas such astolling, parking, access control, border security, restricted areas and so on.This system also has an important role in traffic control systems because the system automatically monitoring the vehicles and identifying them by recognition their number plate.**

Key words: Classification using subspace ensemble discriminant, identifying the location of the Number plate, Region property, optical character identification, template matching.

I. INTRODUCTION

The number plates are used for identifying the vehicles. The Learning based improved classification of number plate using text identification is an image processing idea used for identifying the license plates of the vehicles automatically. This automatic number plate identification system first time used in England at a police station in 1976[1].There are number of limitations for these type systems. Such as, the availability of light, poor maintains of the number plate, different environmental conditions, quality of the camera and so on. There are number of techniques are introduced for to improve the number plate identification systems [1-8].The standard number plates are easy to recognize but the modern fantasy types number plates are sometimes very difficult to identify. Mostly in India the standard definition cameras are used. But in some other nations the High definition cameras are used.

The quality of the picture is the most important thing in the number plate identification systems. If the picture quality is low then we can't get the expected result. But some systems produce result from the low quality videos. But more time is need for this process. For the identifications of the number plate different type of morphological operations are used. In some systems the Digital signal processing (DSP) are used [4] and in some systems the number plates are identified by using Neutral networks [2-3].But in the modern systems the optical character identification is used. All these systems have low picture quality and need more execution time.

This system use High definition (HD) or Standard definition (SD) cameras and Optical character identification technique with classification using subspace ensemble discriminant for the identification of the number plate. This is increase the identification rate. The High definition camera offers very good picture quality and higher identification rate. Also can't affect the environment changes and the availability of light and two or more lanes of the roads are covered by a single camera. But by using the standard definition cameras we can't get these advantages. The proposed algorithm of the system is divided in to following steps:(a)Captured the picture of the vehicle by the High definition or standard definition cameras,(b)Processing the picture,(c)Identifying the location of the Number plate ,(d)Region property,(e)Optical character identification ,(f)Identify the number plate,(g)Identify it is authorized or not. The block diagram is shown in Fig 1.
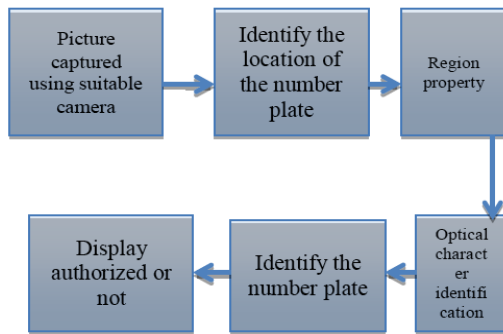
Fig. 1 Block Diagram

Fig. 2 Captured image.

The canny edge detector is used for the edge detection. The bounding box method is used for divides the character and the template matching are used for the identification of the characters in the number plate. The classification using subspace ensemble discriminant is used in the template matching. In template matching each character in the number plate is comparing with the templates stored .i.e., [A-Z] and [0-9].The obtained result is displayed. Also show the vehicle is authorized or not.

II. PROPOSED ANPR SYSTEM

First the picture is captured by a suitable camera(HD or SD). Then the canny edge detector is used for the identification of the number plate location and the edge detection then done the morphological operations. The characters in the number plate are identified by using the template matching and the result is comparing with the database stored. The character classification using subspace ensemble discriminant is used for this step. That increases the recognition speed. Also check it is authorized or not then displayed the result. The steps are used in this algorithm is given below.

A. Preprocessing Step

First captured the image using a suitable camera. Shown in Fig.2.Then the taken image is reset in to gray. Then apply the enhancement to make increase contrast. Then convert the image size to default size 400*600.Then the median filter is used for removing the noise present.

B.Identify the Edges

The canny edge detector is used for the edges identification of the image. Shown in Fig. 3This image is then resetto the binaryimage. The noise are presented in the image are removed using the median filter. Shown in Fig.4.

Fig. 3 Edges are detected by canny edge detector.

C.Region Property

Objects are splited and remove the unnecessary contents present in the image. Such as (.-)...Etc. Shown in Fig.5.

Fig. 5 Region property.

D.Optical Character Identification

In this step the splited character are comparing with the templates stored and identifies the number plate. The identified characters before matching are shown in Fig. 6. In this step use the classification using subspace ensemble discriminant. It increases the identification rate. Then check whether it is authorized or not and display the result.

Fig. 6 Characters before Matching

11.EXPERIMENTAL RESULTS

The algorithm of this system was implemented by MATLAB. This system was checked by the real experiments. The images are taken from various locations, such as: Traffics, Highways, Publicroad, parking areas...etc.

Fig. 4 Noise Removing

The images are taken from different distances. The result shows the success rate about **95%** and the maximum identification time was about **.2** sec .Where this system gives higher identification time. The results shown in Fig. 7.
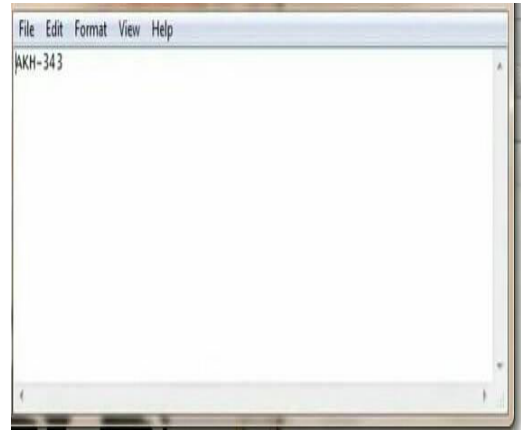

Fig. 7 The Result after Matching

1V.CONCLUSION

This system was a very good and simple identification method for identifying the number plates of the vehicles. By using the subspace ensemble discriminant for the classification of the character the recognition time of the system is obtained as less than **.4 sec**. and the success rate is **95%.**When we uses the HD cameras, then the changes in the environmental conditions can not affected then we get more accurate result and higher recognition rate. Also can covered two or more lanes of the road by a single camera. Also by modifying the database the system can be used in various nations.

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