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Review of Different Techniques of Number Plate Recognition

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ABSTRACT: Number plate is the unique identification Code of an automobiles. It is very critical to recognize number plate of moving vehicles. But still for surveillance and control systems identification of cars is a demanding function. Recognition of automobiles is done through license plates which consist of alphabets and numbers. this uniqueness of a combination of characters and numbers in license plates used for many purposes. For example, to arrest of a suspect's vehicle, imposing parking, violation fines, entrance authentication, in criminal arresting etc. to identify all passing or parked vehicles' license plates is a labour intensive job. So this techniques is used to capture the number plate of a moving automobiles and then to recognize it. This system is known by an Automatic Number Plate Recognition (ANPR). This paper presents different methods of Automatic Number Plate Recognition (ANPR).

KEYWORDS: ANPR-An Automatic Number Plate Recognition, OC-Optical Character Recognition, LPR-License Plate Recognition, CCTV-Close Circuit Television, VNPD-Vehicle Number Plate .Detection, NPR-Number Plate Recognition.

I. INTRODUCTION

Now a days population increases rapidly with result of that the use of automobiles is also increase rapidly. And this again results into the increasing crimes in the automobile world. The present population of India itself is approximately 1,366,888,240 and world's population is approximately 7,714,576,923. Now by observing these numbers, imagine the number of automobiles and automobile related crimes. There are so many cases pending in courts due to the lack of proofs witness related to automobile crimes as victims or eye witnesses unable to recall the number of automobiles. Due to increasing traffic on roads is also increasing populations traffic also increases, a crime related to it is also increases at greater rate. Vehicals involved in crime could not be recognized accurately resulting lots of cases of hit and run, theft, robbery, smuggling, kidnapping, on-road fatalities, etc remain unsolved. Verification of object or characters from license plate of fast moving vehicles is not possible for human eyes. Recognition of object or characters from license plate of fast moving vehicles is achieved by a technique called as Automatic Number Plate Recognition (ANPR) which uses OCR (Optical Character Recognition) to identify the individual character of the number plate. Input to ANPR is from LPR (License Plate Recognition) cameras and recognize alpha-numeric character on number plate. Various applications of it like in toll payments, management of parking, monitoring road-traffic, identification of crimes etc. LPR describes special Close Circuit Television cameras which can deal with capturing fast moving licence plates in conditions like car speeds, fog and reflective lens plate material, night vision. Unique identification of each vehical is its licence plate. License plate of an India consists of ten characters in order. This order carries state Code which is a set of two alphabets, followed by combination of two digits and an alphabets for district information in combination with last four digit is actual registration number of vehicle. The complete information of vehical and owner can be recognized by the licences plate.

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I.I Recognition of Number Plate

By using this technique detection of vehicle number plate and alpha-numeric characters from number plate is possible.

Used techniques are :

I.I.I Optical Character Recognition (OCR)

Images are converted into machine en-coded text eletronically.It is simple and popular method for digitalization of printed text which is modified,stored more densely and diplayed online electronically.

I.I.II Spliting and Merging Segmentation

Dividation of image into uniform region is done by this. Digital image is partitioned into mutpal segments.Partitioning is done for simplicity or sometime for representing image with more meaningful meaning and to analyze it easily. The image area is splits into smaller uniform regions untill no further splitting can be done and further these smaller pieces again merged to show an intersted area.

I.I.III Boundary detection

It is used for detecting the shape of vehicals categories it in hatchback, sedan, SUV, Heavy vehicle etc. Here, dicussing various Automatic Number Plate Recognition (ANPR) methods which are already investigated. Here we are trying to tabulate them.

II. RELATED WORK

S. Ramalingam, et. al. [1] describes an optical Character Recognition (OCR) is base for Automatic Number Plate Recognition (ANPR) systems. It determines the number plates individual characters. Key data sets is based for generating it. Car number plate images is generated by the simulation process. variability in character spacing is assessed by ANPR systems which demonstrate the principles for benchmarking.

Hanit Karwal et al. [2] presents algorithm of Vehicle Number Plate Detection (VNPd) system.Basic for this is template matching. This method is an effective method of recognition of vehicle number plates of an Indian . It is based on the modified Otsu's method of threshold portioning. It highlights the problems of scaling as well as identifying position of characters.

Abd Kadir Mahamad et al. [3] presents paper for inspecting and recognising Malaysian Vehicles by using optical character Recognition (OCR). It has gone through various testing phases to ensure that that proposed method can be applied for real implementation.An intelligent OCR system used like a library and this work is done in Lab VIEW software.

Mr.G.T.Sutar et al.[4] discusses how to implementation Number Plate Recognition (NPR).Designing purpose of this system is security which replaces the manual processes. Vehicle number plate region is extracted using the image segmentation in an Image. The output is used to balance with the record on a database. Implementation and simulation of this system is done in Matlab, and performance work on the real images.

Kuldeepak et al. [5] accurate and automatic number plate recognition system is developed.

Quraishi et al. [6] discussion on the image which contain noise and apply Adaptive median filters.

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III. REVIEW AND DISSCUSSION

Different techniques used for number plate recognition is described in table no. 1.

1. Variable spacing shows adverse impact on ANPR engines. Prediction of illegal spacing or syntax rules is not possible. Therefore more work has to be done.
2. It obtained the 98.07 % accuracy.
3. The proposed system shows good performance for inspection and can recognize an alphabets and numbers of vehicle Number plate.
4. This system works against the different lightening conditions. It is implemented on the entrance of a highly restricted areas. Detection and recognition of the vehicle number plate on real images are with an accuracy of 93%.
5. By optimizing various parameters, they have achieved an accuracy of 98%. But for the tracking stolen vehicles and monitoring of vehicles an accuracy of 100% cannot be compromised with. Therefore to achieve better accuracy optimization is required.
6. ANN can be applied for training & testing for the purpose of recognition if the avg. error is less than 45%.
7. Due to that the test image is recognized & matched successfully with original image.

Table No. 1 : Review table of Techniques of Automatic Number Plate Recognition System

S.N	AUTHOR NAME	DESCRIPTION	TECHNIQUES USED	OUTCOMES
01	S. Ramalingam et al.[1]	An optical Character Recognition (OCR) is base for Automatic Number Plate Recognition (ANPR) systems. It determines the number plates individual characters.	Key data sets is based for generating it. Car number plate images is generated by the simulation process. variability in character spacing is assessed by ANPR systems which demonstrate the principles for benchmarking.	Variable spacing shows adverse impact on ANPR engines. Prediction of illegal spacing or syntax rules is not possible. Which cause a completely unable to capture and reads. Therefore more work has to be done.
02	Hanit Karwal et al. [2]	This is an efficient method for recognizing of an Indian vehicle number plates.	Template matching with Normalized cross correlation is base for VNP system . It is based on the modified Otsu's method of threshold portioning. It focuses on the problems of scaling and recognizing position of characters.	It obtained the 98.07 % accuracy.
03	Abd Kadir Mahamad et al. [3]	This is for inspecting and recognising Malaysian Vehicles by using optical character Recognition (OCR). It has gone through various testing phases for ensuringthat the proposed method can	System is based on Digital Image Processing and Optical Character Recognition (OCR). An intelligent OCR system used a s a library and it uses Lab VIEW software.	The proposed system shows good performance for inspection and can recognize an alphabets and numbers of vehicle Number plate.

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		be applied for real implementation		
04	Mr.G.T.Sutar et al. [4]	Implementation of Number Plate Recognition (NPR) is done by them. Designing purpose of this system is security which replaces the manual processes.	In this vehicle number plate region is extracted using the image segmentation in an Image. The used technique for character recognition is Optical Character Recognition (OCR).	This system works against the different lightening conditions. It is implemented on the entrance of a highly restricted areas. Detection and recognition of the vehicle number plate on real images are with an accuracy of 93%.
05	Kuldeepak et al. [5]	When the roads are busy and uncountable vehicles are passing on it, at that time required the highest degree of accuracy. Therefore needed an automatic number plate recognition. Warnings are also given by it for the stolen vehicle which impossible for human handling services.	For separating each image from the used method is Character segmentation.	By optimizing various parameters, they have achieved an accuracy of 98%. But for the tracking stolen vehicles and monitoring of vehicles an accuracy of 100% cannot be compromised with. Therefore to achieve better accuracy optimization is required.
6	Quraishi et al. [6]	This work is totally new approach for image image recognition based on Artificial Neural Network (ANN).	In .It is based on Artificial Neural Networks (ANN), uses alternative solution for Object Recognition using.	lied sting f recognition if the avg. the recognized & matched fully age.

IV. CONCLUSION

This work is nothing but review of automobile (car) number plate recognition. With the help of these technique we can easily recognize the number plates of automobiles (car). Needed authorities/organisation/anyone can recognize the numbers of number plate by using any one above mention techniques. It is also usefull for trapping the criminals and somewhere the automobile criminals thinks before doing the crimes also. As a future scope any suitable technique as discussed in paper can be implemented for number plate recognition by considering suitable technical environment.

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