International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 02 | Feb 2020 www.irjet.net p-ISSN: 2395-0072

Vehicle Number Plate Recognition System

Rasika M. Salwan[1], Piyush N. Dhamande[2], Kiran P. Chavhan[3], Amar G. Waghade[4]

[1,2,3]Student, Dept. of Computer Science & Engineering, DES'S COET, Dhamangaon Rly
[4]Professor, Dept. of Computer Science & Engineering, DES'S COET, Dhamangaon Rly

---

Abstract - *Automated Number Plate Recognition system would greatly enhance the ability of police to detect criminal activity that involves the use of motor vehicles. This is a potential future system. This system used by local authorities and commercial organizations in all aspects of security, surveillance, access control and traffic management. Here we come up with an innovative system where characters are extracted from input number plate image. We used many image preprocessing steps in order to extract only text from number plate image. Since images are more susceptible to noise and with many other unwanted objects. Noise is removed from image using effective noise removal method. Before image preprocessing steps, RGB image is converted to gray scale image and image is resized keeping aspect ratio same. Morphological processing is used which helps to detect text more accurately. Image is converted to double. Edge detection method is used to detect edges and image intensity level is increased. Objects which have gaps are filled. These can affect a lot in the overall recognition rate. ANPR systems use (ocr) optical character recognition to scan the vehical number plates, and it can be retrieved whenever required. The other details of the owners of the vehicles like address and mobile number can be manipulated whenever necessary by contacting the system administrative. The purpose of this paper is to recognize a car number plate using image segmentation.*

Key Words: **Automatic Number Plate Recognition, Optical Character Recognition.**

1. INTRODUCTION

In last few years, ANPR or license plate recognition (LPR) has been one of the useful approaches for vehicle surveillance. It is can be applied at number of public places for fulfilling some of the purposes like traffic safety enforcement, automatic toll text collection, car park system and Automatic vehicle parking system. ANPR algorithms are generally divided in four steps: Vehicle image capture Number plate detection Character segmentation and Character recognition. As it is shown in Fig.1, the first step i.e. to capture image of vehicle looks very easy but it is quite exigent task as it is very difficult to capture image of moving vehicle in real time in such a manner that none of the component of vehicle especially the vehicle number plate should be missed. Presently number plate detection and recognition processing time is less than 50 ms in many systems.

Automated Number Plate Recognition (ANPR) is also known as Automated License Plate Recognition (ALPR). Automatic Number Plate Recognition or ANPR is a technology that uses pattern recognition to 'read' vehicle number plates. In simple terms ANPR cameras 'photograph' the number plates of the vehicles that pass them. This 'photograph' is then fed in a computer system to find out details about the driver and owner of the vehicle and details about the vehicle itself. ANPR consists of cameras linked to a computer. Vehicle plate detection and recognition is used in many of the applications, including travel time estimation, car counting on highways, traffic violations detection, and surveillance applications. With the growing population, vehicles number also drastically increased .This made it difficult to find a car park these days for a large number of students and faculty at Educational Institutions. Most of the car parks are managed manually by security guards who may not keep record of the vehicles in the parking lot. The extracted text image are separated by bounding box. Each bounding box will contain each character or number. Each character or number is resized to image stored in directory. Extracted image and existing character image feature is compared. After comparison characters are detected. Finally detected characters are shown in text format.

After Edge detection, image might contain many horizontal and vertical lines. These lines should be removed from image which helps to extract only text from image. After applying these image preprocessing steps, image is left with few smaller unwanted objects. These unwanted objects are removed. Bounding boxes is applied to text extracted. These text are in image format. These images are converted to characters. System uses optical character recognition to extract characters from image. Character and number images are stored in directory.

2. SOFTWARE TOOLS SPECIFICATION

The ANPR equipment with an All-in-One architecture deletes the disadvantages of the generic ANPR equipments, these are the following ones:

It is simpler: All the necessary elements for the ANPR process are integrated in the same housing. Only one device is necessary for each lane to be controlled. The equipment may be connected by Ethernet or serial communication with the client application Modular architecture: If equipment with All-in-One architecture does not work, its fall does not affect to the other lanes, because the Process Unit are deleted.

- Most of the number plate detection algorithms fall in more than one category based on different

techniques. To detect vehicle number plate following factors should be considered: Plate size: a plate can be of different size in a vehicle image.

- Plate location: a plate can be located anywhere in the vehicle.
- Plate background: A plate can have different background colors based on vehicle type. For example a government vehicle number plate might have different background than other public vehicles.
- Screw: A plate may have screw and that could be considered as a character.

A number plate can be extracted by using image segmentation method. There are numerous image segmentation methods available in various literatures. In most of the methods image binarization is used. Some authors use Otsu's method for image binarization to convert color image to gray scale image. Some plate segmentation algorithms are based on color segmentation. A study of license plate location based on color segmentation is discussed. In the following sections common number plate extraction methods are explained, which is followed by detailed discussion of image segmentation techniques adopted in various literature of ANPR or LPR.

Another SCW based system is presented in [8] for locating Korean number plate. After applying SCW on vehicle image authors used HSI color model for color verification and then tilt was corrected by using least square fitting with perpendicular offsets (LSFPO). The distance between camera and vehicle varies from 3 to 7 meters. A cascade framework was used in [33] for developing fast algorithm for real time vehicle number plate detection. In this framework a compact frame detection module is used to segment number plate. This module contains three steps: First - Generation of Plate Region Candidates which is used to reject non plate regions by using gradient features. Second – Extraction of complex plate regions which contains three steps to identify plate region and reject non plate regions. Third – plate verification is used to make sure that no non plate regions are extracted in preceding steps. The experiment was carried out on 3-GHz Intel Pentium 4 personal computer.

3. IMPLEMENTATION

Number plate is a pattern with very high variations of contrast. If the number plate is very similar to background. It's difficult to identify the location. Brightness and contrast is changes as light fall changes to it. In this paper the morphological operations are used to extract the contrast feature within the plate. The process of identifying the characters, it is preferable to divide the extracted plate into different images, each containing one isolated character. There are some widely used methods for character isolation which are used in almost all available LPR systems.

Following steps are used to segment the characters of the number plate:

- Stretch the contrast of the image over the entire range of gray levels available (0-255).
- Threshold the plate image.
- Search for connected components in the image, each connected component will be assigned a special label in order to distinguish between different connected components in the image.
- Resize each character from the previous step to the standard height and width in order to be used in the recognition process.

3.1 Character Recognition

Low-resolution template matching method is adopted, namely the using a lower pixel resolution to represent the images and templates to be recognized. Each matrix element corresponds to a sub-matrix in a high-resolution matrix. The element's value is the average of the pixel gray value in the corresponding high-resolution submatrix. Compared with the high-resolution matching algorithm, correct identification rate of the letters and numbers is greatly enhanced. The reason is that if the resolution rate goes through a moderate reduction, the error generated by the image distortion and the noise will be decreased. The recognition errors of letters and numbers mainly occur in some of the characters

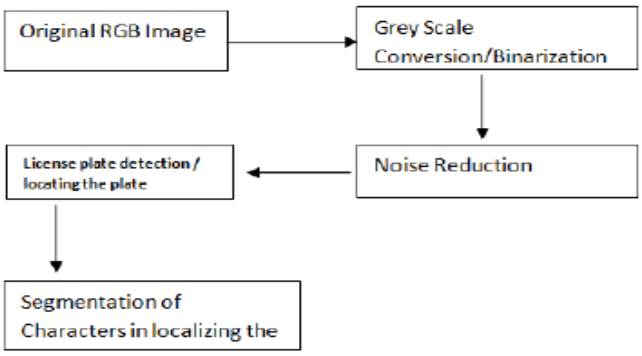

Fig.1 Structure of Proposed System

4. CONCLUSION

The basic elements of an ANPR system including plate location, character separation and recognition are presented in this paper. The goal of the research is to investigate the possibility to create a comprehensive system for Indian vehicle identification based on the license plate recognition. A rear image of a vehicle is captured and processed using various algorithms. Further we are planning to study about the characteristics involved with the automatic number plate system for better performance. This paper presents a recognition method in which the vehicle plate image is obtained by the digital cameras and the image is processed to get the number plate information.

REFERENCES

[1] Rahim Panahi, Iman Gholampour. "Accurate Detection and Recognition of Dirty Vehicle Plate Numbers for High-Speed Applications", IEEE Transactions on Intelligent Transportation Systems, 2017.

[2] H. Caner, H. S. Gecim, and A. Z. Alkar, "Efficient embedded neural network- based license plate recognition system," IEEE Trans. Veh. Technol., vol. 57, no. 5, pp. 2675–2683, Sep. 2008.

[3] Unsupervised Category Modeling, Recognition, and Segmentation in Images Sinisa Todorovic, Member, IEEE, and Narendra Ahuja, Fellow, IEEE

[4] V. Abolghasemi and A. Ahmadyfard, "An edge-based color-aided method for license plate detection," Image Vis. Comput., vol. 27, no. 8, pp. 1134–1142, Jul. 2009.

[5] Semantic Image Segmentation with Contextual Hierarchical Models Mojtaba Seyedhosseini and Tolga Tasdizen, Senior Member, IEEE.

[6] A Complete System for Vehicle Plate Localization, Segmentation and Recognition in Real Life Scene A.Conci, J. E. R. de Carvalho, T. W. Rauber.

[7] Ganesh R. Jadhav, Kailash J. Karande, "Automatic Vehicle Number Plate Recognition for Vehicle Parking Management System" Computer Engineering and Intelligent Systems, ISSN 2222-1719 (Paper) ISSN 2222-2863 (Online) Vol.5, No.11, 2014.

[8] Amr Badr, Mohamed M. Abdelwahab, Ahmed M. Thabet, and Ahmed M. Abdelsadek, "Automatic Number Plate Recognition System", Annals of the University of Craiova, Mathematics and Computer Science Series Volume 38(1), 2011, Pages 62–71 ISSN: 1223-6934.

[9] M. H. Glauberman, "Character recognition for business machines," Electronics, vol. 29, pp. 132–136, 1956.