A NEW APPROACH FOR THE DETECTION OF REGISTRATION NUMBER OF VEHICLES USING LABVIEW

Birdevinder Singh , Prof.Karamjeet Singh
Dept. of I&C,Dept of ECE
BBSBEC fatehgarh Sahib
BBSBEC fatehgarh Sahib
Birdevinder_singh@yahoo.com

ABSTARCT:
The purpose of this paper work is to develop a real time application which recognizes Vehicle number plates from cars at a gate, for example at the entrance of a parking area or a border crossing. The system, based on regular PC with video camera, catches video frames which include a visible car Vehicle number plate and processes them. Once a Vehicle number plate is detected, its digits are recognized, displayed on the User Interface or checked against a database. The focus is on the design of algorithms used for extracting the Vehicle number plate from a single image, isolating the characters of the plate and identifying the individual characters. The Proposed system can be implemented using Vision Assistant & LabVIEW 2010 .The performance of the system can be investigated on real images of the number plates of different vehicles.

Keywords: Optical character recognition, Vehicle number plate, Number plate extraction,. Image acquisition, Database, NI Vision Assistant

I.   INTRODUCTION

Automatic Number Plate Recognition system is an important technique, used in Intelligent Transportation System. It is an advanced machine vision technology used to identify vehicles by their number plates without direct human intervention. It is an important area of research due to its many applications. The development of Intelligent Transportation System provides the data of vehicle numbers which can be used in follow up, analyses and monitoring. This system is important in the area of traffic problems, highway toll collection, borders and custom security, premises where high security is needed, like Parliament, Legislative Assembly, and so on. The complexity of automatic number plate recognition work varies throughout the world. For the standard number plate, This system is easier to read and recognize. In India this task becomes much difficult due to variation in plate model.

The system work is generally framed into the steps: Number plate extraction, character segmentation and character recognition. From the entire input image, only the number plate is detected and processed further in the next step of character segmentation. In character segmentation phase each and every character is isolated and segmented. Based on the selection of prominent features of characters, each character is recognized, in the character recognition phase. Extraction of number plate is difficult task, essentially due to: Number plates generally occupy a small portion of whole image; difference in number plate formats, and influence of environmental factors. This step affects the accuracy of character segmentation and recognition work. Different techniques are developed for number plate extraction

The developed application can acquire images from different sources: webcam cameras, generic frame grabbers, Firewire 1394 cameras or images files.
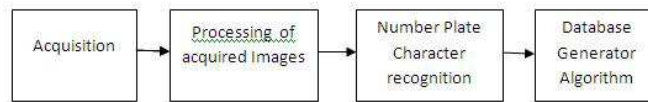
Fig 1:Block Diagram of system

A. Image Acquisition

The first stage of any vision system is the image acquisition stage. After the image has been obtained, various methods of processing can be applied to the image to perform the many different vision tasks. In this work we have used the vision acquisition function from NI labview for the continous video grabbing of the required region

Figure 1: Vision acquisition function appearance in labVIEW VI

B. B. Image Processing

From different processing image techniques, the image is prepared to be analyzed. Next, using extraction methods, the license plate is located and later, OCR is applied in order to find the license plate alphanumeric code. All the processing steps are executed on gray scale image. Preprocessing is mainly used to enhance the processing speed, improve the contrast of the image, and to reduce the noise in the image. In order to reduce the problem of low quality and low contrast in car images, images are enhanced by using histogram equalization on gray scale image.

C. Number Plate Recognition

Automatic Number Plate Recognition is a special form of optical character recognition (OCR). Optical character recognition (OCR) is the process of extracting textual information from a digital image.As the car number plate consists of combination of 0 to 9 digits and alphabets of A to Z. The OCR module is best for the number plate recognition because it includes advanced functions for reading mixed fonts, characters not written on a straight line, and numbers and letters on the same line. A script can be made using NI vision Assistant for the recognition of Numbers written on vehicle License Plate.
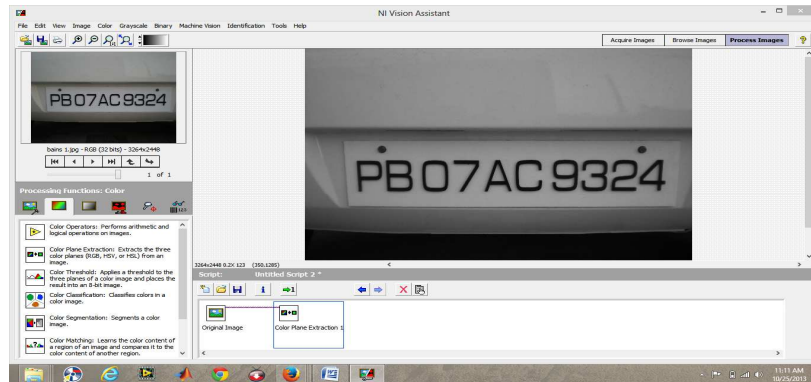
Figure 2 :Front panel of Vision assistant

D. Data Base Generation

The proposed system can easily generate a database carrying the Records of Registed Vehicle number, time of record, place etc. The Labview provides the Database generation tool to generate the excel files or spreadsheets of various outputs of the system. Using this tool we can also generate a alert notifications as 'target vehicles' are identified (Sounding the Alarm) which already exists in database.

II. About the Development of Proposed System
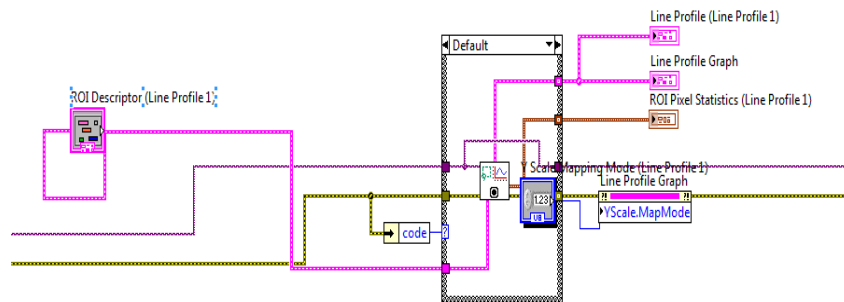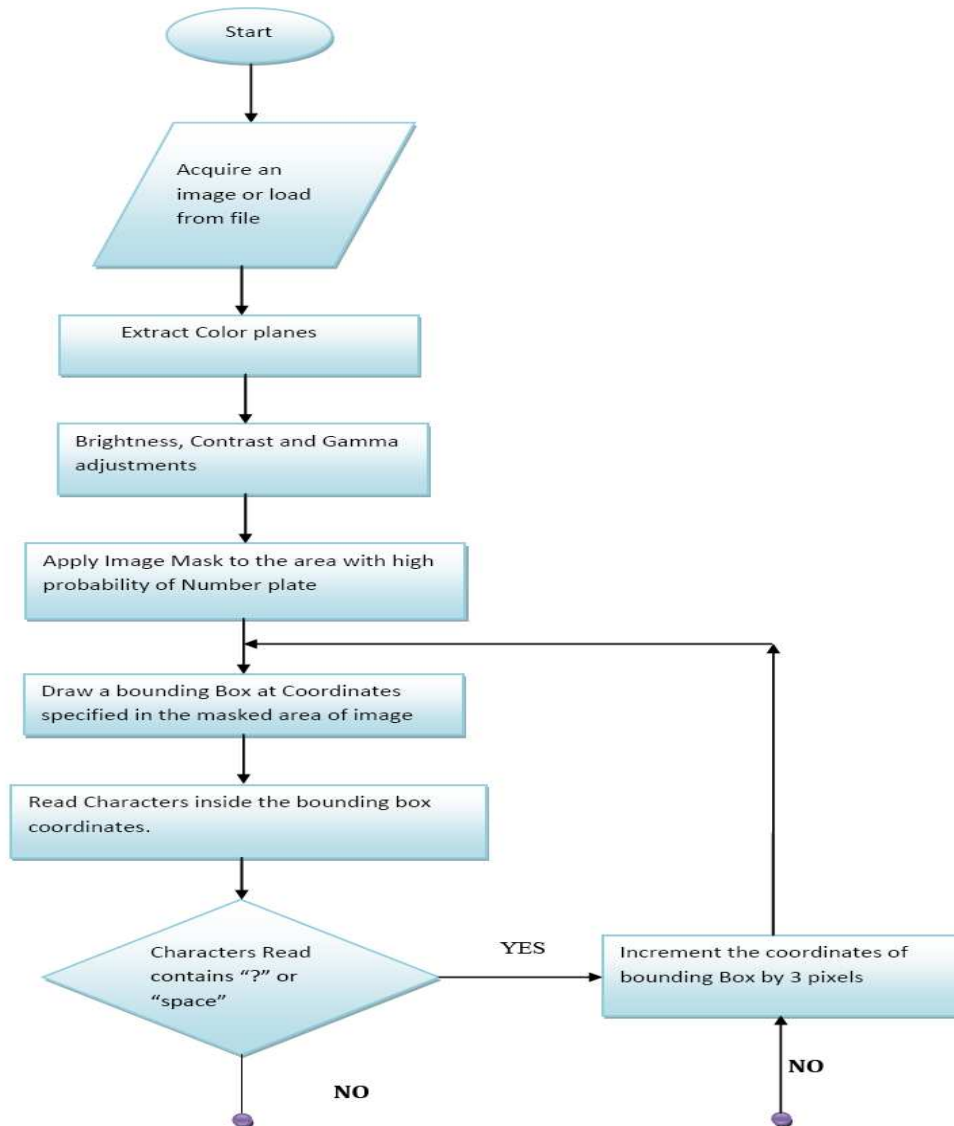The sequence of the steps followed to develop the system is shown in Figure 3 below.

Fig 3(a) block diagram of the proposed system

International Journal of Research in Advent Technology

Start

Acquire an image or load from file

Extract Color planes

Brightness, Contrast and Gamma adjustments

Apply Image Mask to the area with high probability of Number plate

Draw a bounding Box at Coordinates specified in the masked area of image

Read Characters inside the bounding box coordinates.

Characters Read contains "?" or "space"

YES

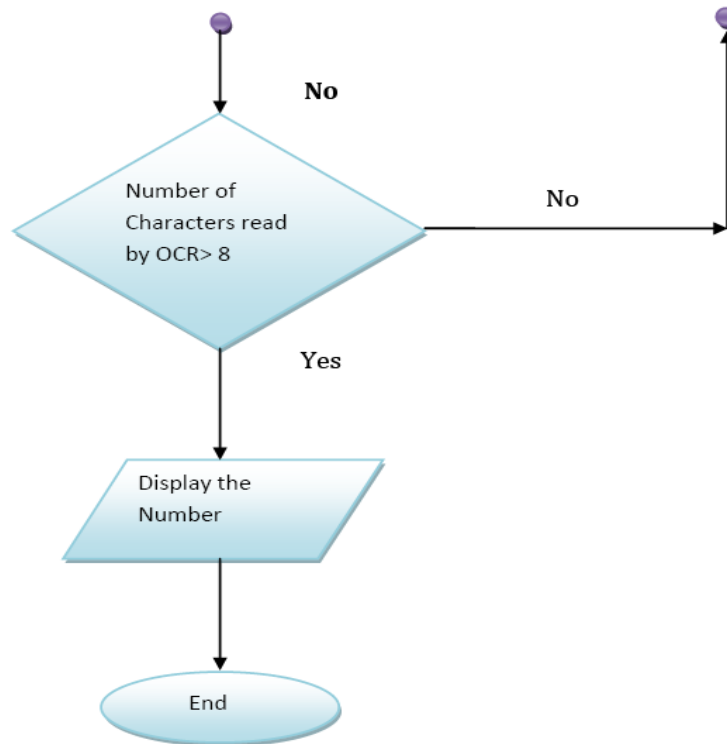Increment the coordinates of bounding Box by 3 pixels

NO

NO

Figure 3 : Flow chart of the Proposed System

The images of various number plates of vehicles can be acquired using camera, thereafter they are fed to the software where they are first converted in to grayscale images. Brightness, contrast and gamma adjustments are made to optimum values to enhance the number plate, the and its digits. Then the region with highest probability of number plate is masked and extracted. Then the resulting region of interest is scanned for characters and numerals by continuously changing the coordinates of bounding box in an OCR session. The output of OCR is saved in a spreadsheet and then for each iteration the result is checked if it qualifies to contain all the digits in number plate. Whenever the results meet the conditions specified, the software displays the number and terminates the execution of program so that next image can be processed.

III. Software Module of the System

The software application that realizes the image acquisition and image processing for automatic vehicle number plate recognition system can be realized in LabVIEW 2010. In addition to the libraries of LabVIEW 2010 it may necessary to use supplementary functions like vision Acquisition & Vission Assistant. For proper operation of the system, it is necessary to install the driver of the video camera connected on USB interface.
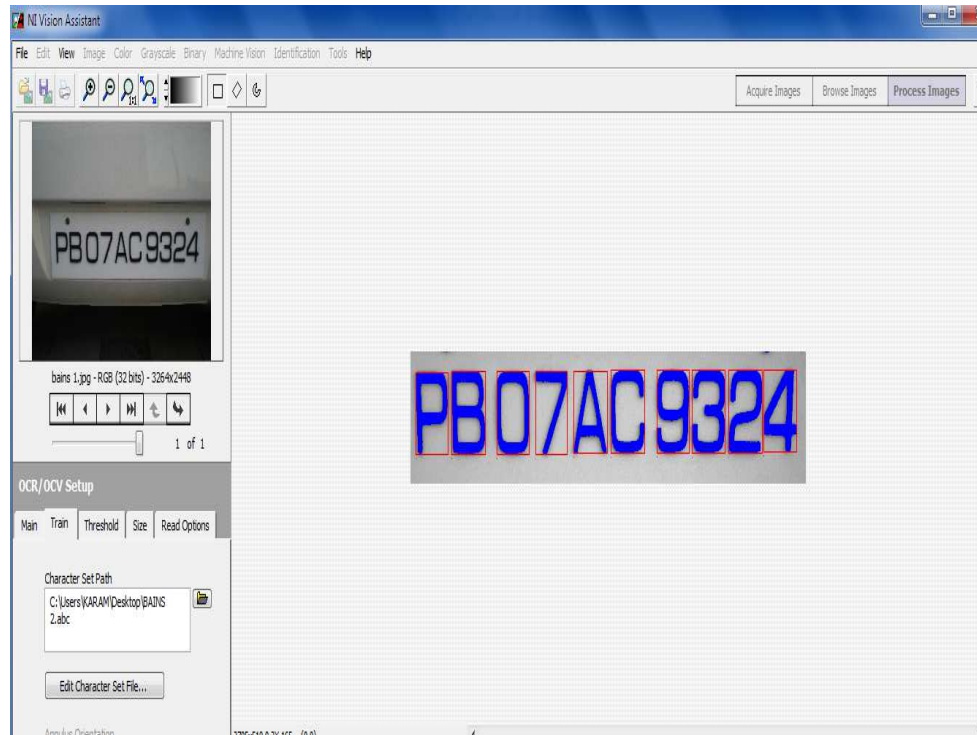
Fig. 4 Front Panel of the Labview Code for application

III.   Applications of proposed System

The proposed system of automatic vehicle Licenses number plate recognition can be implemented in various applications either directly or after minor alterations in the system. Some of that application is listed here: Parking, Access Control, Tolling, Border control, Stolen Cars etc.

IV.   EXPERIMENTS AND RESULTS

The software has been tested for different vehicle images. The results of some images are as under. The table below consist vehicle image, its correct number, number read by our system, and the result.

IMAGE NO.	Vehicle Reg number	INSPECTION NO.	INSPECTION TIME	AVERAGE INSPECTION TIME
1	PB 08 BX 4054	1	15.52	15.748
	PB 08 BX 4054	2	16	
	PB 08 BX 4054	3	15.7	
	PB 08 BX 4054	4	15.6	
	PB 08 BX 4054	5	15.92	
2	PB 31 H 0315	1	15.61	15.818
	PB 31 H 0315	2	15.89	
	PB 31 H 0315	3	15.91	
	PB 31 H 0315	4	15.9	
	PB 31 H 0315	5	15.78	
3	HR 03 E 0300	1	15.9	15.732
	HR 03 E 0300	2	15.84	
	HR 03 E 0300	3	15.61	
	HR 03 E 0300	4	15.6	
	HR 03 E 0300	5	15.71	
4	PB 10 DH 1318	1	15.9	15.868
	PB 10 DH 1318	2	15.85	
	PB 10 DH 1318	3	15.81	
	PB 10 DH 1318	4	15.86	
	PB 10 DH 1318	5	15.92	
5	PB 23 G 5857	1	16.5	16.102
	PB 23 G 5857	2	16.07	
	PB 23 G 5857	3	16	
	PB 23 G 5857	4	15.88	
	PB 23 G 5857	5	16.06	
6	PB 23 A 9384	1	17.01	16.986
	PB 23 A 9384	2	16.97	
	PB 23 A 9384	3	16.96	
	PB 23 A 9384	4	16.96	
	PB 23 A 9384	5	17.03	
7	PB 23 J 0044	1	17.4	17.496
	PB 23 J 0044	2	17.48	
	PB 23 J 0044	3	17.66	
	PB 23 J 0044	4	17.37	
	PB 23 J 0044	5	17.57	
8	PB 23 L 5990	1	17.2	17.292
	PB 23 L 5990	2	17.29	
	PB 23 L 5990	3	17.42	
	PB 23 L 5990	4	17.11	
	PB 23 L 5990	5	17.44	

Figure 5: Results of the samples tested on system

The proposed system is sensitive also to the angle at which images are being taken. For better efficiencies the image must be taken In a way so that vehicle number plate comes in the middle of 1200x1600 resolution picture. Also the resolution of images must be kept 1200x1600 for better results.

V. CONCLUSION

The process of vehicle number plate recognition requires a very high degree of accuracy when we are working on a very busy road or parking which may not be possible manually as a human being tends to get fatigued due

to monotonous nature of the job and they cannot keep track of the vehicles when there are multiple vehicles are passing in a very short time .To overcome this problem, many efforts have been made by the researchers across the globe for last many years. A similar effort has been made in this work to develop an accurate and automatic number plate recognition system. We have used Vision assistant along with LabVIEW 2010 to obtain the desired results. We get an overall efficiency of 98.5% for this system. It may be concluded that the system has been by and far successful. It can give us a relative advantage of data acquisition and online warning in case of stolen vehicles which is not possible by traditional man handled check posts. While thousands of vehicles pass in a day.

References
[1] Yan, Dai."A high performance license plate recognition system based on the web technique, Proceedings IEEE Intelligent Transport Systems, pp. 325-329, 2001.

[2] Hontani, H., and Koga, T., "Character extraction method without prior knowledge on size and information", Proceedings of the IEEE International Vehicle Electronics Conference (IVEC'01), pp. 67-72, 2001.

[3] Cowell, J., and Hussain, F., "Extracting features from Arabic characters",Proceedings of the IASTED International Conference on COMPUTER GRAPHICS AND IMAGING, Honolulu, Hawaii, USA, pp. 201-206, 2001.

[4] Hansen, H.,"Automatic recognition of license plates", Institute for Electronic System, Aalhorg University, May 2002.

[5] Hussain, F., "A fast recognition system for isolated Arabic characters", Proceedings Sixth International Conference on Information and Visualisation, IEEE Computer Society, London, England, pp. 650-654, 2002.

[6] Hamami, L., and, Berkani, D., "Recognition System for Printed Multi-Font and Multi-Size Arabic Characters", The Arabian Journal for Science and Engineering, vol. 27, no. IB, pp. 57-72, 2002.

[7] Optasia Systems Pvt Ltd, http ://www. Singapore gateway. com/optasia/imps ,Singapore.

[8] Percerptics, http://www.perceptics.com/lpr.html , northrop grumman information technology, USA.

[9] Parking Products, Inc., http://www.parkingproducts.com/. Vehicle Identification System for Parking Areas (VISPA), USA, 2002.

[10] Hi-Tech Solutions, http://www.htsol.com/, Israel