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Image Based Vehicle Number Plate Decoding

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Abstract- Our paper is character extraction in vehicle license plate. Today our world is depending on digital technology and also depending on image processing. So we are using MATLAB technique in order to develop a code for extracting character in license plate . In olden days we faced many problems using manual approach method. To avoid this problem, we are developing a code on automatic license plate recognition. Automatic number-plate recognition (ANPR) is a technology that uses optical character recognition on images to read vehicle registration plates to create vehicle location data.
INDEX TERMS: Image processing ,Object Labeling, match ratio ,Data base.

I. INTRODUCTION

A vehicle registration plate, can also be termed as a number plate or a license plate. For official Identification purposes metal or plastic plate attached to a motor vehicle. Every country needs registration plates for road vehicles such as cars, Trucks, and motorcycles. Whether they are required for other vehicles, such as bicycles, boats, or tractors, may vary by jurisdiction [1]. The registration identifier is a numeric or alphanumeric ID that uniquely determines the vehicle owner within the issuing region's vehicle register. In some countries, the Identifier is solitary within the entire country, while in others it is unique within a Province. Whether the identifier is associated with a vehicle or a person also varies by issuing Agency. Electronic license plates also exist. Most governments require a registration plate to be attached to both the fore and rear of a vehicle, although certain jurisdictions or vehicle types, such as motorboats, require only one Plate, which is usually attached to the rear of the vehicle.

To create vehicle location data we use **Automatic number plate recognition .** It is a technology that employs optical character recognition on images to read vehicle registration plates . It can use existing closed-circuit television, road-rule enforcement cameras specifically designed for the task[2]. ANPR is used by police forces around the world for law enforcement purposes, including checking if a vehicle is registered or licensed. It is also used for electronic toll collection on pay-per-use roads and as a method of sorting the movements of traffic, for example by highways agencies.

Automatic number plate recognition can be used to store the images captured by the cameras as well as the text from the license plate, with some configurable to store a photograph Of the driver. Systems commonly use infrared lighting to allow the camera to take the picture at any time of day or night. ANPR technology must take into account plate variations from place to place.

Image processing is a method to convert an image into digital form and perform some Operations on it, in order to get an enhanced image or to extract some useful information from it. It is a type of signal dispensation in which input is image, like video frame or photograph and Output may be image or characteristics associated with that image. Usually Image Processing system includes treating images as two dimensional signals while applying already set signal processing methods to them.

It is among rapidly growing technologies today, with its applications in various aspects of a business. Image Processing forms core research area within engineering and computer science disciplines too. Importing the image with optical scanner or by digital photography. Analyzing and manipulating the image which includes data compression and image enhancement and spotting patterns that are not to human eyes like satellite photographs. Output is the last stage in which result can be altered image or report that is based on image analysis.

II. PROPOSED METHOD

In this method we will work on the image taken as the input from the CCTV footage which is in RGB format. We will be converting that image into gray scale using MATLAB. In general, a camera captures the vehicle pictures and also the laptop processes the captured pictures, detects the car place from the input pictures so reads data from car by

applying numerous image process and optical character recognition techniques. There are multiple registration code recognition systems available, however due to the reality[3]. A lot of problems have to be solved during this process. For instance, during the recognition system procedure, there exists lots of obstruction. For example, camera limitation and natural scene effects are the main reason to get the good image or not. In general, the biggest challenges to the researchers of this area are the way in which they deal with the illumination condition problems, vehicle motion, viewpoint, distance changes and complex background. Methods to Implement The proposed method offers a base for imposing automatic wide variety plate detection the usage of photo processing for toll collection at toll checkpoints.

The proposed system will capture a picture positioned at the toll checkpoint and will perform sure approaches to hit upon the quantity plate of a vehicle.

The given input image is converted into gray to apply the image processing techniques. Now it is converted into the logical image to extract the required features [4][5]. The logical image consist so much noise it is removed by the median filter of 3 X3 to get the noise less image. Now the unwanted areas is removed by applying the structural elements with radius 5. Morphological techniques probe an image with a small shape or template called a structuring element. The structuring element is positioned at all possible locations in the image and it is compared with the corresponding neighbourhood of pixels. This radius value may be incremented or decremented based on the requirement. Now the resultant output contains only the requires objects(numbers). Connected-component labelling is used in computer vision to detect connected regions in binary digital images, although colour images and data with higher dimensionality can also be processed.[1][2] When integrated into an image recognition system or human-computer interaction interface, connected component labeling can operate on a variety of information.[3][4] .A connected component in a binary image is a set of pixels that form a connected group. For example, the binary image below has three connected components. Now each object is labeled using 8-connectivity[5].

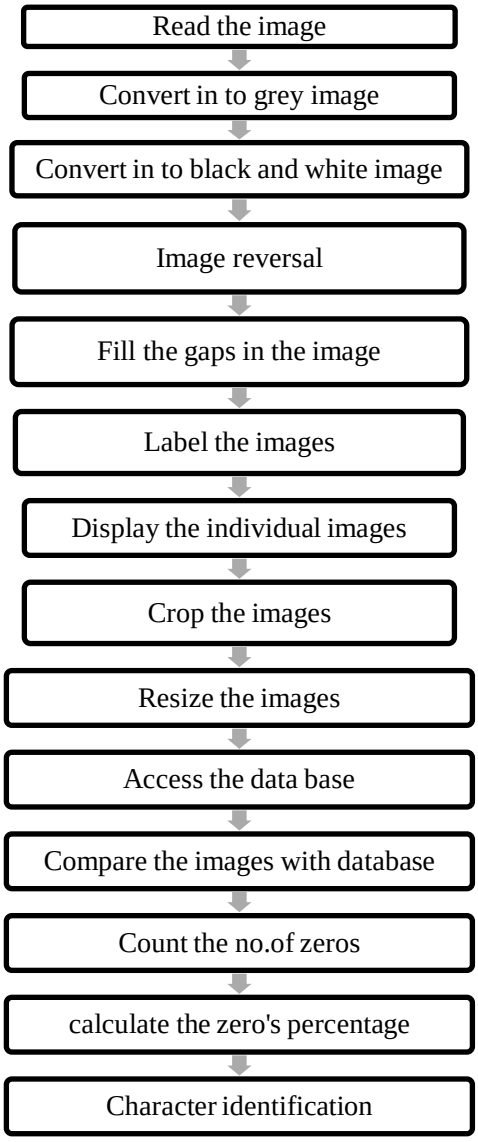

Figure 1: Flow Chart

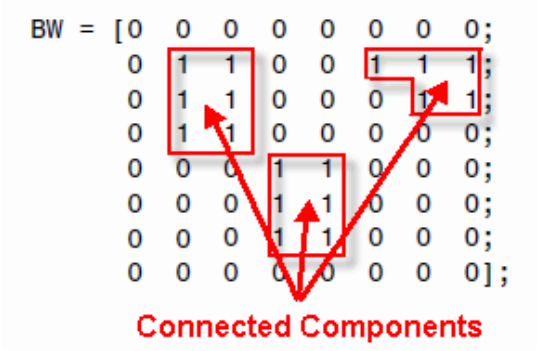

Figure 2: Flow Chart

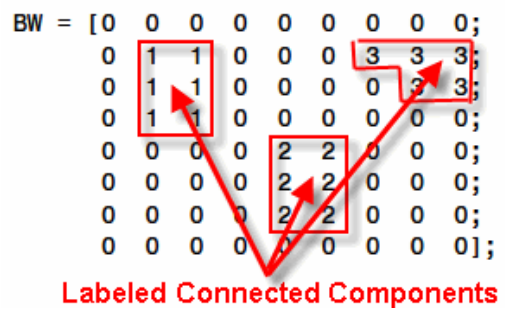

Figure 3: Labeling of objects

Now the maximum number of objects are calculated by max(max(label)). Now each object extracted separately and cropped from the main image.

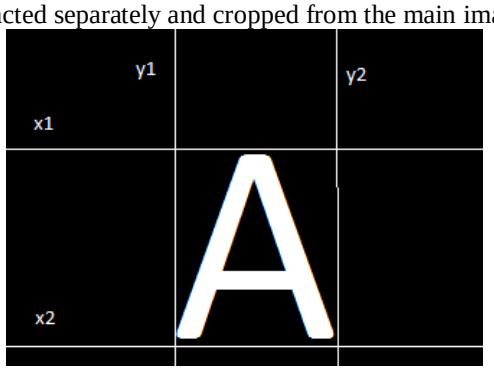

Figure 4: Cropping Edges

In the above figure the character 'A' present between x1 and x2 rows and y, and y2 columns. The required portion cropped by calculating values of x1,x2,y1 and y2. After calculating the x1,x2,y1 and y2 the required portion cropped by using

Cropped Image=original image(x1: x2, y1:y2);

Now the cropped object(number) is resized to the size of database image/ character size .Now the resultant is compared with the data base images.

The database consist images of all the alphabets, Symbols and numbers. Here a simple matrix subtraction is used to compare. After subtracting the cropped image with the database images match ratio is calculated. If match ratio greater than the 0.8 then the resultant alpha numeric character is stored in the vector.

$$match\ ratio = \frac{no.of\ zeros\ in(Xc - Xd)}{rd * cd}$$

Where

Xc=Cropped Object (Image)
Xd=Data Base Image
rd=no.of rows in data base image
cd=no.of columns in database image

The above computation is performed on all the objects(Characters) which are present in the vehicle number plate. All the results are stored in a vector (say z).

Output:

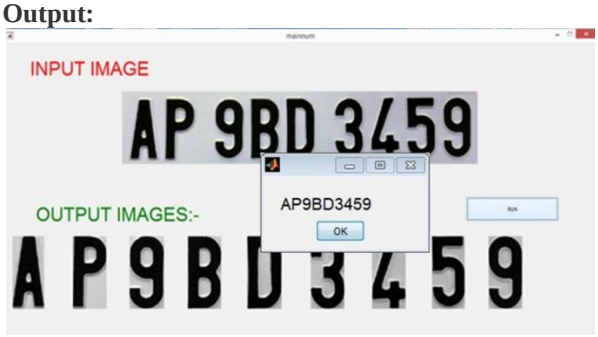

Figure 5: Screen shot of output

Decoding of Number plate:

In the Indian number plate consists maximum 10 characters. Say the result is stored in a vector z.
If z(1)=↑ then, it belongs to Army
If z(5)=T then, it is a public Private Transport vehicle
If z(5)=G then, it is a Government vehicle
If z(5)=P then, it is a Police Department Vehicle
If z(5)=Z then, It is a Government Transport Vehicle

III. CONCLUSION

In this, a software is designed which decode the vehicle number plate number using MATLAB. The proposed method is mainly designed for decoding of Indian vehicle number. This method has four main stages which are preprocessing, noise removing, labeling cropping and lastly applied template matching. This method has been tested over a large number of images which proved the efficiency and accuracy of the method. It has been observed that the proposed model exhibits 95.5% accuracy rate for our tested dataset.

REFERENCES

[1]. J. He, Q. D. M. Do, A. C. Downton and J. H. Kim A comparison of binarization methods for historical archive documents, 6th IEEE International Workshop, Document Analysis Systems,Vol.1, pp.538 – 542, 2005.
[2]. Yingzi Du Chein-I Change and Paul D.Thouin, Automated System for Text Detection in Individual Video Images, Journal of Electronic Imaging July 2003,pp 410-422.
[3]. Xiaoqing Liu and Jagath Samarabandu, Multiscale Edge-Based text extraction from complex images, Multimedia and Expo, 2006 IEEE International Conference, 2006.
[4]. Thanongsak ,Sirithinaphong and KosinChamnongthai, Extracting of car license plate using motor vehicle regulation and character pattern recognition, IEEE international conference of Neural Networks,1998, pp 559-562.
[5]. Leandro Araújo, Sirlene Pio, David Menotti, Segmenting and Recognizing License Plate Characters, International Journal of Computer Vision, vol. 24, no. 3, pp. 251–270,1997.