

Enhance Accuracy of OCR in ITMS

Jaya Mishra *, Swati Soni**

*(Department of CSE, TIETECH, Jabalpur MP Email: jayamishra960@gmail.com)

*(Department of CSE, TIETECH, Jabalpur MP Email: swatisoni@takshshila.org)

Abstract:

The developed system first detects the vehicle and then catches the image of the vehicle. The vehicle number plate area is extracted using image splitting in the image. Optical Character Recognition Technique is used for character recognition. The resultant data is then used to compare the records on the database so that specific information such as the owner of the vehicle, the place of registration, the address etc. can be revealed. The algorithm is implemented and simulated in MATLAB, and its performance is tested on numeric digits from 0-9 and alphabets from A-Z. It was observed from the simulation that the proposed algorithm successfully detects and recognize 32 characters among 36. Therefore, in order to recognize remaining two characters (M & W) one other field has been introduced while for the last two characters (0 & o) an algorithm by considering the Indian Government Traffic Rule is use.

Keywords — ITMS, PC, Pel, UN, ALPR.

INTRODUCTION

ITMS may be accustomed store the pictures captured by the cameras moreover because the text from the registration code. ITMS technology tends to be region specific, due to plate variation from place to put. Concerns regarding these systems have centered on privacy fears of state trailing citizens' movements, mis-identification, high error rates, and exaggerated government disbursement.

I. RECOGNITION

The system is meant for real time videos wherever a camera is employed for continuous recording of videos [1]. The read of camera or the realm coated by camera is mounted between entry zones and exist zone. Every frame is unceasingly processed to examine the presence of a vehicle. An outlined connected element space is taken as threshold; if the detected space is higher than that threshold worth then it'll be recognized as a vehicle and can be half-tracked. A distance is outlined between the vehicle and also the camera and once the vehicle comes among that vary i.e. vehicle's connected element space is most, these frames of video are passed to registration code

recognition algorithmic rule. Afterward recognition of character takes place and information is hold on and compare with information base.

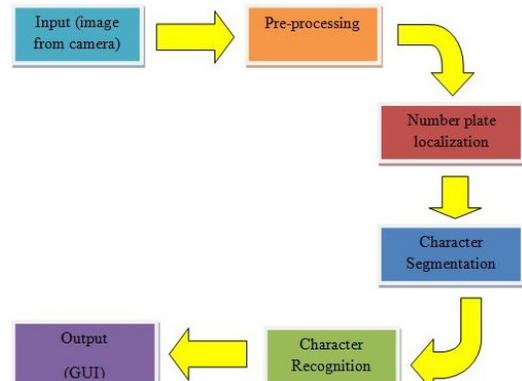


Fig. 1 Flow chart of the ITMS system

A. Literature

Amr Badr, Mohamed M. Abdelwahab, Ahmed M. Thabet, and Ahmed M. Abdelsadek et al [24], the target of this paper was to check and resolve recursive and mathematical aspects of the automated variety plate recognition systems, love problematic of machine vision, pattern recognition and neural networks.

Wu Dingyun, Zhang Lihong and Liang Yingbo et al [5], we propose a replacement methodology for characters recognition within the plate? This algorithmic program will accurately accomplish characters recognition. The experimental results show that the strategy is effective. There should still be one thing we'd like to enhance upon during this algorithmic program, particularly this algorithmic program shall not apply to the plate of characters on the highest line, in my opinion, this will be the developing direction of analysis.

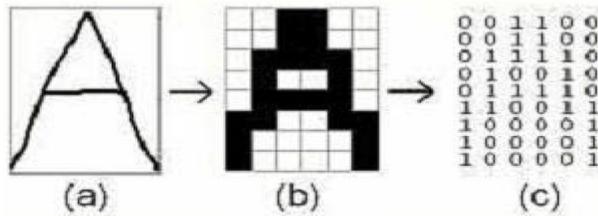


Fig. 2 Digitization

Mr. Dipankar Bhattacharya and Anjan Bikash Maity et al [4], in this paper he overviewed the matter of auto variety Plate recognition with numerous styles of number Plates. He projected a correlation based mostly character recognition system, that provides result with vital accuracy, that is extremely easy to implement. The system has been tested on MATLAB atmosphere with satisfactory results.

II. PROBLEM STATEMENT

The attributes of the License plates play necessary role within the recognition method. The size, colour of the registration code, its font face i.e. size, colour of every character, spacing between characters, the amount of lines within the registration code, script, characters' height and breadth are maintained terribly strictly in developed countries. There are many countries within the world UN agency have tailored this terribly methodology of standardizing the registration code [7]. A number of the quality license plates employed in developed countries are shown in Figure 3.



Fig. 3 Standard License Plates in India

III. ITMS SOLUTIONS IN JABALPUR

Jabalpur is among the first 20 cities selected in first round of smart cities challenge under smart city mission by ministry of housing and urban affairs, Government of India (Formerly, Ministry of Urban Development). Currently, seven cities from Madhya Pradesh have been shortlisted by ministry of housing and urban affairs, GOI, to be developed under the smart city mission. These cities are Jabalpur, Indore, Bhopal, Ujjain, Gwalior, Sagar and Satna [1, 8].

In This Context, Jabalpur Has Incorporated a Special Purpose Vehicle (SPV) –Jabalpur Smart City Limited (JSCL) to plan, design, implement, coordinate and monitor the Smart City Projects in Jabalpur. It has been incorporated under company Act, 2013 on 14th March 2016 [8, 9]. In alignment to Its objectives, Jabalpur Smart City Limited (JSCL) aims to have an ICT based Traffic management system which shall add value to citizens, city authorities and society in general by bringing down travel time, reducing travel related energy consumptions, increasing comfort and safety of travel, establishing efficient and effective management procedures and working towards environmental sustainability. Jabalpur desires to foster the development of a robust intelligent traffic management system infrastructure that is reliable and efficient leading to effective traffic management in the city [1, 9].

IV. PROPOSED ALGORITHM

- 1) Camera captures the object image, which may be an image consisting of many license plates or other undesired background. Now filtered out the background and pass the foreground image to the next stage. Here we obtained the image from the camera from Traffic control room of our city. We upload the captured crop image taken from the Traffic control room of our city.

- 2) Resizing the image.
- 3) Convert the RGB (colour) image to gray image.
- 4) Removes the noise.
- 5) We may use the Sobel edge detection method if image has poor resolution.
- 6) The result image is Convolved itself to increase the sensitivity by defining the edges well.
- 7) Localization process is done by Comparing License Plate dimension to the database.
- 8) Final image is a binary image which is found out by implementing many stages of thinning the edges.
- 9) Segmentation is achieved to define 10 segments separately.
- 10) If 10 segments are not obtained then number cannot be extracted. If obtained then characters are displayed on the output screen.
- 11) Here we define "the Proposed methodology". Features are extracted here by Optical Character Recognition (OCR) method. There are 6 features in each of the characters. According to these 6 features we recognize the character and display in output.
 - X1=Numbers of Triangle
 - X2=Numbers of Square
 - X3=Numbers of Corner
 - X4=Numbers of Pore
 - X5=Numbers of End
 - X6=Positions of Ends
- 12) All the characters are defined now. To differentiate between "Zero & o" another program is prepared.

A. Character Extraction

Character Extraction or character segmentation is that the necessary element of our recognition system. It takes a properly divided vehicle plate as associate degree input. Some pre-processing (Morphological operators) is finished on the vehicle plate image for the removal of noise and also the noise free output image is distributed for character segmentation. Image binarization and image projections area unit used for character extraction. Character segmentation is a crucial step in vehicle plate Recognition system. There are a unit several difficulties during this step, adore the impact of image noise, space mark, plate frame, rivet so on. The spots remaining when the previous stage area unit organized within the type of a string and area unit treated as potential vehicle plate characters. Every of those candidate characters is size-

normalized to a reference size, before example matching against a collection of hold on templates is performed. For isolating Characters, we assume that the license plate is horizontal and we proceed.

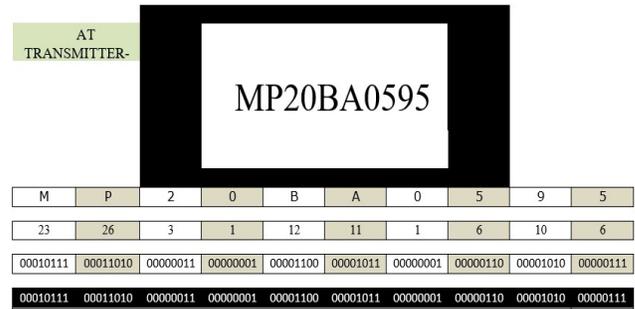


Fig. 4 Conversion of alphabets or numeric digits into binary format

V. PROBLEM STATEMENT

Now this number is feed into the Android application or web site of RTO which will give the detail of the owner of the Vehicle. If the Character is not found it means the number plate is not following the rules of Traffic or there is no number in the plate or there is no plate.

The result of the localization process in the article given in IEEE paper by Kartikeya Jain, Tanupriya Choudhury and Nirbhay Kashyap, gave Accuracy of 88 % whereas the character recognition technique is 96 % Accuracy [2].

The complete Automatic Number Plate Recognition System Gives the Accuracy given by

$$\frac{88\% + 96\%}{2} = 92\%$$

The result of the localization process in the article given in IEEE paper by Bhavin V Kakani gave Accuracy of 96.7 % whereas the character recognition technique is 92.2 % Accuracy [3].

The complete Automatic Number Plate Recognition System Gives the Accuracy given by

$$\frac{96.7\% + 92.2\%}{2} = 94.45\%$$

In the proposed technique the localization process is kept same as given in by Bhavin V Kakani [3]. Here the problem is that Digit '0 (Zero)' and alphabet 'o' is similar. Hence this method gives 94.5 % Accuracy, but it is not a severe problem in India.

The current format of the Registration Index consists of 4 parts [7], they are:

- 1) 1st two characters are Alphabets,
- 2) 2nd two are numeric digits
- 3) 3rd two are Alphabets again and
- 4) Last 4 digits are Numeric digits.

So that Zero and Alphabet o may be clearly separated out by their position in Number Plate. Therefore, in the proposed character recognition technique we achieve 100% accuracy by defining the location of the characters. The localization process given by Bhavin V Kakani et al [4] is 96.7% which is actually better. On the other hand, the Proposed Method gives 100 % accuracy observed from simulation in MATLAB which is more than that of in previous methods. There is now the complete Automatic Number Plate Recognition System Gives the Accuracy given by

$$\frac{96.7\% + 100\%}{2} = 98.35\%$$

The localization process given by Kartikeya Jain [2] gives 88 % accuracy while given by Bhavin V Kakani [3] gives 96.7 % accuracy. It means the best choice is the second one. Here our proposed method gives 100 % accuracy for Indian License Plate having two fonts only which is more than that of in previous methods.

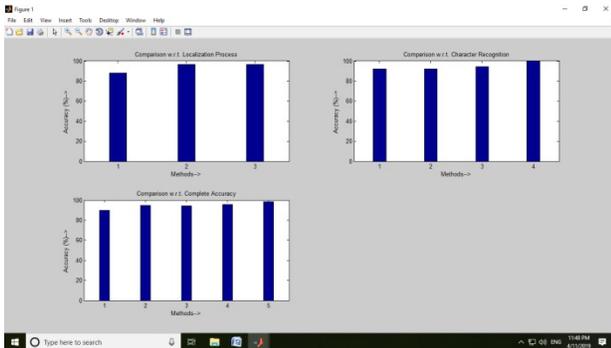


Fig. 5 Comparison of the methods

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