Enhance Accuracy of OCR in ITMS

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Abstract:*The developed system first detected the vehicle, and then capture the image of the vehicle. The Vehicle Number Plate area is extracted using image splitting. Optical Character Recognition method may be applied for character recognition. Extracted letterings, are cast-off for the comparison records on Database, so that specific information, such as information of owner of the vehicle, place of registration, and address of the owner can be revealed. This algorithm is implemented using MATLAB software, and the performance is tested on numeric digits from 0 to 9, and alphabets from A to Z. It is 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, ALPR, Pel, ANPR.

1. INTRODUCTION

ITMS may be accustomed save an image, taken through image camera moreover, and convert in the form of script. ITMS tends to be county precise, because of dissimilarity of the number plates. Concerns regarding state regulations, mis-identification, higher error rate, and government disbursement.

2. RECOGNITION

The Recognition may be capable to work in real time environment, wherever are camera is utilized for taking a continuous recording of the movement of vehicles [1].

The series of cameras is mounted in Entrance Sector, or Exit Sector. Every frame is unceasingly processed for examining to the fact that the vehicle is present there. An outlined linked element space is taken as threshold; if the detected space is higher than that threshold worth, then it will be recognized as a vehicle, and can be 50% tracked. A distance is outlined is between the vehicle, and also the camera, and once the vehicle comes among that changes, such as vehicles connected element space is most, is these frames of videos are passed to registration code recognition algorithmic rule. Afterward, recognition of character takes place, and information is hold on, and compared with database.
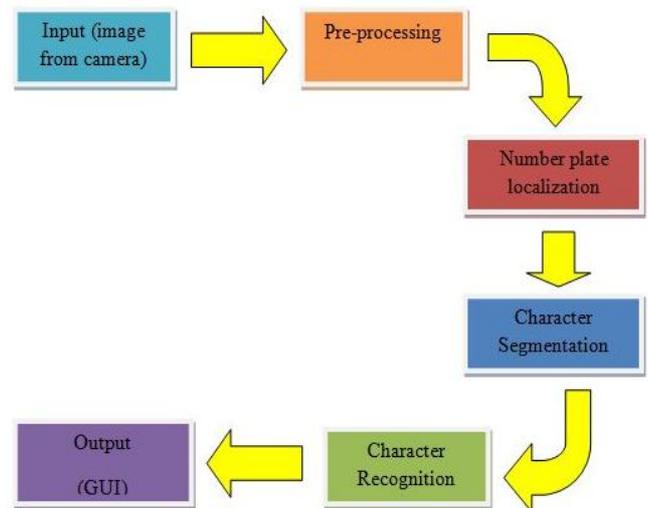

Figure 1 Flow chart of the ITMS system

2.1 Literature

Amr Badr et al. [9], the target in the paper to check, and resolve recursive, and mathematical aspect of Automated number plate recognition systems, like CCTV, Pattern Recognition, and Neural Networks.

Wu Dingyaun et al. [5] proposed a replacement methodology for Characters Recognition within the plate. This algorithmic program will accurately be completed recognition of characters. The experimental results show that, strategy it is effective. There should still be one thing we would like, to enhance on the program, particularly this algorithm program shall not apply to the plate of characters on highest line, in my opinion this will be the developing direction of analysis.
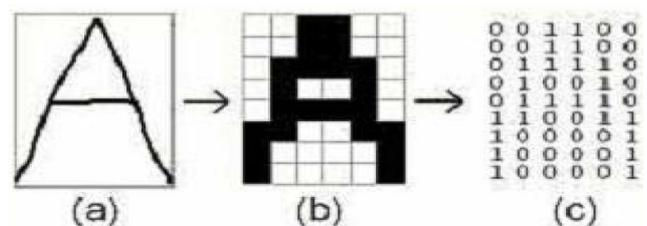

Figure 2 Digitization

Dipankar Bhattacharya, and Anjan Bikash Maity et al. [4] overviewed the matter of ANPR with numerous styles of number Plates. They projected a correlation based, mainly Character Recognition System, that provides result with vital accuracy, which is extremely easy to implement. The system has been tested on MATLAB atmosphere with satisfactory results.

3.   PROBLEM STATEMENT

The attributes of the license plates play necessary role within recognition method. The size, color of registration code, fonts, & size of every character, spacing between characters, amount of lines within registration code, script, character's height, and width of the maintained terribly stately in developed countries. There are many countries UN agency has tailored it terribly methodology of standardizing registration code [7]. A number of the license plates employed in developing countries are shown below.

Figure 3 Standardized License Plates used in India

4.   ITMS SOLUTIONS IN JABALPUR

Jabalpur is among the first 20 cities selected in first round of smart cities challenge, and Formerly, Ministry of Urban Development. Currently, seven cities from Madhya Pradesh have been shortlisted by Government of India, to be developed [1], [8].

In This Context, it has been incorporated under company Act, 2013 on 14th March 2016 [8], [9]. In alignment to Its objectives, Jabalpur Smart City Limited aims to have an ICT based traffic management system [1], [9].

5.   PROPOSED ALGORITHM

- Camera captures the object image, which may be an image consisting of many license plates, or other undesired backgrounds. 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.
- Resizing the image.
- Convert the RGB (color) image to gray image.

- Removes the noise.
- We may use the Sobel edge detection method, if image has poor resolution.
- The resultant image is Convoluted itself to increase the sensitivity by defining the edges well.
- Localization process is done by Comparing License Plate dimension t• Final image is a binary image, which is found out by implementing many stages of thinning the edges.
- Segmentation is achieved to define 10 segments separately.
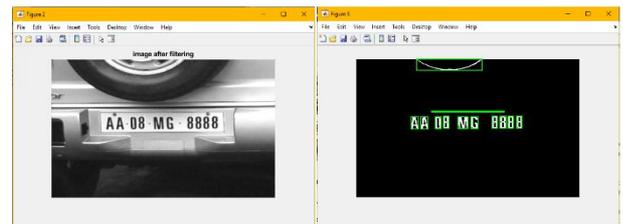

Figure 4 Gray image and achieved Segments

- If 10 segments are not obtained, then number cannot be extracted. If obtained, then characters are displayed on the output screen.
- 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.

  $X1=Numbers\ of\ Triangle$
  $X2=Numbers\ of\ Square$
  $X3=Numbers\ of\ Corner$
  $X4=Numbers\ of\ Pore$
  $X5=Numbers\ of\ End$
  $X6=Positions\ of\ Ends$

- All the characters are defined now. To differentiate between Zero & o, another program is ready.

5.1 Character Recognition
Character extraction, for character segmentation is a necessary element of our recognition system. It takes up properly divided vehicle plate as associate input. Some preprocessing may be used on a vehicle plate image for removal of noise, and also noise free output image is distributed is for character segmentation.
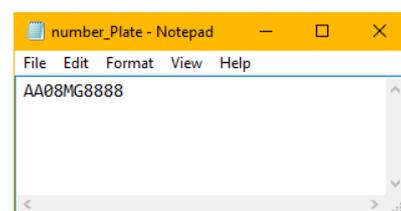
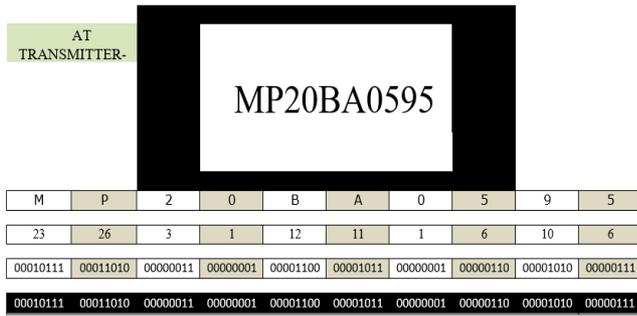**Figure 5** Extracted Number of LP using proposed method

Figure 6 Conversion of alphabets or numeric digits into binary format

Image binarization, and image projections are used for character extraction. Segmentation is crucial step of the Vehicle Plate Recognition System. There are several are some difficulties, for example impact of image noise, marking of other things or dust, frame of the plates etc. The spots remaining, when the previous stage is organized within the type of strings, and are treated as potential vehicle plates characters. Each of these candidate characters is size normalized to a reference size, before the sample matching against collection of hold on templates is performed. To isolate characters, we as you that the license plate is totally horizontal.

6.   RESULTS AND DISCUSSION

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 by Kartikeya Jain, Tanupriya Choudhury, and Nirbhay Kashyap, gave the accuracy 88%, whereas the character recognition is 96% [2].

Complete system gives the Accuracy given by:

$$A = \frac{88\% + 96\%}{2} = 92\ \% \tag{1}$$

The result of the localization process given by Bhavin V Kakani is 96.7%, whereas the OCR is 92.2% accurate [3].

Complete system gives the Accuracy given by:

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

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' are similar. Hence, this method gives 94.5% Accuracy, but it is not a severe problem in India.

The current format of the Registration plates consists of 4 parts [7], and given as:

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

Therefore, Zero, and Alphabet o may be clearly separated out by their position in Number Plate. 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 for Indian License Plate having two fonts only, observed from simulation in MATLAB, which is more than that of in previous methods. There is now, the complete system gives the Accuracy given by:

$$A = \frac{96.7\% + 100\%}{2} = 98.35\ \% \tag{3}$$

The localization process given by Kartikeya Jain et al. [2] gives 88% accuracy, while given by Bhavin V Kakani [3] is 96.7% accuracy. It means, the best choice is the second one. Here, the proposed method gives 100% accuracy for Indian License Plate having two fonts only, which is more than that of in previous methods. Figure 7 shows the comparisons with the previous methods.
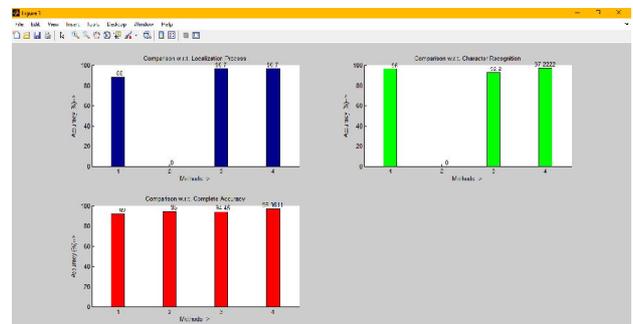

Figure 7 Comparison of the methods

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