

TRACKING OWNER DETAILS BY AUTOMATIC NUMBER PLATE RECOGNITION

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Abstract

Vehicle number plate recognition is an image processing technique. The objective is to design an efficient vehicle identification system by using the number plate of a vehicle, and to implement it for various applications such as (marketing purposes, inventory control,accident control, border checkpoints). The system has color image inputs of a vehicle and the output has the owner details of that vehicle. The proposed algorithm consists of four major parts: These are image acquisition, plate localization, Character segmentation, Character recognition and retrieving details using database. This system is implemented and simulated in MATLAB 2010a and ms access database.

Keywords—acquisition,localization,segmentation, recognition, retrieve.

1.INTRODUCTION

Vehicle number plate recognition has become popular now since the digital cameras resolution are improved, processing speed is also increased. VNPR technique is used to extract vehicle number plate in the form of digital images. It consists of camera that has the capability to capture an image, finds the location of the number plate in the image and then extracts the characters.Using character recognition tool that translate the pixels into alphanumerically readable character or string. Earlier neural network was used, due to continous improvement at present optical character recognition is used which is efficient and increases the processing speed. License plate capture camera, also known as LPR cameras, are a specialized CCTV camera that has built in software to help identify and record license plates on still vehicles.

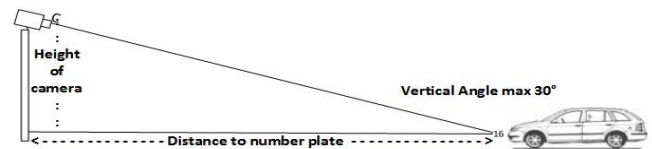


Figure 1 Distance from the number plate

Number plate recognition accuracy results

Actual distance from the camera to the number plate	15.38 m
Width of coverage at 15.38 m	3.5 m
Vertical camera angle to number plate (max 30 degrees)	11.3 degrees
Horizontal camera angle to number plate (max 15 degrees)	7.6 degrees

Figure 2 camera angle and distance from number plate

2 PLATE LOCALIZATION, SEGMENTATION , CHARACTER RECOGNITION

VNPR System consists of four steps these are image acquisition, license plate extraction, character segmentation, and character recognition. For the efficient and accurate results various approaches have been used for this purpose.

1.Plate localization – responsible for finding and isolating the plate on the picture.

2.Normalization – adjusts the brightness and contrast of the image.

3.Character segmentation – finds the individual characters on the plates.

4.Optical character recognition.



Fig1. Captured image

2.1. Plate Localization

The initial phase in localization of vehicle number plate is by detection of the number plate size. The challenge is to include an algorithm that is able to detect the rectangle number plate region in the image which is called as Region of interest (ROI). For extraction of the plate region, method based upon combinations of edge statistics and mathematical morphology will be applied to detect that region.



Fig2. Plate localization

2.2. Segmentation

To obtain segmented characters in number plate, first plate image is converted into binary image. The individual characters have to be distinguished (segmented) from each other, Because the images contain some noise it is further filtered and normalized. To make the final image to match up the standard template uniform that contains only two gray values of black and white.

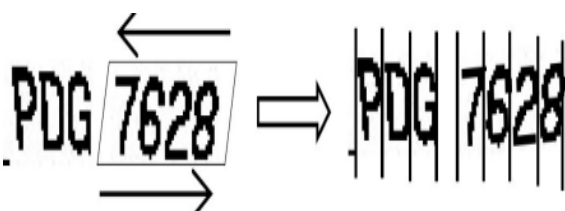


Fig3. Plate segmentation

2.3. Character Recognition

Optical character recognition (OCR) is used to compare the each individual character against the complete alphanumeric database. The OCR actually uses correlation method to match individual character and finally the number is identified and stored in string format in a variable. The character is then compared with the database for the vehicle authorization. Templates will exist for all the characters i.e. A-Z and 0-9 as shown in fig 4.

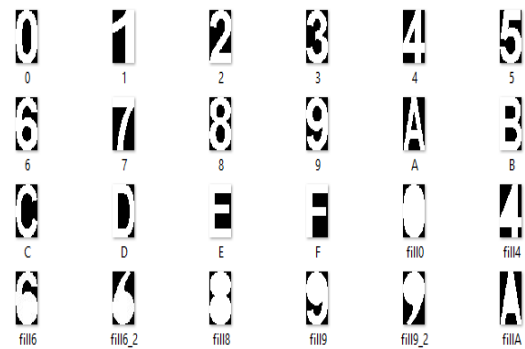


Fig4. OCR(optical character recognition)

3. EXISTING WORK

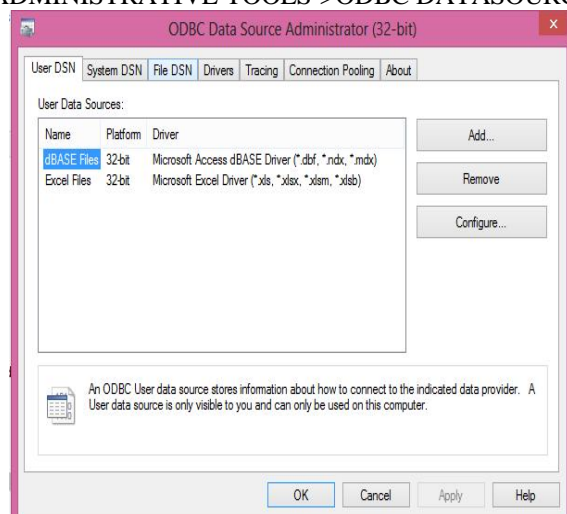
Input of the system is the image of a vehicle captured by a camera. The captured image taken from 4-5 meters away is processed through the license plate extractor with giving its output to segmentation part. Segmentation part separates the characters individually. And finally recognition part recognizes the characters giving the result as the plate number.

3.1. Difficulties

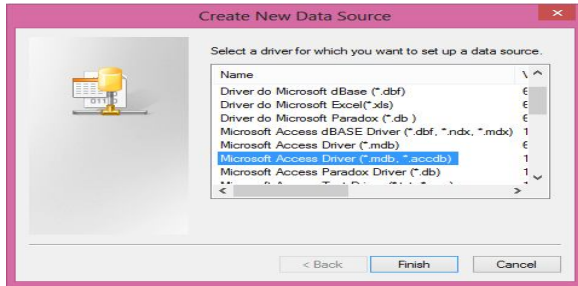
- Because of the similarities of some characters, there may be some errors during recognition. The confused characters mainly are B and 8, E and F, D and O, S and 5, Z and 2.
- Displays only the number plate characters.
- There are certain limits on parameters like speed of the vehicle, script on the vehicle number plate, skew in the image which can be removed by enhancing the algorithm further.

4. DATABASE CONNECTIVITY

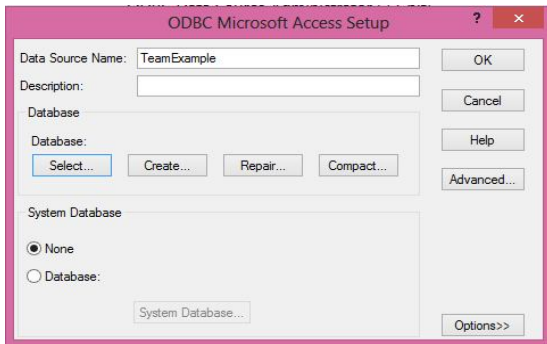
The system use image processing techniques for identifying details of the vehicle from the database stored in the computer. ms access database is used. The data source name for the database is given CONTROL PANEL->ADMINISTRATIVE TOOLS->ODBC DATASOURCE.



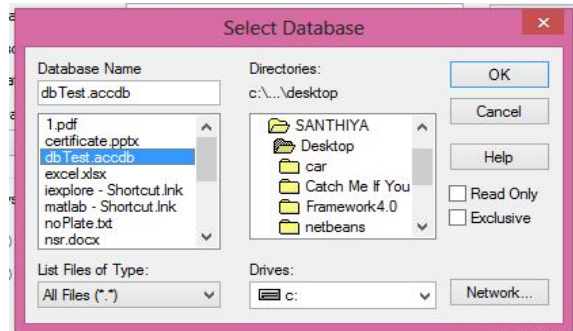
ODBC DATA SOURCE ADMINISTRATOR->ADD->MS ACCESS DRIVER->FINISH



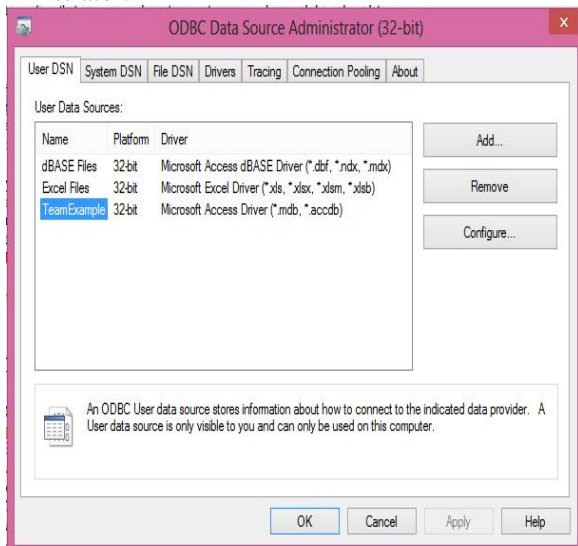
In ODBC MS ACCESS SETUP->Enter DATA SOURCE NAME->SELECT.



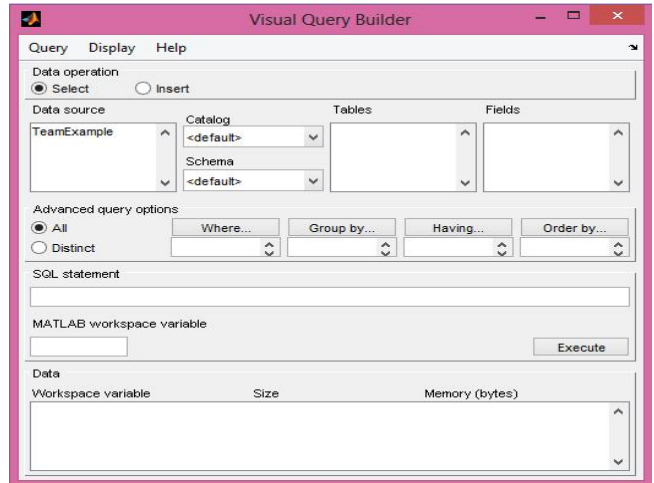
The database contains details of the vehicle which has been already stored during the registration of vehicle. In SELECT DATABASE DIALOG BOX->SELECT THE NAME OF THE DATABASE->CLICK OK.



The data source name is visible in the ODBC data source administrator.



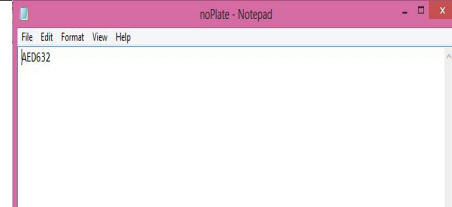
Using visual query builder in MATLAB 2010a,ms access is connected.



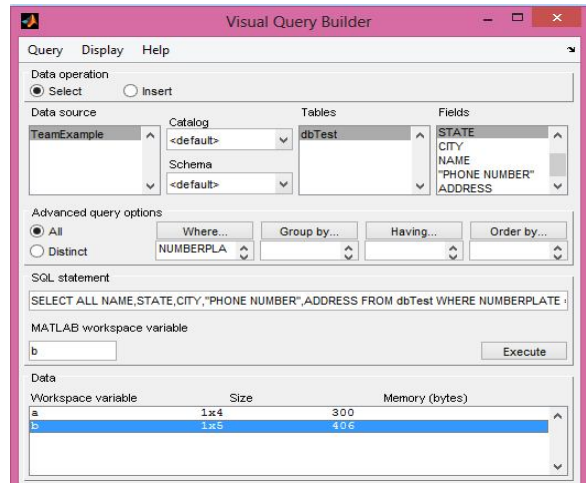
In visual query builder, the data source name of the database is shown eg:TeamExample. In the SQL statement the query is generated automatically and a variable is given in MATLAB workspace variable and executed. The details for the given vehicle number is displayed in MATLAB.

5.EXPERIMENTAL RESULTS

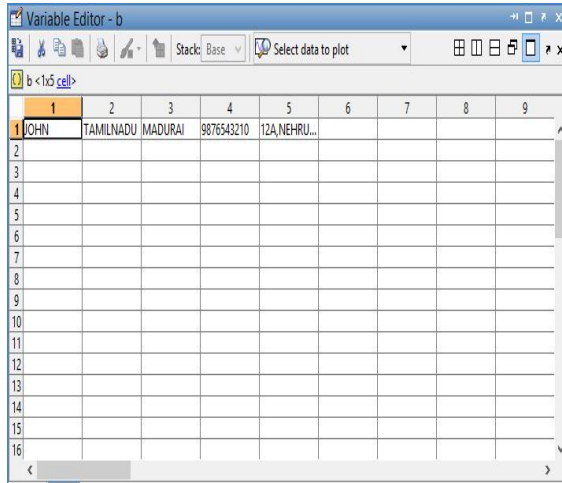
The code for extracting the number plate is given in the MATLAB.NEW->FUNCTION. Specify the image name in the code. Once the code is given, run the program the number plate characters will be displayed in the notepad. The image given in the code is given below.



In order to retrieve details of the vehicle visual query builder is used.



The output will be displayed in MATLAB once the visual query builder is executed.



	1	2	3	4	5	6	7	8	9
1	JOHN	TAMILNADU	MADURAI	9876543210	12A, NEHRU...				
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									



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6. CONCLUSION

In this paper, we presented application software designed for the recognition of car number plate. Firstly we extracted the plate location, then we separated the plate characters individually by segmentation and finally applied template matching with the use of correlation for recognition of plate characters. This system is designed for the identification TamilNadu license plates and the system is tested over a large number of images. The system works satisfactorily for wide variation of conditions and different types of number plates. The system is implemented and executed in MATLAB and performance is tested on genuine images. The system works quite well however, there is still room for improvement. This system can be redesigned for video capturing car license plates .

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