AUTOMATIC NUMBER PLATE RECOGNITION: AN APPROACH

Mohammad Humam*, Simon Ghimiray**, Megha Bhardwaj*** A.K.Bhardwaj****,

* B. Tech. (EE), SHUATS Allahabad,

** B. Tech. (EE), SHUATS Allahabad,

*** M. Tech. (CS), GBU Greater Noida

*** Professor, (EE), SHUATS Allahabad

ABSTRACT

ANPRANS (Automatic Number Plate Recognition by Accessing Number of Softwares) is a unique approach to this tech world where recognition and tracking will be a matter of just one click. Surveillance was limited up to identification of few vehicles and due to this, surveillance was very poor on roads, so a digitalized approach is required to enhance information sharing with authentication. In this paper we have accessed several softwares from MATLAB from capturing the image to processing it, to give final information from any kind of database. MATLAB is utilized as the programming software for capturing image (accessing camera from wired or even wireless connection, whichever is available by default), characters are being recognized using morphological image processing, recognized characters are than transfer in a notepad window, followed by the popping of encrypted database, after the decryption of database the program searches for the match of extracted number plate and the database(vehicle number column), if the match is found, the corresponding column containing details linked with that particular vehicle number is acquired and printed in new notepad popup. A GUI (Graphical User Interface) is used to design the app to be more convenient to users.

1.Introduction

As the world grows towards technology and science then strong security features is needed for every arena from a small room up to a big country, so this system has a big role in security features. Our system can capture the image of a vehicle and focuses on no. plate and morphologically process the image to give it in a text form followed by accessing both online and offline data to give the owner's detail.

MATLAB is wide range programming software that can access different applications on the systems. It has image processing unit by which images can be filtered and objects in the images can be collected according to the requirement, several commands are used to read and write the text in other applications and authorizing them to popup, when the program is being compiled.

2. METHODOLOGY

The license plate recognition process can be roughly divided into three steps, Plate Localization, Character Segmentation and Character Recognition. Each step will be carried out by an independent module. An input image submitted to the system is first examined and processed to obtain the vehicle license plate region, then the plate region is process to locate each individual digit and character, these are then submitted to the final Optical Character Recognition (OCR) process to determine the identification.

The MATLAB platform is optimized for solving engineering and scientific problems. The matrix-based MATLAB language is the world's most natural way to express computational mathematics. Built-in graphics make it easy to visualize and gain insights from data.

For a vehicle on road the camera system must be capable of detecting the proper focused image of the number plate while a vehicle is in motion. Infrared cameras can detect the number plate even in the presence of high intensity headlights used oftenly at night. The camera capability of rotating 360° and autofocus features is the basic requirements to run this project on road.

Mathematical Morphology is set-theoretic method for analysing the image and extracting image components that are useful in the shape representation and extraction of geometrical structure. They are used to detect boundaries of objects, their skeletons, and their convex hulls. These are the basic operations that has to be carried over for any image pre- and post-processing techniques, that include edge thinning, thickening, region filling ,pruning etc.,. The following operations form the basis of mathematical morphology.
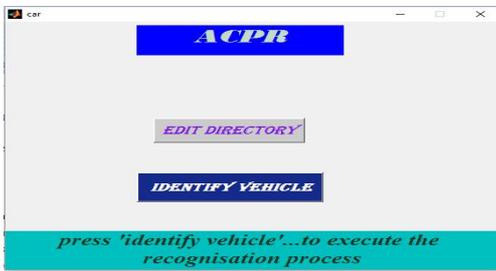
GUI window
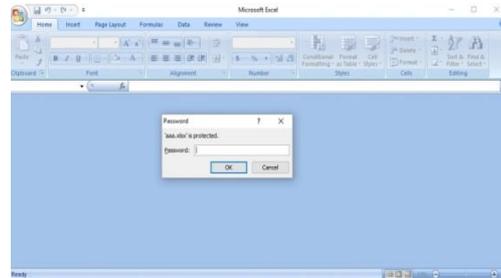
Editing window
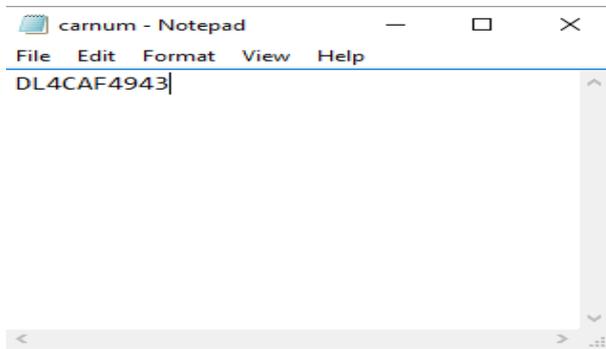

Captured Image

Morphological Image

Classified Image

The characters are individually selected and compared with predefined alpha-numeric templates for character recognition, followed by printing the complete set of plate in a pop-up notepad window.
Protecded database is displayed which requires appropriate decryption to access the details.


Extracted numbers

Protected Database

The user can recognize the details by him/herself, but this is a seldom case. Rather than this the MATLAB program access the extrated number, compares with the column of database containing list of numbers, and displays the corresponiding details in a new pop-up notepad window as shown below.The secured database can be altered as per requirement,but after successful decryption.
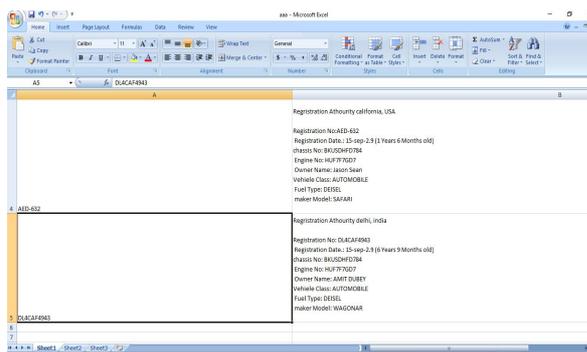
Opened Database

Popup Details

3.RESULT

The tests were conducted on 8 images taken with the help of 13mega pixels android digital camera and MATLAB R2013b software was used for the experiment. About 90% of the number plates were localized correctly and 10% images resulted in the localization of number plates along with unwanted non candidate regions, because of the damage in the number plates. Except for the unwanted regions, the algorithm works robust under different illumination and brightness. Experiments have been performed to test the proposed algorithm and to measure its accuracy. The system is simulated in MATLAB for Indian license plates for the extraction, segmentation and recognition of range plate. Colour pictures were used for testing the techniques with size upto 2048 x 1536. The pictures were taken of various colour and variable sized range plates. The gap between the camera and the vehicle varied from 3 to 7 meter.

It is shown that accuracy for the extraction of plate region is 96%, 94% for segmentation of the character and 95% looking forward to recognized characters. The system performance may be outlined because the product of all unit's accuracy rates. Thus overall accuracy of our system is 95%.

4.CONCLUSION

The online and offline accessing of the database is now more secured and the digitalization reduces operator's errors.The GUI of the program is quite simple and easy to use.Thus in click the data can be edited or viewed using appropriate authentication. Earlier only image capturing was done for identifying the vehicles and this has many type of limits, image details were sent manually for verifying the vehicle number and this uses to take a lot of time. Database accessing modifies this approach without man. It provides online as well as offline database accessing with designated securities.

5.FUTURE SCOPE

In future it can be developed by installing variouus features from different fields such as GPS tracking(live satellite images) in vehicles, face recognition system in cameras(for driver identification), linking cellphones and repective vehicles and voice tracking from near by sources. By using this idea we can create face Recognition system to identify driver, to whom the vehicle is being registered.

Global Prositioning System(GPS) and unique barcode allotement system can also be implented in the vehicle for advanced tracking and monitoring purpose, which will definetly improve the administration of National Highways Authorities (NHA) and provide a better crime control in all kind of scenarios. If someone changes the car to escape from law, his/her voice can be tracked not only by his/her cellphone but even from the near by online celullar devices. Once the target is identified, all the cameras (ATMs,streets,banks,shops,etc.) can be aligned in such a manner that the target can't get the rid out of the surveillance.

Thereby, imposing a crack over the common idolums, making perfect crimes just a myth.

References

[1]. Abd Kadir Mahamad, Sharifah Saon, and Sarah Nurul Oyun Abdul Aziz (2014), "A Simplified Malaysian Vehicle Plate Number Recognition", Recent Advances on Soft Computing and Data Mining, A conference by Springer International Publishing Switzerland DOI: 10.1007/978-3-319-07692-8_36, pp 379-388

[2]. G. T. Sutar1 ,Prof. Mr. A.V. Shah (2014), "Number Plate Recognition Using an Improved Segmentation", International Journal of Innovative Research in Science, Engineering and Technology ISSN: 2319-8753, Vol. 3, Issue 5, pp 12360-12368

[3]. Hanit Karwal, Akshay Girdhar (2015), "Vehicle Number Plate Detection System for Indian Vehicles", IEEE International Conference on Computational Intelligence & Communication Technology, **ISBN:** 978-1-4799-6023-1 **DOI:** 10.1109/CICT.2015.13, **INSPEC Accession Number:** 1503489213-14 Feb. 2015, pp 8-12.

[4]. KazukiMaeno, Hajime Nagahara, Atsushi Shimada, and Rin-ichiro Taniguchi (2013) "Light Field Distortion Feature for Transparent Object Recognition", Computer vision foundation, IEEE explore, 2013, pp 2786-2793.

[5]. Kuldeepak, Monika kaushik and Munish Vashishath (2012), "License Plate Recognition System based on Image Processing Using Labview" International Journal of Electronics Communication and Computer Technology (IJECCT) ISSN:2249-7838, Volume 2 Issue 4, pp 183-188

[6]. Muhammad Tahir Qadri, Muhammad Asif (2009), "Automatic Number Plate Recognition System for Vehicle Identification Using Optical Character Recognition" International Conference on Education Technology and Computer. **ISSN:** 2155-1812, **DOI:** 10.1109/ICETC.2009.54, **INSPEC Accession Number:** 10792318, 17-20 April 2009, pp 335 - 338

[7]. Amar Badr Mohamed M. Abdelwahab, Ahmed M. Thabet, and Ahmed M.Abdelsadek (2011), "Automatic Number Plate Recognition System", Annals of the University of Craiova, Mathematics and Computer Science Series, ISSN: 1223-6934, Volume 38(1), pp 62-71.

[8]. Markus Friedrich Prokop Jehlicka Johannes Schlaich (2008), "Automatic Number Plate Recognition for the Observance of Travel Behaviour" 8th International Conference on Survey Methods in Transport, France, May 25-31, 2008. pp 01-17

[9]. M. Egmont-Petersen (2002), "Image processing with neural networks", Volume 35, Issue 10, pp 2279–2301

[10]. Mu-Liang Wang Yi-Hua Liu Bin-Yih Liao, Yi-Sin Lin, Mong-Fong Horng, "A Vehicle License Plate Recognition System Based on Spatial/Frequency Domain Filtering and Neural Networks", International Conference on Computational Collective Intelligence, Springer, Berlin, Heidelberg, ISBN 978-3-642-16696-9, DOI: 10.1007/978-3-642-16696-9_8, Volume 6423 pp 63-70.

AUTHORS

Dr. A.K. Bhardwaj received his Ph.D. degree in 2011 after completed his M. Tech from IIT Delhi (India). Presently working as Professor with SHUATS, Allahabad (India). He has published more than 80 papers in national and international journals. His research interest is in the field of Power Mangement, Power Electronics with software technologies.

Megha Bhardwaj completed her Master of Technology in Computer Science from Gautam Buddha University, Greater Noida in 2016 after obtaining her B.Tech. in Computer science and Engineering from SHUATS, Allahabad. Her research interest is in the field of Net Working and Data structure.

Mohammad Humam, is Bachelor of Technology in Electrical and Electronics Engineering from SHUATS, Allahabad. Completed this work in his final year project. His field of interest is research with software programming.

Simon Ghimiray, Bachelor of Technology in Electrical and Electronics Engineering from SHUATS, Allahabad. Completed this work in his final year project. His field of interest is research with software programming.