



Implantation of “Automatic License Plate Recognition with Email”

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ABSTRACT:- License Plate Recognition was a computer system that recognizes any digital image automatically on the number plate. This system includes various operations such as taking pictures, localizing the number pad, truncating characters and OCR from alphanumeric characters. The main idea of this system is to design and develop effective image processing techniques and algorithms to localize the license plate in the captured image, to divide the characters from that number plate and to identify each character of the segment by using the Open Computer Vision Library. This has been implemented in K-NN algorithm and python programming language. Many applications can be implemented by using this system, such as security, highway speed detection, violation of light, identification of handwritten text, discovery of stolen cars, automatic fee collection systems.

Keywords: License plate, Computer Vision, Pattern Recognition, Python, OCR, Email.

I. INTRODUCTION

People from different countries interact in a multicultural environment to develop solutions to never-ending problems for men. The Open Source section is a one of the outstanding contribution in the scientific world is Python. Computer vision in the Intel's research has been producing a fruit called Open Computer Vision (Open CV), which can support the development of computer vision . At present, the use of vehicles is increasing throughout the country. All of these vehicles have a unique vehicle identification number as their main identifier. The ID is actually in the license number that refers to a legal license to participate in the public movement. Each vehicle in the world must have its own number plate that must be installed on its body (at least on the back). They need to identify the vehicles are increasing in parallel with the number of vehicles. This identification system helps with safety, automatic switching systems, highway speed detection, light detection, stolen vehicle detection, and human and non-human loss collection systems. The auto license plate recognizing system replaces the manual license plate number writing process in the computer system.

The scientific world is deploying research in intelligent transportation systems which have a significant impact on lives of people. Automatic License Plate Recognition (ALPR) is a computer vision technology to extract the license number of vehicles from images. It is an embedded system which has numerous applications and challenges. Typical ALPR systems are implemented using proprietary technologies and hence are costly.

This closed approach also prevents further research and development of the system. With the rise of free and open source technologies the computing world is lifted to new heights. People from different communities interact in a multi-cultural environment to develop solutions for mans never ending problems. One of the notable contribution of the open source community to the scientific world is Python. Intel's researches in Computer Vision bore the fruit called Open Computer Vision (OpenCV) library, which can support computer vision development..

II. LITERATURE SURVEY

S.Roy, A. Choudhury, J. Mukherjee. [1]The proposed a system to localization of number plate mainly for the vehicles in West Bengal (India) and segmented the numbers as to identify each number separately. This paper presents an approach based on simple and efficient morphological operation and sobel edge detection method. He also presents a simple approach to segmented all the letters and numbers used in the number plate. After reducing noise from the input image we try to enhance the contrast of the binarized image using histogram equalization. We mainly concentrate on two steps; one is to locate the number plate and second is to 1538 International Journal of Engineering Research & Technology (IJERT) Vol. 3 Issue 2, February - 2014 IJERTISSN: 2278-0181 IJERTV3IS20834 www.ijert.org segment all the number and letters to identify each number separately.

S. Du, M. Shehata, W. Badawy [2] Describe a comprehensive survey on existing (Automatic License Plate Recognition) ALPR Techniques by categorizing them according to the features used in each stage. Comparisons of them in the terms of Pros, Cons,

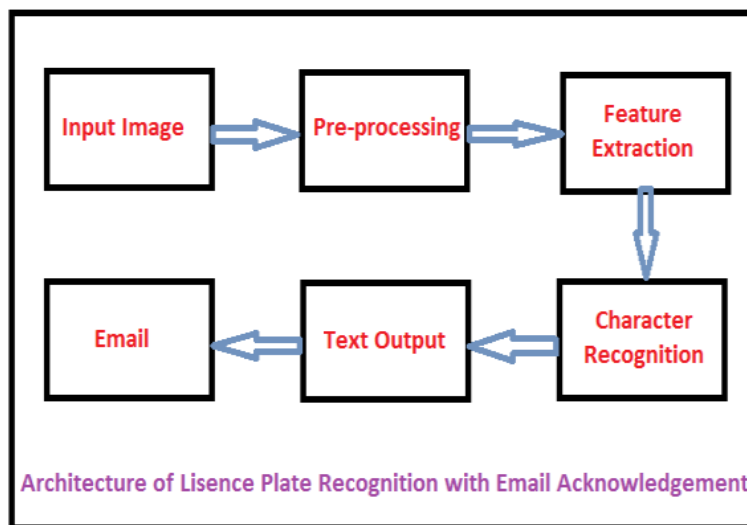
Recognition results, & Processing speeds were addressed. A future forecast for ALPR was also given at the end. The future research of ALPR should concentrate on multi-style plate recognition, video-based ALPR using temporal information, multi-plates processing, high - definition plate image processing, ambiguous -character recognition.

P. anishiya, prof. S. Mary Joans [3] focused a number plate localization and recognition system for vehicles in Tamilnadu(India) is proposed. This system is developed based on digital images and can be easily applied to commercial car park systems for the use of documenting access of parking services ,secure usage of parking houses and also to prevent car theft issues. The proposed algorithm is based on a combination of morphological operation with area criteria tests for number plate localization.

D. Jiang,T. M. Mekonnen,T. E. Merkebu,A Gebrehiwot.[4] Discussed paper presents about car plate recognition system.it describes, design algorism and future of implementation. The system has color image inputs of a car and the output has the registration number of that car. The system has three main steps to get the desired information. Those are plate localization, character segmentation and character recognition. First, the number of plate is extracted from the original image, then the characters from it are isolated, and finally each character is recognized. The algorithms were developed using a set of training images. The final program is capable of extracting the desired information in a high percentage of the test images.

Z. Xu, H. Zhu.[6] Presented an efficient and robust method of locating license plate is presented. The method makes use of the rich corner information in the plate area and the edge information of license plates. It can deal with more difficult location problems, especially with a license plate existing in a complicated background.

BLOCK DIAGRAM:



METHODOLOGY:

Input Image:-

The image of the license plates are captured using a high resolution photographic camera. A better choice is an Infrared (IR) camera. The camera may be rolled and pitched with respect to the license plates. Here, one can consider the already captured images. These can be downloaded from internet and prepare a simple database of images.

Pre-processing:-

Preprocessing is the set algorithms applied on the image to enhance the quality. It is an important and common phase in any computer vision system. For the present system preprocessing involves two processes: Resize– The image size from the camera might be large and can drive the system slow. It is to be resized to a feasible aspect ratio. Convert Colour Space– Images captured using IR or photo-graphic cameras will be either in raw format or encoded into some multimedia standards. Normally, these images will be in RGB mode, with three channels (viz. red, green and blue). Number of channels defines the amount colour information available on the image. The image has to be converted to grayscale.

Feature Extraction:-

Feature Extraction involves number of steps which are as follows:

i. Localize :-

Rear or front part of the vehicle is captured into an image. The image certainly contains other parts of the vehicle and the environment, which are of no requirement to the system. The area in the image that interests us is the license plate and needs to be localized from the noise. Localization is basically a process of binarizing the image. The image is converted to black and white. There are two motivations for this operation –1. Highlighting characters and 2. Suppressing background. Localization is done by an image processing technique called Thresholding. The pixels of the image are truncated to two values depending upon the value of threshold. Threshold requires pre-image analysis for identifying the suitable threshold value. Adaptive thresholding technique determines a local optimal threshold value for each image pixel so as to avoid the problem originating from non-uniform illumination.

ii. Connected Component Analysis:-

In order to eliminate undesired image areas, a connected component algorithm is first applied to the binarized plate candidate. Connected component analysis is performed to identify the characters in the image. Basic idea is to traverse through the image and find the connected pixels. Each of the connected components (blobs) are labelled and extracted.

iii. Segmentation:-

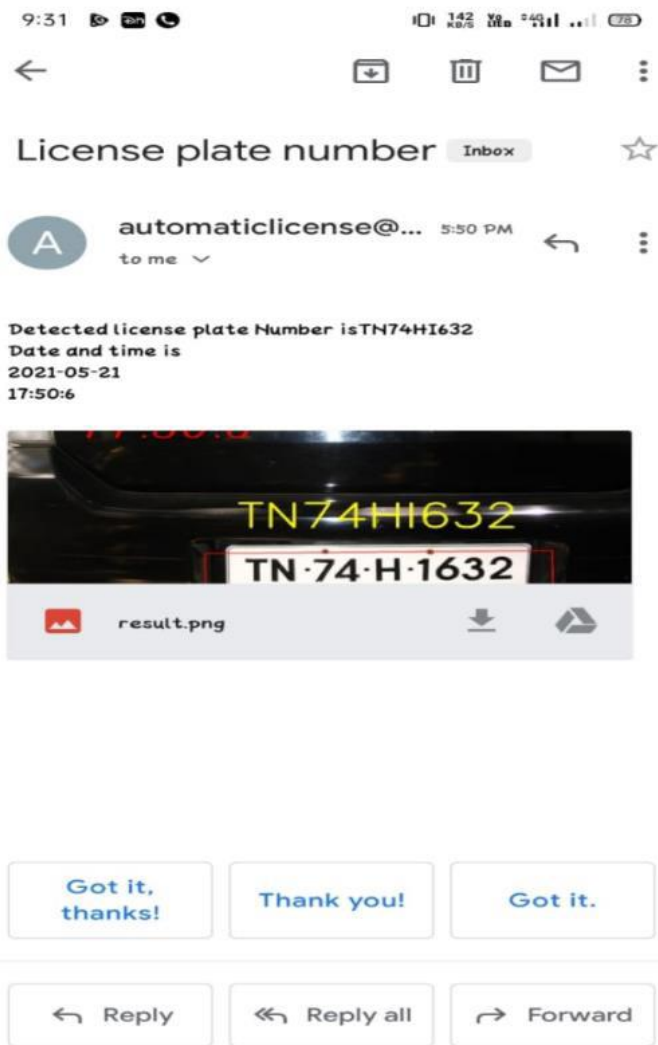
Segmentation is the process of cropping out the labelled blobs. These blobs are expected to be the required portion of the license number. A special algorithm called Image Scissoring is introduced here. In this algorithm, the license plate is vertically scanned and scissored at the row on which there is no white pixel and the scissored area is copied into a new matrix.

Character Recognition:-

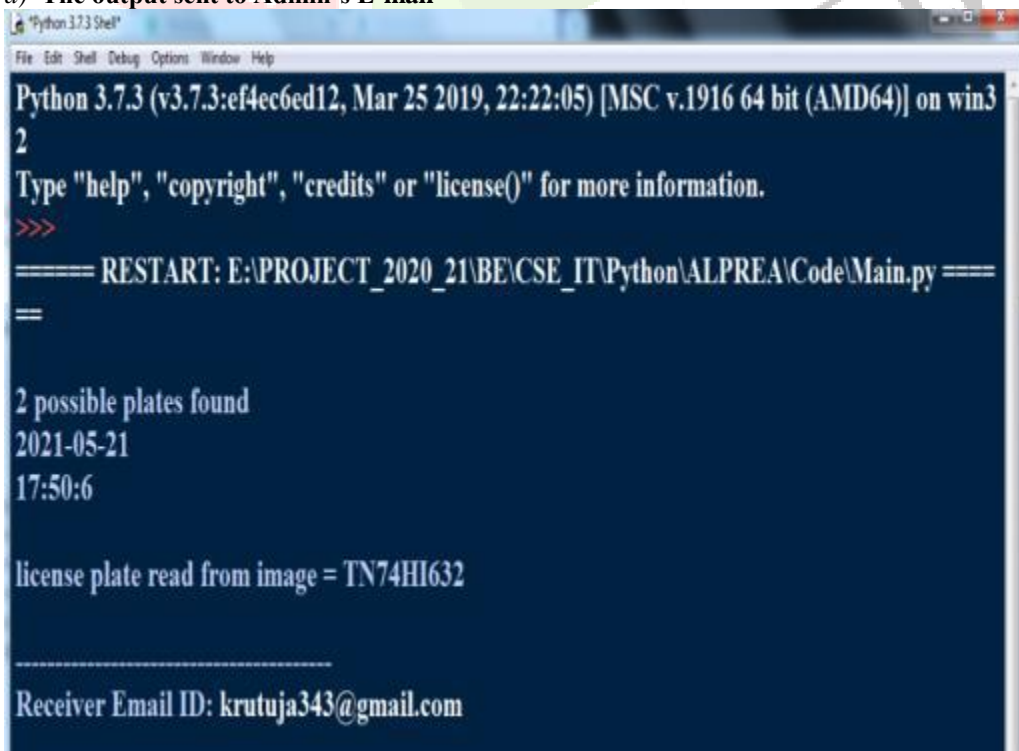
The selected blobs are send to Optical Characterp Recognition (OCR) Engine, which returns the ASCII of the license number. Save license plate in text format.

Email Acknowledgement:-

Finally, obtained text result is email to admin. For Email we use SMTP server.



a) The output sent to Admin's E-mail



(b) Output on Python shell



(c) The image sent on Admin's E-mail.

Facilities available:

Electronics Research Laboratory

Hardware:

Desktop/Laptop computer with following specification-

Processor : Core I3

Hard Disk : 500 GB

Monitor : 15 LCD

RAM : 2 GB min.

Software:

Operating system :- windows 7 and above

Technology : - Python IDLE

Library Facilities: E-Journals, IEEE

SCOPE :

The system can be used for security and monitoring. If the vehicle enters any restricted area its photograph will be captured via camera and sent through mail to the admin. It can be used in non-parking areas. It can also be used in restricted areas so that authorities get to know when any vehicle passes through the area and action can be taken. To provide easy access to information of license holder via Number plate of vehicle.

Conclusion

Scanning number plate sometimes goes unsuccessful by using the shape analysis method to detect exact area of the plate. Future extension of this work is to develop character recognition using template matching algorithm. Detecting number plate characters during night times work efficient but it gets inefficient in case of sunny time

Reference:

Reference [1] S. Uma¹, M .Sharmila²

Implementation of License Plate Recognition System in ARM Cortex A8 Board IJCEM

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www.IJCEM.org

Reference[2] N.Abirami¹, Dr. J.S.Leena, Jasmine² Accurate vehicle number plate recognition and Real time Identification using Raspberry Pi International Research Journal of Engineering and Technology (IRJET) Automatic Number Plate Recognition (ANPR) System for Indian conditions

Reference [3] Prathamesh Kulkarni (Student Member, IEEE), Ashish Khatri, Prateek Banga, Kushal Shah* *University of Pune, Dept. of Electronics and Telecommunication, India.

References [4] Pratiksha Jain , Neha Chopra, and Vaishali Gupta, “Automatic License Plate Recognition using OpenCV”, International Journal of Computer Applications Technology and Research Volume 3– Issue 12, 756 - 761, 2014. [2] Ankit Sharma, Dipti R Chaudhary, “Character Recognition Using Neural Network”, IJETT, ISSN: 2231-5381, Vol.4 Issue 4, pp 662-667, April 2013 [3] Youngwoo Yoon, Kyu-Dae Ban, Hosub Yoon, and Jaehong Kim,” Blob Extraction based Character Segmentation Method for Automatic License Plate Recognition System” Robot/Cognition System Research Department,IEEE.

