

NUMBER PLATE DETECTION USING RASPBERRY PI

IOT BASED NUMBER PLATE DETECTION

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ABSTRACT: - License Plate Recognition was a computer system that automatically recognizes any digital image on the platform. The method involves many activities, such as taking pictures, identifying the plate number, truncating letters, and alphanumeric character OCR. The key purpose of this program is to design and create efficient image processing techniques and algorithms to find the license plate in the captured image, separate the characters from that number plate and classify each section character using the Open Computer Vision Library. This has been applied in the programming language CNN algorithm and python. Many apps can be introduced with this method, such as surveillance, highway speed detection, light break, handwritten text recognition, stolen car discovery, automated fee collection systems. We are using raspberry Pi controller for more user friendly and GSM to capture user location. Every time the License Plate is detected, the system can open gate.

Gate opening used as a hardware part Servo Motor.

Keywords: Raspberry Pi, GSM, identifying the vehicle, number plate recognition, OCR optical character recognition.

I. INTRODUCTION

Within a multicultural climate, people from different countries collaborate to create solutions to endless problems for everyone. The section Open Source is one of Python's excellent contributions to the scientific world. Intel's work into computer vision has created a fruit called Open Computer Vision (Open CV), which can help computer vision development.

Currently vehicle usage is growing across the world. As their main identifier all these vehicles have a unique vehicle identification number. However the ID is in the identification number relating to a valid license to engage in the popular movement. Every vehicle in the world must have its own number plate which must be mounted (at least on the back) on its frame. They need to recognise that parallel to the number of vehicles the vehicles are growing. This identification system assists with protection, automatic switching systems, highway speed detection, light detection, detection of stolen vehicles and collection of human and non-human losses. The machine understanding auto license plate eliminates the method of writing manual license plate number in the computer system. The license plate identification technique consists of three main topics to get an acceptable personal recognition. They are, they find the place to Digital image screen, panel picture segmentation characters and digital object Recognition. The most prevalent and fundamental step is to determine the exact location of the number plate in the captured picture. Localization of a license plate was identified either by method of structural analysis or color analysis. Unwanted spots are deleted in the License panel area by parsing the related portion. ANPR is a collective control system recording the image of the vehicle and marking its license number. Many ANPR system implementations include automated traffic control and tracking system,



Figure 1.1: LPR

collection of highway toll / automatic parking systems, automation of fuel stations, flight time monitoring. Such systems automate the process of identifying the number of vehicle licenses, making it quick and cost-effective.



Figure 1.2: ANPR Processing

II. RELATED WORK

The quest for the identification of license plates remains an issue. This requires three major steps. We designate space for pad numbers, segmentation of characters and identification of characters. Every move suggested different ways of improving the performance. One of these methods [1] used the threshold of adaptation to highlight the characters and remove the context. A component algorithm is first applied to the converted binary image from the original panel, in order to remove unwanted image spaces. A special algorithm called Image Scissoring is used to separate the tesseract Optical Character Recognition Engine, which returns ASCII to the license number. The whole system was implemented with the use of open CV.

Another method[2] is deploying the method of forward background feed for classification of characters. Backward-propagation algorithm is used to develop the neural network. The preprocessing steps include standardisation, scale and edge detection. The horizontal and vertical graph and component survey can tackle the character fragmentation problem.

[3] Another way of choosing character areas is by binarization, the study of the related components. The method of point analysis eliminates undesired points and incorporates split points and split points. In character segmentation, this unit achieves an accuracy rate of 97.2 per cent. Recognition rate was 90.9 percent.

[4] Provides an approach based on an efficient morphological operation and the Sobel Edge detection process. This approach is simplified by using the Surround Box method to separate both letters and numbers used in the number pad. The corresponding strategy is used to identify numbers and characters after the prototype is broken. Using MATLAB, the whole framework was implemented.

[5] Provides an description of the study of related components and methods, such as aspect ratio analysis and analysis of pixel counts.

In [6] the author studies a comparison of four algorithms that use statistical properties sequentially, the algorithm Hough Transform and Contour, the approach to medium transformation and morphological processes and their results.

The handwritten text[7] is broken by the algorithm of the Watershed. Noise reduction, slope adjustment, budgeting, and standardization of pretreatment were removed. After fragmentation a reverse integer performs the process of removing a segmented image to transform the wavelet integer. Neuroscience is then categorized by grouping.

III. EXISTING METHOD

Methods for ANPRs such as Australia, Korea and several other countries have been introduced in several countries[1]. The numeric plate specifications are strictly applied in the implementation of the ANPR program in many countries. These use common features on the license plates, such as the panel lengths, board lines, letter and color characters, etc., to help identify the number pad quickly and to indicate the license number of the vehicle.

Standards for plates are rarely observed in India[2]. Font styles, texts, scale, position and number plate colors differ widely. For certain cases, the number plate includes extra unnecessary decorations. In addition, there are no special features on the Indian panel to promote recognition in various other countries. Therefore, the ANPR in India has not been commercially developed, and only manual device recording is currently being used.

IV. PROPOSED METHOD

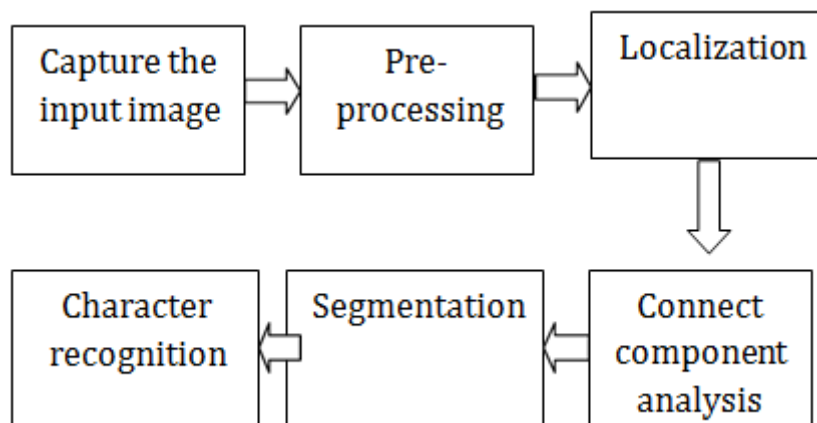


Figure (4) :block diagram of license plate

CAPTURE THE INPUT IMAGE:

A high-resolution camera takes the car's number pad. The resolution of the plate recognition method is dependent on the image that is captured. The RGB image needs to be converted into a gray image.

PRE-PROCESSING

Pre-processing is a series of image algorithms used to enhance the efficiency of transforming the gray image to a binary image. The image is smoothed to reduce noise before converting to a binary image. The threshold algorithm can be used for pre-processing. There is another form of threshold such as Global threshold Adaptive mean threshold Adaptive Gaussian threshold

V. NUMBER PLATE LOCALIZATION

A shape analysis or a method of color analysis is used to retrieve the license plate. The screen has a rectangular shape in the General License. Therefore algorithms look for rectangular geometrical forms. Many license plates in India are white or yellow, and color analytics can also be applied. The image must either be in a binary picture before locating the rectangle in an image or detecting the edges of the image. Then the correct rectangular corners should be identified and connected. In the final analysis all rectangular areas of interest are related and extracted with the package.

CONNECT COMPONENT ANALYSIS

The component algorithm connected to the binary filter is used first in order to remove the unwanted image space. To determine the characteristics in the image, the linked component is parsed. The basic suggestion is to cross the picture and find a pixel. Distinguish and remove each part (dots).

SEGMENTATION

Increasing character has to be broken once the license plate has been removed. To order to identify the related areas to binary digital images, the component mark for object division is used to look at the screen. The components label works by scanning the image from top to back in a pixel-in-pixel scan to identify linked pixels and related pixel cards.

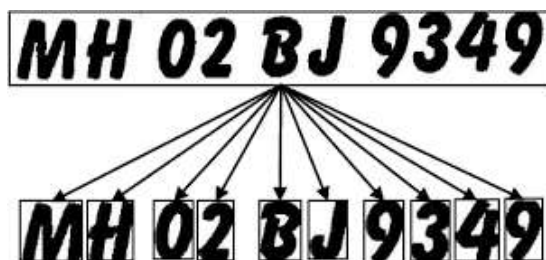


Figure (5): character segmentation

VI. CHARACTER RECOGNITION

In the license panel, the segment characters have to fit certain models which have already been developed to define characters. The license number is returned in ASCII format and stored in a text document by the identification process.

It's a two-way process in this recognition. In the first case, every word was tried to define. Every successful word is transferred as training data to the adaptive workbook. The adaptive workbook provides a chance for more detailed text learning.

VII. ALGORITHM PROCEDURE

- 1: Begin
- 2: Input: Original Image
- 3: Output: Characters
- 4: Method: K-Nearest Neighbors
- 5: LP: License Plate
- 6: Convert RGB image to Grayscale
- 7: Filter Morphological Transformation
- 8: Transforms Grayscale image to binary image
- 9: Filter Gaussian for Blurs image
- 10: Finding all contours in image
- 11: Search & recognize all possible character in image
- 12: Crop part of image with highest candidate LP
- 13: Crop the LP from original image
- 14: Apply steps from 6 to 11 again on crop image
- 15: Print the characters in LP
- 16: End

VIII. RESULTS



Figure [1] Input image



Figure [2] RGB to grayscale image



Figure [3] output of the contours



Figure [4] character recognizing



Figure [5] final output



Figure [6]Hardware Module

IX. Conclusion

The number plate scanning is sometimes failing through the method of form analysis to detect the accurate area of the plate. This work will be expanded to further improve character recognition using a corresponding algorithm for the prototype. Nighttime character counts are measured effectively, but in sunny weather, it is inefficient. Whenever the License Framework is detected, the machine responds to gate. Gate opening used as a hardware part Servo Motor.

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