

Real Time Vehicle License Plate Recognition

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Abstract: Real time Automatic License Plate Recognition system for vehicles plays an important role in Intelligent Transportation System (ITS). It is an important area of image processing which has numerous commercial applications. On Indian roads there are variety of number plate formats and variety of fonts are used in vehicles. In this dissertation, a smart, simple and efficient algorithm which is mainly designed for Indian license plate recognition is presented for vehicles license plate recognition system. License Plate Recognition (LPR) systems basically consist of 3 main processing steps such as: Detection of number plate, Segmentation of plate characters and Recognition of each character. This system is implemented on Raspberry pi hardware and simulated in MATLAB. The performance of the proposed algorithm has been tested on real car images. The proposed system is mainly applicable to Indian cars license plates. These paper proposed a real time vehicle license plate Recognition with the standalone approach with included an image processing using the Matlab.

I. INTRODUCTION

A license plate is the unique identification of a vehicle. The basic issues in real-time license plate recognition are the accuracy and the recognition speed. License Plate Recognition (LPR) has been applied in numerous applications such as automatically identifying vehicles in parking slots, access control in a restricted area and detecting. These paper proposed a real time vehicle license plate Recognition with the standalone approach with included an image processing using the Matlab

Real time Automatic License Plate Recognition system for vehicles plays an important role in Intelligent Transportation System (ITS). It is an important area of image processing which has numerous commercial applications like in car parking. On Indian roads there are variety of number plate formats and variety of fonts are used in vehicles. a smart, simple and efficient algorithm which is mainly designed for Indian license plate recognition is presented for vehicles license plate recognition system. License Plate Recognition (LPR) systems basically consist of 3 main processing steps such as: Detection of number plate, Segmentation of plate characters and Recognition of each character.

The system is main the based on the standalone approach by using the raspberry pi controller, we used Matlab Simulink for the standalone implementation of the real time application implementation of vehicle license plate recognition due to the portable handling component the installation and system complexity is less and have and low cost for whole system installation

II. LITERATURE

M.I. Khalil is proposed Car Plate Recognition Using the Template Matching Method segmentation recognition of individual character. But templatematching method does not need the "segmentation" process of input image [1]. Kaushik Deb, Hyun-Uk Chae and Kang-Hyun Jo used sliding concentric windows (SCWs) based on extract candidate regions by finding vertical and horizontal edges from vehicle region [2]. SVM Based License Plate Recognition System: is proposed by Kumar Parasuraman SVM is a supervised learning technique, which takes Statistical Learning Theory (SLT) as its theoretical foundation [3]. Lucky Kodwani, Sukadev Meher proposed Automatic License Plate Recognition in Real Time Videos using Visual Surveillance Techniques they used Gaussian mixture model then proposing a real time and robust method of license plate extraction based on block variance technique region-based approach. The recognition scheme combines adaptive iterative thresholding with a template matching algorithm [4]. Mr. G. T. Sutar proposed Number Plate Recognition Using an Improved Segmentation based on the image processing system. the system is simulated by using Matlab [5] [8]. Abhinav deo proposed recognition of licence plate and detection of optical nerve pattern using hough transform The global technique of detection of the features is Hough transform used in image processing, computer vision and image analysis [6] Dalal, Saprem, and Aaron D'Souza. "Automatic license plate recognition system." the dea with problem related with artificial intelligence, neural networks and machine vision so This system is based on the mathematical principle and algorithm [7].

From literature survey it has been observed that there are certain limitations about proposed algorithms like:

- Poor image resolution
- Less Accuracy

- Poor lighting and low contrast
- Higher Computational Cost
- Improperly segmented characters will result in misrecognized characters
- Lack of standards of the plate of the vehicles

Our Approach is to Deal the problem with the Earlier Systems to solved that problem and Achieve a highly efficient , Higher resolution Quality ,with greater Speed and High Accuracy

III.BLOCK DIAGRAM

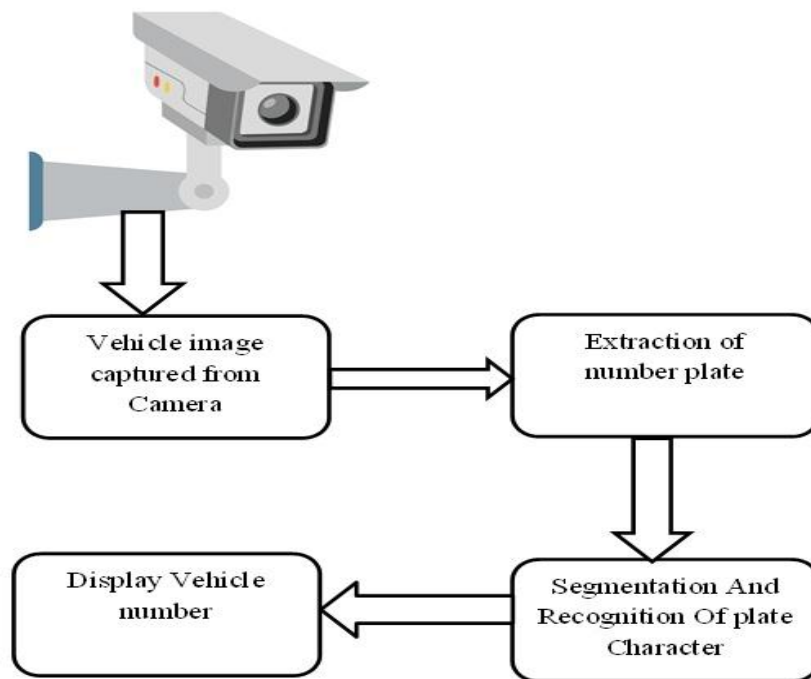


Fig 1 :Block diagram of Real Time Vehicle License Plate Recognition

The proposed system block diagram consist of

- Camera
- Vehicle image captured
- Extraction of number plate
- Segmentation and recognition of plate Character
- Display Vehicle Number

IV.HARDWARE AND SOFTWARE TOOLS

4.1 HARDWARE

The proposed system Hardware consist of

- Raspberry Pi-II module: The Raspberry Pi 2 delivers 6 times the processing capacity of previous models. This second generation Raspberry Pi has an upgraded Broadcom BCM2836 processor, which is a powerful ARM Cortex-A7 based quad-core processor that runs at 900MHz. The board also features an increase in memory capacity to 1Gbyte.
- PI-Camera: This 5mp camera module is capable of upto 1080p video and still images and connects directly to your Raspberry Pi. Connect the included ribbon cable to the CSI (Camera Serial Interface) port on your Raspberry Pi, 25mm x 20mm x 9mm and weighing in at just over 3g.
- Computer: The Computer is having an installed windows 7 OS and Matlab R2014a with simulink and supported packages.

- Power Supply: For the Raspberry pi it required power supply in between the 3.3v to 5.0v for their operating.
- Ethernet Cable: By using the Ethernet cable system is communicate with the raspberry pi board and the host computer.

4.2 SOFTWARE

- MATLAB R2014A
- Windows 7 compatible OS

V.IMPLIMENTATION

5.1 Interfacing of Raspberry Pi and MTALAB R2014A

Image processing is much easier by using the Matlab tool so use here Matlab tool software. Here we use raspberry Pi-II B+ model for our system implementation which is easily interface support with the MATLAB R2014a

- Matlab system requirements:
- (SDK)Software Development Kit (compiler) for Windows 7
- Netframe work (.NET 4 or higher version)
- MATLAB SUPPORTPACKAGE FOR RASPBERRY PI
- SIMULINK SUPPORTPACKAGE FOR RASPBERRY PI

5.2 Steps for Installing Packages

Stop-1:Open MATLAB and Click On Add-Ons and select Get hardware support package

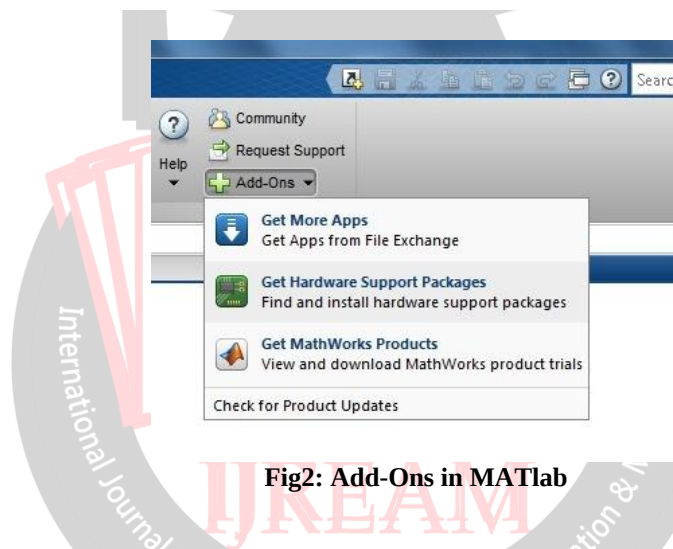
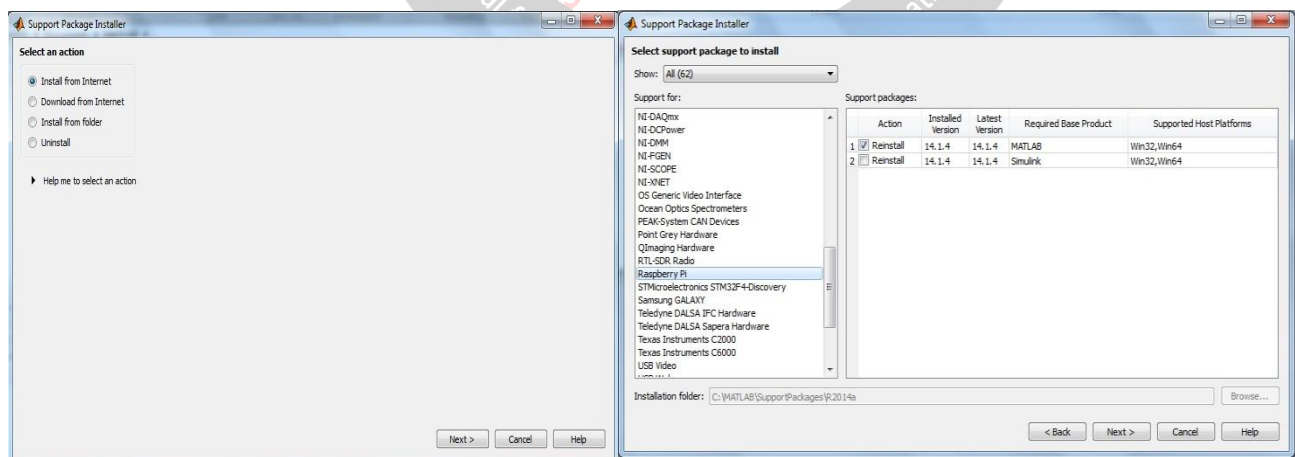
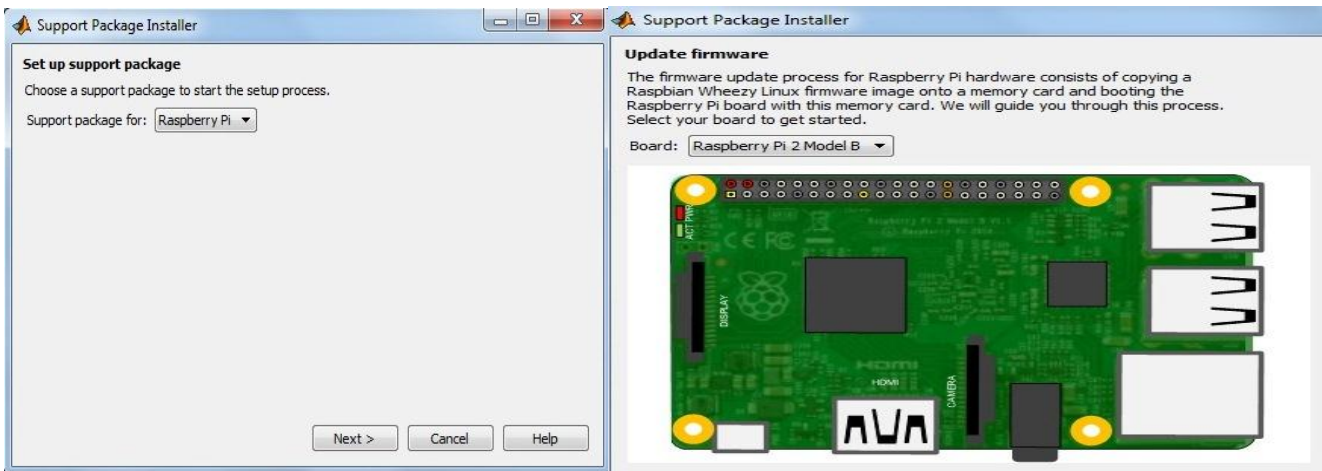


Fig2: Add-Ons in MATlab



Step 2: Select the Option as required we download it from the Mathwork official website so select install from internet and select MATLAB and Simulink both option

Step 3: Select the Support Package to install as Raspberry

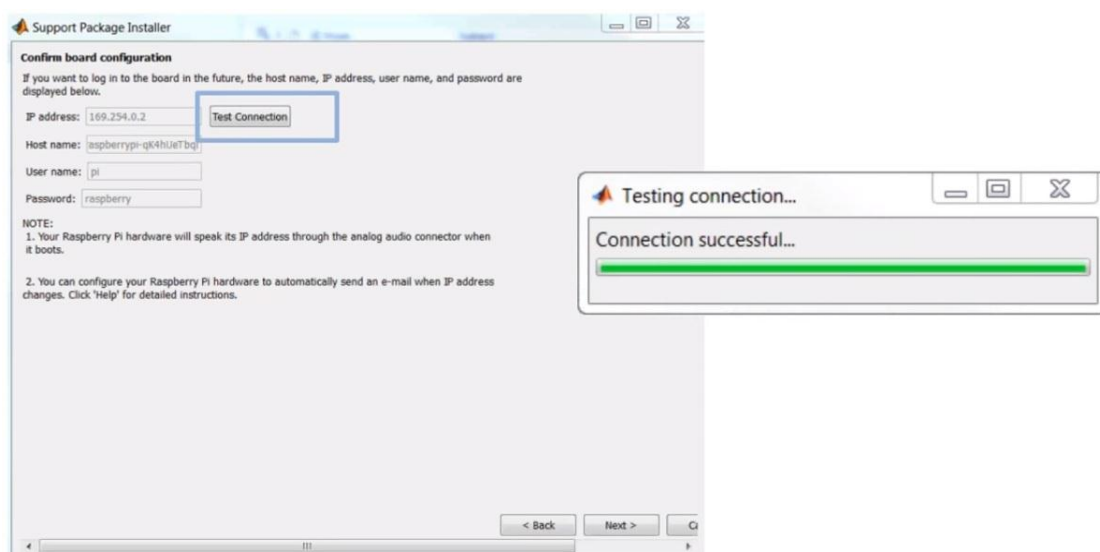


Step 4: After successful installation , Set up support for device so select packages for Raspberry pi for the Matlab support select the Device Raspberry pi 2-B



Step 6: Configure the Network as Direct Step 7: Insert memory card to to the computer the extract to Connection host computerthe Rasbian OS which is support for MATLAB

Step 8:connect the Raspberry pi Hardware to Host computer follow some instruction



Step 9: After connect test the connection

VI. RESEARCH METHODOLOGY

The entire system is work under the image processing here by using the Pi-camera image is been captured and then Matlab tool is perform the image processing operation on the captured image the flow of the entire system as

6.1. Flowchart:

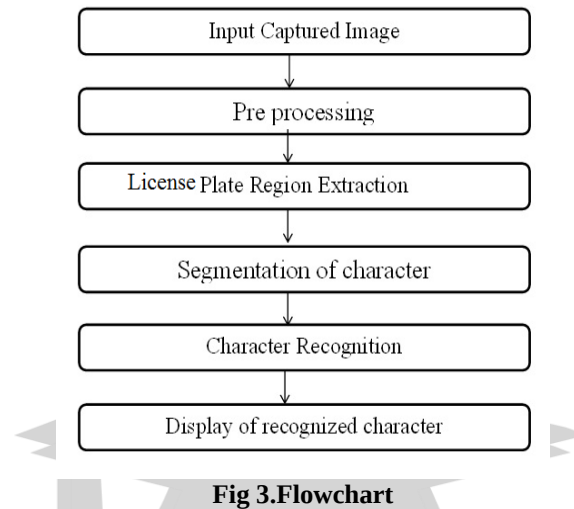


Fig 3. Flowchart

6.2 input Capture image:(Image acquisition) This first step is the capturing of an image using PI-camera vehicle from the video input ,images will be taken. and captured images will be stored as colour JPEG format .

6.3 Preprocessing: In the captured image there is noise is present that affect the system output so to remove these noise use gray Processing and median filtering. gray processing is convert the image in to the gray color format and by using median filtering the noise is removed

6.4 License Plate Region Extraction: The image is of the full front side of the vehicle among that we required only the license plate so for that purpose Bounding Box and Edge Detector are Used Edge detector will Detect the edge of vehicle and bounding box will make rectangle shape to high light the license plate

6.5 Segmentation of character: segmentation is subdivide the image into a character region or object that are segment are create for the each of character is present on the license plate

6.6 Character recognition: The OCR(Optical Character Recognition) is used to recognizedifferent character and digits. In this approach is based on pattern recognition principles. And system of OCR engine is based on a template-matching algorithm. The OCR database (0-9) number and (A-Z) ,(a-z) character are save as fix size template that template are compare with the segmented character image

6.7 Display of recognized character: The system is generate a text file as output to Display the recognized Character the output file is in the form of .txt

VII. RESULTS AND DISCUSSION

Project real time vehicle license plate recognition will achieves the Successfully interface Raspberry pi-2 module with the Matlab R2014a and its working with higher speed as compare to earlier system approach the data text file is generated as output display for the vehicle recognition of the character

The standalone execution of the system is been done by using the MATLAB Simulink the detail system result is shown below

7.1 Descriptive Results of work



Fig 4:Original Image



Fig 5- convert RGB in to gray

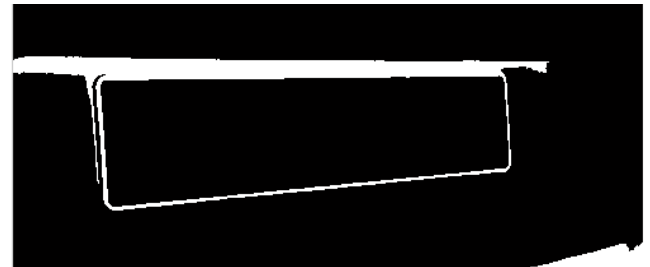


Fig 6-License plate Extraction



Fig 7- character segmentation



Fig-8-edge Detection of each charachetr

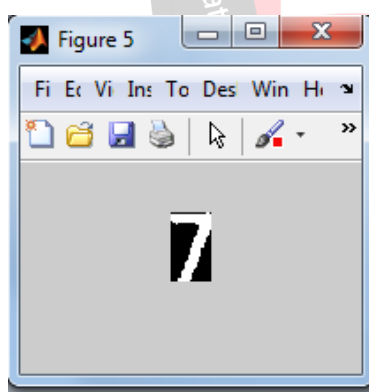


Fig 9- character recognition of each character

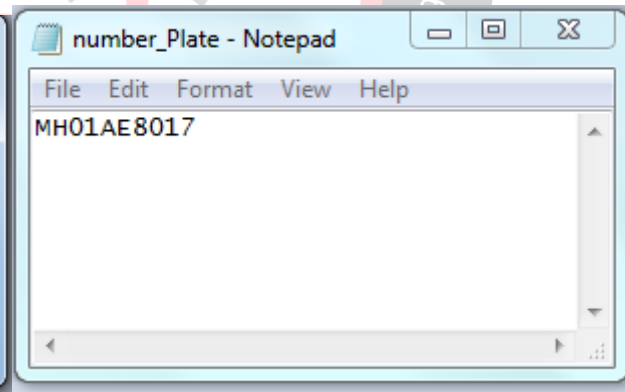


Fig 10- final recognized character as text output

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