

Raspberry Pi Vehicles Number Plate Recognition

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Abstract- The project's goal is to use a Raspberry Pi to automatically take a photo with the webcam while also identifying a passing car's license plate. Vehicle number plate recognition is a difficult but essential system. This is very beneficial for automating toll booths, automatic signal breaker identification locating traffic law infractions, and insurance checks.

Key Words: Raspberry pi, Number plate, Optical Character Recognition, Character Segmentation, Image Segmentation.

1. Introduction:-

Even though difficult, vehicle number plate recognition is an essential system. Automating toll booths, identifying signal breakers automatically, and identifying traffic law violators all benefit greatly from this.

Here, we propose an automatic license plate recognition system for the Raspberry Pi that makes use of image processing. The system uses a Raspberry Pi, an LCD circuit, and a camera. The system continuously looks for any signs of number plates in the incoming camera footage. The camera processes the camera input and eliminates the number plate portion of the image when it detects a number plate in front of it. uses OCR to separate the license plate number from the extracted image. The system then shows the extracted number on an LCD. So, using a Raspberry Pi, we propose a fully functional system for reading license plates.

This fully automated number plate recognition system employs image processing to find the number plate, which is then used for additional analysis. Digital image processing methods are used by this automatic system. This initiative aims to intelligently collect insurance and fines. In some nations, we have automated systems for collecting fines and insurance, but they are all expensive fixes, so in this country, we have put in place a budget-friendly monitoring system. a system for automatically identifying license plates. Following is a summary of the procedure. This instantly finds, identifies, and recognizes a license plate. After being captured, the image is processed using image processing methods. The detected license plate is also used to send emails, check fines, and fulfill other insurance and legal requirements.

2. LITERATURE SURVEY:-

This paper proposed the Electronic Toll Collection System based on RFID which has the advantages of less cost, small size, and high reliability. It is very suitable for practical applications with the rapid development of the national economy, the total mileage of expressways and vehicle population remain constantly increasing in china, accordingly, the expressway network has become more complex [1].

This paper proposed that, the double chance algorithm as an approach to car license plate extraction. The first algorithm extracts the line segments and groups them based on a set of geometrical conditions, using a real-life database collected by a speed enforcement camera, they obtained a high success rate of 99.5%, through a double chance approach with verification [2].

This paper proposed a method to detect Korean vehicle plates from black box videos. It works in two stages: The first stage aims to locate a set of candidate plate regions and the second stage identifies only actual plates from candidates by using a support vector machine classifier. Internet services that share vehicle Black Box videos need a way to obfuscate license plates in the uploaded video because of privacy issues [3].

The objective of this paper is to complete an automatic recognition system using OCR, they have used the existing closed circuit, television, or road rule for informant cameras or ones specifically designed for the task. The images of a vehicle's license plate are captured and processed by segmentation of character and are verified by the Raspberry pi processor authentication proposed [4].

The system aims at the designing system which captures the image of the vehicle number plate and these details were used by the Raspberry pi processor for authentication. The system also alerts the authorities when any unauthorized image of a number plate is detected using the buzzer alarm system. In this situation, LED indicators may even be used to signal number plate recognition. The camera records the number plate image whenever a vehicle passes by the system. The image of number plate details is fed as input to the Raspberry pi processor. The main objective of this paper is to provide researchers with an analytical inspection of Automatic License Plate Recognition research by assorting the

existing techniques according to the attributes they used. System based on number plate validation to control gate, LCD acknowledgment, and Email notification. The paper presents the algorithms for the localization of yellow color license plates using morphological operation, character segmentation using histogram and intensity projection, and optical character recognition using template matching. The traffic monitoring system by registration number identification is nowadays developed as a solution for traffic monitoring with the help of technology. In this instance, the laser and LDR sensors will detect the vehicles that are bouncing signals, and the camera will capture their images. The recognized registration number of a vehicle will be stored. Additionally, it gives the person doing the monitoring an SMS alerting system whenever no vehicle exceeds the brooking signal.

3. DESIGN & IMPLEMENTATION:-

The objective of this project is the Usage of image authentication technology, Capturing of Vehicle number plate details using the camera, unauthorized authentication and alerting through buzzer alarm, and Number plate recognition indication even through LED indicator.

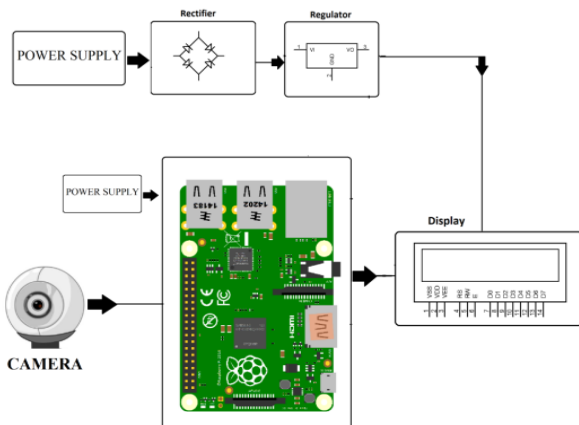


Fig 1: Block Diagram

The block diagram for recognizing licence plates on vehicles using a Raspberry Pi is shown in the above figure. The Raspberry Pi 3 serves as the system's brains, and we've installed Linux along with some crucial libraries and packages for text-to-image conversion, like open CV OCR. The Raspberry Pi is a Soc gadget. Here, we connect the camera to the Raspberry Pi via a port. The primary component of this system is the camera. The number plate image is automatically captured and converted into text using OCR and open CV as soon as the vehicle comes within range of an ultrasonic sensor. Then contrast the text with the current licence plate. If the number plate matches, a servo motor opens the gate; otherwise, a buzzer alerts the built-in operator that the vehicle is

unknown. Figure 1 depicts how the Raspberry Pi was used to carry out the recognition of vehicle licence plates.

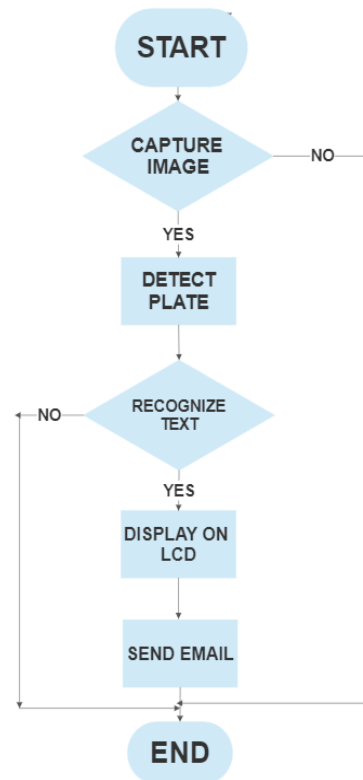


Fig 2: Flowchart

In this project, a DC power supply is utilized to provide the load with a constant DC voltage. It offers a DC power of 5 volts. Through the four USB ports on the board, it supports current flows of up to 2.5A, which is more than enough. The hardware that was used to create the suggested system is listed below.

1)Raspberry Pi 3: Raspberry pi is a credit card-sized single-board computer that was first developed in the UK by the raspberry pi foundation. Raspberry pi has a total of 40 pins of which 27 pins are GPIO (General purpose input and output) and the remaining 13 pins are used for VCC and GND. It is a minicomputer that has an inbuilt operating system, but it requires an inbuilt SD card for booting and long-term storage. Due to this drawback, one can use a desktop computer.

2)LCD DISPLAY: A display is made up of millions of pixels. The quantity of pixels in a display is often used to describe its quality; for instance, a 4K display is composed of 3840 x 2160 or 4096 x 2160 pixels. Red, blue, and green subpixels—commonly referred to as RGB—combine to form a pixel. A different color can be produced when the color combinations of the sub-pixels in a pixel change.

3)BUZZER: Buzzer is an electrical device that makes a buzzing noise and is used for signaling.

1. Provides 3 to 27 volts.

2. Provides sound in the range of 2 to 4KHZ

4)Camera: The Raspberry Pi camera was used to capture the image for this project. A 5Mp image can be captured by this camera.

1. Resolution of camera 5 Megapixel

2. It can produce static images with a resolution of 2592 by 1944 pixels and supports video in 1080p30, 720p60, and 640x480p60/90.

4. RESULT:-

In this project, the text is converted into characters and displayed on the LCD using the OCR technique. The system's effectiveness sets it apart from its rivals, particularly in cases where the cost of the application must be kept within acceptable bounds. This aids in the recognition and detection of vehicle license plates. The system makes use of a camera, an LCD circuit, and a Raspberry Pi. The technology continuously scans incoming camera footage for evidence of number plates. The camera analyses the camera input and eliminates the number plate section of the image when it detects a number plate in front of it.

5. CONCLUSION:-

The identification and detection of vehicle licence plates are both aided by this paper. Here, the emphasis is on identifying the locations of the characters, which can be done by utilizing the OCR method. There are several methods used to accomplish this. Cloud computing will be very beneficial for permanently storing data in the future.

6. REFERENCES:-

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