

Anti-terrorism Vehicle Authorization System

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Submitted: 01-05-2022

Revised: 04-05-2022

Accepted: 08-05-2022

ABSTRACT - The purpose of the project is to provide a robotized check post framework. When a vehicle approaches a check post, vehicle's number plate is captured in pi camera, connected with raspberry pi module. Vehicle's number is extracted from number plate with help of open CV and OCR (Optical Character Recognition). This extracted number, processed by the framework reflects the vehicle information like ID of vehicle and owner's details. If the vehicle information is authentic then check post gate is opened, Otherwise check post gate remains closed and a buzzer starts ringing which indicates an unauthorised vehicle is approached to the check post.

Key Words: Raspberry pi, Pi camera, Ultrasonic sensor, Servo motor, Buzzer, Open CV Library, OCR (Optical Character Recognition).

I. INTRODUCTION

These days, security is major concern at every level. The worldwide terrorism threats every country. Most of the explosive and illegal weapons are conveyed by the unauthorised vehicles in militant zones. Any unauthorised vehicle must be checked and not permitted inside. Now days, a manual checking of vehicle is not trustworthy totally. A manual checking of the vehicle may a security risk.

Thus, in this paper we propose an electronic framework which connects the raspberry pi 3 with the environment components like pi camera, ultrasonic sensor, servo motor and Buzzer. The Raspberry pi 3 is the name of a series of single-board computers made by Raspberry Pi Foundation, a UK charity in 2012. It comes with a 1.2GHz Quad-core ARM Cortex-A53 640bit CPU. The raspberry pi is head component of the whole framework. Generally vehicle license plate recognition is divided into several steps including image acquisition, license plate extraction, character segmentation and character recognition. When the vehicle arrives at the check post, Ultrasonic sensor senses the vehicle and the Image of the license plate is captured by pi camera and image is processed in

raspberry pi to extract the license number. The license number is matched with database of government and if identity of vehicle is authentic then servo motor opens the gate. A SD card in raspberry pi micro SD slot is used to store authentic license plate numbers and their identity. The process of image to text conversion is OCR (Optical Character Recognition) and Open CV software is installed in raspberry pi.

II. LITERATURE REVIEW

In this paper a system captures image of vehicle and identity is verified using Raspberry pi processor that there is no change in the original image and test image. If any unregistered vehicle is detected then system gives alerts to the computer using buzzer alarm system. Input to the system is taken as image of vehicle and the output is detected number plate .This paper consists of following processes: Coloured image to grayscale conversion, vertical edge detection using Sobel detector, converts non-linear image to linear image, opening-closing and dilation, vertical projection and thresholding, location of number plate, filtering the number plate and image enhancement, linearization and character segmentation for obtaining separate numbers. Linux operating system is used. Linux is an open source operating system. Here one can change codes and add programs [1].

This paper represents the following methods- In first method the pre-processing is done. In this the coloured input image is converted to the grey scale image which divides the image into number of pixels. Next the Detection of edges is done using canny edge detector where the edges of image are detected to reduce the discontinuities. Then the input image is dilated using morphological operator to increase the thickness of the number so that the number can be detected easily. Segmentation is done on the dilated image. It performs like the numbers of the plate is obtained separately. The segmentation uses template matching algorithm like OCR. Lastly the numbers are enhancing to get better desired image at output. The

camera should be of very high resolution so that the output can be of very high quality [2].

In this paper firstly the image is captured using pi camera and video is taken as input and captured images will be stored as colour jpeg format. The noise is present in the system. To remove the noise grey processing and median filtering is used. Grey processing is used to convert the image into grey colour format and median filtering is used to remove noise. For detecting the license plate region the borders of rectangular plate is detected using Bounding Box and Edge Detector is used to detect the edge of vehicle. After Extraction segmentation is done. Segmentation is used to separate the characters present in the license plate. The OCR is used to recognize different characters and Digits. After recognition the characters are displayed at output in the form of .txt [3].

III. PROPOSED ARCHITECTURE

In this proposed architecture, raspberry pi GPIO (General Purpose Input Output) pins connect the environment components.

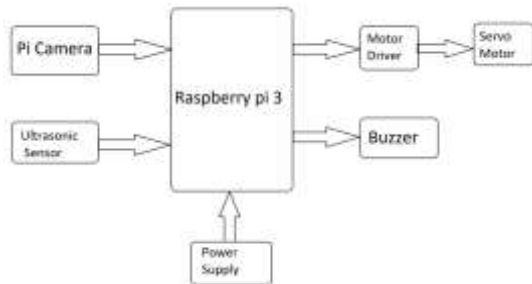


Fig -1: Block Diagram of proposed system

IV. OPERATION FLOW CHART

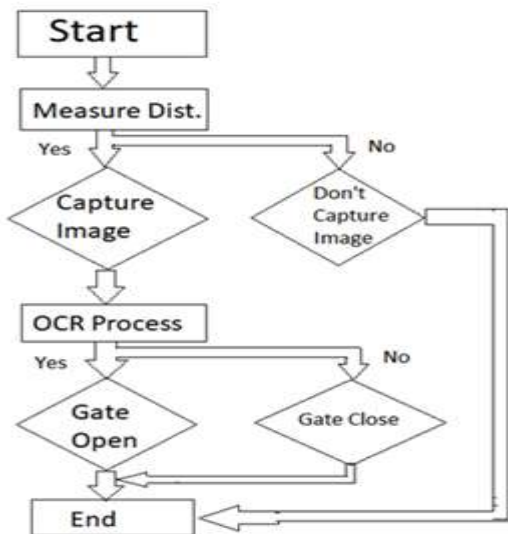


Fig -1: Flowchart of proposed system

V. PROPOSED COMPONENTS WITH THEIR FEATURES AND SPECIFICATIONS

5.1 Raspberry Pi

The Raspberry Pi is a series of small single board computers developed in the U.K. by the Raspberry Pi Foundation to promote teaching of basic computer science in schools and in developing countries.

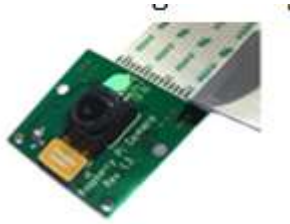
- 1Model: Raspberry Pi3 B
- Quad Core 1.2GHz Broadcom BCM2837 64bit CPU
- BCM43438 wireless LAN and Bluetooth Low Energy (BLE) on board.
- 1GB RAM
- 100 Base Ethernet
- Full size HDMI
- 40-pin extended GPIO
- 4 Pole stereo output and composite video port
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- Micro SD port for loading your operating system and storing data
- Upgraded switched Micro USB power source up to 2.5A



5.2 Pi Camera

The Raspberry Pi camera module is capable of taking HD 1080p photo and vide. In this framework, Pi camera is used to take image of vehicle.

- 5MP Omni vision 5647 Camera Module
- Still picture Resolution: 2592 x 1944
- Video: Supports 1080p @ 30fps and 640x480p 60/90 Recording
- 15-pin MIPI Camera Serial Interface – Plugs Directly into the Raspberry Pi board
- Size: 20 x 25 x 9mm
- Weight 3g



5.3 Ultrasonic Sensor

Ultrasonic distance sensor determines the distance to an object by measuring the time taken by the sound to reflect back from that object. A typical ultrasonic distance sensor consists of two membranes. One membrane produces sound, another catches reflected echo. Basically they are speaker and microphone. The sound generator generates short ultrasonic impulses and triggers the timer. Second membrane registers the arrival of the sound impulse and stops the timer. From the timers time it is possible to calculate the distance travelled by the sound.

- Model: HC-SR04
- Sensor Type: Ultrasonic
- Output: Digital Sensor
- Voltage: 5DC
- Detection Distance: 2cm – 400cm (0.04M – 4.0M)
- Static Current: < 2mA
- Level Output: high-5V
- High Precision: up to 0.3cm



5.4 Servo Motor

A servo motor is an electrical device which can push or rotate an object with great precision. In this system, Servo motor is used to open the gate of check post.

- Model: Tower Pro SG90 Servo
- 3 pole ferrite, all nylon gear
- Top ball bearing
- Operating Voltage: 4.8V~6.0V
- Operating Speed: 0.12sec/60 degree
- Output Torque: 1.6kg/cm 4.8V
- Dimension: 21.5 x 11.8 x 22.7mm
- Weight: 9gm



5.5 Buzzer

Buzzer is an electrical device that makes a buzzing noise and is used for signaling.

- Weight: 13.6gm
- Operating Voltage: 12V

VI. RESULT

The system is successful in recognizing the number plate of vehicles. The system is based on optical character recognition technique which converts the vehicle image into a text. If the text matches with stored data in SD card, the check post gate would open else remain closed and it will send an alert.

VII. CONCLUSIONS

The system is able to categorize the vehicles as safe or a security threat. The security issue, faced by many organizations can be resolved using OCR proposed system. It is most efficient and accurate to keep the records of all the vehicles. And the error rate in manual checking can be minimized. A robotized system not only provides ease of use also increases level of trust and accuracy.

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BIOGRAPHIES

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