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Automatic - Vehicle Validation System

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Abstract : Our project works on an AI processor to help humans by letting them know whether the vehicle is from the premises or not. When a vehicle enters the premises and stops at the entrance of the building, that time security guard instantly can confirm whether the vehicle is from outside or inside without going on the gate physically or seeing the vehicle. This unique system is what we require in India for buildings or industrial premises. RASPBERRY PI (1 GHz. Frequency) is there, it will take 100-200 mili-seconds to verify the vehicle number. No need to remember all vehicle no., it will store all the vehicle data in the database. One camera sensor will be connected to the raspberry pi to scan the number plate and give the data to the microprocessor to verify with the database. This is a technology that uses optical character recognition on images to read vehicle no. Data. Number-plate recognition can be used to store the images captured by the cameras as well as the text from the number plate.

Keywords - AI processor, Number-plate recognition, Raspberry PI, 1 GHz., Camera sensor & Optical character.

I. INTRODUCTION

Every property has a separate entry gate. When a vehicle arrives at the gate the security guard has to visually see and verify that vehicle and then goes to open the gate, this process takes time. (For small or medium scale property) Big tower or big commercial building or big industrial estate has too many blocks, it gets difficult to remember whose vehicle it is from inside and outside. We can't inform every time to the security guard who is newly shifted in premises or who sold their property. On large premises, it gets difficult to remember all the vehicle's number plates. Automatic vehicle validation system working on an AI (Artificial Intelligence) processor to help security guard whether the vehicle is from outside or inside of premises. When a vehicle comes from outside and stops at the entrance of the building, that time security guard can instantly recognize whether the vehicle is from outside or inside without going on the gate physically or seeing the vehicle. And by using this system, the security guard can instantly allow the vehicle in if a vehicle is from premises. This unique system is what we require in India for medium and large-scale buildings or industrial premises. In this paper, we will discuss the working, application, and advantages of the Automatic Vehicle Validation System.

II. PROBLEM DEFINITION

India there is not a proper vehicle validation system. What they are doing is like they are giving customized stickers for their own premises and that's not correct, people can duplicate the sticker and stick on their vehicle. And there are some people who don't want to stick that sticker on their vehicles because sometimes people don't like stickers or don't want to stick it on their front windshield. Every property has a separate entry gate. When a vehicle comes on the gate then the security guard can visually see and verify that vehicle and then goes there to open the gate, this process takes time. Sometimes security company changes or security guard changes so at starting he doesn't know who all are from the premises. (For small or medium scale property). Big towers or big commercial buildings or big industrial estates have too many blocks then it gets difficult to remember whose vehicle is from inside and outside. We can't tell every time to the security guard who is newly shifted here or who sold their property. For big buildings, it gets difficult to remember every bike no. and car no. because of too many vehicles. We need a fast validation system in India.

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2.1 Objectives

We need a fast verification system, also we need a database where all the vehicle registration numbers are their for-security guard. This system has to be very compact and light in weight, so it can be easily portable. The system can go asleep until a vehicle comes, so it will save electricity. It has to verify the data with the original database as fast as it can so once verification gets done then the security guard can open the gate.

III.   METHODOLOGY

Firstly, one Pi camera has to be installed at the entrance of the premises and has been connected with Raspberry Pi (Processor) with some long cables. Once it's connected with raspberry-pi then install OS (Operating system). by mounting (burn process) in it. Once OS gets installed in the processor then we can use it for coding purposes. Raspberry Pi can easily work on python codes by using Geany (Geany is a lightweight text editor that supports over 50 programming languages, so it can be used for almost anything related to coding. On Raspberry Pi, we can also use it as a text editor for anything else, as it's more powerful than the default text editor). Once a coding part is done then we have to connect 3 LED's (Green, Red & Yellow) & a buzzer to the processor for outputs.
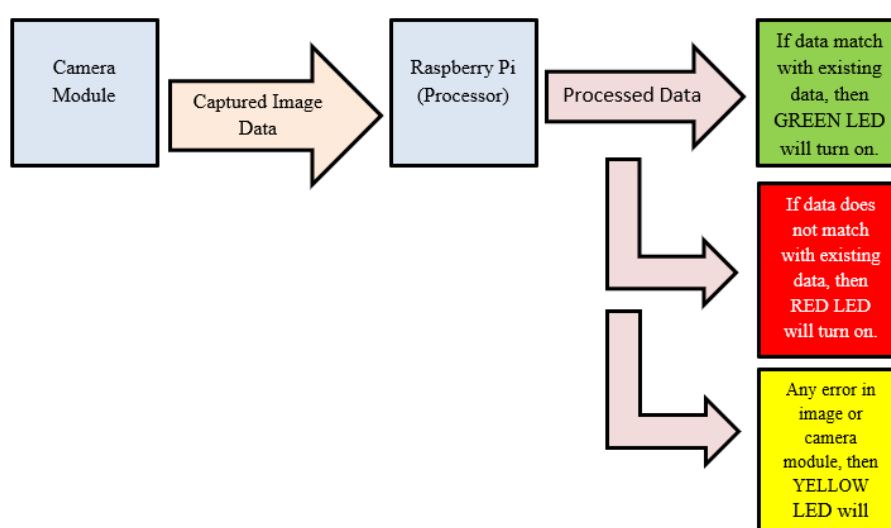
3.1 Market Survey

In the market, there are too many processors available for python coding like Micro Python, ESP8266, Banana Pi M3, Asus Tinker Board UDOO SA69 & Raspberry PI. We have found that Raspberry Pi processors are easily available in the market at a low price as compared to others. It has stable working and it can work on python language with its specifications.

For the selection of camera sensor, we first observed the real need for this project, we have to capture image data of a number plate of a vehicle, which means we just require image data of a tiny thing from that captured data so no need for HQ cams or higher MP. The processor will render the image data in black, white, yellow & red colors so it will get all the license plate digits.

For the selection of storage as in micro-SD card for the processor, we preferred SanDisk cards because of the warranty period and service of it.

3.2 Design

A camera sensor should be fitted where the vehicle stops outside of premises, so the camera sensor will capture a photo of it. It is connected to raspberry pi with the help of some cables, raspberry pi is located in a security cabin so the guard can see the indicating led. The design layout is shown below.

3.2.1 Design layout

3.3 Components

3.3.1   Raspberry Pi

The Raspberry Pi is a low-cost, credit-card-sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It's easily available on online websites and robu.com.

3.3.1 Raspberry Pi

3.3.2 Raspberry Pi Camera

The Raspberry Pi Camera Board plugs directly into the CSI connector on the Raspberry Pi. It's able to deliver a crystal clear 5MP resolution image or 1080p HD video recording at 30fps! It's also available on online websites and robu.com.

3.3.2 Raspberry Pi Camera

G-109

3.4 Cost Analysis

Cost analysis is currently a somewhat controversial set of methods in program evaluation. One reason for the controversy is that these terms cover a wide range of methods, but are often used interchangeably. There are too many vendors for different products so prices may vary. Cost estimation is all done on online purchase websites like robu.com, amazon &, etc.

Parts	Cost
Raspberry PI (Model 2 – B v1.2)	2,890/-
Raspberry Pi Camera Module (REES52)	350/-
Memory Card	250/-
HDMI Cable (For Testing Purpose)	120/-
Connecting Wires	20/-
LED's	30/-

3.5 Cost Analysis

IV. CONCLUSION

We have successfully managed all the assembly and started working on it. The pi camera sensor is working fine with a raspberry pi so will start coding part in python. The project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, and assembling doing this project work. We feel that the project work is a good solution to corporate and residential premises.

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