ADVANCEDTRAFFICVIOLATIONCONTROLA ND PENALTY SYSTEM USING IOT AND IMAGEPROCESSINGTECHNIQUES

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ABSTRACT:

The main aim of our project is to monitor if a vehicle violates the traffic signals and alsoto generate penalty for the respective vehicle registered person with the help of Raspberrypi. We are going introduce RFID (Radio frequency Identification). Technology as well asImage processing technology. Firstly, we are going to collect data with the help of RFIDwhichisusedtoscananynoticeabletagsthatareconnectedtovehiclessuchascars, bikes etc. We are using pi camera which is mounted on the traffic signals. This picamera is interfaced the raspberry Pi. The main of Pi camera is to continuously monitorthe vehicles which passes through the signal. Whenever A person or a vehicle breakstraffic rules especially when a vehicle jumps a signal, then this Pi will capture the pictureof the vehicle and which in turn sends mail to the vehicle owner with the captured imageand penalty. Operating systems and files are initially stored in the SD card which is thekey part of Raspberry Pi. Later storage can be extended with the help of many types ofUSBconnectedperipheral.

Keywords: RFID tag ,RFID detector ,Image Processing ,Raspberry Pi

LITERATURESURVEY:

T. Devi, K. Priya, and A. Deborah have proposed. Traffic flow analysis and violation detection system using RFID The primary goal of this project is to continuously monitor vehicles for running red lights. Additionally, it computes and updates the fine for cars that run red lights. RFID (radio frequency) technology is employed in this system to identify automobiles that jump signals.

S. Bharambe, omkar Dixit has proposed.Thissystemismainly introducedtodecreasetheaccidentRateand alsotoeradicatecorruption.Wheneveravehiclejumpsthesignal,itautomaticallycollectsthepenaltyfromthevehicleowner's account.

P. Chaudhary. & R. Yawl has introduced traffic violation and detection and penaltygeneration system at a sheet intersection. By using this system, traffic violated vehiclesare detected withthe help ofvideo processing techniqueswherevera vehicle evaluatesred signal and also violation of lane change, image is captured depending on movementtend,stop lineapproach andtrafficsignal status.

Kumar Sridhar Murthy and G. Govinda has proposed violation detection method forvehicular and Hoc Networking. The main aim of this system is to detect crossing speedlimits of a vehicle and also to analyze the behavior of the driver and to ensure that thedrunkendriver should notescape fromlawwhichisagainst thetraffic rules.

A.Y. Felix and A. Jesu doss has proposed monitoring using recognition. This system is proposed to ease the identification of vehicles when in largenumber. In this, Deep Neutral Network (DNN) is used for the classification of charactersandcomparethetextwiththepredefinedtablewhichiscreatedin MYSQL.

INTRODUCTION:

The electronics industry is more hyped now due to automation. The main justification for this hype is that automation offers more benefits than human interaction, including accuracy, energy efficiency, reliability, and more. Any one of the aforementioned requirements necessitates the creation of an automated device. In the current situation, having an energy dialogue is crucial, thus it should always be done to the fullest extent feasible. If we can manage the traffic lights on the highways by illuminating them in accordance with a time delay, we can effectively conserve energy.Therefore, in this scenario, we need consider a system that can sense the traffic density and should automatically be able to adjust the traffic levels by extending the period of time until the green light appears on busy roadways. This project's main objective is to use a Raspberry Pi to monitor traffic light violations and the associated punishment mechanism. Radio Frequency Identification (RFID) and image processing techniques are both utilised in this work. It is designed and run in a way that allows for the independent tracking of fines. Low-cost hardware was used in conjunction with RFID technology, passive tags, a processing unit (computer), and a communication system. Data collection using RFID, which scans any recognisable tags connected to cars, is a representation of the first level.A pi camera is put on traffic lights in this is connected to the Raspberry Pi to track vehicles continuously. When a vehicle violates a traffic regulation, especially a signal jump, a pi camera records the violation and mails the vehicle's image and penalty to the vehicle owner, further showing the vehicle's number on an LCD screen. Road accident avoidance and reduction will be aided by the idea presented in this title. A crucial component of the

Raspberry Pi is the SD card, which serves as the device's initial storage for files and the operating system. Several different kinds of USBconnected peripherals can increase storage.

TRAFFICVOILATION CONTROLANDPENALTYSYSTEM

In this project, we're using a Raspberry Pi camera to take pictures whenever a person driving a car or a car drives through a red traffic light. When a car travels past a traffic signal with a green or yellow light, it typically doesn't react. However, if a car passes by the signal while it is red, the Pi camera's and RFID tag reader will record the car's number. When a car violates traffic laws, the Pi camera snaps a picture of it, and that picture, along with the fine associated with the infringement, is emailed to the owner of the vehicle. Here, we're connecting a Raspberry Pi camera. Python is used to program the Raspberry Pi.On the 32GB memory card that is loaded into the Raspberry Pi, Python is used to code the device. In this, the first step is to load the OS, and the next step is to write the Python code. Once the code has been written, the output modules at the LCD, traffic signals, and pi camera will be controlled, and the traffic alerts will be sent.

BLOCKDIAGRAM:

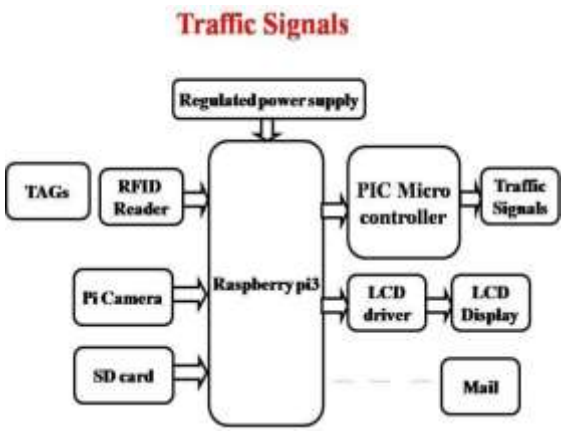
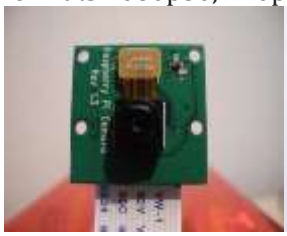


FIG 1: BLOCK DIAGRAM

We have interfaced LCD to the raspberry Pi at pin numbers 17, 27, 22, 9, 10, 11. Traffic signals au interfaced to the raspberry pi at pin numbers 5, 6, 19. Transmitting and receiving pins along with 23, 24 Pins of Raspberry pi are interfaced to the PIC 6F72 micro controller. Before the kit is turned on, we need to enable hotspot in our phone. Through the hotspotand data only the system will send the email alerts. We need to change some hotspot settings in our mobile phone whose data is given to raspberry pi. For that we configured our hotspot name to project5688 without any spaces or capitallettersand changedour passwordto 123456789. One more setting to be changedthat isap band should be changed to 2.4GHz. After successfully changing the settings, turn onhotspot in our mobile and login to the Gmail which we have coded inside the raspberry pi.RaspberrypiNow ON the power supply to the micro controller and raspberry pi. Raspberry pi will takearound 20-30 sec of duration for booting Successfully. After that the 3 traffic lights willon and off two times and LCD will display welcome message. We can see one device isconnected to your mobile phone hotspot. RFID data will be read from the EM18 RFIDeditormoduleandthesamedatawillbe sent to the Raspberry pi, throughserialcommunication.

Pi camera:

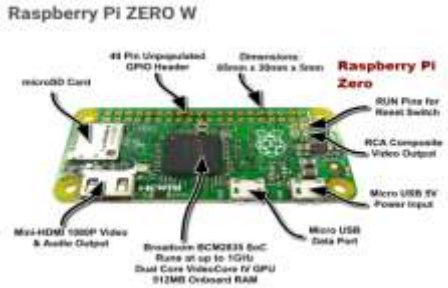
Both still images and high-definition video can be captured using the camera module. It supports still capture and the video formats 1080p30, 720p60, and VGA90. A 15-centimetre ribbon cable is used to connect it to the Raspberry Pi's CSI port.



Raspberry Pi

- Bluetooth 4.1,
- Bluetooth Low Energy (BLE)
- 802.11 b/g/n wireless LAN

- 1 GHz single-core processor
- 512MB RAM
- Micro USB
- On-The-Go (OTG)
- mini HDMI with micro USB power
- HAT compatibilityports40-pin header
- CSI camera connector,
- reset headers and composite video

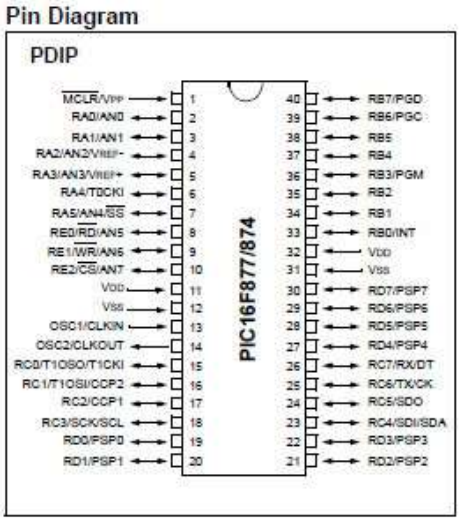


RFID Tag

RC522: 13.56 MHz RFID Reader/Writer with Cards Two S50 RFID cards and a 13.56 MHz RF reader/writer module using an RC522 IC are included in the kit. The MF RC522 is a highly integrated transmission module that operates at 13.56 MHz for contactless communication.

PIC Microcontroller:

A microcontroller is a tiny computer on a single integrated circuit that combines a very simple CPU with support features including a watchdog timer, serial and analogue I/O, a crystal oscillator, and timers. Additionally, initiatives involving science, advanced technology, and aircraft employ microcontrollers. Microcontrollers are made for specific, limited uses.For low-end PICs, there are roughly 35 instructions, whereas high-end PICs have about 80 instructions. The instruction set comprises instructions for conditional execution, programmer branching, the accumulator, a literal constant, or a register, as well as for performing various operations on registers directly.



LCD Display:

A compact, flat electronic visual display called a liquid crystal display (LCD) makes use of the capacity of liquid crystals to regulate light.The liquid crystal display is a crucial component of embedded systems. It gives the user a great deal of versatility because he can display any data he needs. These have a wide range of uses, such as in televisions, instrument panels, cockpit displays, aeroplanes, signage, and computer monitors.

CIRCUITDIAGRAM:

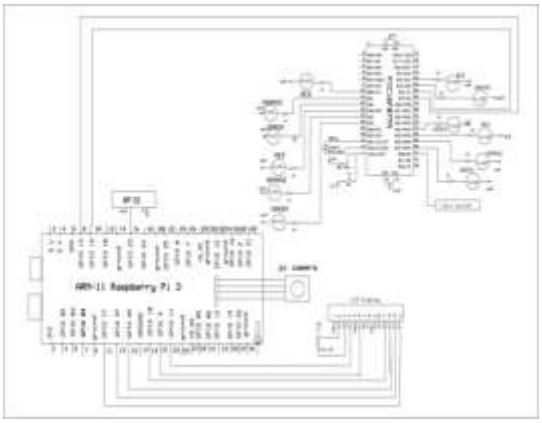


FIG 2:SCHEMATICDIAGRAMOFTRAFFICVIOLATIONCONTROLANDPENALTYSYSTEM

ThisSchematicdiagramexplainsabouttheinternalConnectionofhardwareEquipmentof Advanced traffic violation control and penalty system.Here We have PIC MicroController, RFID, Raspberry Pi, LCD display, Pi camera, traffic signal Lights, CrystalOscillator, Regular power supply. Traffic lights are connected at four sides of the PICmicrocontroller.Red,yellowgreenlightsareconnectedtoB0,Bl,B2Pinsofmicrocontrollerononeside.Red,yellow,greenlightsareconnectedtoC4, C5,D4pinsof micro controller on Second side. Red, yellow green lights are connected to b3, b4, b5Pins of microcontroller on third side. Red, yellow green lights are connected to D5, D6,D7 Pins of microcontroller on fourth side. Crystal oscillator isconnected to $13^{th}$and 14^{th}pins of PIC micro controller. 11^{th} and 32^{nd} pins of microcontroller are connected toregulated power supply. Reset button is connected to 1^{st}Pin and Raspberry Pi3 along withPiCamerais connected toC0 PinofPICmicrocontroller.

HARDWARERESULTS:

The pi camera will continuously monitor the vehicles. So whenever there is green or yellowlight of traffic signal, then the LCD will display "monitoring" text on the screen and picamera will not capture any image of any vehicle. But if any vehicle crosses the signalduring red signal, then the LCD will display tag number followed by vehicle number anda text "sending mail" on the screen. With the help of RFID, image captured by pi cameraand penalty for violating traffic rules will be sent to the respected vehicle registeredowner.

CONCLUSION:

Hence by using automatic traffic Violation control and penalty system will help to reduceaccidents and punish the people who does not follow traffic rules properly. It is veryuseful in today's world because of heavy traffic and increasing number of vehicles. Thissystem makes the work simpler and Easier. We can also extend this project with the helpof GSM modem. By using GSM modem, we can send additional information such asstatusof trafficdensity.andsignallightinformationtotherespective owners

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