

IOT BASED VEHICLE ANTI-THEFT DETECTION AND PROTECTION

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ABSTRACT

Now a days development in automobile sector has increased rapidly but in the same way it has become more difficult for the owners of the vehicles to protect these from professional thieves. This proposed system mainly aims to provide security to such vehicles by using facial recognition method. Though there are many vehicle guards that are available in today's market they do not prove to be a proper solution for customers problem. The main objective of this system is when an unauthorized person tries to start the vehicle the owner will be notified and the vehicle will not get start as well as the location will also be notified incase if the vehicle is stolen or tampered. This proposed system is built on raspberry-pi- microprocessor and a pi-camera, this is a very simple and low-cost method compared to the others.

Keyword: - Raspberry pi, pi-camera, Facial recognition,

1. INTRODUCTION

The main purpose of this proposed system is to provide better security guard to the car by using facial recognition method. This IOT based vehicle anti-theft detection and protection system provides us the real time application that can be applied in our daily activities of the drivers. We have also implemented anti-theft techniques that provides the major functions that are required in advancing the car intelligence and also to avoid vehicles from getting stolen from professional thieves. In the process of handing high security to vehicle system, we are using open CV with haar classifier because the data that is stored in the default system sometimes may not be matched though the driver is authorized because of uneven brightness on the face and irregular face. A modem that accepts the sim card and is operated just like a mobile phone. With the help of this modem the owner can get an alert message provided with the latitude and longitude data information. This project helps us to reduce the complexity and also improve the security. The result of this experiment shows that it takes few seconds to detect the image. This paper gives more information with more accurate results.

2. PROPOSED WORK

The advanced system that can be used to identify facial expressions and it can be utilized by the authorized users of the vehicles and only the authorized persons are allowed to use the vehicle. The system designed with an algorithm called as facial detection through which the identification of the driving person is done. Based on that result the vehicle ignition is controlled by the facial recognition. MemS sensors are also utilized in this project to detect the position. The prototype of this system is controlled by the Raspberry pi. When an unauthorized person tries to use the car, then the face of the person is scanned and checked whether the face is matched with the authorized person or not. In case if the face does not match the system with the trained data set and the process is denied and the buzzer makes a beep sound and automatically the doors are locked and proceeds with a IoT notification to the owner of the vehicle through a GSM module and location of the vehicle is detected with a GPS module. The Bluetooth is added into the system to be secured with unauthorized users.

3. METHODOLOGY

3.1 Block diagram

In this system both hardware as well as software mechanisms are being used in which the hardware system includes the power supply unit, raspberry pi, pi camera, dc motor, buttons and software parts includes python code that is dumped into the raspberry pi which is the main component of this security system. And in this way this system is utilized for the security purpose for the vehicle systems.

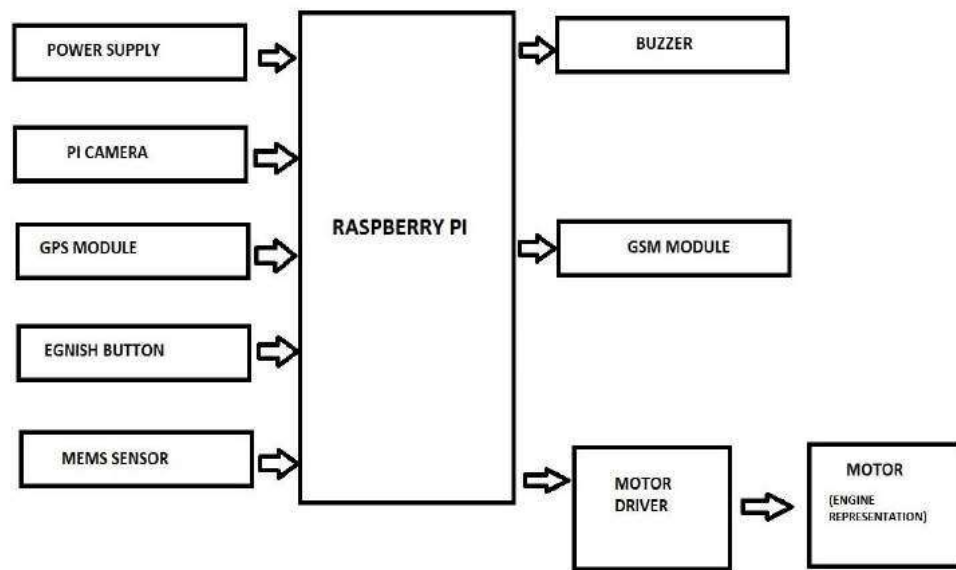


Fig-1: Block diagram

3.2 Flow chart

This technology is used for the identification and verification of the person with the different digital features. This program mainly used in the security systems in cars using the python code language. According to the program the persons face who is settled at the driver seat is captured using the pi camera. This captured image is divided into number of pixel values using the haar cascade classifier algorithm. With the help of that pixel values the captured image is compared with the trained data set. If the data is not matched with the trained data set then he is recognized as an unauthorized person and the buzzer makes a beep sound which alerts the person.

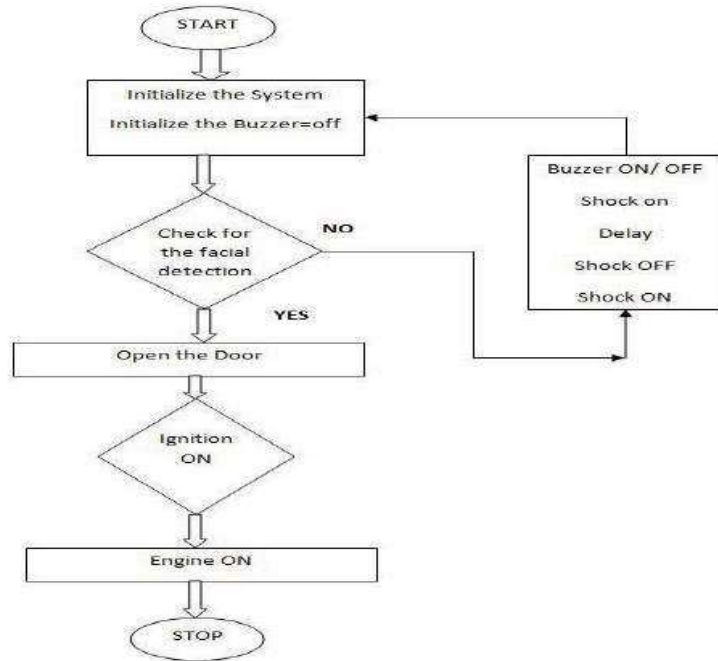


Fig-2: Flow chart

The position of the vehicle can be tracked and noted with the mems sensor. Automatically the engine of the vehicle doesnot start even when the person tries to start the ignition. The current location of the vehicle is sent through a message to the owners mobile phone. If the driver is authenticated the no alert is needed.

4. HARDWARE COMPONENTS

4.1 Power Supply



It is mainly used for the conversion of main AC to low voltage terminal DC supply and allows +5.1 micro supply and 2.5A power supply.

4.2 Raspberry Pi 3-model B+



The Raspberry Pi can run Linux which is a computer of credit card-sized with an ARM processor . Raspberry Pi 3 Model B+ has 1GB of RAM , dual-band WIFI , Bluetooth 4.2 , Bluetooth Low Energy (BLE) , an Ethernet port , HDMI Output , audio output , RCA composite video output , four USB ports . Micro SD card with an operating system is required for Raspberry pi . As compared to Model B , Model B+ has a faster clock speed and dual band WiFi .

4.3 Pi Camera



Pi camera is used to take pictures and high definition video . Pi camera is attached directly to Raspberry Pi Board which already has CSI (Camera Serial Interface) using 15-pin ribbon cable. Pi Camera can capture wide , still (motionless) images with resolution 2592*1944

4.4 Lock Systems



These Lock System only give access to authorized person . This allows front passenger to lock or unlock the vehicle. This lock system is fitted using electronic locking systems.

4.5 MemS Sensor



MEMS (Micro Electro Mechanical Systems). It is used in manufacturing of Sensors , Tranducers , Actuators , Gears , Pumps , Switches etc . It is a combination of electronics , electrical and mechanical elements , they use microsystem technology (MST) to work together for a single function . It is used to measure static acceleration gravity due to motion , shock or vibration .

4.6 Buzzer



It has 2 pin structure . It operates at 5v . Due to the result from GPIO pins the output voltage is about 3.3v. It has little strong volume which generally operates with switching circuit turn on to tuen off . We use this buzzer for highly automobile electronics and for communication equipments .We used this mainly in alarm devices , computer timers and confirmation of user .

4.7 Dc motor



It converts current electrical energy to mechanical energy . It operates between 1.5 volts – 100 volts or more . It is a rotatory electrical machine .

5. SOFTWARE

In this project we use PYTHON IDE and PYTHON CODE for the programming of raspberry pi microcontroller . Simulator software FRITZING is used for simulation.

6. EXPERIMENTAL RESULTS

- The training set consists of many number of different frontal images of the authorized to drive the vehicle as shown below:



The system very well identifies the possible drivers if they enter in to the vehicle, if the recognized face matches with the authorized one which is stored in the training data set, the vehicle will start soon after pressing the ignition button. We can also add n number of training data set to the system. If an unknown person such as shown in the fig below enters in to the vehicle, face recognition system recognizes him as a thief and informs the owner about the vehicle theft.

Result 01:



Fig.5 Image of an unauthorized person



Fig.6 Screenshot of the mail sent to the owner

7. CONCLUSIONS

This proposed system provides the real time application for the protection and detection of vehicles with the help of IOT notification wirelessly with raspberry pi camera and internet as its major components. It uses hybrid mechanisms such as Haar cascade algorithm for the identification and recognition of images that is captured by the pi-camera. The system is low cost, secure and highly efficient and thus can acts as a very good vehicle guard for the Automobile sector

8. REFERENCES

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