

Raspberry Pi Based Intelligent Car Anti-Theft System Through Face Recognition Using Fingerprint

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Abstract- major problem today for car owners is that they're in constant fear of getting their vehicles stolen from a standard parking zone or from outside their home. We are providing an ultimate solution for vehicle theft problem by using image processing. In this research, a system had been developed for Smartphone application with alert SMS and simultaneously system compares his or her face with database to see whether he's an authenticated driver or not. The owner is formed ready to perform car stopping through the message from his mobile. The GPS module in the car detects the location of the car so that the owner of the car can continue to monitor the safety of his car from a remote location. Without Authorized person of the car the car ignition system cannot be started. So theft prevention and recovery of car in an easier and faster by this system the identification of the thief and the location way. This proposed system has two components, the hardware and the software modules. The hardware component includes Raspberry Pi processor, GSM module, GPS module, camera, switch, motor driver and DC motor. Python language is used as a software component. In this system, we are developing low cost framework for car security system, which can contain FDS (Face Detection Subsystem), a GPS (Global Positioning System) module, and a GSM (Global System for Mobile Communications) module.

In this system when the user start the switch (Ignition) then automatically an image of that person send to the owner Smartphone application with alert SMS and simultaneously system compares his or her face with database to see whether he's an authenticated driver or not.

Keywords- SECURITY, GPS, GSM, FDS, key, DC MOTOR, BUZZER

I. INTRODUCTION

A major problem today for car owners is that they're in constant fear of getting their vehicles stolen from a standard parking zone or from outside their home. It is a system of vehicle theft detection for prevention of vehicle base on Image processing this will provide solution to the problem for vehicle

theft. In this research, a system had been developed for theft prevention and recovery of car in an easier and faster way. This proposed system has two components, the hardware and the software modules. The hardware component includes Raspberry Pi processor, GSM module, GPS module, camera, switch, motor driver and DC motor. Python language is used as a software component. In this system, we are developing low cost framework for car security system, which can contain FDS (Face Detection Subsystem), a GPS (Global Positioning System) module, and a GSM (Global System for Mobile Communications) module. In this system when the user start the switch (Ignition) then automatically an image of that person send to the owner of the car are simply smarter. Python language is used as a software component. In this system, we are developing low cost framework for car security system, which can contain FDS (Face Detection Subsystem), a GPS (Global Positioning System) module, and a GSM (Global System for Mobile Communications) module. In this system when the user start the switch (Ignition) then automatically an image of that person send to the owner Smartphone application with alert SMS and simultaneously system compares his or her face with database to see whether he's an authenticated driver or not. The owner is formed ready to perform car stopping through the message from his mobile. The GPS module in the car detects the location of the car so that the owner of the car can continue to monitor the safety of his car from a remote location. Without Authorized person of the car the car ignition system cannot be started. So by this technique the identification of the thief and therefore the location of the car are simply smarter.

II. RESEARCH ABOUT EXISTING SYSTEM

In an existing system Main aim of the system is to supply the safety to vehicle. If the vehicle is stolen, this technique is meant to retrieve the position of the vehicle and therefore the vehicle thief. There are two types of security systems are using 1) Face recognition using MAT Lab 2) Radio frequency identification (RFID). The proposed Embedded Car Security System captures the image employing a camera which can be

hidden within the dash board. Face Detection Algorithm is employed to detect the face. A database is created by taking the pictures of all the family members. A minimum of ten photos of each family member is taken. Using PCA algorithm the captured image is compared with already present images which is present in database. Once the captured face matches with the already present database Micro controller will allow user to swipe the RFID card, after swiping when card matches message will display on LCD and says that person is recognized so, it is clear that the vehicle is not stolen and one of the family members is using the vehicle. A message is sent to the owner of the vehicle stating “Match Found”. Otherwise, if the captured face and RFID card doesn't match with the database then the processor activates the GPS module and therefore the GSM module. to the owner of the vehicle. Also alongside the situation, the image of the driving force is shipped through MMS to the owner.

Disadvantages Of Existing System:

- 1) Once configured, these systems cannot be changed. Hence, no improvement or upgradation on the ones designed and created can be made.
- 2) They are hard to maintain. It is also difficult to take a backup of embedded files.
- 3) Troubleshooting is difficult for embedded systems. Transferring data from one system to another is also quite problematic.
- 4) Because these systems are made for specific tasks, hardware is limited.
- 5) Microcontroller is more costly.

III. ALGORITHM

FACE RECOGNITION TECHNIQUE:

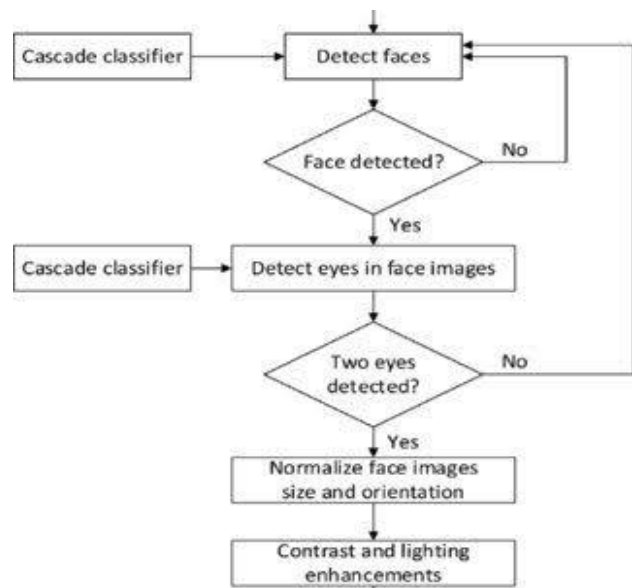
Verification or authentication of a facial image. It basically compares the input facial image with the facial image associated with the user which is requiring the authentication. In our project we have used Face Recognition Technique using Haar Cascade Algorithm.

Haar Cascade Algorithm:

- Step 1: Pick a pixel location from the image.
- Step 2: Now crop the sub image with the selected pixel as the centre from the source image with the same size as the convolution kernel.
- Step 3: Calculate an element wise product between the values of the kernel and sub-image.

Step 4: Add the result of the product. Dimensionalities In this paper we use PCA algorithm, the major advantage of PCA is using it in Eigen face approach.

Step 5: Put the resultant value into the new image at which helps in reducing the size of the database for the same place where you picked up the pixel recognition of a test images. The images are stored on their location. In the database feature vector which is find out by projecting each and every trained image to the Eigen faces set which is been calculated. PCA is applied on Eigen face approach to scale back the dimensionality of a large data set.



IV. SYSTEM ARCHITECTURE

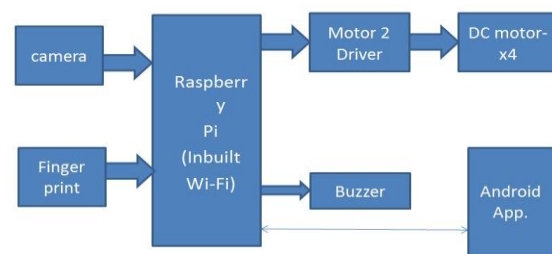


Fig: 1

This proposed system has two components, the hardware and the software modules. In this system we are developing low cost framework for security of car which will contain FDS (Face Detection Subsystem), a GPS (Global Positioning System) module, a GSM (Global System for Mobile Communications) module . Hardware component includes Raspberry Pi processor, GSM module, GPS module, camera, switch, motor driver and DC motor. Python language is used as a software component. In this system when the user

start the switch (Ignition) then automatically an image of that person send to the owner Smartphone application with alert sms and simultaneously system compares his or her face with database to see whether he's an authenticated driver or not.

V. REQUIRED TOOLS

1. Web camera

In the system prototype, one USB camera is employed to catch images in car, and therefore the data are transmitted to FDS module by USB channel, and therefore the data are transfer into format of jpeg files by the chip embedded camera before the transmission. Every image is about to be 320*240 pixels in resolution ratio to stay small in size and will be detected fast enough.



2. Raspberry PI 3

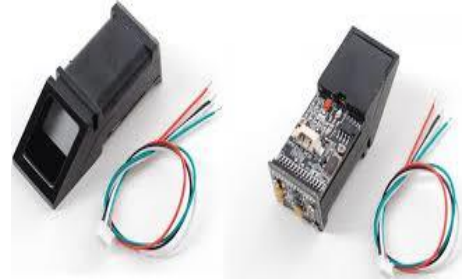
The cost of Raspberry Pi is very low, and it is a credit-card sized computer that plugs into a computer or TV, and uses a standard keyboard and mouse. It is a device which is enables all the people to learn how to program in languages like Scratch and Python.



3. Finger Print

Fingerprint system is impression left by the friction ridges of a human finger. In any crime scene fingerprint is an important method of forensic science. Moisture and grease of a fingers can easily come metal or glass, result in fingerprints on surfaces. All the fingerprints can be obtained by ink or other substances. It is difficult to copy someone's fingerprint, hence we used fingerprint system for giving safety to cars. The Fingerprint system record usually contain the joint of fingers

and also thumbs, though fingerprint card also record portions of lower joint areas of the fingers.



VI. RESULT

As per this way The owner is formed ready to perform car stopping through the message from his mobile. The GPS module in the car detects the location of the car so that the owner of the car can continue to monitor the safety of his car from a remote location.

VII. FUTURE WORK

- 1) We can implement it for Biometric Identification as well so it could be providemore security.
- 2) We can implement it for Alcohole Detection.
- 3) We can also use sensors that could provide more security

VIII. CONCLUSION

So we have implemented this theft control techniques which will provide the important functions required by advanced intelligent Car Security, to avoiding vehicle theft and protect the cars by using unauthenticated users. A secured and safe environment system for automobile users and also the key points for the investigators can be easily found out with the hijacker's image. By using this system, we can easily predict the car theft in our day to day life. This project will help us to reduce the complexity and improve security

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