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Vehicle Security System using Raspberry Pi

M.Santhanaraj¹, V.M.Divyaprabha², D.Jeffrin², S.Madhumitha²

U.G. Student, Department of Electronics and Communication Engineering, KPR Institute of Engineering and Technology, Coimbatore, India²

Assistant Professor, Department of Electronics and Communication Engineering, KPR Institute of Engineering and Technology, Coimbatore, India¹

ABSTRACT: Every individual are concerning more about the security nowadays. The Problems of the theft is increasing at a high speed. It is our duty to safeguard our properties. We have proposed this model to enhance the security of the vehicle because everyone own vehicles. Biometric identification is fast, easy to use, trustworthy, accurate. This guarantees the vehicle security system. Fingerprints of the known person are registered so that only authorized person can start the vehicle. The PI camera is fixed in the vehicle which turns ON when the fingerprint is not matched. The image captured by the camera is sent to the owner through the developed applications. Using this applications, the owner will about to know the person and he can control the vehicle. The GPS is used to track the location of the vehicle. The location also is viewed by the owner using the theft applications

KEYWORDS: Fingerprint sensor module, Camera module, App development, GPS system

PROPOSED SYSTEM: In this proposed system, Fingerprint recognition is used along

I. INTRODUCTION

One of the most important duty is to secure our properties. Vehicle is the main property for every individual since the roadways are better in India. Several measures are taken to safeguard the vehicles. In this we proposed the three modules and one theft applications to identify and to know the exact state of the vehicle. The first module is Fingerprint sensor. The fingerprint sensor is fixed in the self start of the vehicle through which the prints of the known person are registered. The registered person is the authorized. So the authorized person can access the vehicle. If the fingerprint does not match the registered, then that person cannot start the vehicle. So in this case to recognize the person who is about to start the vehicle can be identified using camera.

The camera used is PI camera which captures the image of the unregistered person. This camera module is used for taking videos and still photographs. This module has five megapixel focus camera. This will capture the image of the person and sends it to the application developed for this project. The application created is known as theft application .This application consists of many options through which the owner has the entire control of the vehicle. It consists of control button, controller image, location tracker. The control buttons comprises of ON/ OFF/ ENROLL/ START options. The controller image is used to view the image of the person in JPEG format.

The third module is Global Positioning System (GPS). The GPS is fixed in the vehicle, so the location of the vehicle is updated using the theft app. Location tracker in the application is used to position the latitude, altitude and longitude of the vehicle. The location is viewed by the map along with satellite view. The every move of the vehicle is known to the owner and he can control the entire vehicle using theft applications. So by this project we can reduce theft and also we can identify the person who tries to take the vehicle. This way we can secure our vehicles for long use and it is also user friendly with low cost.

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II. RELATED WORK

The vehicle security can be done using many methods. There are some existing methods which is used for primary use. The existing system consists of alarming system. If someone touches the vehicle then the alarm gets ON, then the owner become cautious. By using this theft can be controlled over a small range. It has some disadvantages like

1. Many vehicle possess same kind of alarm sound which makes confusion for the owner. This may cause the owner to become lathogic. Alarming system can be easily disabled by the thief. Because the security system in alarms is quite less when compared to other security systems is proposed in [10].
2. The fingerprint sensor is only present in the vehicle. The key lock system is not present. So only using fingerprint the vehicle can be accessed is proposed in [11].
3. For theft prevention, we can also trace the location of the vehicle by giving a call to GSM modem which is embedded on the system. The real time tracking begins and the GPS location of the vehicle is sent to the owner by SMS proposed in [2].
4. The information of the vehicle can be send only using SMS. The SMS is the oldest method of transmitting information from one place to another.
5. The information of the vehicle can be accessed from a particular distance. If the vehicle crosses the limit then the owner does not get the information. This may increase the theft activity.

III. PROPOSED SYSTEM

In this proposed system, Fingerprint recognition is used along with key locking system. This compares the fingerprint with the predefined fingerprints in the database. If the fingerprint does not match, then the camera turns ON and sends the information using theft app to the owner. In this we proposed the THEFT APP through which we can identify the image of the person. The location of the vehicle can be tracked using GPS using the applications.

IV. SYSTEM DESCRIPTION

In this paper, the heart of the system is GPS and camera module. GPS module is used to display the coordinates of the vehicle position with the help of camera module. Raspberry pi is the brain of the security system. It is fed with the program containing the logic to control the vehicle. The biometric pattern include fingerprint. This system is the unique security system. This technique is used for personal purpose and security system. The camera module is designed which is connected to the raspberry pi using serial interface. The theft app plays a major role in this security system. With this application, we may know about the image of the person, location of the vehicle.

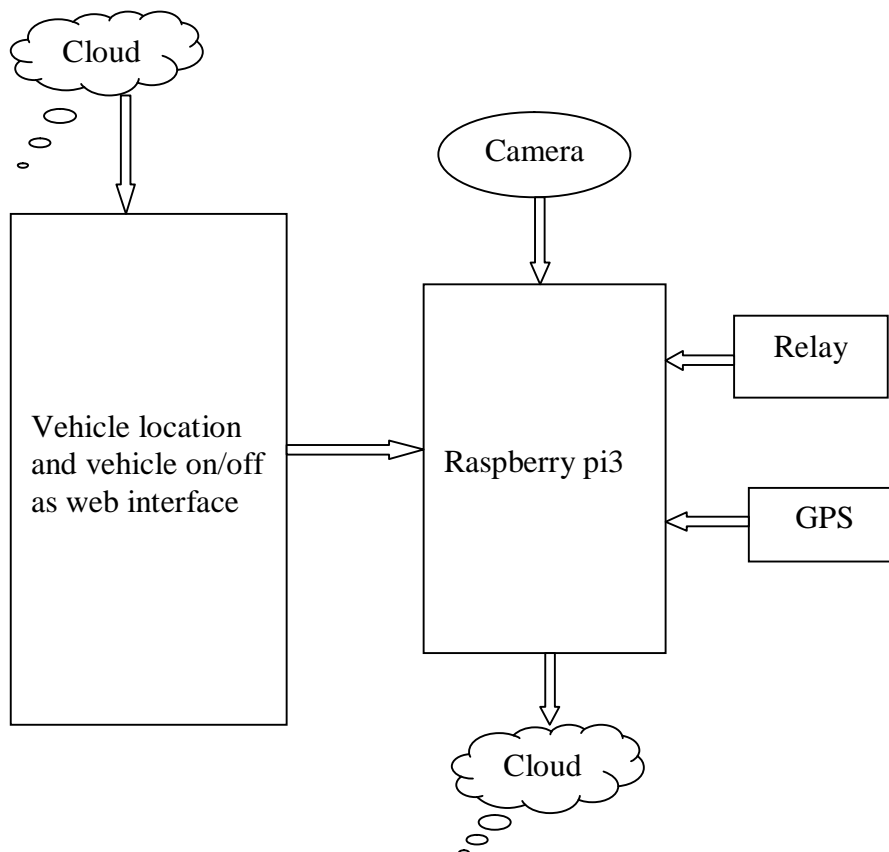
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V. BLOCK DOAGRAM



BLOCK DIAGRAM OF VEHICLE SECURITY SYSTEM

VI. FINGERPRINT SENSOR MODULE

The most widely used security system is biometrics. In every field Biometrics is used for many applications. Fingerprint sensor module consists of two parts namely sensor and scanner. The prints of the owner are registered for two to three persons. The registered fingerprints are the prints of the authorized person. Only the authorized person can access the vehicle. The person wish to drive the vehicle, the prints of the person is scanned using fingerprint sensor. The sensor senses the prints of the person and sends to the scanner where the registered fingerprint is present. When the fingerprint matches with the saved database then the person can start the vehicle. If the fingerprint does not match with the saved database, then the person cannot start the vehicle. Because the entire control of the vehicle is in the hands of the owner. Fingerprint module is the main module through which the ignition of the vehicle is done.

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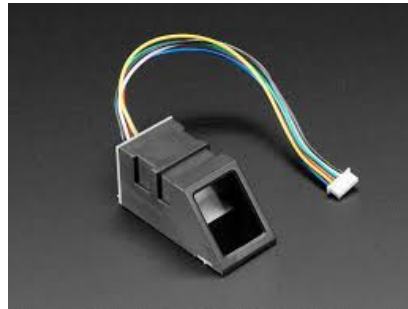


Fig.1. Fingerprint sensor

VII. CAMERA MODULE

If the fingerprint does not match, then the next process started. The fingerprint does not match with the registered, then the camera gets started. It captures the image of the person for few seconds. The camera used here is PI camera. The camera is used for taking videos and still photographs. The photograph will be saved in the JPEG format. This camera module is very popular in home security applications and in wildlife camera traps. The sensor used is 5MP sensor and it captures wider image. The camera consists of small circuit board, which is connected to the Raspberry Pi camera serial interface. The interface bus connector used here is flexible ribbon cable. The captured image is send to the mail or to the developed applications.



Fig.2. Camera module V2

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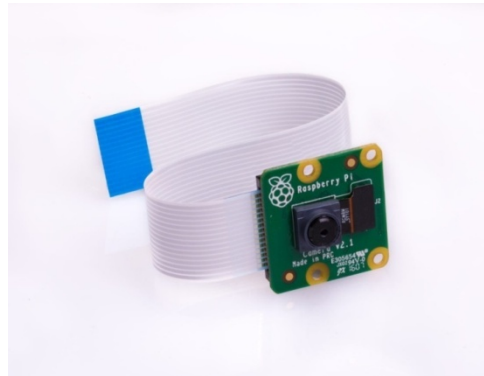


Fig.2.1. Raspberry pi camera module

The still resolution of camera V2 is about 8 Megapixels. The sensor used here is Sony IMX219. Cropping of the image cannot be done. Lens correction and automatic luminance detection cannot be done. The LED flash is present. Using serial interface the camera is connected to the Raspberry Pi. The picture will be in the JPEG format.

VIII. APP DEVELOPMENT

The captured image is send to the developed application called the THEFT APP. The theft applications consists of many options namely control button, controller image, location tracker. The control button consists of the full control of the vehicle. It consists of ON/ OFF/ ENROLL/ START. The ON switch is used for starting the vehicle. If the owner turns ON button the vehicle get started. The OFF switch is used to turn off the vehicle. The enroll option is present through which the fingerprints of the person is enrolled. The START option ignite the vehicle Through controller image option, the owner can view the image. By viewing the image the owner can choose the options from the control button. Location tracker is used to locate the exact location of the vehicle.

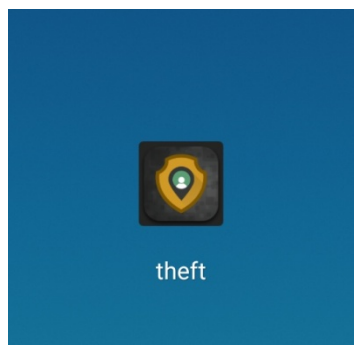


Fig.3. Image of theft app

The theft app is used to view the person who is about to take the vehicle. This applications provide information to the owner and he may know the exact condition of the vehicle. This is the main area of the work. This app can control the

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entire vehicle from being lost because using view option, the image of a person can be viewed and he has the control to start and stop the vehicle wherever necessary using GPS.

Control Button



Controller Image



Location Tracker



Fig.3.1.View of theft app

IX. GPS TECHNOLOGY

The exact location of the vehicle can be located using GPS technology. The global positioning system is used to position the latitude, longitude and altitude. The position of the vehicle can be viewed by using the applications. It can be viewed in general network map and in satellite view. The every move of the vehicle can be noticed using the theft applications. This makes the owner to know the location to track the vehicle. The raspberry pi GPS module is a small circuit which gets the information about the position, altitude as well as speed, date and time. It uses the NMEA protocol to transmit the location through serial port. The GPS module has transmitter and receiver part. It has a small internal antenna which is fragile. This antenna must be in horizontal position so that the exact location can be identified. The vehicle can be tracked using GPS and monitored.

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FIG.4.GPS

X. CONCLUSION

Security is in hike nowadays. This project is aimed to improve the security of the vehicles. Since the fingerprint and camera module is for identifying the person in terms of security. It is also easy to use. This is the unique method for controlling theft actions which is highly reliable. This project can be implemented with further development for better future scope.

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