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Vehicle Anti-Theft Face Recognition System

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***Abstract*: In this modern generation there is rapid increase in number of vehicles in the world and so is the number of car theft attempts, locally and internationally. With the invention of strong stealing techniques, owners are in fear of having their vehicles being stolen from common parking lot or from outside from home. Thus the protection of vehicles from theft becomes important due to insecure environment in world. Real time vehicle security system based on computer vision technology provides a solution to this problem. In vehicle security system perform real time user authentication using face detection and recognition techniques and microprocessor based control system fixed on PCB Board with the vehicle dashboard. As the person enters the parked car overcoming the existing security feature, the hidden USB Camera fixed on the front of driver, to detect the face of driver.**

***Keywords*: Raspberry-pi 3, USB camera, Ignition key circuit, Relay (5V), Buzzer.**

1. Introduction

The use of vehicles becomes important everywhere in the world and also preventing it from theft is required. Vehicle manufacturers the security feature of their products by introducing advanced technologies to avoid the thefts particularly in case of cars. Biometric and non-biometric methods usually provide such security features. Sometimes these systems fail due to hack password and our private database, but it is almost impossible to make replica of distinctive characteristics. Face recognition systems are modern and use techniques like Face recognition, iris recognition and face recognition. [1] Of these face recognition and Detection systems are more sophisticated, easy to install and people can be identified without their knowledge. Some advantages of face recognition method for in vehicle security system, the objective is to prevent the theft of vehicle and ensure safety of personal vehicle by avoiding theft. [2] One level of ensuring authentication of driving is through face recognition system that authenticates a user being an authorized person to have access to the ignition system. this project to use as cloud database to store data securely. AWS services like recognition and S3 Bucket to store images. Mongo dB server use to store image data and transmit to heroku server to show images through webpage (UI).

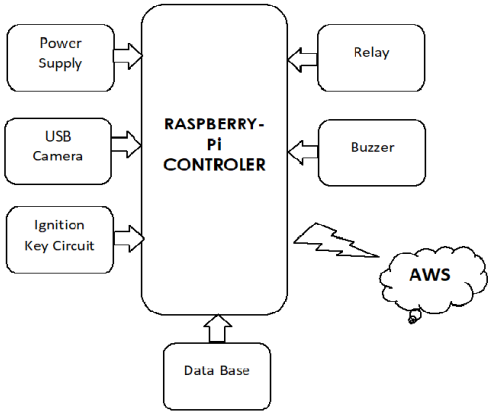

Fig. 1. Block diagram

2. Block Diagram Description

A. *Power Supply*

we use 5v power supply for Raspberry pi, Relay, Ignition Key Circuit and USB Camera, Buzzer.

B. *Raspberry pi 3*

The Raspberry Pi 3 Model is the third generation Raspberry Pi. This powerful credit-card sized single board small computer can be used for many applications.in This Project use Pi3 Module Configured with required specification.in this project act as a small controller to process on this image receive transmit to the cloud. Control the inputs and outputs.

1. Broadcom BCM2837 64bit ARMv7 Quad Centre Processor powered single board machine running in 1.2GHz.
2. 1GB RAM
3. Wi-Fi
4. Bluetooth Low frequency
5. 40pin extended GPIO 4 x USB 4 ports


Fig. 2. Raspberry pi-3 controller

C. USB Camera

In the system prototype, one USB camera is used to catch images in car, and the data are transmitted to Raspberry pi module by USB channel, and the data are transferred into jpeg format files by the camera to the controller. Every image quality is set to be 320*240 pixels in resolution ratio to remain small in size, due to image transmit will be fast as possible.

Fig. 3. USB Camera

D. Ignition Key Circuit

Ignition switch is mechanical movement; Ignition switch use to start the vehicle. electrical contact between controller and vehicle

Fig. 4. Ignition key circuit

E. Relay (5V)

A relay is an electrically operated switch. It consists of set of input terminal to apply input supply voltage and another is operating contact terminals. Such as make contacts and break contacts or combinations there. The Relay acts as switch.

Fig. 5. Relay (5V)

F. Buzzer

A buzzer is an audio signaling device, which may be mechanical, electromechanical and piezoelectric. Typical uses of buzzers include alarm device.

Fig. 6. Buzzer (5V)

G. AWS

As we use python language as backend language so we required a communication between the cloud and the raspberry pi so we use the Boto3 is the Amazon Web Services (AWS) SDK for Python. It uses Python developers to create, configure, and manage services from AWS, Boto provides an easy to use, object-oriented API, as well as low-level access to AWS services.

Support for Python 2 and 3

Boto3 was written from the ground up to provide native support in different Python versions 2.6.5+, 2.7 and 3.3+.

Installation command

pip install boto3

H. Data Base (Mongo dB)

MongoDB is a document database designed for ease of development and scaling. The Manual introduces key concepts in MongoDB Data base, presents the query language, and provides operational considerations and procedures as well as a comprehensive reference section. MongoDB database is store the data in a structure of field and pairs.it is also similar to the JSON object that understandable to the cloud. MongoDB Atlas A we use the MongoDB Atlas which provides and helps to host your data in the cloud. the purpose behind using the MongoDB atlas that atlas handles the complexity of uploading data on the cloud

I. Amazon Recognition Documentation

As our project Details. We use a one service which is Amazon Recognition which helps you to add images and videos to your application in our project. we just provide an image to Amazon Recognition API and the AWS service can identify the images. this service can detect any inappropriate highly accurate facial analysis and facial recognition.

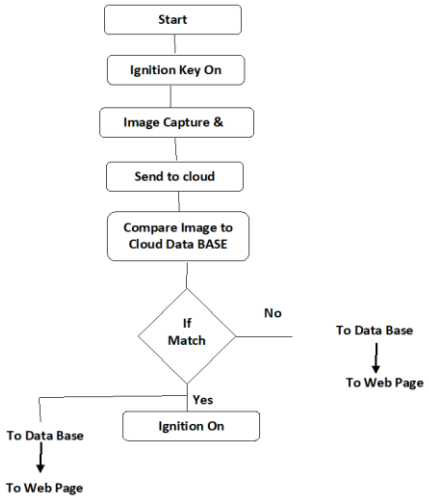

Fig. 7. Flow chart

3. Observations and Result

Antitheft vehicle system project is all about to provide security to our vehicles .the idea behind this project is whenever a unknown person tries to start our vehicle with the key then there will one camera is placed which captures the face of that

person and the image will send to the cloud which interface through raspberry pi and then cloud services will compare the enrolled image and newly upcoming image if it matched then it gives a true signal to the raspberry pi and ignition will be on .In this project there are many technologies are used like AWS (amazon web services) within this we used two services one is S3 bucket and second is face recognition. S3 bucket is used to store an enrolled images and recognition service is used to compare the enrolled data and newly upcoming image. Heroku sever is used to host our webpage. and mongo db database is used to store the data. MongoDB Atlas provides an easy way to host and manage your data in the cloud.

4. Result

The program for face detection is coded using python language. This program is run in the Raspberry Pi. The image of the person is captured immediately by the USB CAM. This is then cropped to obtain the face. This face detection procedure image quality ratio will be above 85%. Antitheft vehicle system project is all about to provide security to our vehicles .the idea behind this project is whenever a unknown person tries to start our vehicle with the key then there will one camera is placed which captures the face of that person and the image will send to the cloud which interface through raspberry pi and then cloud services will compare the enrolled image and newly upcoming image if it matched then it gives a true signal to the raspberry pi and ignition will be on .In this project there are many technologies are used like AWS (amazon web services) within this we used two services one is S3 bucket and second is face recognition. S3 bucket is used to store an enrolled images and recognition service is used to compare the enrolled data and newly upcoming image. Heroku sever is used to host our webpage. and mongo db database is used to store the data. MongoDB Atlas provides an easy way to host and manage your data in the cloud.

5. Advantages and Application

1. Improves Security.
2. Low cost system, providing maximum automation.
3. Reduction in manpower.
4. Low power consumption.
5. Industrial Application.
6. In Vehicle Security.
7. Home Application.

6. Conclusion

From this we implement theft control techniques that can provides the important functions required by advanced intelligent Car Security system, to avoid vehicle theft and protect the usage of unauthorized users. A secured and safety environment system for automobile users and also the key points for the investigators can be easily found out with the detected images. We can predict these thefts by using this system in our day today life. This project will help us to reduce the complexity and improve security, also much cheaper and smarter in modern technology. Experiment results show that it takes about 5 seconds to detect one 320*240 color jpeg image by software which is running on Raspberry pi model. It seems to be too long to be used in real-time detection and recognition. this images sends to cloud from raspberry pi.

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References

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