Protection to Vehicles from Thefts and Accidents

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Abstract: A major issue for car owners today is that they are constantly afraid to their cars stolen from a specific parking lot or from outside their home. Image processing based on the detection and prevention system of real-time vehicles provides the ultimate solution to this problem.The system described in this paper automatically takes driver photos and compares its face with database to check whether or not it is an authenticated driver.Only if he is an authenticated driver have access to that vehicle.An alarm rings and electrical connections are not activated if he is not an authenticated driver.The technology used here is real-time facial recognition and face detection. As the photos are taken in real time, the machine may be influenced by several issues, such as uneven lighting and changes in context.DCT normalization and background cancelation algorithms are incorporated along with basic face detection and face recognition algorithm to overcome this problem. Software and system hardware details are discussed in this paper.This paper focuses primarily on reducing injuries arising from a collision with another vehicle or from reckless driving and drunk driving.The Bluetooth Technology has been used as an indicating device.This paper has presented a system that will make cars self-sufficient to make decisions and remain protected from various types of accidents occurring both inside and outside the cars using sensors, GPS, Bluetooth and all these devices will be controlled using Raspberry-pi.

Keywords: Bluetooth Collision Warning System,Child in Car Alerting System, Face Recognition, Fingerprint, Hill Mode, Rash and Drunken Driving Alerting System,PCA.

INTRODUCTION

There are many features produced by various car companies such as lane departure alert system, antilock braking system, etc.In order to provide vehicles with safety use of a combination of Bluetooth module and RFID tags in cars to protect vehicles from collision, the implementation of a system to enhance the vehicle's controllability by using ABS that the controller receives[1].CAN BUS will execute communication between the controller and ABS according to the inputs provided by the sensors allowing the car to send a signal to the nearby police station using the ZigBee module, which is turned on when the pressure sensors in the accelerator and breaks decide that weather the car is in rash driving state or not depending on the traffic.Stop the cars if the driver is found to be intoxicated and sensed using sensors, and warn the driver when the processor recognizes an important road sign,some devices are also deployed to help the car owner protect their kids or pet from suffocation while being locked in the car's back seat[2].Biometric systems are the most advanced and sophisticated security systems for access control.It is

easy to get back information embedded on a wire, easy to decrypt encrypted data, but it is almost impossible to make a copy of distinctive human characteristics.The program will decide if there is a face in the specified picture or not is called Face Detection method.When face is identified, region of the face is extracted for identification of face.One innovative invention in the field of biometrics is the access control system based on face detection and verification technology.Principal component analysis (PCA) algorithm is used for face recognition.Principal Component Analysis (PCA) involves a mathematical process that converts a number of potentially associated variables into a number of uncorrelated variables called main components, related to the original variables through an orthogonal transition.PCA algorithm is used because it is one of the best classification algorithms, and coding PCA algorithm is simple and involves reducing the dimensionality. Dimensional reduction requires less processing time, and less memory.PCA algorithm classifies a face present or not based on a threshold value belonging to a database[3].

PROPOSED FEATURES

The features that need to be prevented are explained below: collision with other cars, drunken driving, reckless driving, children trapped in the back of the seat.

1. *Bluetooth Collision Warning System:*

This function would prevent other cars and driver from colliding. The essence of this device is Bluetooth, which will provide an indicator of the presence of cars in its vicinity within the Bluetooth range.If Bluetooth detects a car's presence then the sensors placed in eight directions will be activated. An interrupt will be sent to ABS or the Lane Departure Alerting System, depending on the input from the sensors[4]. A full procedure is described in figure 1.
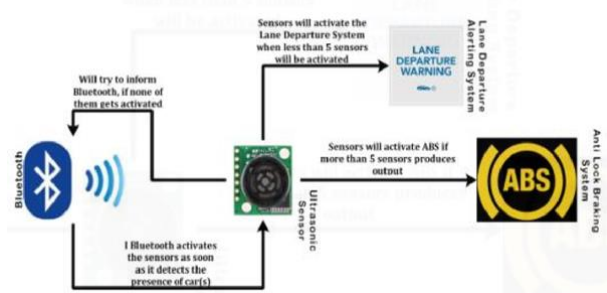

Figure 1: Bluetooth Collection Warning System

2. *Hill Mode:*

This is a unique feature that helps to encourage the car to brake as soon as the accelerator is released using an elevated plane when moving.Using the figure 2 can easily understand that feature[5].
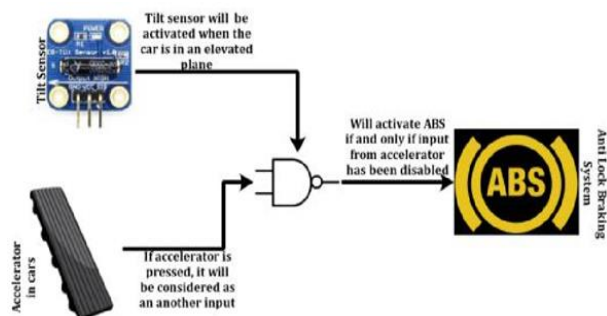

Figure 2: Hill Mode

3. *Child in Car Alerting System:*

This main purpose behind implementing this feature is to protect a child, an elderly person or a disabled person, or a pet that has been locked into the car or in the back of the seat.This immediately detects the temperature inside the vehicle, and sends signal to the A.C. Unit, window glass section via CAN BUS system and if any temperature abnormality occurs, then the alarm will ring along with switching ON the parking lights[6].

4. *Rash and Drunken Driving Alerting System*:

This feature will help prevent the user from getting into rash driving as well as into drunken driving sate.This will be done by using a simple touch switch located on the accelerator and brake paddle, which will count the amount of time the accelerator and brakes have been positioned so that system will be able to determine whether the car is in a rash driving state or not, along with this the system will also sense the speed of the car.If either or both of them show an abnormality in their output, the car will be made in Halt State and the driver's location will be given to the nearest police station using GPS simultaneously.An Accident Prevention Unit (similar to MSC in GSM Architecture) must allow the communication.To measure the amount of alcohol ingested by the driver, it is possible to install an infrared sensor on the steering wheels, which will disrupt the GPS and execute the same procedure as when driving reckless[7].

5. *Road Sign Identification:*

This function will help identifycatcomes across the road and help the car do the desired job. A camera which will be mounted on the dashboard will capture the images[8].

Figure 3: Road Sign Identification

6. *Fingerprint Based Start/Stop Button:*

This feature will recognize the user's fingerprint trying to get auto control.The device will check the fingerprint if the fingerprint matches the accessible then the user will

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be allowed to drive the car but if the fingerprint is not correct then the alarm will start.This feature will be implemented on Start/Stop button[9].

IMAGE PROCESSING BASED VEHICLE THEFT DETECTION AND PREVENTION SYSTEM

The machine is composed of a software module and a hardware module. Hardware module includes system, sensor, alarm, and relay for image acquisition. The processing of images is done with a digital camera. The software module comprises the processing of images.The processing of photographs includes face detection and face recognition.
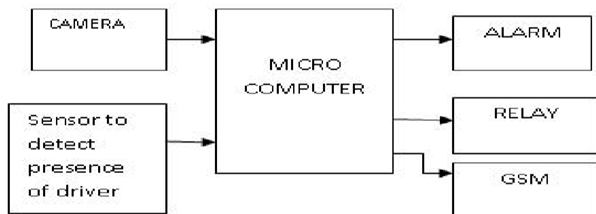

Figure 4: Block Diagram of Entire System

The camera captures the image and sends it to a microcomputer device. A PIR sensor is used to detect driver presence. Microcomputer begins processing the image if the sensor detects the presence of the driver.Microcomputer is nothing more than image processing section.Image processing system consists mainly of two sub-systems: (1) Face Detection and (2) Face Recognition.Phase in which extract face portion from an image and create database is called as enrolment phase and phase in which a new face is compared with the database is called authentication phase.Relay is used to make and disconnect the connection to the ignition coil based on microcomputer performance. An alarm is mounted at the microcomputer output. If driver is not an authenticated driver, the alarm will ring and a vehicle in danger message will be sent to the mobile owner.To assess the threshold, the PCA algorithm use to enforce the authentication system, an offline tuning is performed after the enrolment process. A weight vector for all images in the database as well as for the new test image is determined in PCA algorithm[10].

1. Algorithm for Face Recognition:

Face recognition is the second phase andit involves comparing facets in the database with the input face. PCA algorithm is used for facial recognition. Photos are called training images in the database and the photo taken during the authentication phase is called as test image.If the minimum Euclidean distance between the corresponding weight vectors is less than a particular threshold, the test image matches the image in the database.
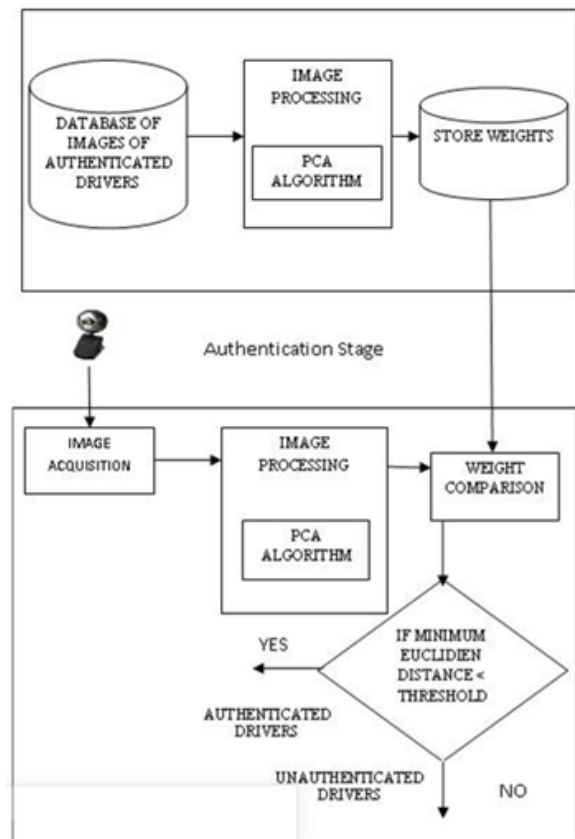

Figure 5: Face Recognition System

The algorithm can be divided into two phases: (1) Phase of enrolment; (2) Phase of authentication.Images will be taken of all drivers that owner wants to authenticate and face portion alone will be extracted from those images to create a database.Processing images requires PCA algorithm on it. The weight vector of this test image here, as in the enrolment phase. Calculate the Euclidean

distance between test image weight vector and each of database image weight vectors[11].

CONCLUSION

An automatic vehicle theft detection and prevention system is introduced. The program eliminates the increased amount of theft in today's cars. The above is one of the applications being developed for the face-recognition system.Principal component analysis (PCA) algorithm is used for face recognition.Principal Component Analysis (PCA) involves a mathematical process that converts a number of potentially associated variables into a number of uncorrelated variables called main components, related to the original variables through an orthogonal transition.PCA algorithm is used because it is one of the best classification algorithms, and coding PCA algorithm is simple and involves reducing the dimensionality. Dimensional reduction requires less processing time, and less memory.PCA algorithm classifies a face present or not based on a threshold value belonging to a database.The system can be used in a range of applications likeBluetooth collision warning system, hill mode, child in car alerting system, rash and drunken driving alerting system, road sign identification, and fingerprint based start/stop button.

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