Car Anti-Theft System through Face Recognition using GPS & GSM Module

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Abstract- This paper proposes an intelligent anti-theft car security system, which uses biometric application like Face Recognition to identify thief along with GPS module which tracks and locates the car. The proposed system consists of embedded control ARM processor, face recognition system, GPS (Global Positioning System) and GSM(Global System for Mobile Communications) modules used for preventing vehicle from theft. The system described in this paper automatically take photos of driver and compares his or her face with database to check whether he is an authenticated driver or not. The face detection subsystem is based on optimized PCA algorithm and can detect faces in cars. The other modules transmit necessary information to users.This system prototype is built on Raspberry pi, controls all the processes. The owner is made able to perform car stopping through the message from his mobile. The GPS module in the car detects the location of the car. So by this system the identification of the thief and the location of the car are simply smarter and cheaper than traditional one.

Keywords- Face Detection Subsystem (FDS). Global System for Portable Communications (GSM), Global Positioning system (GPS), PCA, Raspberry Pi.

I. INTRODUCTION

As the demand for the cars is increasing day by day there has also been increased in the car theft cases. Earlier central lock system with RFID tag, shock or vibration sensors were used, but major limitations of systems were it could not measure the intensity of shock or jolt which would result in a false alarm, Also the car was not been able to prevent from loss or theft. The most obvious benefit of proposed system is it prevents car from loss and in case of theft car can be located along with the victim responsible for theft. Proposed anti-theft smart car security system uses Biometric application like Face Recognition, GPS module for tracking the location of car and GSM module for user identification. A webcam is placed in the car, in which the video frames will be recoded and face of the person trying to enter the car will be recognized using face recognition system. If the person is not the user, the image of unauthorized person along with GPS co-ordinates would be sent to owner of the car through GSM module placed in the car. After receiving SMS on Mobile, owner can stop the car by sending SMS to GSM module which then triggers interrupt controller of ARM processor generating interrupt to stop car's ignition unit. Depending on GPS coordinates car can be tracked and recovered and person responsible for theft can be identified.

II. RELATED WORK

The use of cars worldwide is critical and must also be prevented from theft. Vehicle companies achieve their products safety characteristics by implementing sophisticated automated systems to prevent theft, especially in the case of automobiles. Such security features are usually provided by biometric and non-biometric techniques. Sometimes these systems fail to reproduce the distinctive features due to the stolen authentication and decrypted data encryption. Biometric technologies are new, using methods such as fingerprint recognition, iris identification and facial recognition. Sophisticated, quick to install and individuals can be detected with these facial recognition and detection systems without their knowledge.

III. LITERATURE SURVEY

[1] Face Detection and Recognition using Viola-Jones algorithm and Fusion of PCA and ANN, Narayan T. Deshpande, S. Ravishanka, 2017,

Description:

Complicated visual model of multi dimensions of human face and the development of a computational model is therefore very hard to recognize. The paper introduces a methodology based on image acquired features for recognizing the human face.

Limitation:

Face detection and recognitions using Viola-Jones algorithm and fusion PCA and ANN only.

[2] A Comprehensive Survey on Pose-Invariant Face Recognition, ACM Transactions on Intelligent Systems and Technology. Changxing Ding and Dacheng Tao, 2016.

Description:

Addressed the issues inborn in PIFR and present an intensive assessment of the strategies created. Existing PIFR systems can be arranged into four groupings, for example present powerful extraction ways to deal with highlights, multi-see ways to deal with subspace learning, face amalgamation approaches and half and half approaches.

Limitation:

Working of Limited data.

[3] Face Detection System Based on Viola - Jones Algorithm, International Journal of Science and Research, Mehul K Dabhi, Bhavna K Pancholi, 2013.

Description:

In this paper, which states that apps such as eye tracking face recognition, face expression recognition, and face monitoring and lip reading are essential for the location of facial characteristics in images. They present a way of identifying a live image's face. Using algorithm viola jones, the face is acknowledged from the entire image.

Limitation:

In this system work on only images not any work videos.

[4] An Embedded Interface for GSM Based Car Security System, Mangla, B.; Singh, S.; Kul Shrestha, S, 2012.

Description:

The most important function is to provide a user friendly and efficient tracking system of the vehicle to the owner through a simple text message from his mobile phone. Whenever the owner deems it necessary, he may send a text message from his phone to a GSM modem in the car and within seconds the modem will reply with a text message that includes the current location (in form of coordinates) of the vehicle.

Limitation:

In this paper send only text messages on mobile phone do not send to emails to any others.

[5] The All-or-Nothing Anti-Theft Policy—Theft Protection for Pervasive Computing, J. I. Pagter and M.O.Pedersen, 2007.

Description:

All-or Nothing anti-theft policy, which has two phases: device association, and presence verification. In the vehicle environment, a new component makes the association with other devices to join the in- vehicle group by the key distribution.

Limitation:

Only two phases are used in these systems.

IV. PROPOSED SYSTEM ARCHITECTURE

The program for the Smart car security is done in the python. According to the program face of the driver who sits in the driver seat is captured. Cut the image using Haar-Cascade classifier algorithm and the chopped image is compared with the images in the data base by PCA algorithm. If the captured image is in the data base the vehicle can be accessed and an access message is send to the owner. If the captured image is not in the data base, the image is sent with a message of "unauthorized person is trying to access the vehicle" to the owner's mobile. The owner has two choices one is to allow the access if the person is accessing the vehicle. with his permission and is done by send a keyword "Allow". If the accessing is by a thief the owner can send the keyword "Stop", the ignition valve of the vehicle is stopped. The other helpful keyword is "Locate" which helps to locate the vehicle, done by using the GPS module.

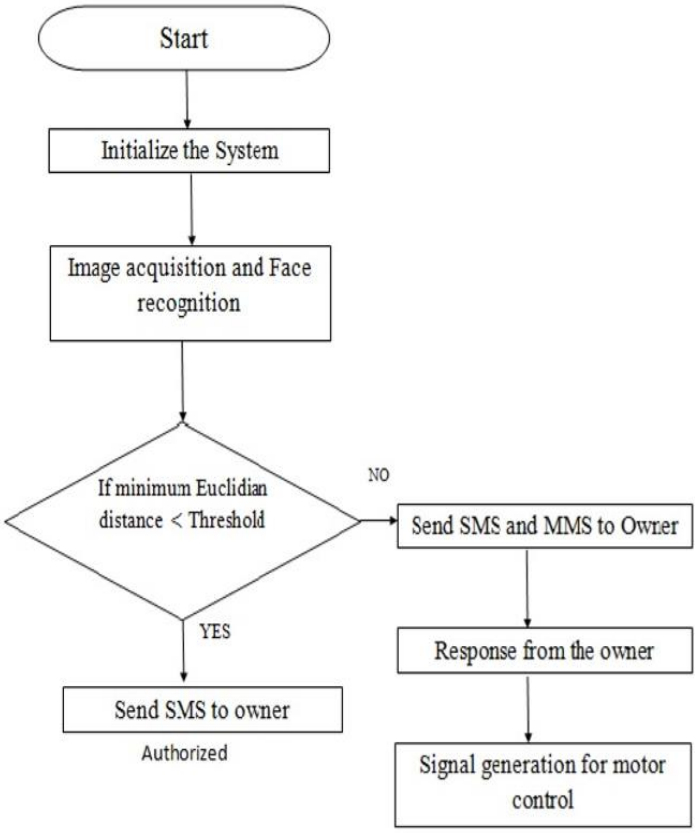

Fig.1: Proposed System Architecture

V. CONCLUSION

In this paper, we propose a real time smart car security system using Face Recognition to prevent car from theft. The proposed smart car security system proves to be reliable and helpful in preventing the car from theft as compared to traditional sensor based car security systems. By introducing the mobile app with good GUI will help the operation of the proposed system more convenient.

VI. ACNOWLEDGMENT

We take this opportunity to thank our project guide S.A.Hadke and Head of the Department Prof.Dr.D.A.Godse for their valuable guidance and for providing all the necessary facilities, which were indispensable in the completion of this project report. We are also thankful to all the staff members of the Department of Information Technology of BVCOEW, Pune for their valuable time, support, comments, suggestions and persuasion. We would also like to thank the institute for

providing the required facilities, Internet access and important books.

VII. REFERENCES

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