Car Security - Vehicle Theft Identity and Control System

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Abstract— Due to the insecure environment the ratio of vehicle theft increases rapidly. Because of this is manufacturers of luxury automobiles has the responsibilities for taking steps to ensure the authorization for the owners and also in built the anti theft system to prevent the vehicle from theft. The proposed security system for smart cars used to prevent them from loss or theft using FIM 5360 and PIC16F877A processor. It performs the real time user authentication using face recognition and finger print detection. According to the comparison result, processors trigger certain actions. If the result is not authentic means processors produces the signal to block the car access. It produce the interrupt signal to car engine to stop its action, alarm and inform the car owner about the unauthorized access via SMS and sends image to owners mailbox with the help of GSM modem.

Keywords—FIM 5360 processor,GSM module,finger print recognition,face detection

I. INTRODUCTION

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Many people make the mistaken assumption that car theft only occurs in seedy areas of town, but car theft can occur anywhere from an urban area to a suburb. People need to be careful not to entice thieves by making common mistakes. Theft is one of the most common and oldest criminal behaviours.Where the ownership of a physical possession can be altered without the rightful owner's consent, theft prevention has been introduced to assert the ownership whenever the rightful owner is physically absent. In recent years, vehicle thefts are increasing at an alarming rate around the world. People have started to use the theft control systems installed in their vehicle. The Global System for Mobile communications (GSM) is the most popular standard for mobile phones in the world. Over billion people use GSM service across the world. The usability of the GSM standard makes international roaming very common between mobile phone operators, enabling subscribers to use their phones in many parts of the world.

II. EXISTING SYSTEM

Current existing systems are an extendable emergency response system for smart car to prevent them from loss or theft using Advanced RISC Machine processor. In this method, the FDS aims at detect somebody's face. By using PCA algorithm we can get the common Eigen values of the person and it compares the image by finding the nearest value in some mathematical form which as like a function. If the person matches vehicle starts or owner will get MMS and GPS values of the vehicle location as SMS.

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A. Face Detection System (FDS)

Face recognition is a non-intrusive method, and facial attributes are probably the most common biometric features used by humans to recognize one another. The applications of facial recognition range from a static, controlled authentication to a dynamic, uncontrolled face identification in a cluttered background. While the authentication performance of the face recognition systems that are commercially available is reasonable, they impose a number of restrictions on how the facial images are obtained, often requiring a fixed and simple background with controlled illumination. These systems also have difficulty in matching face images captured from two different views, under different illumination conditions, and at different times. 'th' is the threshold value depending on the real time environment (varies from 300 - 400). lt is questionable whether the face itself, without any contextual information, is a sufficient basis for recognizing a person from a large number of identities with an extremely high level of confidence.

B. Principle Component Analysis (PCA)

The purpose of PCA is to reduce the large dimensionality of the data space (observed variables) to the smaller intrinsic dimensionality of feature space (independent variables), which are needed to describe the data economically. The main idea of using PCA for face recognition is to express the large 10 vector of pixels constructed from 15 facial image into the compact principal components of the feature space. This can be called Eigen face Projection.

C. Embedded Control System

The ARM is a 32-bit Reduced Instruction Set Computer (RISC) Instruction Set Architecture (ISA) developed by ARM Holdings. It was known as the Advanced RISC

Machine, and before that as the Acorn RISC Machine. The relative simplicity of ARM processors made them suitable for low power applications. This has made them dominant in the mobile and embedded electronics market as relatively low cost and small microprocessors and microcontrollers

D.   GPRS/GSM Module

A GSM module is a wireless modem that works with a GSM wireless network. Mainly used for the Short Message Service (SMS) in this project. A wireless modem behaves like a dial-up modem. The receiver in the GSM module is mentioned as ignition unit. A GSM modem can be an external device or a PC Card (specially used for laptop systems). Typically, an external GSM modem is connected through a serial cable or a USB cable. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate.

III.   PROPOSED SYSTEM

To develop a security system the face detection and finger print recognition concept is applied to real time car for theft detection identity and control. The face detection architecture is designed using face detection subsystem (FDS).The finger print recognition architecture is designed by FIM 5360 processor. The IR pairs are used for detecting the position of face when the user enters the car. PIC16F877A is the microcontroller used and RS232 cable is used for communication. The application flow is as follows: A fingerprint scanner will be placed in the car door, in which the 1000 fingerprints are recoded. For this fingerprint module is used. The person trying to unlock the car will be scanned using scanner. Then that finger is compared with the recoded fingerprints. If it matches, door opens otherwise an alarm is produced.

If a match found the door get opened when user enters the car camera get on and the IR pair locates the face. For the face detection process the face detection module is used. The camera captures the image. The captured image is compared with stored images in the database. If a match found the car engine starts. If a match is not found, the person is not the user, the engine will not start. Then it will immediately intimate the authorized person regarding the theft details by sending the warning message to his/her mobile through GSM, sends image to owners mailbox. For authentication the owners have to reply to the message that he have received. If he send ok message the car engine starts, otherwise it doesn't. GSM is the global system positioning and it is used for the authentication purpose.
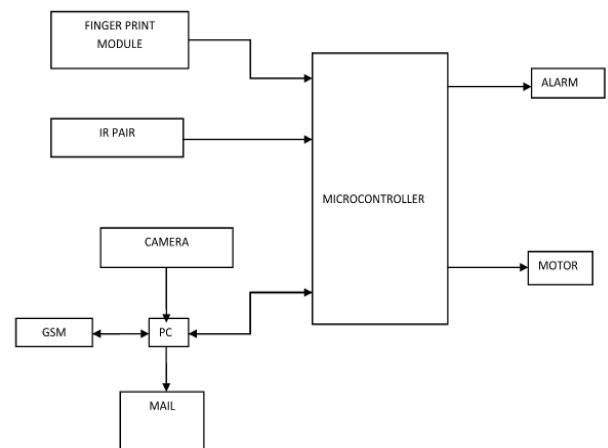

Fig 1: Block diagram of proposed system

A.   Finger Print Detection Module

Step 1: First the finger print is scanned by up to down scanning mode

Fig 2: up to down scanning

Step 2: The correlation process done, if matches door get open otherwise not

Fig 3: correlation

B.   Face Detection Module

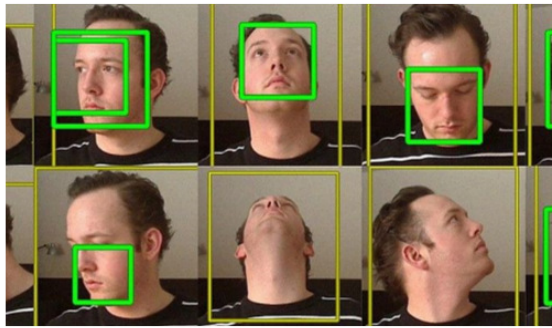Step 3: The image is captured by camera and correlation is done

Fig 4: capturing and correlation

C.   GSM Module

Step 4: Captured image is send to the owners email and a notification to his mobile via GSM Module

Fig 5: GSM Module

D.   Embedding Module

Step 5 : It was known as the Advanced RISC Machine and relative simplicity of processors made them suitable for low power applications.
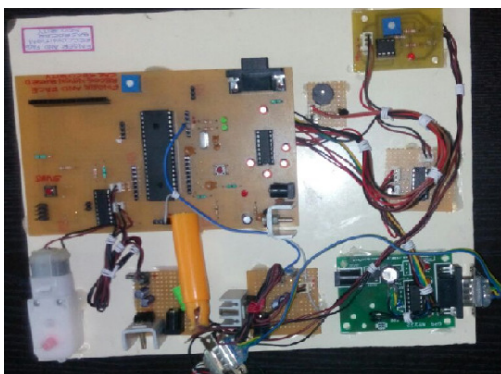

Fig 6 : Embedding Module

IV.   HARDWARE AND SOFTWARE REQUIREMENTS

TABLE 1: HARDWARE AND SOFTWARE REQUIREMENTS

HARDWARE	SOFTWARE
Fingerprint scanner	Matlab
Web camera	Embedded c
GSM modem	Hi-tech c
Integrating unit	PIC compiler
IR pair	
Alarm	

V. SCOPE

Anything cannot be ended in a single step. It is the fact that nothing is permanent in this world. So this utility also has some future enhancements in the security system. we present advanced security system for cars. We have used the current technology of GSM.

Car security system holds good future scope. There will not be any vehicle theft by using this system.The system and the architecture of the proposed system is a compatible one, so addition of new modules can be done without much difficulty. Since this module has its unique properties it can extend further to make this system a complete one.

VI. CONCLUSION AND FUTURE WORK

In this paper it is a great challenge because it prevent the vehicle theft by using face detection and fingerprint recognition.In the present method the camera captures owner's image only,no finger print scanners are used.To overcome this one, we can extend this work by storing multiple faces and fingerprints into the memory.

The embedded control central works all the time or discontinuously for power saving, achieve images. During the alarm periods, if faces have been detected, alarms would be made, and GSM module works to inform somebody.

If any person wants to start the vehicle, the camera compares the person's image and finger print with the all stored data. If the result is matched the motor will start otherwise, the unknown person's image will go to the owner's mailbox and sms to mobile.Thus this security system reduces the real time vehicle theft.

In future,multimodel biometric technique can be used to improve the biometric rates for example voica or retina recognition along with the face and fingerprint recognition.other than these,the proposed system can also be used for the other application area like,biometrics in handled devices and also banking applications mainly in locker side.

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