

Real Time Vehicle Theft Identity and Control System Based on ARM 9

D.Narendar Singh

Associate Professor, M.tech,Ph.d

*Department of Electronics and Communication Engineering
Anurag group of Institutions, Hyderabad , A.P, India*

K.Tejaswi (M.Tech)

*Department of Electronics and Communication Engineering
Anurag group of Institutions, Hyderabad , A.P, India*

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 Advanced RISC Machine (ARM) processor. It performs the real time user authentication (driver, who starts the car engine) using face recognition, using the Principle Component Analysis (PCA) algorithm. According to the comparison result (authentic or not), ARM processor triggers certain actions. If the result is not authentic means ARM produces the signal to block the car access (i.e. Produce the interrupt signal to car engine to stop its action) and inform the car owner about the unauthorized access via Multimedia Message Services (MMS) with the help of GSM/GPRS modem. Also it can be extends to send the current location of the vehicle using the GPS modem as a Short Message Services (SMS).

Keywords: Vehicle Security System, Face Recognition, GSM Module, Messaging Service, Advanced RISC Machine (ARM) Processor.

I. INTRODUCTION

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. An anti-theft system is any device or method used to prevent or deter the unauthorized appropriation of items considered valuable..

The rest of the paper is organized as follows. Proposed system and flowchart are explained in section II. Experimental results are presented in section III and Concluding remarks are given in section V.

II. PROPOSED SYATEM

2.1. Overview of the project

In our project, we propose an extendable emergency response system for smart car to prevent them from loss or theft using Advanced RISC Machine (ARM) processor (RISC means Reduced Instruction Set Computing). In this method, the Face Detection Subsystem (FDS) aims at detect somebody's face (who try to access the car).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.

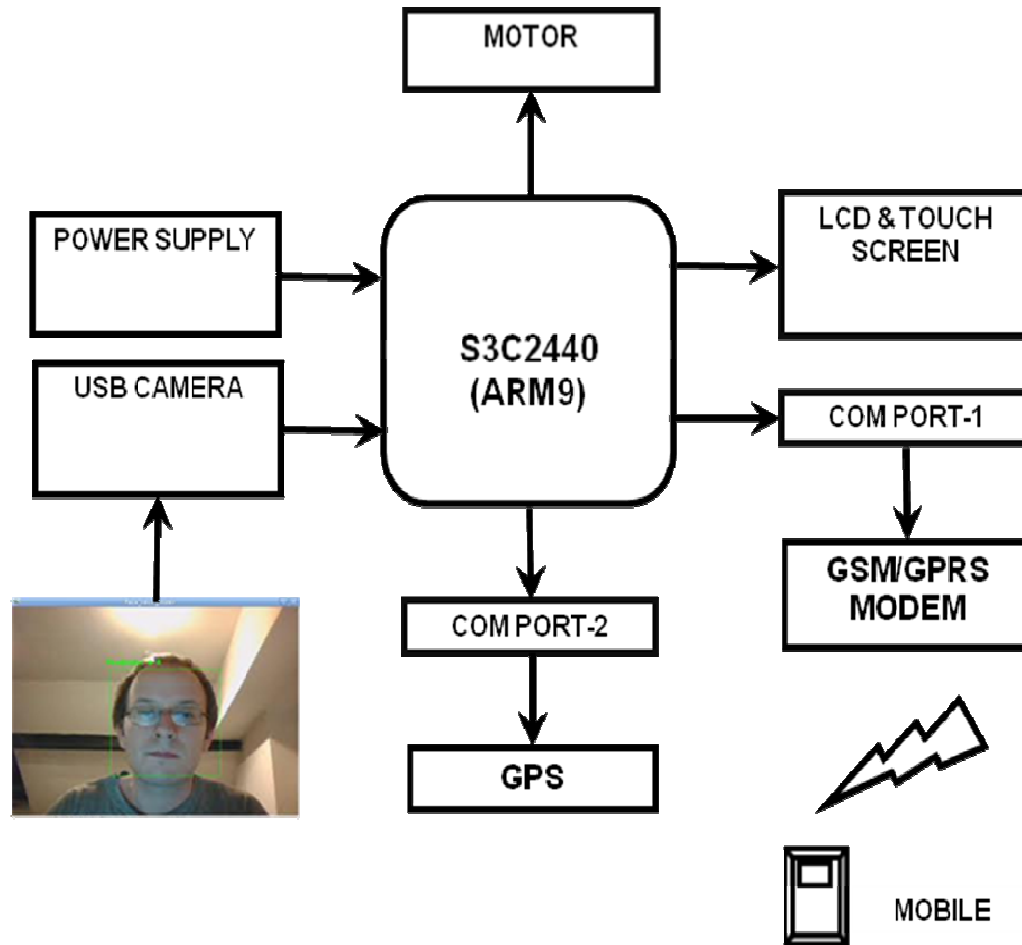


Fig. 1 Block diagram of proposed method

2.2. 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 system 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). It 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.

2.3. Principle Component Analysis (PCA)

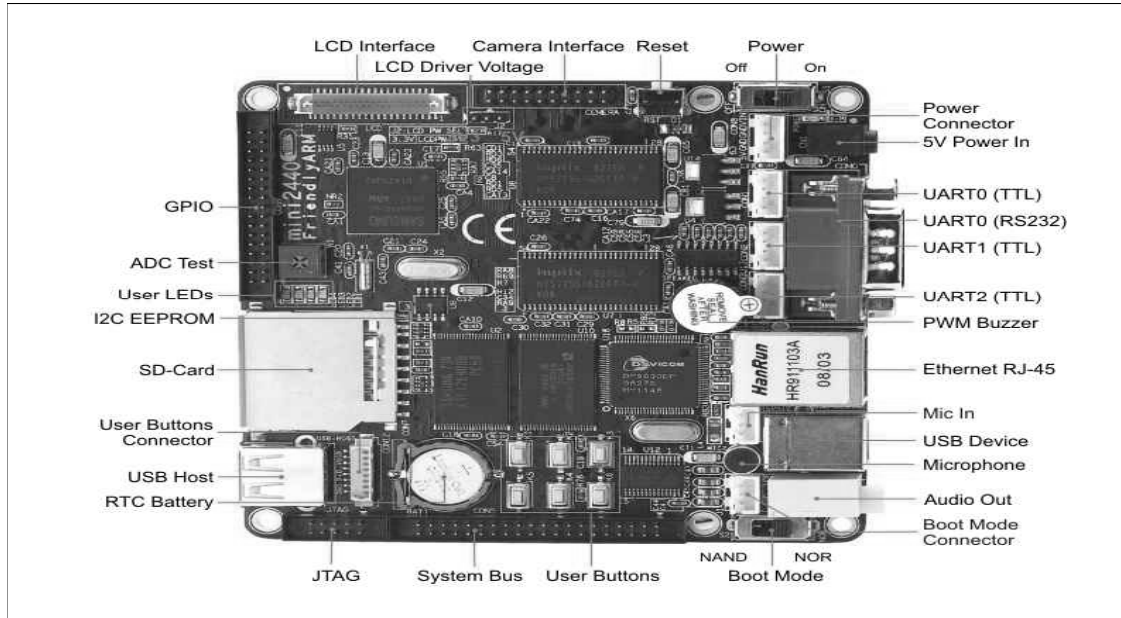
The purpose of PCA is to reduce the large dimensionality of the data space (observed variables) to the smaller intrinsic dimensionality of feature space (independent variables), which are needed to describe the data economically. The main idea of using PCA for face recognition is to express the large 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.

2.4. 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

2.5. MINI2440 ARM9

The ARM Mini2440 is a single board computer based on a Samsung S3C2440



ARM9 microprocessor. The board measures 10 cm x 10 cm, ideal for learning about ARM systems or integrating into numerous products.

2.6. 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.

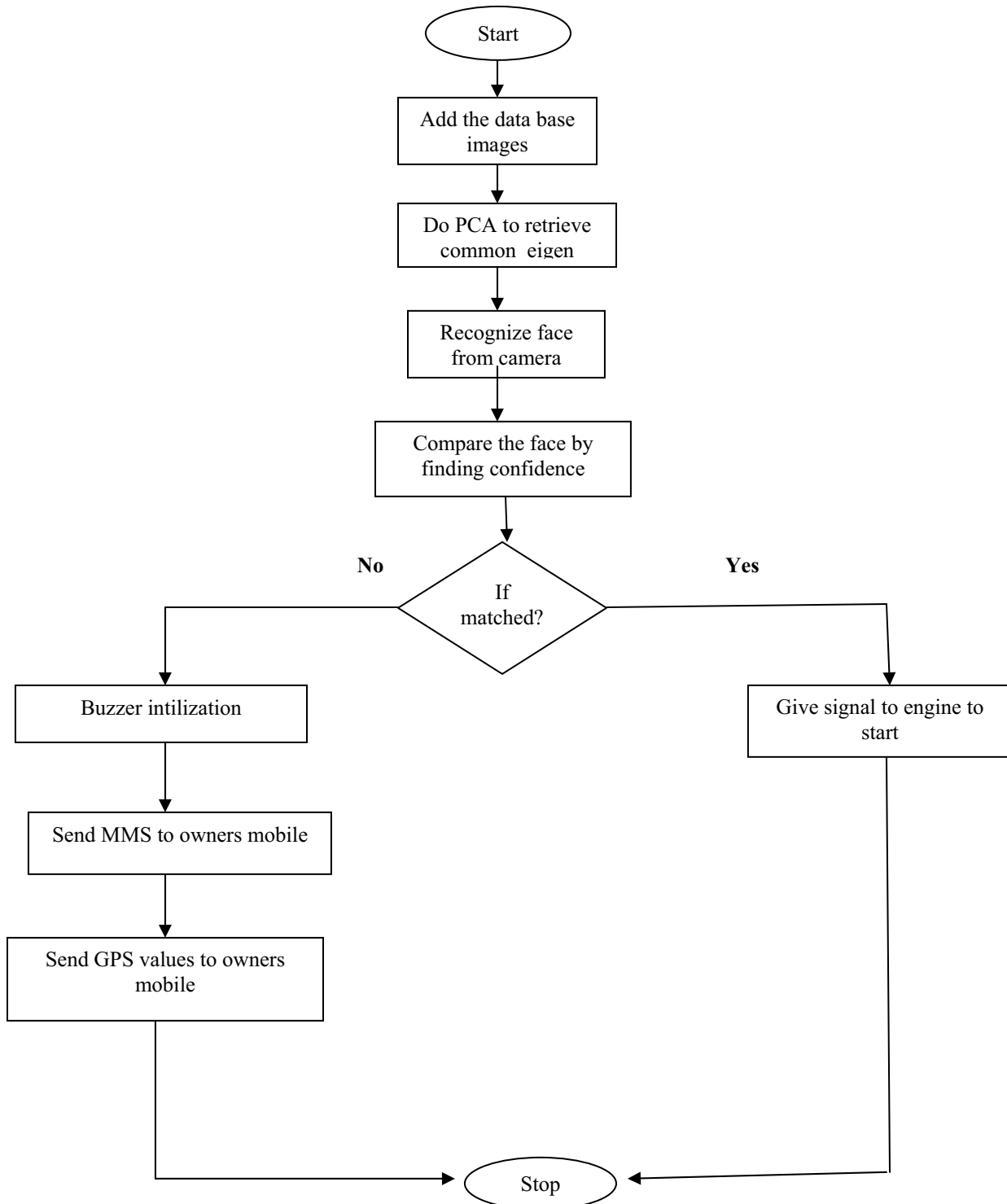
2.7. GPS Module

GPS, which stands for Global Positioning System, is a radio navigation system that allows land, sea, and airborne users to determine their exact location, velocity, and time 24 hours a day, in all weather conditions, anywhere in the world. The capabilities of today's system render other well-known navigation and positioning "technologies"—namely the magnetic compass, the sextant, the chronometer, and radio-based devices—impractical and obsolete. GPS is used to support a broad range of military, commercial, and consumer applications.

2.8. Motor

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.

I. Flow chart



2.9. Algorithm

The working of the project can be explained in the following steps:

1. Initially switch On the power supply for boards ARM9, GPRS and GPS.
2. Capture the image from the camera.
3. Then save the image.

4. Like this capture and save the image for 15 times.
5. From 15 images retrieve the common eigen values.
6. Store generalized eigen values in XML file.
7. Now click on the recognize button.
8. Then it compares the eigen values of the face.
9. If the image matched, start the motor.
10. If not matched buzzer initialized and
11. Send MMS of the face.
12. Send GPS values as SMS.

III.EXPERIMENTAL RESULTS

In this project, the real time face recognition is performed by using the PCA method with the help of web camera.

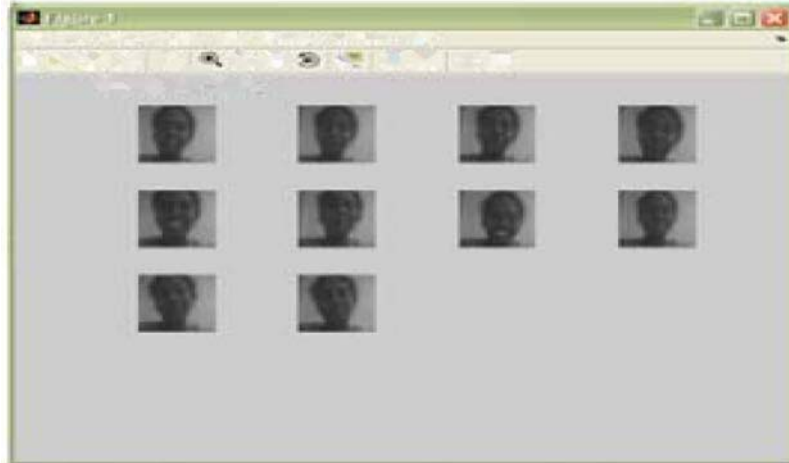


Fig. 2 Gallery or database images

Fig 2 shows the screen short after the collection of the gallery (owner) images. Then any person getting in to the carry it will compares if matched motor will starts i.e it will signal to the car to start otherwise the unauthorized person image will send as MMS to the owners mobile which shows the below figure 3.



IV.CONCLUSION

This paper has been successfully designed and tested. When compared with the existing system the advantage of this paper is that we can prevent the vehicle theft by using face recognition.

In the present method the camera captures owner's image only. If the owner's relatives or friends want to start the vehicle it will not start. To overcome this one, we can extend this project by storing multiple faces into the memory. If any person wants to start the vehicle, the camera compares the person's image with the all stored images. If the result is matched the motor will start otherwise, the unknown person's image will go to the owner's mobile. In the

current project if the results are unmatched, the unknown person's image will go to owners mobile only. In future we can extend this by sending the information to police control room for taking immediate action.

REFERENCES

- [1] AnandRaghunathan, NajwaAaraj, Niraj K . .Iha, and Srivaths Ravi, "Hybrid Architectures for Efficient and Secure Face Authentication in Embedded Systems", IEEE Transactions on Very Large Scale Integration (VLSI) Systems, Vol. IS, Mar. 2007, pp 296-308.
- [2] Chee-Ming Ting, Lih-Heng Chan, and ShHussainSalleh, "Face Biometrics Based On Principal Component Analysis and Linear Discriminant Analysis", Journal of Computer Science, 2010, pp. 693- 699.
- [3] Davis, B. DeLong, "Combined Remote Key Control AndImmobilization System For Vehicle Security", IEEE Power Electronics in Transportation, Oct. 1996, pp. 125-132.
- [4] Fabio Roli, and Gian Luca Marcialis, "Fusion of Appearance-Based Face Recognition Algorithms", Pattern Analysis Application, 2004, pp. 151-163.
- [5] Guiming, and Zhixiong Liu, "A Vehicle Antitheft and Alarm System Based on Computer Vision", IEEE on Electrical Systems, 2005, pp. 326-330.
- [6] Lie Yang, William Kunz, and Xilin Chen, "A PDA-Based Face Recognition System", Proceeding of Applications of Computer Vision in IEEE Workshop, 2002, pp. 1-5.
- [7] McCartney, "New Vehicle Security Assessment - A Practical Insurance Approach", European Convention on Security and Detection, May 1995, pp 239-243.