

Real Time Vehicle Theft Identity and Control System Based on ARM 7

¹Anup Kamat, ²Sonali Devtarse, ³S.R.Nibe

^{1,2}Dept. of E&TC, S.C.S.C.O.E, Ahmednagar, Savitribai Phule Pune University, Maharashtra, India

³Assistant Professor, Dept. of E&TC, S.C.S.C.O.E, Ahmednagar, Savitribai Phule Pune University, Maharashtra, India

Abstract

In today's era use of vehicle is must for everyone and due to the presence of insecure environment the ratio of theft is also increasing day by day. Automotive theft is one of the major problem the car owners are facing from because of this the manufactures of luxurious automobiles are ensuring various safety measures. This paper proposes a smart system in which Face Recognition is used to recognize the thief. The image of the driver is compared with the preloaded saved images for authorization. The vehicle will start only when the image of the authorized is recognized. If any attempts are made to theft the vehicle the image of the thief will be send to the user. It also uses a GPS system which is use to track the exact location of the car. A SMS (Short Message Services) will be send to the owner about the exact location of the car.

Keywords

ARM 7(Advance RISC Machine), GPS (Global Positioning System), GSM (Global System for Mobile Communication) , Camera.

I. Introduction

In today's world the amount of car theft is increasing day by day. Each year more than a million vehicles are stolen in the U.S. – that's one vehicle every 30 seconds. Vehicle theft occurs not only in metropolitan areas but it can occur in seedy areas of town. Theft is one of the most common and oldest criminal activities. So the manufacturers of the vehicle are attempting to improve the security features of the car. In our project we use FDS (Face Detection System) is used, where we can compare the image of the driver with the predefined images. If the image of the driver does not match with the owner of the vehicle then the image of the thief is send to the user. So the owner of the vehicle can get the clear image of the thief through the hidden camera set inside the car. Also we can get the exact location of our car using GPS system. The address of the location of our car is send through SMS using GSM module.

II. Existing System

Many people think that vehicle theft can occur only in seedy areas of town but it can occur anywhere. People need to be careful not to entice thieves by making common mistakes. Theft is one of the most common and oldest criminal behaviours. The automobiles have been stolen for different reasons viz. for transport, resale of vehicle, reselling parts etc. There are many systems which will help you for preventing from car theft such as wheel lock, steering lock, brake lock, ignition cut-off switches in spite of this system they can easily be broke down.

Car central locking system ensures the best guarantee to protect your car from different kinds of theft cases. It is a car security device that offers excellent protection to your car. A car with central locking security system helps the user to lock and unlock doors at the press of a button.

Mainly two types of central locking systems are used in Auto industry, Automatic central locking system and Manual central locking system that ensures smoother and secured operation. Again this system could not prove to provide complete security and accessibility of the vehicle in case of theft. So here in this project we have made the use of more developed system based on FDS, GSM and GPS system.



Fig.1 : Existing System

In this proposed embedded car security system, FDS (Face Detection System) is used to detect the face of the driver and compare it with the predefined faces. For example, in the night when the car's owner is sleeping and someone theft the car then FDS obtains images by one tiny web camera which can be hidden in the car. FDS compares the obtained image with the predefined images if the image doesn't match, then the information is sent to user. So now owner can obtain the image of the thief as well as he can trace the location through GPS. With ARM7 , the new intelligent vehicle security system integrated a lot of hardware modules such as video capture, GPS positioning and wireless transmission, the design of the system software used the embedded software developing platform on. By the hardware/software co-design, the new intelligent vehicle security system implemented the functions of video capturing, GPS positioning.

III. System Description

In this paper the heart of or system is ARM 7 LPC 2148, GPS module and GSM module. GPS module is used to display the coordinates of the vehicle position with help of GSM module. As shown in the figure 2, this system built an intelligent security for the vehicle based on the ARM 7 embedded processor, vehicle identification technology, GSM technology, GPS positioning system.

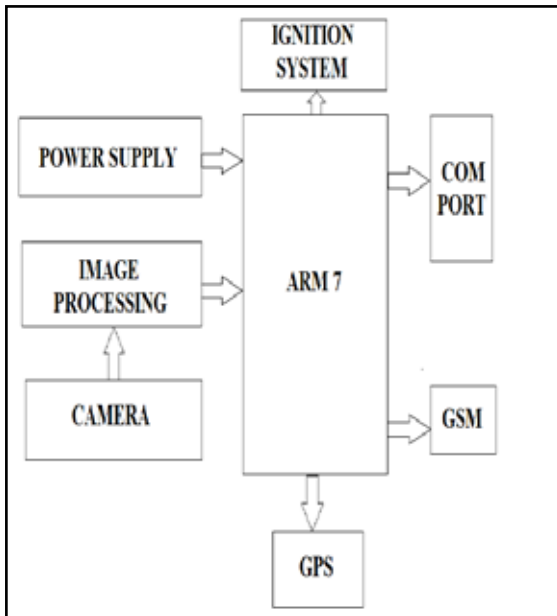


Fig.2: System Components

ARM7 TDMI Processor

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.

Features

- 16/32 bit ARM7TDMI-S microcontroller is a 64 or 144 pin package
- Two 32 bit timers, PWM unit, Real Time Clock
- On chip oscillator operating at 1MHz to 30 MHz
- 16 Kb on chip static RAM
- 128/256 Kb on chip Flash Program Memory
- Multiple serial interfacing including two UARTs, Fast I2C , two SPI
- In System Programming and In Application Programming

GPS Module

GPS is a space based navigation system which provides the location and time information in all weathers and at all times anywhere on the earth. It can provide accurate positioning 24 hours a day where there is unobstructed line of sight. In this system GPS is used to track the exact position or location of the vehicle.



Fig.3 : Vehicle tracking using GPS

GSM Module

GSM is a wireless modem that works on wireless network for eg. mobile. GSM is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group mobile cellular radio system operating at 900 MHz.

Mobile services based on GSM technology were first launched in Finland in 1991. Today, more than 690 mobile networks provide GSM services across 213 countries and GSM represents 82.4% of all global mobile connections. According to GSM World, there are now more than 2 billion GSM mobile phone users worldwide. GSM World references China as the largest single GSM market, with more than 370 million users, followed by Russia with 145 million, India with 83 million and the USA with 78 million users. In our proposed system GSM is used for establishing communication between the vehicle and the owner

Ignition System

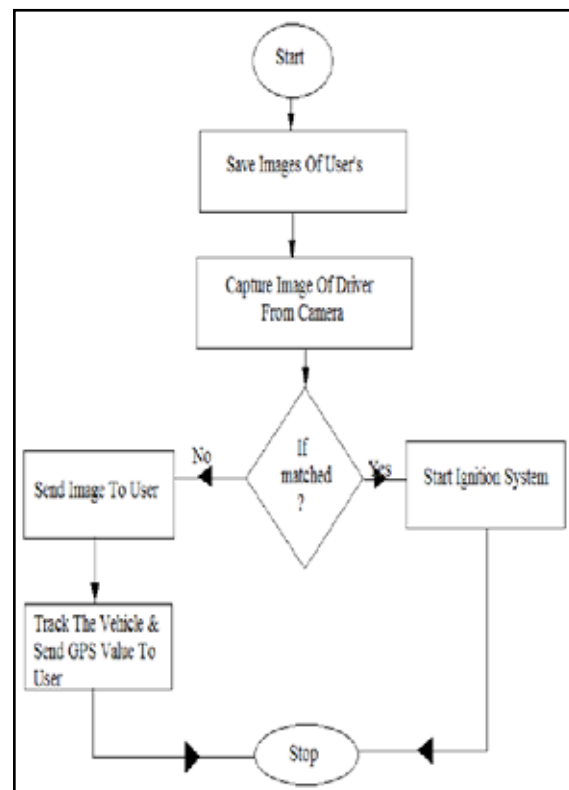
If the image of the driver and the owner of the vehicle are matched then only it will start the ignition system of the vehicle.

IV. Algorithm

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

1. Initially switch ON the power supply for boards ARM7, GSM and GPS
2. Camera captures the image
3. The image of the driver of the vehicle is then saved
4. Now compare the image with the saved images
5. If the image is matched with the preloaded images then start the ignition system
6. If the image is not matched then
7. Send the image of the thief to user
8. Send GPS values as SMS.

V. Flowchart



VI. Advantages

- It protect the vehicle from getting theft using face recognition
- We get the clear image of the thief
- We get the location of the vehicle
- It provides safe and secure environment
- It is act as one of the smart security system

VII. Limitation

This project can save 2 to 3 images of the owner if we want to increase the user we have to increase the database.

VIII. Future Scope

The proposed Anti-theft system can be made more efficient by improving precision of Face Recognition and adding other biometric applications like finger print recognition along with Face Recognition feature for more secureness also by replacing GSM and GPS modems with higher baud rate GSM and GPS modems the communication problem of the system could be minimized. 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 goes to owners mobile only. In future we can extend this by sending the information to police control room for taking immediate action.

IX. Conclusion

In this system FDS system is used as advanced Intelligent Car security systems which avoids vehicle theft and protect the usage from the unauthenticated users. It provides secure and safe environment system for automobile users and also key points for the investigators can easily find out the hijackers image. 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. We can predict the theft by using this system in our day to day life. This project will help to reduce the complexity and improve security, also much cheaper and 'smarter' than traditional ones. Because of the flexibility of embedded system, the embedded smart car security system is extendable for special purposes. The System offers a widely communication bandwidth with the car control system to change data and information, and new functional modules can be easily added to the system to upgrade and enhance it.

References

- [1] Jian Xiao and Haidong Feng "A low extendable framework for Embedded smart car security system " *IEEE international conference, 2009.*
- [2] SPadamapriya & Esther Annlin Kala James "Real time smart car lock security system using face detection and recognition" *IEEE international conference Coimbatore, 2012.*
- [3] Lotufo R.A., Morgan A.D., Johnson A.S., *Automatic numberplate recognition .Proceeding of image analysis for transport application , IEEE Colloquium, 1990*
- [4] Abid Khan, Ravi Mishra *GPS-GSM based tracking system, International Journal of Engineering Trends and Technology,*

Volume3, Issue2, Pp:161-169, 2012

- [5] 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.*
- [6] 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.*
- [7] Davis, B. DeLong, "Combined Remote Key Control And Immobilization System For Vehicle Security", *IEEE Power Electronics in Transportation, Oct. 1 996, pp. 125-13 2.*
- [8] Fabio Roli, and Gian Luca Marcialis, "Fusion of Appearance-Based Face Recognition Algorithms", *Pattern Analysis Application, 2004, pp. 151-163.*
- [9] Guiming, and Zhixiong Liu, "A Vehicle Antitheft and Alarm System Based on Computer Vision", *IEEE on Electrical Systems, 2005, pp. 326-330.*
- [10] McCartney, "New Vehicle Security Assessment - A Practical Insurance Approach", *European Convention on Security and Detection, May 1995, pp 239-243.*