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Multi Level Anti Theft Security System using GSM Technology

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Abstract

This paper presents Design & Development of Multi level Anti theft security system to control the theft of a vehicle using GSM and Biometrics. The main objective of this is to offer an advanced security system in multiple levels to protect the car from unauthorized access using GSM technology. It provides a protected password to unlock the car and real time biometric user authentication in second level to start the ignition after finger print verification is done. If the fingerprint does not match with that in database, ARM produces the interrupt signal to disable the ignition and initiates an alarm and also inform the car owner about the unauthorized access via short Message Services (SMS) by means of GSM modem[1].

Keywords: Finger print module,, GSM technology, Multi level authentication, RF module.

Introduction

Nowadays, automobile thefts are increasing at an alarming rate all over the world. Hence to prevent vehicles from being stolen, most of the vehicle owners have started using the theft protection systems. Presently available anti-theft systems are very expensive. Hence an attempt is made to develop a system, based on ARM7 microcontroller using GSM technology. The system developed is a simple and economical in providing high security to vehicles.

This multi level anti-theft security system makes use of RF transceiver with protected password in the first level to unlock the car. In the second level finger print authentication is incorporated to start the car ignition. In case unauthorized person is trying to have access to the car, then the system disables the ignition and sends a text message to the vehicle owner and simultaneously an alarm is initiated to alert the neighborhood.

In case the owner desires to permit a known person to have access to his car, then an SMS is sent to the system from owners mobile to activate the car ignition system at the third level of security.

Functional Description

This system provides multiple levels of security to protect the vehicle from unauthorized access .The first level of security is to unlock the car, a secret Password is required from the user. User can type this password from his car key which contains RF transmitter along with four digit keypad. RF receiver is placed inside the car and interfaced to the microcontroller. It is used to receive the string from RF transmitter. Then the system

compares the entered password with the existing password. If entered password is correct then the system goes to next security level. Otherwise, a text message is sent to the owner that “password entered at level 1 is unauthorized

Before going to start the ignition user has to go through the second level of security i.e. fingerprint verification of the user. Finger print sensor is used to enroll and verify the fingerprints. In case it matches with the stored fingerprints, then user has to insert key to start the car. Otherwise a text message is sent to the owner about “finger print verification at level2 is unauthorized “and at the same time alarm is enabled [4].

In case if a known person to owner whose fingerprint is not stored in memory desires to use the car, then the person has to undergo the third level of security. In which owner remotely gives permission to access the vehicle by sending a text message to the system to enable the ignition.

System Architecture

The system comprises of a ARM7 micro controller which is the brain and control circuit behind the entire design, GSM network, RF module, fingerprint sensor, proximity sensor, alarm, relay and DC motor [3].

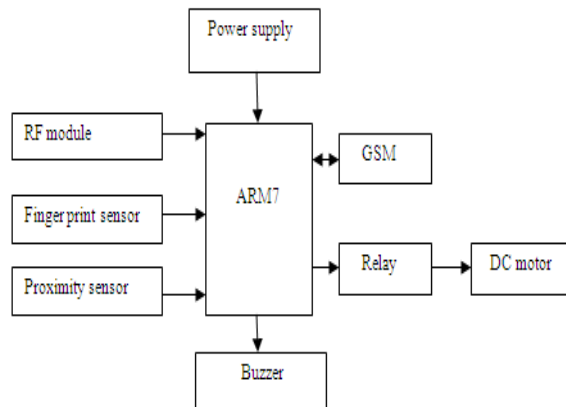


Fig 1: Functional block diagram of the system

ARM7:

The LPC2148 microcontrollers are based on a 32/16 bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combines the microcontroller with embedded high speed flash memory ranging from 32 kB to 512 kB. The entire design is controlled with a written program stored into its ROM. The on chip features of this controller reduce the system cost and better solution for network applications [6].

RF module:

RF module is ideal for remote control applications. The transmitter operates from 1.5-12V supply, making it ideal for battery-powered applications and where low cost and longer range is required. The receiver module requires no external RF components except for the antenna. It generates virtually no emissions, used for high volume applications.

Fingerprint module:

It adopts optic fingerprint sensor, which consists of high-performance DSP and Flash. Fingerprint Sensor Module is able to conduct fingerprint image processing. It is used to perform fingerprint enroll and verification for additional security.

Proximity sensor:

The system has an inductive proximity sensor, which detects the presence of metal objects that come within range of their oscillating field and provide target detection to "zero speed". When the key is inserted in the key hole the inductive proximity sensor detects the key and sends signal to the microcontroller, after which ignition system is enabled.

GSM module:

GSM is Global System for Mobile communications. It is the most popular form of telephone communication, and is nowadays available at almost all locations in the world. GSM enables users to make use of their phones for mobile communications [2]. The popularity of GSM is evident from the number of user's

i.e. over 2 billion people all across the world use GSM technology nowadays. It provides users with high quality signal and speech channels, giving them access to high quality digital communication at very affordable rates. GSM network operators can provide their customers with cheap calling and text messaging options.

Relay:

A relay is an electrically operated switch and it isolates one electrical circuit from another. In its simplest form, a relay consists of a coil used as an electromagnet to open and close switches contacts. It is used to switch a device which draws more current than is provided by an output of a switch or component.

Buzzer:

The PB series are high-performance buzzers. They exhibit extremely low power consumption in comparison to electromagnetic units. They are constructed without switching contacts to ensure long life with no electrical noise and are compact.

DC motor:

A DC motor consists of a rotor and a permanent magnetic field stator. Who's maintained by using either permanent magnets or electromagnetic windings. DC motors are most commonly used in variable speed and torque applications.

Design Frame Work

HARDWARE DESIGN

In this section we are interfacing microcontroller to coordinate the entire system.



Fig 2: Multi level anti theft security system

The system consists of RF transmitter, which contains four switches, through which user enters the secret password. This entered password is then received by RF receiver. RF transmitter is battery powered and is placed on car key of the owner [6].

Power supply is interfaced to provide 5V supply to ARM7 and to other modules in the system. RF receiver is interfaced to microcontroller Port (0.4 - 0.7) to receive 4 bit data from transmitter. Fingerprint sensor is interfaced to Port (0.8-0.9) for fingerprint authentication in the second level. DC motor is interfaced to Port (0.15) through relay for ignition. GSM

is interfaced to controller through UART0. buzzer is interfaced to Port (1.31) to initiate alarm in case finger print verification is unauthorized. Inductive proximity sensor is interfaced to Port (1.30) to sense the key during insertion. Two switches are interfaced to the controller Port (1.28-1.29). Which are used for enrolling and verifying finger prints.

SOFTWARE DESIGN

The different software's used to develop the system are *Embedded C:*

Source code is written in C .Programming in C makes the embedded systems more reliable hence code written for a specific microcontroller can easily be transferred to systems using different micro controllers. It can be reused, easy to maintain and easy to debug and extend. Also writing in C simplifies code development for large projects. It is easier to modify and update.

Flash Magic:

Flash Magic is a tool which is used to program hex code in EEPROM of micro-controller. It is a freeware tool. This supports the micro-controller of Philips and NXP. To burn a hex code into those controllers flash magic is used, which supports ISP (in system programming) feature.

Keil μVision IDE:

The μVision IDE from Keil combines project management, source code editing, program debugging, and complete simulation in one powerful environment. The μVision development platform is easy-to-use and helps to quickly create embedded programs that work. The μVision editor and debugger are integrated in a single application that provides a seamless embedded project development environment.

Results

In this paper we present a novel anti theft security system for cars using GSM that tries to protect the vehicle from theft by means of multiple levels of security.

Level 1:

To unlock the car, a secret password is required from the user. If the entered password is correct then the system goes to next security level.

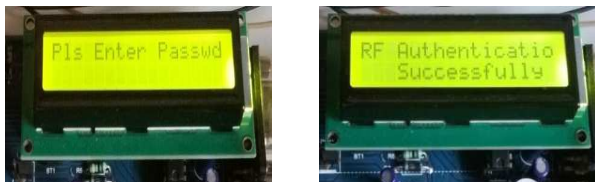


Fig 3: level 1 authentication

Otherwise, a text message is sent to the owner that “password entered at level 1 is unauthorized “shown in figure 5.

Level 2:

At level 2 finger print verification of user is done. In case it matches with the stored fingerprints, then “please insert key” is displayed, so that user can start the car.



Fig 4: level 2 authentication

Otherwise a text message is sent to the owner about “finger print authentication at level2 is unauthorized” as shown in figure5 and at the same time alarm is enabled. In case if a known person to owner desires to use the car, then the person has to undergo the third level of security. In which owner grants access by sending text to the system.



Fig 5: Alert messages to the mobile at level 1 & 2

When an authorized person trying to access the car, then the system sends a text message to the owner mobile in level1 & level2. As shown in figure 5.

Level 3:

At third level of security, access to the vehicle is provided to the person who is known to owner and whose fingerprint is not stored in memory by just sending a secret text message to the system. After which the access to car is grant to the known person.

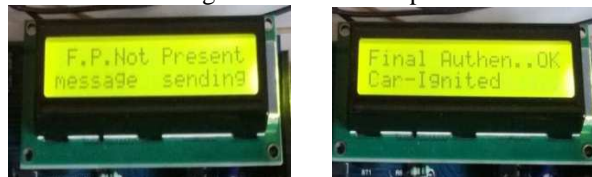


Fig 6: level 3 authentication

Conclusion and Future Work

Where there is high level of theft, there is need for better security system for automobiles. This paper provides a unique method of designing and assembling a low cost and compact theft control system for car using GSM and biometrics implemented on ARM7 microcontroller. This system provides reliable security for vehicles. By installing this system in cars an unknown person cannot start the car. In future, Cameras can be incorporated into the system to identify the person and also GPS system can be added to keep the track of the vehicle that is being stolen.

References

- [1] Microcontroller Based Anti-theft Security System Using GSM Networks with Text Message as Feedback, International Journal of Engineering Research and Developments-ISSN: 2278-067X, p-ISSN: 2278-800X, www.ijerd.com Volume 2, Issue 10 (August 2012).
- [2] www.gsm-modem.de/
- [3] <http://www.datasheetsite.com/datasheet/MA>
- [4] B.G.Nagaraja, Ravi Rayappa, M.Mahesh, Chandrasekhar M. Patil, Dr. T.C. Manjunath:- "Design & Development of a GSM Based Vehicle Theft Control System" 978-0-7695-3516-6/08©2008 IEEE, DOI 10.1109/ICACC.2009.154, pp.148-152.
- [5] S. P. Pingat, Shubham Rakhecha, Rishabh Agrawal, Sarika Mhetre, Pranay Raushan, Smart Car Security System by Using Biometrics, International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-2, Issue-4, March 2013
- [6] Jayanta Kumar Pany1 & R. N. Das Choudhury2 Embedded Automobile Engine Locking System Using GSM Technology, International journal of instrumentation, control and automation (IJICA) ISSN : 2231-1890 Volume-1, Issue-2, 2011.