Fingerprint-Based Vehicle Anti-Theft System Using GPS and GSM

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Abstract - This paper presents a mechanism to make vehicle thefts just about impossible. GSM and GPS technologies area unit used or that purpose. The projected system provides two levels of security, fingerprint protection for the vehicle. This system jointly provides provision for vehicle trailing victimization GPS. GSM technology is utilized for intimating the owner. This projected work is a shot to vogue degree advance vehicle security system that uses Fingerprint Recognition on GPS and GSM system to forestall thievery and to ascertain the precise location of automotive along with completely different varied security mechanisms. Message is in addition sent once to thevehicle it is started. The owner can sent sms to slowdown the car and switch on the alarm.

Keywords - *ARM7, Fingerprint sensing element, GSM, GPS.*

I. INTRODUCTION

In this present world where the technology is growing day by day. And lot of research is going on enhance the existing technology. Now a day's security is high concern at present vehicle usage is basically necessary for everyone. Simultaneously protecting the vehicle from the theft and also other type of bulgy activities. Previously security system contains some sensor, alarm system and cost of sensor is also high. If vehicle is stolen no alternative methods be available to help the owner of the vehicle to find vehicle back. The main aim of our paper is to provide the high security to the vehicle. And allow only authenticated users. It also user friendly, fast access, fingerprint reorganization technology[1] along with GPS and GSM system. The prototype model for vehicle security system is built on embedded platform using ARM microcontroller which control the all the operations. Cost of this is less and also it enhances the security. If theft attempt to unlock the vehicle using a duplicated key, metal sensor sense it and send a SMS to owner. Fingerprint recognition system is provided at the engine ignition .By using the GPS technology vehicle tracking is very easy. Thus our systems provide high security at all the level. And also Currently GPS vehicle tracking ensures their safety as travelling. In this system found in user vehicles as theft means Vehicle sent location to owner or Police tracking system to track a theft vehicle in same time the stolen vehicle engine speed going to decrease after switch of the engine.

II. SYSTEM HARDWARE

ARM Processor:
The ARM7 family includes the ARM7TDMI, ARM7TDMI-S, ARM720T, and ARM7EJ-S processors. The ARM7TDMI core is that the industry's most typically used 32-bit[2] embedded laptop design small chip resolution. Optimized for value and power-sensitive applications, the ARM7TDMI resolution provides the low power consumption, small size, and high performance needed in moveable,Embedded applications the arm7tdmi core uses a three-stage pipeline to increase the flow of directions to the processor.This permits multiple synchronous operations to require place and continuous operation of the method and memory systems.

Operating modes
The ARM7TDMI core has seven modes of operation:
- User mode is that the usual program execution state
- Interrupt (IRQ) mode is employed for general purpose interrupt handling
- Supervisor mode could be a protected mode for the software system
- Abort mode is entered when an information or instruction pre fetch abort
- System mode could be a privileged user mode for the software system
- Undefined mode is entered once associate undefinable instruction is dead.
- The interrupt settings of ARM support the DHLS to response to the interrupt returning from the server section.

Finger Print sensor:
- Fingerprint recognition[6] automatic technique of collateral 2 human fingerprints.
- Fingerprints unit of measurement one all told many varieties of statistics used to verify a private and verify their identity. The analysis of fingerprints for matching functions usually wants the comparison of the many choices of the print pattern.

These embody patterns, that unit of measurement mixture characteristics of ridges, and detail points, that unit of measurement distinctive choices found within the patterns.
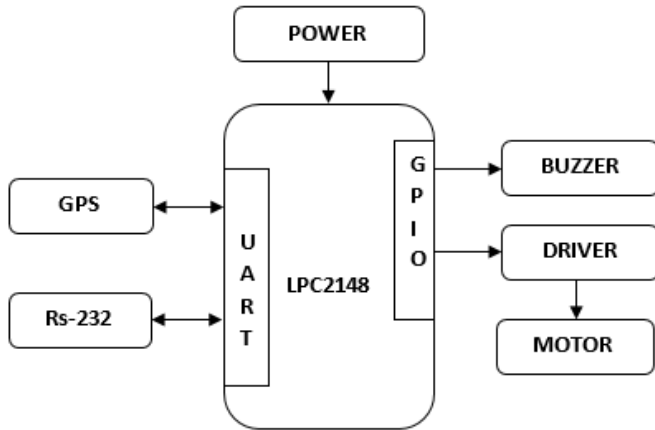
Block Diagram:

Fig: Block Diagram

Patterns

The 3 basic patterns of fingerprint

- Arch Pattern
- Loop Pattern
- Whorl Pattern

Arch Pattern:

An arch is a pattern where the ridges enter from one side of the finger, rise in the center forming an arc, and then exit the other side of the finger.

Loop Pattern:

The loop is a pattern where the ridges enter from one side of a finger, form a curve, and tend to exit from the same side they enter.

Whorl Pattern:

In the whorl pattern, ridges form circularly around a central point [8] on the finger.

Wireless communication:

UART communication:

We have a tendency to area unit victimization serial communication technique to form a communication between computer and Processor. The serial digital communication transfer data is declared in bits/s .Another wide used language for bits per second is baud. However, the information measure [9]and bits per second rates don't seem to be essentially equal. This can be because of the very fact that baud is that the electronic equipment language and is outlined because the range of signal changes per second. In modems, there area unit occasions once one modification of signal transfers many bits of information. As way because the conductor wire worries, the baud and bits per second area unit a similar.

In RS232, a one is diagrammatical by -3 to -25V, whereas a zero bit is +3 to +25V, creating -3 to +3 vague. That's why we will use logical converter. The RS232 to voltage converters like MAX232 to convert the TTL logic levels to the RS232

voltage level. The ARM transfers and receives knowledge serially at several information measure rates. The baud within the ARM is programmable. This can be finished the assistance of timer one.The relationship between the crystal frequency and therefore the baud is mentioned here. The UART electronic equipment divides the machine cycle frequency of 921.6 kHz by thirty two all over again before timer one to line the baud uses it. Therefore, 921.6 kHz divided by thirty two provides twenty eight, 800Hz. using this interface we have a tendency to area unit human activity between the computer and therefore the Processor.

GSM

GSM equipment could also be wirelessnetwork that works with a GSM wireless technology. The GSM could also be a globally accepted commonplace for cellular communication. A pan-European mobile cellular phone implement normal European mobile phone standard in 1982. GSM provides recommendations, not wants. The GSM specifications outline the functions and interface desires intimately however don't address the hardware. the reason for this may be to limit the designers as very little or no as achievable however still to form it achievable for the operators to shop for for instrumentation from absolutely fully totally different suppliers. The GSM is split into three systems:

- shift system (SS)
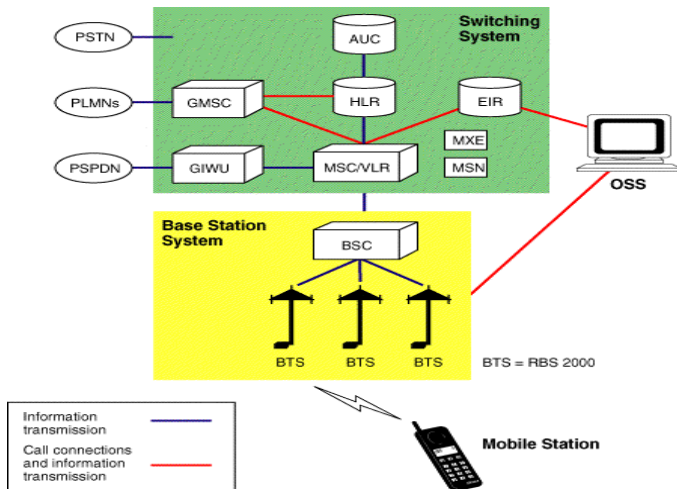- cheap station system (CSS)
- Operation and network (OSS).

Fig.2 GSM network Topology

GSM modems based on AT commands. AT commands provide by GSM standards.you'll be able to do things like:
o   Reading, writing and deleting SMS messages.
o   Sending SMS messages.
o   Monitoring the signal strength.

o   Monitoring the charging standing and charge level of the battery.
o   Reading, writing and looking out phone book entries.
o   Sending the message

To send the SMS message, kind the subsequent command:
AT+CMGS="+31638740161" <ENTER>
Replace the on top of variety|telephone number| [10] with your cellular phone number. The electronic equipment can respond with: > You can currently kind the message text and send the message mistreatment the <CTRL>-<Z> key combination:

Hello World ! <CTRL-Z>

After some seconds the electronic equipment can respond with the message ID of the message, indicating that the message was sent correctly:
+CMGS: 62

GPS MODULE:
The worldwide Positioning System (GPS) includes 3 segments:
o   The house phase (all useful satellites)
o   The management phase
o   The user phase (all civil and military GPS users).

GPS Was developed by the U.S. Department of Defense (DOD) and should be used every by civilians and military Personnel.
- SPS (Standard Positioning Service)
- PPS (Precise Positioning Service)
Can entirely is used by commissioned government agencies. the first Satellite was placed in orbit on twenty second Gregorian calendar month 1978, and there unit of measurement presently twenty eight operational satellites orbiting the planet at a height of twenty,180 kilometer on vi utterly completely different orbital planes. Their orbits unit of measurement inclined at 55° to the equator, guaranteeing that a minimum of 4 satellites unit of measurement in radio communication with planet. Throughout the event of the GPS system, explicit stress was placed on the subsequent 3 aspects:
a) It had to produce users with the potential of crucial position, speed and time, whether or not in motion at rest.
b) It had to possess a continual, global, three-d positioning capability with a high degree of accuracy, regardless of the weather.
c) It had to supply potential for civilian use civil use.

III. CONCLUSION AND FUTURE WORK
The implementation of automotive thieving detection with high level authentication is finished successfully. A Vehicle Positioning System is thus designed by exploitation lpc2148

controller at the side of GPS, GSM and fingerprint modules. once the latitude and line values obtained and fed into owner, the position of the vehicle could beacknowledged. Authentication is to boot provided thus alone the commissioned users can access the vehicle. The model is implemented in bikes with changes created to device, battery and key. The system can any be improved with speed management mechanism, that is, to stop the engine if the speed exceeds positive limits. The system can any be improved for providing parental guidance that is to stop the vehicle if it crosses a particular vary of distance.

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