IJIREEICE

ISSN (Online) 2321 – 2004
ISSN (Print) 2321 – 5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

ISO 3297:2007 Certified

Vol. 5, Issue 6, June 2017

Smart Vehicle with Theft Prevention using GSM and GPS

Sushanth K J[1], Aysha Farana[2], Sachin[2], Bushra Salina[2], Mahammad Isthikar[2]

Assistant Professor, Electronics and Communication Engineering Department, BIT, Mangalore, Karnataka, India[1]

Students of Final Year, Electronics and Communication, Bearys Institute of Technology, Mangalore, Karnataka, India[2]

Abstract: Today in the current global scenario safety and especially security of vehicle in common parking places has become a prime concern. In this system simple and cheaper vehicle tracking is implemented with the help of Global Positioning System (GPS), and Global System for Mobile Communication (GSM) technologies. The main components in the system are GPS module, GSM modem, IR sensor, RFID reader and microcontroller. The use of GPS system is to track the current location of the vehicle. As GPS system can only receive the vehicle location information from the satellites, GSM system is also installed in the vehicle for sending information to vehicle's owner. In case of towing and break open of vehicle this system automatically sends the SMS to own.

Keywords: RFID, IR Sensors, GPS and GSM.

1. INTRODUCTION

Security to all vehicles is the main objective of vehicle tracking system. In this system vehicle security is improved. Now days latest systems like GPS system is very useful and it helps the owner to observe and track the vehicle. This system also helps in finding out movement of vehicle and vehicle past activities.

This latest technology which created many wonders in the vehicle security is called vehicle tracking system. This hardware is assembled on the vehicle in such a way that it is invisible to the person inside or outside of the vehicle. If any interrupt to the system then it sends location information to the monitoring unit. To find the location of vehicle, location information from tracking system is used in case if the vehicle is stolen and can be informed to police for taking actions. It also alerts the owner by detecting unauthorized movement of vehicle.

2. METHODOLOGY AND PROPOSED SYSTEM

The proposed system consists of GSM, GPS, IR sensor RFID and Keypad based access control for vehicle ignition system capable of providing unauthorized access to start the vehicle and sending SMS alerts on unusual events.

The system consists of RFID Reader, Keypad, GSM Modem, GPS system using triangulation technique, IR sensor Relays interfaced to a Microcontroller to form a vehicle access control system. The user has to swipe his RFID card against the reader to authenticate the system. Once right card is swiped, the system prompts him to enter the password to enable the ignition system. On password authentication, the system can start the vehicle hence avoiding unauthorized access and providing more security against duplicate keys. The user can also switch off the vehicle by sending an SMS from his mobile phone. Once the GSM receives the message, the microcontroller processes it and switches off the ignition system. If vehicle has been stolen then user can track the vehicle by sending 'DATA1'(TRACK) and by using GPS system installed in the vehicle. Once the location of stolen vehicle discovered then user can trap the thief by using control messagessuchas'DATA2'(IgnitionOFF)','DATA3'(Doorlock)','DATA4'(Door Unlock).

3. TECHNOLOGY USED

- **IR Sensor Technology**

An IR sensor is a device which detects IR radiation falling on it. The principle of working of IR sensors is explained in the Fig. 1.

IR LED is used as IR transmitter and photodiode as receiver. When the vehicle passes through the booth, IR rays going to receiver are cut and signal is send to microcontroller[1]. An IR sensor consists of an IR LED and an IR Photodiode; together they are called as Photo – Coupler or Opto – Coupler. When the IR transmitter emits radiation, it reaches the object and some of the radiation reflects back to the IR receiver. Based on the intensity of the reception by the IR receiver, the output of the sensor is obtained.

IJIREEICE

ISSN (Online) 2321 – 2004
ISSN (Print) 2321 – 5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

ISO 3297:2007 Certified

Vol. 5, Issue 6, June 2017

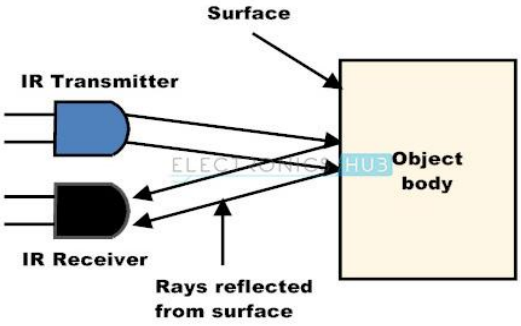

Fig.1: Block Diagram of IR Sensor

- **RFID Technology**

RFID stands for Radio-Frequency Identification. The acronym refers to small electronic devices that consist of a small chip and an antenna. The chip typically is capable of carrying 2,000 bytes of data or less[2].

The RFID device serves the same purpose as a bar code or a magnetic strip on the back of a credit card or ATM card it provides a unique identifier for that object. And, just as a bar code or magnetic strip must be scanned to get the information, the RFID device must be scanned to retrieve the identifying information. Radio Frequency Identification (RFID) technology is a wireless technology, mainly consists of three components, RFID tag or smart label, RFID reader, and an antenna. RFID tags contain an integrated circuit and an antenna, which are used to transmit data to the RFID reader also called an interrogator. The reader then converts the radio waves to a more usable form of data. Information collected from the tags is then transferred through a communication interface to a host computer system, where the data can be stored in a database and analyzed at a later time.

4. IMPLEMENTATION

The implementation part of the project work includes the circuit schematic of entire system, the software used and the source code.

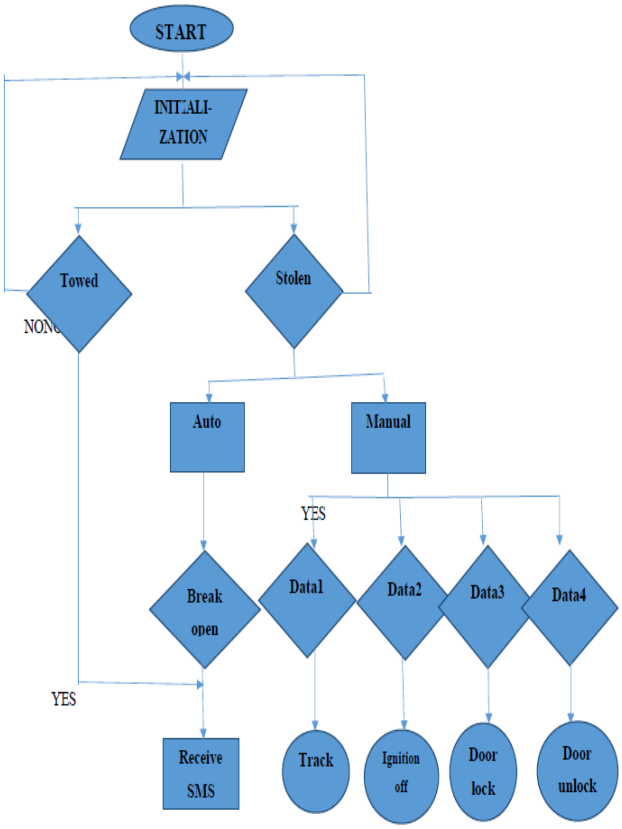

Fig.2: Flow Chart of Proposed System

IJIREEICE

ISSN (Online) 2321 – 2004
ISSN (Print) 2321 – 5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

ISO 3297:2007 Certified

Vol. 5, Issue 6, June 2017

The above flow chart Fig 2. shows the working flow of the system. When the system is initialized, it keeps on checking for 2 conditions, that is towing and stolen. If the vehicle is towed, user receives an sms with the location.

If the vehicle is stolen by forcible unlocking of door, then the user will get an SMS about it. And if there is no forcible unlocking and the vehicle is missing, then the vehicle can be tracked by sending "DATA1" to the system.

User can also switch off the ignition by sending another control message "DATA2" to the system. Other control messages "DATA3" and "DATA4" are used to lock and unlock the door respectively, which can be used to trap the thief.

- **BASCOM:** It is a relatively new programming language it was introduced in 1995.The BASCOM test board was designed for the testing of programs.

5. EXPERIMENTAL RESULTS

The experimental results comprises of the results that are obtained while working with the entire module. It includes the results of both toll collection and effective speed detection.

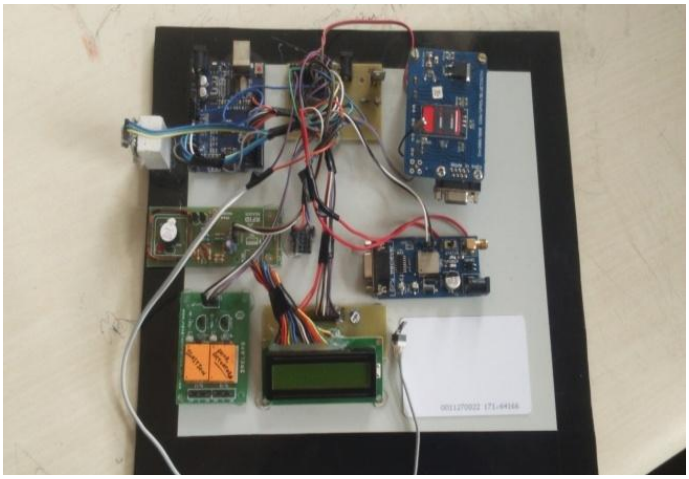

Fig.3: Overall System Module

The overall system module is shown in the Fig. 3. GSM and GPS modules are interfaced with Arduino UNO. It also consists of RFID tag and RFID reader, IR sensor, SPDT relays, LCD display, all connected to microcontroller AT328P.

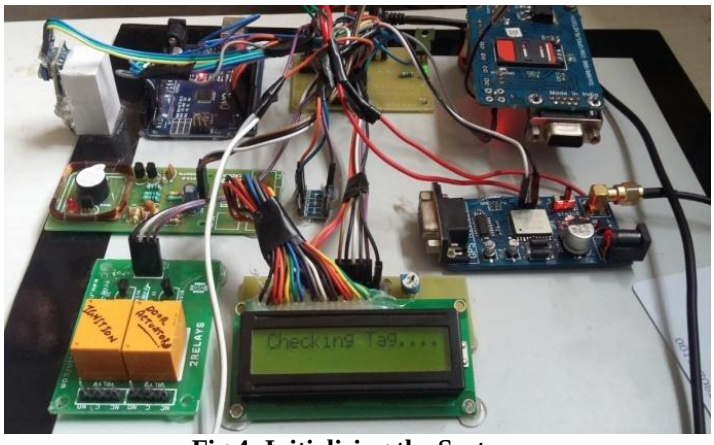

Fig.4: Initializing the System

After the system is initialized, the driver must prove his authentication by using his RFID Tag. The RFID reader decodes and compare the unique serial number with the stored data, if it matches, then the ignition is turned on as shown in fig 4.

IJIREEICE

ISSN (Online) 2321 – 2004
ISSN (Print) 2321 – 5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

ISO 3297:2007 Certified

Vol. 5, Issue 6, June 2017

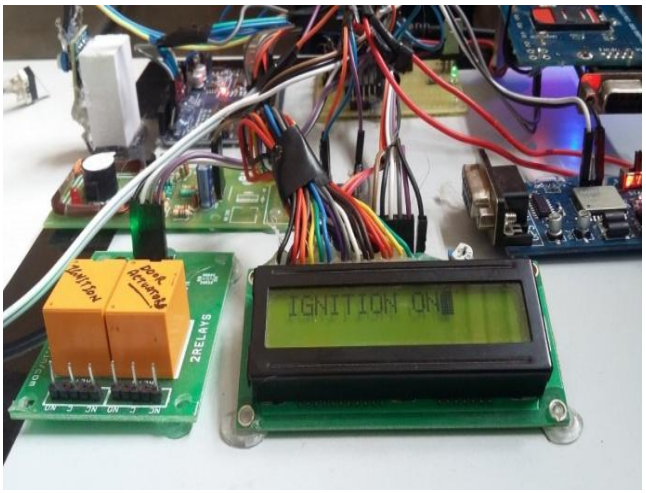

Fig.5: Ignition ON

If the Tag is sensed again, then the ignition will be turned OFF as shown in fig 5.

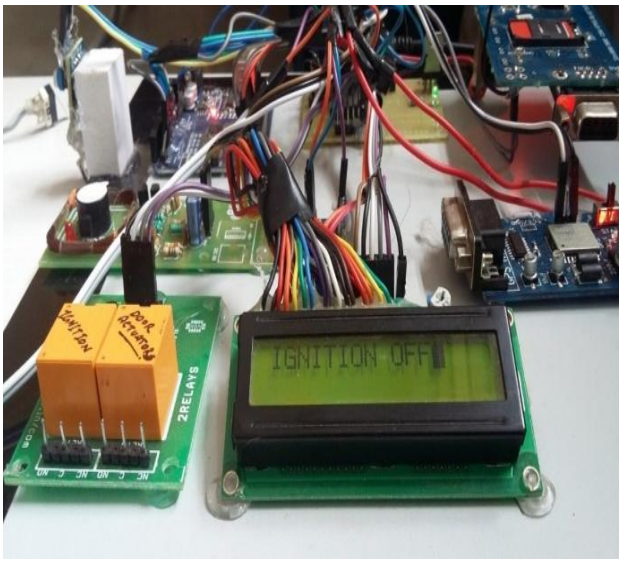

Fig.6: Ignition OFF

A leaf switch is incorporated with the vehicle door.Whenever a person tries to break open the door, there will be a increased pressure on the leaf switch which is interfaced to arduino. It detects and sends'Break open' message to the car owner, as shown in fig 6.

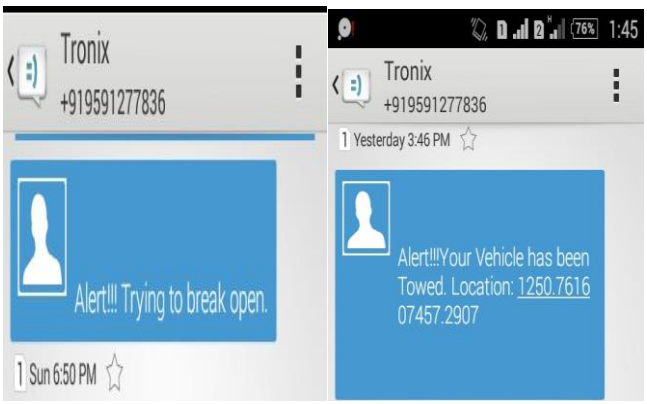

Fig.7: SMS Alerts to the User

DOI 10.17148/IJIREEICE.2017.5617

IJIREEICE

ISSN (Online) 2321 – 2004
ISSN (Print) 2321 – 5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

ISO 3297:2007 Certified

Vol. 5, Issue 6, June 2017

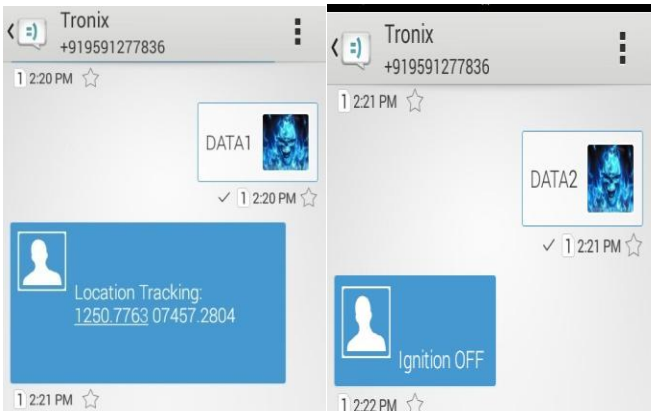

Fig.8: SMS Alerts to the User

If the vehicle found missing then the user can send a control messages such as'DATA1', 'DATA2','DATA3' and 'DATA4' and will have complete access to the vehicle as shown in fig 8.

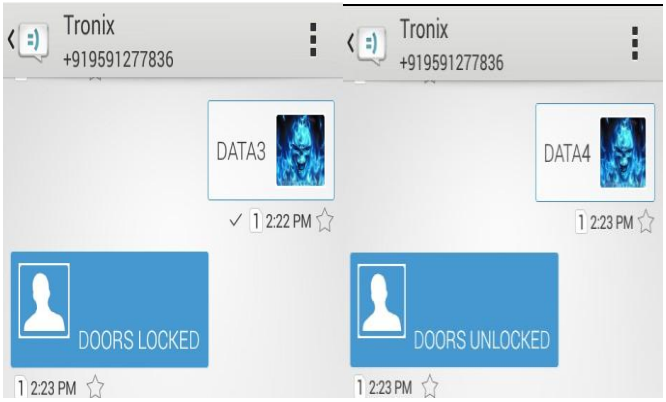

Fig.9: SMS Alerts to the User

When the user sends control message 'DATA3' to the system, microcontroller locks the door by switching the relay. When the user sends control message 'DATA4' to the system, microcontroller unlocks the door by switching the relay as shown in fig. 9

6. CONCLUSION & FUTURE SCOPE

This proposed work a novel method of vehicle tracking and locking systems used to track the theft vehicle by using GPS and GSM Technology. When the theft identified, the responsible people send SMS to the micro controller, then issue the control signals to stop the ignition. After that all the doors locked. To open the doors or to restart the engine authorized person needs to send other control messages. This system is cost-effective, reliable and has the function of preventing theft and providing accurate tracking system. A smart anti-theft system is one of the essential systems that homogenize both GPS and GSM systems. It is fundamental because of the huge numbers of uses of both GSM and GPS frameworks and the wide use of them by a great many individuals all through the world. This complete system is designed to provide better security for vehicle considering the low range vehicles.

In future we can include vibration sensor in the system, which can detect the intensity of vehicle hitting an object. If the intensity exceeds certain level, it detects accident and can send SMS to relatives and also the system can include USB connected webcam.

ACKNOWLEDGEMENT

This work is carried out with the help of group of students and authors. We would like to thank all the faculty members, students and **Prof. Abdul Kareem,** HOD, Department of Electronics & Communication, BIT, Mangaluru for their continuous Support.

IJIREEICE

ISSN (Online) 2321 – 2004
ISSN (Print) 2321 – 5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

ISO 3297:2007 Certified

Vol. 5, Issue 6, June 2017

REFERENCES

[1] Kichun Jo, Student Member, IEEE, Keounyup Chu, Student Member, IEEE, and MyounghoSunwoo, Member, IEEE Interacting Multiple Model Filter-Based Sensor Fusion of GPS With In-Vehicle Sensors for Real-Time Vehicle Positioning, IEEE transactions on intelligent transportation systems, vol. 13, no. 1, march 2012.

[2] Mohammed Abuzalata, MuntaserMomani, Sayel Fayyad and Suleiman Abu-EinDepartments of Mechatronics and Mechanical Engineering, Faculty of Engineering, Al-Balqa' Applied University, Technology, Amman, Jordan "A Practical Design of Anti-Theft Car Protection System Based on Microcontroller" 2012 Science Publications.

[3] Alaqeeli, A., J. Starzyk and F.V. Graas, 2003. Realtime acquisition and tracking for GPS receivers. Proceedings of the 2003 International Symposium on Circuits and Systems, May 25-28, IEEE Xplore Press, pp:IV-500-IV-503DOI:10.1109/ISCAS.2003.1205933.

BIOGRAPHIES

Sushanth K J received his BE from Coorg Institute of Technology, Coorg, India and M.Tech Degree from Sri Jayachamarajendra college of Engineering (SJCE), Mysore, under VTU, Karnataka, in the 2010 and 2012, respectively. At present he is working as Assistant Professor in Bearys Institute of Technology, Mangalore, India, in the department of Electronics and Communication Engineering. His research areas include Wireless Sensors networks, Embedded systems, and VLSI design.

Aysha Farana, Currently Pursuing BE, Final year in Electronics and Communication, at Bearys Institute of Technology, Mangalore, Karnataka. Her research interested in embedded systems, Image Processing and Digital communication.

Bushra Salina, Currently Pursuing BE, Final year in Electronics and Communication, at Bearys Institute of Technology, Mangalore, Karnataka. Her research interested in Microelectronics and Nano Technology.

Sachin, Currently Pursuing BE, Final year in Electronics and Communication, at Bearys Institute of Technology, Mangalore, Karnataka. His research interested in Embedded systems, Image Processing. Wireless networks.

Mahammad Isthikar, Currently Pursuing BE, Final year in Electronics and Communication, at Bearys Institute of Technology, Mangalore, Karnataka. His research interested in embedded systems, Image Processing.