VEHICLE TRACKING AND CONTROLLING SYSTEM USING GPS AND GSM

[1]P.Sindhoori, [2]M.Shanthi,
[1] Assistant professor, [2]Assistant professor,
[1]Electronics & Communication Engineering
[1]Narayana Engineering College, [1]Nellore, [1]Andhra Pradesh, [1]India

ABSTRACT

The rapid growth of technology and infrastructure has made our lives easier. The intelligent vehicle monitoring and controlling system is based on the GPS&GSM modules . It provide a optimum solution for the smart controlling of the vehicle using the RFID tag . By the GPS&GSM modules we can trace the vehicle location and the information is send through an SMS to the respective mobile number .Even If anyone tries to start the vehicle without the respective card[key] , a message is sent & later we can stop the ignition from our mobile, If this module is removed or destroyed we can get the message by using the accelerometer . This project is useful in detecting the accident precisely by means of accelerometer. The lost vehicle location can be easily traced and smart card locking & unlocking make this project as intelligent vehicle controlling . As a future implementation a wireless webcam can be added for capturing the images of the accident scene.

KEY WORDS: ATMEGA328P Microcontroller, GPS MODULE, GSM MODULE, RFID MODULE EM-18,Engine of Vehicle ,Relay board.

1.INTRODUCTION:

In the last few decades, India has progressed at such an enormous rate that many companies have strongly established themselves here. These companies bring a huge amount of workforce with them. Arranging transportation to such a huge mass is a cumbersome task involving many intricacies. Generally, this transport is arranged through the local transport vendors on a yearly contract basis, recently happen mishaps such as burglary, rape cases etc. The development of satellite communication technology is easy to identify the vehicle locations. Vehicle tracking systems have brought this technology to the day-to-day life of the common person. Today GPS used in cars, ambulances, fleets and police vehicles are common sights on the roads of developed countries. This system designed for users in land construction and transport business, provides real-time information such as location, speed and expected arrival time of the user is moving vehicles in a concise and easy-to-read format.

2.LITERATURE SURVEY:

The remote monitoring system based on SMS and GSM was implemented . Here, the network is used as a medium for transmitting the remote signal. This consists of two parts: the monitoring centre and the remote monitoring station. The proposed GPS/GSM based System has the two parts, first is a mobile unit and another is controlling station. The mobile unit and control stations are working successfully with the system processes, interfaces, connections, data transmission and reception of data. These results are compatible with GPS technologies.

In the proposed tracking system is based on cloud computing infrastructure. The sensors are used to monitor the fuel level, driver conditions, and speed of the vehicle. All the data transferred to cloud server-using GSM enabled device. All the vehicles equipped with GPS antenna to locate the place. To avoid the drunk and drive, the alcohol sensor installed to monitor the driver status. The proposed technology significantly avoids the accident in highways.

3.ATMEGA328P Microcontroller:

3.1 Introduction:

The Atmel ATmega328P is a 32K 8-bit microcontroller based on the AVR architecture. Many instructions are executed in a single clock cycle providing a throughput of almost 20 MIPS at 20MHz. The ATMEGA328-PU comes in a PDIP 28 pin package and is suitable for use on our 28 pin AVR Development Board.

Block Diagram:

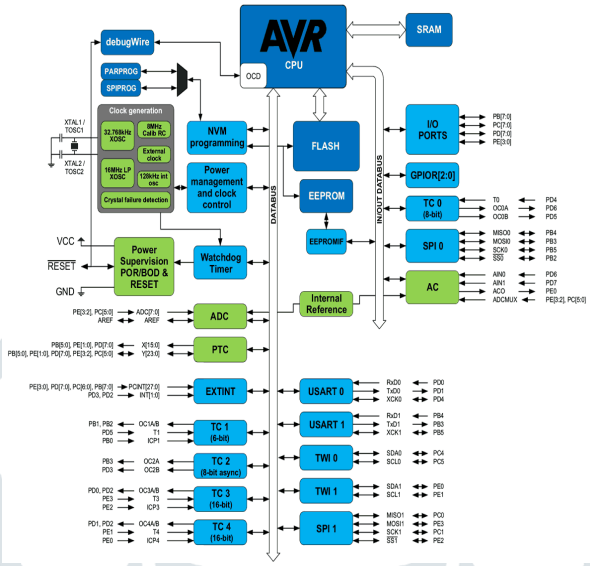


Fig: Block diagram

3.2 GPS MODULE

GPS Global Positioning System:

The GPS is a Global Navigation Satellite System (GNSS) developed by the United States Department of Defence. It is the only fully functional GNSS in the world. It uses a constellation of between 24 and 32 earth orbit satellites that transmit precise radio signals, which allow GPS receivers to determine their current location, the time, and their velocity.

Fig: GPS Module

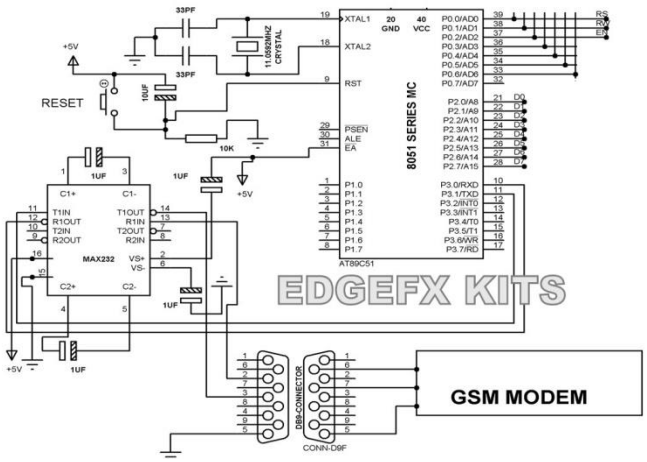


Fig:GSM Module

3.3RFID MODULE EM-18

Introduction:

The µRFID reader is a low cost, low power consumption, small size & easy to use device ideal to develop an RFID system. µRFID reader also has a detection pin(BUZ) that could be used to simply detect a valid RFID card. Its form factor and output data formats are 100% compatible with EM-18 Reader Module.

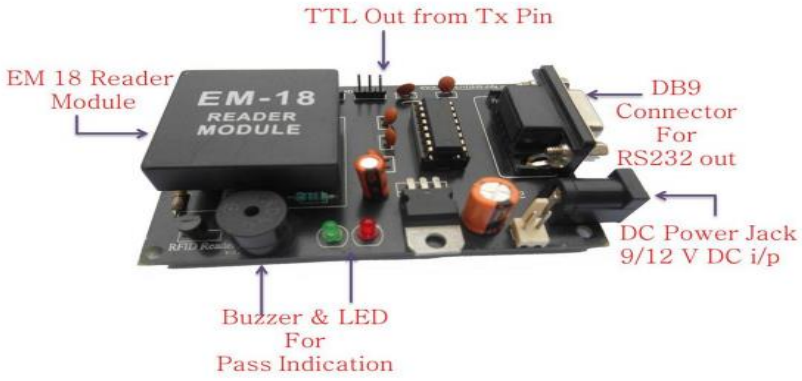
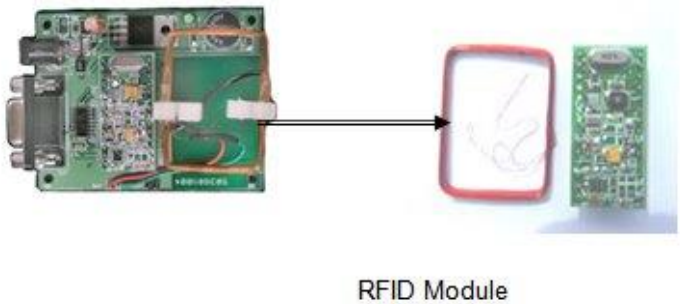


Fig:RFID Module

3.4 RFID Reader Module

RFID Reader Module, are also called as integrators. They convert radio waves returned from the RFID tag into a form that can be passed on to Controllers, which can make use of it. RFID tags and readers have to be tuned to the same frequency in order to communicate. RFID systems use many different frequencies, but the most common and widely used & supported by our Reader is 125 KHz.



RFID Module

Fig RFID Module

Fig Tags

The RFID tag consists of a powered or non powered microchip and an antenna. The three different types of tags are described below.

RFID Tag – The actual data carrying tool of an RFID structure, in general comprise of an antenna (coupling element) and an electronic micro-chip.

3.5 Accelerometer

Introduction:

One of the most common inertial sensors is the accelerometer, a dynamic sensor capable of a vast range of sensing. Accelerometers are available that can measure acceleration in one, two, or three orthogonal axes. They are typically used in one of three modes:

- As an inertial measurement of velocity and position;
- As a sensor of inclination, tilt, or orientation in 2 or 3 dimensions, as referenced from the acceleration of gravity (1 g = 9.8m/s^2);

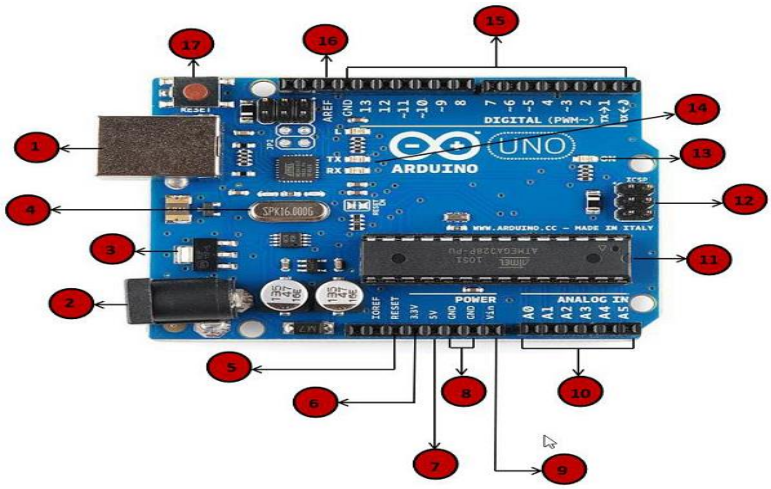
Fig Accelerometer

4. Arduino IDE

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

4.1.Hardware Specifications:

- Microcontroller: ATmega328
- Operating Voltage: 5V
- Input Voltage (recommended):7-12V
- Input Voltage (limits): 6- 20V
- Digital I/O Pins: 14 (of which 6 provide PWM output)
- Analog Input Pins: 6 • DC Current per I/O Pin: 40 mA
- DC Current for 3.3V Pin: 50 mA
- Flash Memory: 32 KB (ATmega328)
- SRAM: 2 KB (ATmega328)
- EEPROM: 1 KB (ATmega328)
- Clock Speed: 16 MHz



1. Power USB: Arduino board can be powered by using the USB cable from your computer. All you need to do is connect the USB cable to the USB connection (1).
2. Power (Barrel Jack): Arduino boards can be powered directly from the AC mains power supply by connecting it to the Barrel Jack (2).
3. Voltage Regulator: The function of the voltage regulator is to control the voltage given to the Arduino board and stabilize the DC voltages used by the processor and other elements.
4. Crystal Oscillator: The crystal oscillator helps Arduino in dealing with time issues.
5, 17.Arduino Reset: You can reset your Arduino board, i.e., start your program from the beginning.
6, 7, 8, 9. Pins (3.3, 5, GND, Vin):
- 3.3V (6): Supply 3.3 output volt
- 5V (7): Supply 5 output volt

10. Analog pins: The Arduino UNO board has five analog input pins A0 through A5. **11. Main microcontroller:** Each Arduino board has its own microcontroller (11). You can assume it as the brain of your board.
12.ICSP pin: Mostly, ICSP (12) is an AVR, a tiny programming header for the Arduino consisting of MOSI, MISO, SCK, RESET, VCC, and GND.
13. Power LED indicator: This LED should light up when you plug your Arduino into a power source to indicate that your board is powered up correctly.
14. TX and RX LEDs: On your board, you will find two labels: TX (transmit) and RX (receive). They appear in two places on the Arduino UNO board.
15. Digital I / O: The Arduino UNO board has 14 digital I/O pins (15) (of which 6 provide PWM (Pulse Width Modulation) output.
16. AREF:AREF stands for Analog Reference. It is sometimes, used to set an external reference voltage (between 0 and 5 Volts) as the upper limit for the analog input pins.
4.2.Arduino Installation:
Step 1:
First you must have your Arduino board (you can choose your favorite board) and a USB cable. In case you use Arduino UNO, ArduinoDuemilanove, Nano, Arduino Mega 2560, or Diecimila,
Step 2: Download Arduino IDE Software.
You can get different versions of Arduino IDE from the Download page on the Arduino Official website.
Step 3: Power up your board.
The Arduino Uno, Mega, Duemilanove and Arduino Nano automatically draw power from either, the USB connection to the computer or an external power supply.
Step 4: Launch Arduino IDE
After your Arduino IDE software is downloaded, you need to unzip the folder. **Step 5: Open your first project.**
Once the software starts, you have two options: Create a new project,Open an existing project example.To create a new project, select File --> New.
To open an existing project example, select File -> Example -> Basics -> Blink.
Step 6: Select your Arduino board.
To avoid any error while uploading your program to the board, you must select the correct Arduino board name, which matches with the board connected to your computer. Go to Tools -> Board and select your board

Step 7: Select your serial port.
Step 8: Upload the program to your board.

5.EXPERIMENTAL RESULTS

Message for theft
:
"TheftAlert
latitude: 2400.0090, Nlongitude: 12100.0000, E
time: 12:00"
Message for accident
:
"Accident alert
latitude: 2400.0090, Nlongitude: 12100.0000, E
time: 12:00"
This system shows the location of vehicle on the lcd connected to it also justto make sure the working condition of the microcontroller.

6.Applications

1.You can locate your stolen vehicle easily using your mobile without any extra cost.
2. It can be used for trucks carrying valuable goods, to keep track of the status of delivery and location of the truck at all times.

7.CONCLUSION AND FUTURE SCOPE

In today's world, the security of the vehicles is at stake. The incidents of theft are common. Also, the size of the device is compact since the GSM and GPS modules are not present as separate module.The project is all about controlling theft of a vehicle. The system is about making vehicle more secure by the use of GPS, GSM technology and a web application. The simulation is done by PROTEUS software.

8.REFERENCES

[1] El-Medany,W.;Al-Omary,A.;Al-Hakim,R.;Al-Irhayim,S.;Nusaif,M.,"A Cost Effective Real-Time Tracking System Prototype Using Integrated GPS/GPRS Module," Wireless and Mobile Communications (ICWMC), 2010 6th International Conference on,vol.,no.,pp.521,525,20-25 Sept.2010 International Journal of Computer Science, Engineering and Applications (IJCSEA) Vol.3, No.3, June 2013 40

[2] Hu Jian-ming; Li Jie; Li Guang-Hui, "Automobile Anti-theft System Based on GSM and GPS Module," Intelligent Networks and Intelligent Systems (ICINIS), 2012 Fifth International Conference on , vol., no., pp.199,201, 1-3 Nov. 2012

[3] Nagaraja, B. G.; Rayappa, R.; Mahesh, M.; Patil, C.M.; Manjunath, T. C., "Design & Development of a GSM Based Vehicle Theft Control System," Advanced Computer Control, 2009. ICACC '09. International Conference on , vol., no., pp.148,152, 22-24 Jan. 2009

[4] Fleischer, P.B.; Nelson, A.Y.; Sowah, R.A.; Bremang, A., "Design and development of GPS/GSM based vehicle tracking and alert system for commercial inter-city buses," Adaptive Science & Technology (ICAST), 2012 IEEE 4th International Conference on , vol., no., pp.1,6, 25-27 Oct. 2012