Theft Detection And Controlling System of A Vehicle Using Internet of Things (IOT)

M. Uday Kumar Naidu[1], P Anil Kumar[2]
[1, 2] M.Tech, Department of Mechanical Engineering
[1, 2]JNTUA College of engineering, Ananthapuramu, A.P.

Abstract- *At present days with increase in number of vehicles, vehicle thefts are also increasing in large numbers it is a challenging task for the owners to protect the vehicles, to overcome the theft of the vehicles an anti theft system is designed which is easier, useful and cost effective to protect the vehicles. This system uses GSM system, GPS system, a Buzzer, a sensor to detect theft of the vehicle and solenoid valve to cutoff the fuel supply for the engine from the carburetor. It also uses the internet as a tool to track and trace the vehicle location such that the owner can easily find the vehicle.*

I. INTRODUCTION

In India according to vehicle theft, burglary census from 2013 the vehicle thefts are increasing nearly 8.47 % on an average, for this situation the technology to avoid the theft of the vehicle must also be increased, Microcontroller based real time vehicle theft detection and prevention system provide solution for this problem. The Global system of mobile (GSM) communication is a globally accepted standard for cellular communication. The vehicle owner uses Subscriber Identity Module (SIM) inserted with in his mobile phone to send messages to GSM modem and GPS system which is a part of the vehicle theft prevention system that is attached to vehicle. This system is used for any vehicle like bus, bikes or cars and is also cost effective.

The main scope of this project is to send an alert message to the owner of the vehicle when the vehicle is stolen. This project includes a GSM modem, GPS system, microcontroller, buzzer and solenoid valve for fuel cut-off and a sensor to detect vehicle theft. When someone tries to steal the vehicle then microcontroller gets interrupted and orders GSM Modem to send the sms, the owner receives a SMS that his car is being stolen and also the exact location of the vehicle through GPS system. With a message from owner mobile the ignition system and fuel supply to the vehicle is cut off. And with the help of Internet Of things (IOT) we can find and trace the vehicle through the specially designed Application.

II. LITERATURE REVIEW

Some people uses the GPS system only to the vehicle to trace the vehicle location like the latitude, longitude and speed of the vehicle but not useful for controlling the vehicle. Some people uses only GSM for controlling the vehicle but not useful to trace the vehicle, some researchers uses GSM, GPS system to control the vehicle as well as to trace its location. The literature review of the work is as follows.

S.Ajaz et al [1] developed an anti-burglary vehicle security system which uses thumb impression to start the vehicle. The authorized persons thumb impressions are stored in the database of the system. The vehicle is started if the finger print of the database is matched. If anyone accessed the vehicle by chance then the fuel tank will be emptied through the relay bolt fitted to the tank at the same time it gives alarm that the vehicle is theft so that the unauthorized person cannot refill the emptied fuel tank. S S Pethakar et al [2] uses GSM, GPS & RFID security system for taxi like vehicles. For starting the vehicle the worker must use the RFID card in which the identification number is provided such that the identification numbers already preloaded in to the database of the system, If the number is matched, GPS and GSM comes in to play and sends SMS to the vehicle owner the location like latitude and longitude of the vehicle. If the owner detected theft by chance then he sends the SMS to the GSM such that it will lock the doors of the vehicle. Nagaraja et al [3] used GSM system, Microcontroller, and relay switch for the ignition system. It theft is detected the Microcontroller activates the GSM system to send SMS to the owner, If the owner gives reply to the SMS then the relay switch is activated and it deactivate the ignition system. Alkheder [4] uses GPS-GSM system that uses Google earth application. The system contains GPS module provided in the vehicle, this GPS module exchanges information with the GSM system to send SMS to the owner. After getting SMS to the owner he can trace the latitude, longitude and speed of the vehicle using Google earth application.

III. HARDWARE DISCRIPTION

1. RELAY

Relay uses an electromagnet to operate the switch mechanically. It energises to close or open the circuit.

Fig. 1 Relay

The Arduino Microcontroller does not have the capability to control the high voltage circuits. The Arduino microcontroller uses a low voltage signal to operate the relay and this relay interns used for the handling of high voltage circuits.

2. ARDUINO UNO BOARD

Arduino UNO board uses ATmega328 Micro-controller. It contains 14 digital input output pins, reset button, an USB and power jack. Uno means one in Italian language which means Arduino 1.0 series. The Uno series is the latest version of USB Arduino boards. This Arduino board can be powered with both the USB connection as well as external power source. It selects the power source automatically. The technical specifications of the Arduino board are as follows:

Table1. Specification for Arduino Uno Board

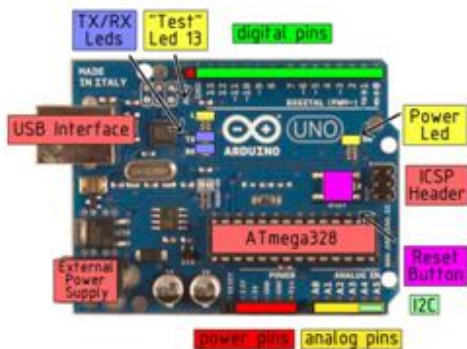| S. No	Specification	
1	Microcontroller	ATMega328
2	Operating voltage	5 V
3	Digital I/O pins	14
4	Analog input pins	6
5	Flash Memory	32 KB
6	EEPROM	1 KB
7	SRAM	2KB
8	Clock Speed	16 MHZ

Fig.2 Arduino Uno board

3. SOLENOID VALVE

Solenoid valve is an electromechanical device. The valve is operated by electric current passed through the solenoid. Through this valve the outflow of the fluid can be allowed or restricted. Solenoid valve uses less power, accurate in working, gives longer life and compact design. The technical specifications of solenoid valve are as follows.

S. No	Specification	
1	Operating Voltage	12 V DC
2	Fluid used	Petrol
3	Orifice size	
4	Type	2 Way
5	C_v Value	

Technical data for solenoid valve

Fig.3 Solenoid valve

4. SIM 808 MODULE

SIM 808 module contains GSM, GPRS and for satellite navigation it also incorporates GPS technology. With this technology we can trace our assets with a single system. This system is very convienient and cost effective because of its simplicity by incorporating the GPS, GPRS and GSM module in a single chip. It is Quad-band module working in frequency range of GSM 850 MHz, EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz. It provides horizontal position accuracy up to 2.5 m. It works in two modes that is functional mode and sleep mode. In sleep mode the current flow will be minimum in the module. The technical data of the system are as follows.

S. No	Specification	
1	Operating voltage	3.4 to 4.5 V
2	Modes	2 modes
3	Tracking sensitivity	165 dBM
4	Update Rate	5 Hz
5	GPS receiver channels	22 tracking
6	Operating temperature	40 to 80 ·C

Technical data for the SIM808 Module

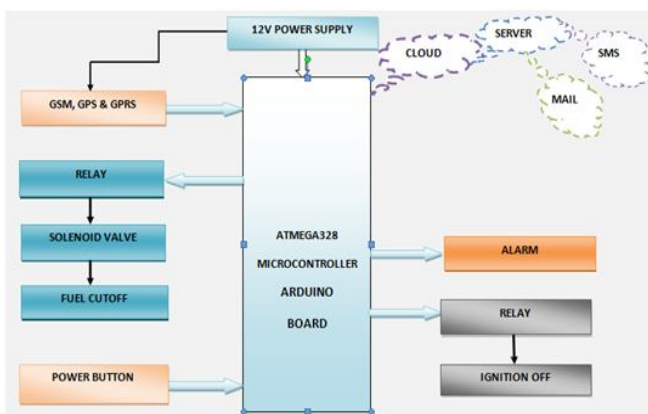Fig. 4 SIM 808 Module

5. BUZZER/ALARM

Here the buzzer is used to give the beep sound when the vehicle theft is detected. Here the buzzer used is piezoelectric type and of 5 Volts.
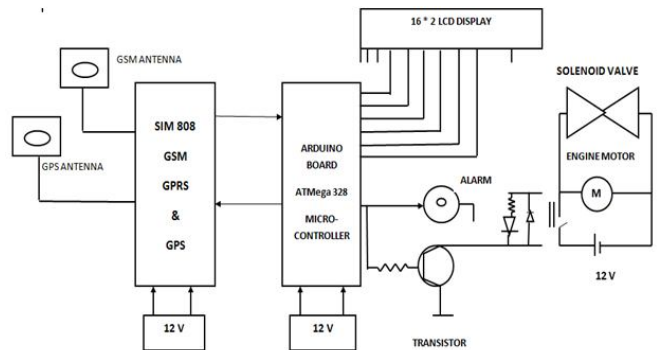

6. ATMEGA328 MICROCONTROLLER

ATMega328 microcontroller comes with the Arduino board, which consists of 28 input/output pins. It contains 1 KB EEPROM and 2 KB internal SRAM.

IV. BLOCK DIAGRAM

V. CIRCUIT DIAGRAM

VI. WORKING OF ANTI THEFT SYSTEM

While we go for work after riding the vehicle, the antitheft system must be kept in the active mode with the help of a switch present in the system. If anyone by chance starts the vehicle which is already in active mode, the voltage in the circuit becomes high which gives the signal to the microcontroller. This microcontroller again sends signal to the GSM, GPS and GPRS system to send SMS to the owner, and also its location like Longitude, Latitude and speed of the vehicle through GPS to the cloud, from the server we will get the mail. With the help of internet by using Ubidots website we can trace the vehicle. If the owner finds any threat to the vehicle then the owner with the help of SMS he will cut off the ignition by switch off the motor or spark plug with the help of relay and fuel supply to the engine with the help of the solenoid valve.
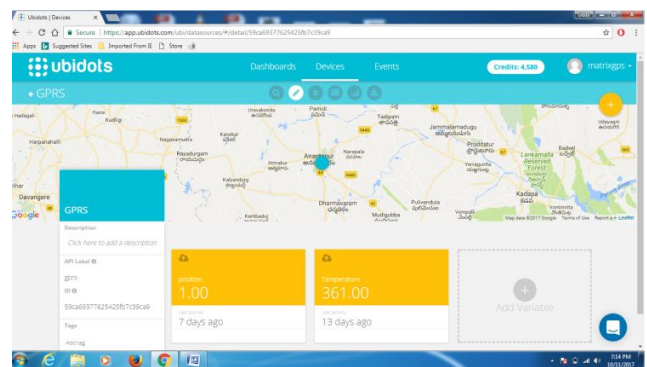
Tracing of the vehicle through Ubidots website

VII. RESULTS AND CONCLUSION

When the vehicle is taken by any one we will trace the vehicle using internet with the Ubidots application. If we can not trace the vehicle then with the help of mobile application we can switch off the ignition system and the buzzer is activated and at the same time solenoid valve is activated and the fuel from the tank is poured out.

REFERENCES

[1] S.Ajaz et al "Autonomus Vehicle monitoring & tracking system", SCONEST 2005 PP 1-4.

[2] S. S. Pethakar et al, "RFID, GPS and GSM based vehicle tracing and employee security system", International Journal of Advanced Research in Computer Science and Electronics Engineering, vol. 1, no. 10, pp. 91-96, Dec. 2012.

[3] B. G. Nagaraja et al, "Design and development of a GSM based vehicle theft control system," presented at the International Conference on Advanced Computer Control, Singapore, January 2009.

[4] M. A. A Khedher, "Hybrid GPS-GSM localization of automobile tracking system", International journal of computer science and technology, Vol. 3, no. 6, pp. 75-85, December 2011.

[5] Ishan karande et al, "Intelligent anti-Theft tracking and accident detection system for automobiles based on internet of things", International journal of innovative research in computer and communication Engineering, Vol. 4, Issue 3, March 2016