Vehicle Tracking System

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Abstract

This project describes a practical model for tracking the vehicle any where in the globe .The vehicle tracking system is based on GPS (Global positioning system) and GSM (Global system for mobile communication).The vehicle tracking system uses geographic position and time information of vehicle from the Global positioning Satellites. The GPS continuosly send the co-ordinate of vehicle position .GPS can be communicated by the user with the help GSM modem on which transmitter transmits co-ordinate of position and at receiver the location of vehicle will be known.The information of vehicle can be viewed on electronic map via internet or specialized software.

Keywords: Global positioning system (GPS), Global system for mobile communication (GSM), Microcontroller,Vehicle tracking system,General packet radio service (GPRS),SMS

I. INTRODUCTION

GSM and GPS based vehicle location and tracking system will provide effective, real time vehicle location , mapping and reporting this information value. A GPS-based vehicle tracking system will inform where your vehicle is and where it has been, how long it has been. The system has "on-board module" which resides in the vehicle to be tracked and a "Base Station" that monitors data from the various vehicle .The on-board module consist of GPS receiver, a GSM modem.[1]

The above figure shows vehicle tracking system based on GPS. Most of the modern vehicle's tracking systems belong to the category of Automatic-Vehicle-Location (AVL) systems.

AVL systems aid in determining the geographic positioning information of vehicles and transmitting it to a remotely located server. The vehicle's location is determined using GPS, while the transmission mechanism can be satellite, terrestrial radio or cellular connection from the vehicle to a radio receiver, satellite.[2].

II. GSM MODEM

Global system for mobile communication (GSM) is globally accepted standard for digital cellular communication. The GSM modem is wireless modem that works with a GSM wireless network. The GSM module can help in make/receive voice call,

send/receive SMS message and allow to connect with the internet through GPRS wireless network. A SIM card is essential for the GSM module to operate. The GSM shield communication data rate in bits per second for serial port is 9600bps.

Fig. 1:

This is SIM908 module which includes both GPS, GPRS and GSM in one chip. They have so many applications and can used easily for real time tracking applications.[3]

III. GPS

The is global positioning system is a global navigation satellite system based on space that provides reliable location and time information in all weather. The system provides essential information to military, civil and commercial user around the world and which is freely accessible to anyone with GPS receiver. A GPS is made up of constellation of satellite orbiting around earth.
GPS modules are popularly used for navigation, positioning, time and other purposes. GPS
antenna receives the location values from the satellites. GPS gives information about:

1) Message transmission time
2) Position at that time[4].

With the help of GPS receiver we could find the following :

- location
- latitude and longitude
- speed

IV. Microcontroller :ATMEGA32

A. Features:

- High-performance, Low-power 8-bit Microcontroller
- Advanced RISC Architecture
  - 131 Powerful Instructions
  - 32 x 8 General Purpose Working Registers
- I/O and Packages
  - 32 Programmable I/O Lines
- Operating Voltages
  - 2.7V - 5.5V for ATmega32L
  - 4.5V - 5.5V for ATmega32
- Special Microcontroller Features
  - Power-on Reset and Programmable Brown-out Detection
  - Internal Calibrated RC Oscillator
  - External and Internal Interrupt Sources
  - Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby and extended standby.

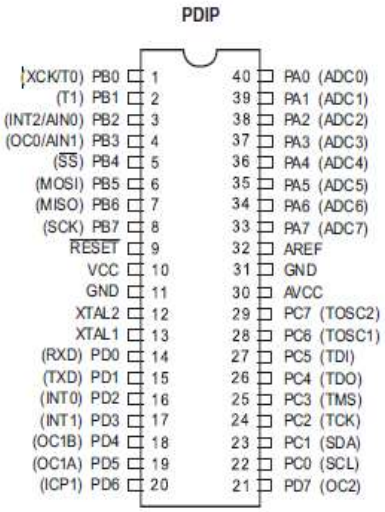

Fig. 2:

The ATmega32 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega32 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed[5].

V. SOFTWARE USED

A. Eagle version 6.1.0:

EAGLE, the Easy Applicable Graphical Layout Editor is a powerful PCB design software tailored to meet the needs of professional engineers, makers.

B. Schematic Editor:

Electrical Rule Check (ERC): Error check in the Schematic and consistency check between Schematic and Layout
Hierarchical Design: schematics can be designed in a hierarchical structure
Automatic board generation[7]

C. Schematic Diagram:

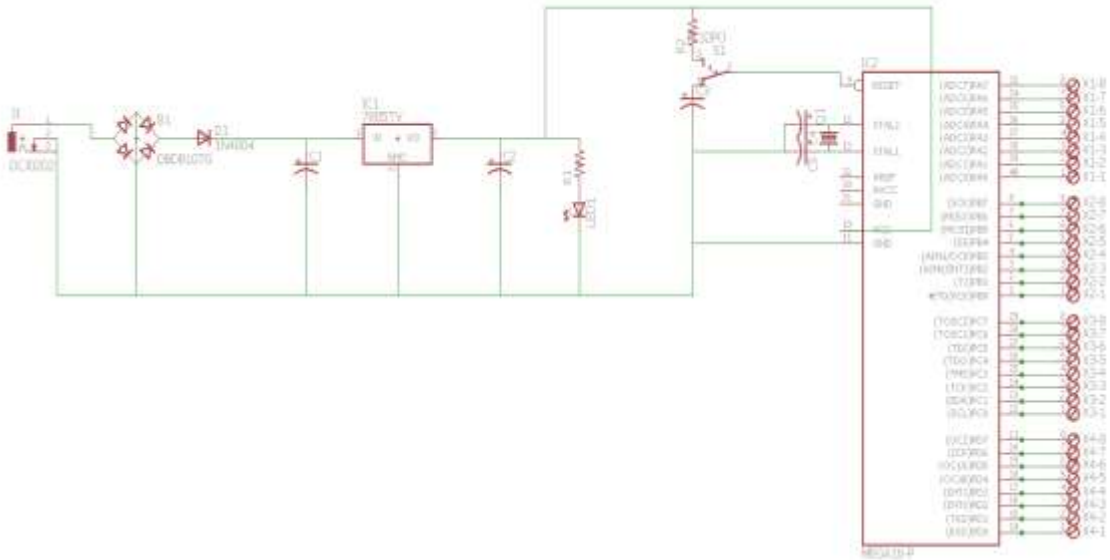

Fig. 3:

D. PCB Layout:

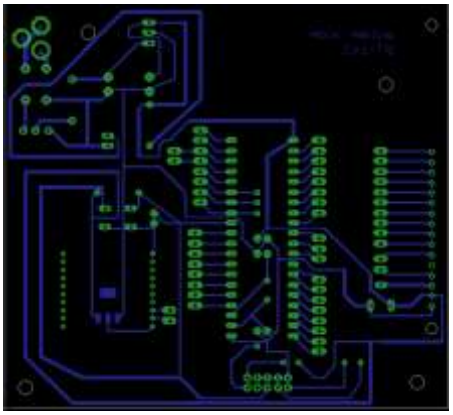

Fig. 4:

VI. DESIGN OF TRACKING SYSTEM

In this paper it is proposed to design an wireless system which is used for tracking and positioning of any vehicle by using Global position system GPS and global system for mobile communication GSM. In this device ATmega32 microcontroller is used for interfacing to hardware peripherals. The current design is an application of wireless network which will continuously monitor a moving vehicle and report the status of the vehicle on demand for that ATmega32 microcontroller is interfaced serially to a GSM modem and GPS. The GSM modem is used to send the position of (latitude and longitude) of the vehicle. The GPS modem will give the data of demanded(through SMS) I.e. the latitude and longitude indicating the position of vehicle. Then the above locations which are received through SMS is copied in the Google maps to check if the location given is perfect or not.
The microcontroller used is a ATmega32 .The code is written in the internal memory of the microcontroller with the help of an microcontroller instruction set it proceeds the instruction on demand and it acts as interface between GSM and GPS with the help of serial communication of ATmega 32. The AT commands are used in GSM and GPS. The GPS modem always transmits the data and GSM always receive the data, GPS transmitter pin is connected to an microcontroller and the GSM transmitter and receiver pin is connected microcontroller port D. Microcontroller takes data from GPS receiver and then sends the information to the user through SMS with help of GSM modem.[6]

E. Algorithm:

1) START
2) Define microcontroller input's and output's.
3) Initialize interrupt delay and string headers.
4) Port initializations (port D) as a input's & output's.
5) Port D initialization transmitter and receiver connection.
6) Initialize UART .
7) If UART initialization is done then the receiver sends message to the GSM.
8) If UART initialization is not done the go to step 5.
9) If GSM module receive message from receiver then it it transmits GPS location to the receiver.
10) If data is not received to the GSM location then go to step 5.
11) SIM908 sends SMS co-ordinates to the receiver.
12) If not then go to step no 4.
13) EXIT.

F. Applications:

- Car navigation.
- Theft protection.
- Stolen vehicle recovery.
- In school bus.
- For live tracking.

G. Result:

Whenever we want to find the location of vehicle then send the message " (where,666666#) " to the GSM number then we will receive location of vehicle in the form of co-ordinates like
Latitude:2400.0090,N

Longitude:12100.0000,E
Time:12.00
Date:yy-mm-dd
This system shows the location of vehicle on the LED connected to make sure the working condition of the microcontroller.

H. Advantages :

Commercial fleet operators are by far the largest user of vehicle tracking system. These systems are used for operational functions such as routing, security, dispatch and collecting on-board information. These are also used for fire detector is large vehicles like train, bus etc. because the vehicle like train contains large number of people and the sending alert of fire accident can save many lives. The applications for this project are in military, navigation, automobiles, aircraft, fleet management, remote monitoring, remote control, security system, teleservices , etc.

- It provides more security than other system.
- From the remote place we can access the system.
- Fleet Monitoring
- Vehicle scheduling
- Route monitoring
- Driver monitoring
- Geo-fencing geo-coding[1].

I. Future Scope:

- We can use the kit to do live tracking.
- We can use the concept for child tracking.
- VTS is becoming more important in cities & it is more secured than other system.
- VTS is very useful in future because cost of vehicles are increasing now a days so to protect them from being stolen.

VII. CONCLUSION

Vehicle tracking system makes better fleet management and which in turns brings large profiles. Better scheduling or route planning can enable you handle larger jobs leads within a particular time.VTS both in case of personal as well as business purpose improves safety and security.So in the upcoming year,it is going to play major role in our day to day life upcoming year,it is going to play major role in our day to day life

REFERENCES

[1] Baburao kodavati,V.K.Raju,S.Srinivasa Rao,A.V.Prabhu, Dr.Y.V.Narayana/International journal of engineering Research and Applications.ISSN:2248-9622
[2] IEEE Jordan Conference on applied electrical Engineering and Computing Technology. Iman M.Almomani , nour Y.Alkhalil, Enas M. Ahmad, Rania M.Jadeh.
[3] http://www.google.co.in/gsm+modem+908. http://www.fut-electronics.com.
[4] International Journal of Computer Science, Engineering and Applications (IJCSEA) Vol.3, No.3, June 2013.
[5] ATmega 32 microcontroller datasheet complete. The 8051 Microcontroller and Embedded Systems using Assembly and C by Muhammad Ali Mazidi , Janice Gillispie , Rolin D. Mckinlay.
[6] ISSN 2277-1956/V1N3-1103-1107,WWW.IJECSE.ORG.
[7] EAGLE Software version 6.1.0.