## EFFICIENT VEHICLE TRACKING AND MONITORING SYSTEM USING GPS AND GSM

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**ABSTRACT-** This paper proposes a vehicle monitoring systems purposely designed to eradicate the rate of kidnapping by their own vehicle driver which is increasing in number. It can be achievedby creating awareness to the parents by giving the information about the current travelling location of their children. This system is attached to the desired vehicle comprising, a GPS (Global Positioning System) for receiving the longitude and latitude values of the current location of a specified vehicle, an Arduino Micro-Controller for comparing the incoming data with the data which is pre-defined in the program while writing it, and a GSM (Global System for Mobile Communication) for sending the status of that vehicle in the form of SMS (Short Message Service) to the subscribed users. Thus the current travelling location of their children is always made visible to them. This system will track the vehicle at anytime and anywhere in the world. Hence this system is very efficient for global use.

**KEYWORDS:** GPS, Longitude, Latitude, GSM, Arduino Micro-Controller, Vehicle Tracking, Transmitter, Receiver.

## INTRODUCTION

The proposed system performs an accurate tracking of vehicles by using a module called GPS(Global Positioning System). Thus this reliable system can be very useful for the public to protect their vehicle from theft.Even though some systems are available for tracking the vehicles,only the particular position of the vehicle was sent as the message to the required clients. But this system is designed to provide all possible locations of the desired the vehicle, where it is currently moving on. Thus we can check whether the vehicle is going in a correct and in a regular path or not. And also they give the information to the users only in the form of mobile apps, or to the particular centers. But this proposed system will text a message to the passengers even they have no smart phones with them.

Here the Longitude and the Latitude values of the current position of the vehicle will be determined and transmitted to AtMega 8 micro-controller that is connected to theArduino board by the GPS. Then these valueswill be verified with the pre-defined values of micro-controller and only the matched data will be sent to the GSM.Now finally this GSM modem will forward the current location of the desired vehicle to the subscribed users through messages. The GPS module, Arduino

Atmega 8 micro-controller and GSM modem are connected together and resided in the vehicle which to be tracked.

Hence this GPS-GSM based tracking system will provide theeffective features like: a) Location Information b) Real time tracking using SMS. Since it is an intelligent system, it can evenresolve the problems such as late arrivals to scheduled work, improper use of company timeand resource, and stealing of vehicles. Andit willreduce the waiting time of the public user, if it is implemented in public transport. Because the persons can get the information about the required locationas a message at any time, they can come to the stop at the right time. Once they knew that their bus has moved from their stop then they can go with an alternate option even faster.

In this paper, section 2 deals with the literature survey, section 3 explains the proposed methodology and the working of the system and the section 4 gives the conclusion.

## 1. LITERATURE REVIEW

Abid khanet al [1] designed a trackingunit that makes use of global positioning system for determining theprecise location of an object and GSM modem for transmitting it to the remote user. The purpose of this system is to provide the location information using SMS, and to track activity of bus drivers. Here the communication is instantaneous.Ashish et al [2]developed a software package which reads, processes, analyzes and stores the incoming messages. And a password is sent by the owner and that will automatically stops the vehicle. This system is integrated with GPS-GSM.BaburaoKodavati et al [3] designed a system

that installs an electronic device in a vehicle, or fleet of vehicles, with designed computer software to enable the owner or a third party to track the vehicle's location. Thus this system uses the RF transmitter-receiver and GPS to locate the position of vehicle and uses GSM to transmit those data to the owner.

Chia-Hung Lienet al [4] developed a terminal device that includes GPS, GSM/GPRS and an embedded server which is used as a transfer location server, to monitor the trajectory in real-time Also, they have used a virtual comport to combine the existing electronic map directly. Iman M. Almomanietal[5] proposed a system that acquires the location and the ground speed of a particular vehicle and also monitors the vehicle by setting the speed and the geographical limits. Thus if that vehicle exceeds those pre-defined limits then the alerts will be sent in the form of SMS.G.S.Prasanth Ganesh et al [6] use a SMS to switch ON the system which in turn instructs the microcontroller to send the current location of the vehicle and by evaluating the time gap between the successive messages the exact location of the specified vehicle in a specified area can be determined.

The system [7] isequipped with a Compass Sensor and an Accelerator Sensor for determining the direction of a particular vehicle. After the completion of whole processes, the vehicle's location will be displayed on Google Map.N. Watthanawisuthet al [8] use accelerometer in addition to GPS and GSM and also use the threshold algorithm and the speed of the motorcycle to determine the accident in real-time. It can be used to detect the linear fall, non-linear

fall and a normal ride with a high accuracy.Md. ZavedParvezet al [9] developed a software system that sends a specialized request to the GSM cellular networks for calling a particular vehicle ID (SIM).

Thus by comparing all the existing systems, only the particular position of the vehicle was sent as the message to the required clients. But this system is designed to give all possible locations of the desired the vehicle currently moving on its trajectory. Thus we can check whether the vehicle is going in a correct and in a regular path or not.

## 3.1 HARDWARE DESIGN

The hardware part of this system comprises three major components such as GPS (Global Positioning System), Arduino with Atmega 8 microcontroller and a GSM (Global System for Mobile phones). For receiving co-ordinates values from the GPS receiver the Transmitter pin of the GPS must be connected to the Receiver pin of Micro-controller as shown inFigure 1. Thus the longitude and latitude values will be sent to the Micro-controller continuously. While receiving those values, the controller will perform the comparison operation between the values that comes into it with the values that are already fed into it.

Now we need to connect the Transmitter pin of the Controller with the Receiver pin of the GSM to transfer the location information of the desired vehicle to the specified mobile phone users as messages. For the accomplishment of the above functions, the additional connections such asthe power supply and the ground should be made properly to every individual component.
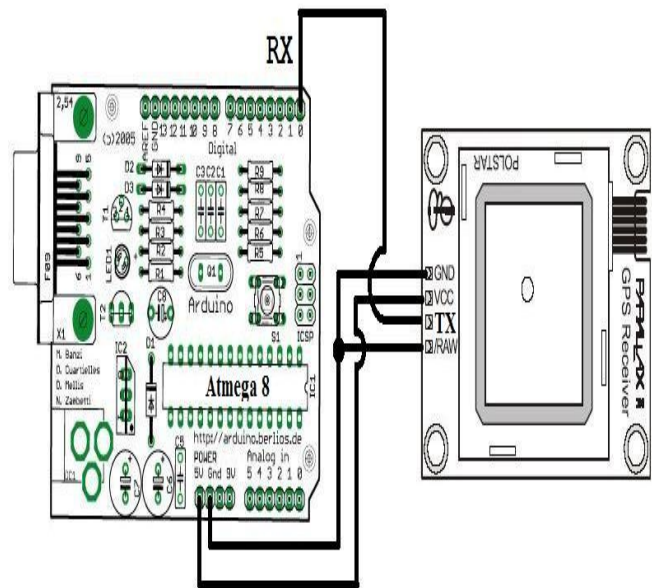


Figure 1. Connection between GPS and Arduino

The algorithm and the pseudo code for sending the message to the Subscribed users are mentioned below.

Algorithm: Vehicle Tracking System— To Send SMS to the Subscribed user thatcontainsthelocation information.
Input:

1. Signals from satellites to GPS receiver.
2. Longitude and latitude values to the Micro controller from GPS.
3. Location information to the GSM from microcontroller.

Output:

SMS, which contain the current position of the tracked vehicle.

PROCEDURE:

Step 1: Give the power supply to GPS, ARDUINO and GSM.

Step 2: GPS Receiver will receive the signals, transmitted by the GPS Satellites.

Step 3:Connect the GPS to the ARDUINO micro controller via Serial Convertor.

Step 4: GPS Receiver will transmit those signals as values to the Micro Controller.

Step 5:Comparison will be done by the controller as follows.

If (New locations of GPS Receiver == Predefined values that are already fed into it).

Step 6: Now the information corresponding to the matched values will be sent to the GSM modem.

Step 7: GSM will send thosereceived information to Subscribed users in the form of SMS.

on commands and those commands will always start with AT (which means ATtention) and finish with a <CR> character. Thus by using the following commands it will send the received information as messages to the mobile phone users whose details were stored in a separate database.

Table 1. Commands used for sending data to mobile

| Commands | Purpose |
|----------|---------|
| CMGF | To set the preferred message format |
| CMGR | To read the message |
| CMGS | To send the message |
| CMGL | To list the message |
| CMGW | To write the message to Memory |
| CMGD | To delete the message |

Thus the subscribed users can get the information about the current location of the vehicle anywhere in the world just by using their own mobiles phones.

**CONCLUSION**

This vehicle tracking and monitoring system is becoming important in larger cities and it is a cost effective one when compared to other tracking systems. Because any subscribed users who even do not have any smart phones with them can receive the message that gives the information about the current location of their vehicle. It also reduces the waiting time of the public user if it is implemented in public transport. Since the persons can get the message about the location whenever they need, they can come to the stop at the right time. And also if they came to know that their bus has moved from their stop then they can go with an alternate option even faster.

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