



## Secure traffic management using wireless based antilock security system

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### Abstract

This proposed work is an attempt to design a tracking unit that uses the global positioning system to determine the precise location of a object, Vehicle or other asset to which it is attached and using GSM modem this information can be transmit to remote user. It can provide Traffic signal-monitoring system for inter-cities transportation vehicles such as taxis and buses. This system contains single-board embedded system that is equipped with Antilock and GSM modems along with ATMEG 328P that is installed in the Traffic signal. During object motion, the Vehicle can be reported by SMS message. A software package is developed to read, process, analyze and store the incoming messages. The use of Antilock and GPS technologies allows the system to track object and provides the most up-to-date information about motion object. If a password like SMS is sent by the police, this system finds its application in real time traffic management system. It could be used as a valuable tool for real time moving Vehicles. The current system can be able to provide monitoring process from anywhere. The purpose of this system is to design and integrate a new system which is integrated with Antilock- GSM to provide following feature: a) Location information, b) Real time tracking using SMS, c) Communication is instantaneous therefore we can receive running report quickly. It is completely integrated so that once it is implemented in all Traffic signal, and then it is easy to track vehicles anywhere and anytime.

**Keywords:** controller (atmeg 328p), zigbee, gsm, nmea protocol smart traffic signal, security, ir sensor

### 1. Introduction

Proposed design is cost-effective, reliable and has the function of accurate tracking. When the number of vehicles was spread over the signal, the Traffic police often found it difficult to keep track of what was happening. They require a system to determine where each object was at any given time and for how long it opens the signal and also vehicles tracking are needed. To prevent any kind of over tracking vehicles because police can use tracking report to locate stolen vehicle. GSM and Antilock based tracking system will provide effective, real time vehicle location and reporting. An antilock- GSM based tracking system will inform where your vehicle is and where it has been, how long it has been. The system uses geographic position and time information from the Global Positioning Satellites. The system has an "On- Board Module" which resides in the vehicle to be tracked. The On-Board module consists of GPS receiver, a GSM modem and controller. It can provide traffic signal-monitoring and management system for inter-cities transportation vehicles such as taxis and buses [2]. During vehicle motion, its real-time parameters such as signal location are reported by SMS. The system has advantage of wireless technology provides powerful traffic management signal. The use of GSM and GPS technologies allows the system to track vehicle and provides the most up-to-date information about ongoing vehicles. This system finds application in real time traffic surveillance. It could be used as a valuable tool for real time vehicle information, congestion monitoring, and system evaluation [4]. An intelligent, automated

vehicle tracking system can resolve following problems such as, late arrivals to scheduled, improper use of signal time and resources, unsafe overtake signal habits, and people dissatisfaction. This can lead to better traffic flow modeling and a better understanding of traffic signal behavior. This paper includes various features like ingenuity, simplicity of design and easy implementation. It is completely integrated so that once it is implemented in all signals then it is easy to track vehicle anywhere anytime [7].

### 2. Hardware Design

Hardware model for tracking system is shown in Fig 1. System contains high Performance ATMEG 328P, a GPS, and GSM modem and overall system reside near the traffic signal. A tracking system will provide effective real time overtake vehicle details and Tracking system will inform where your vehicle is and where it has been, how longer it has been there. The basic function of vehicle, Monitor and transmit the position, latitude, and longitude, time to management center either at fixed interval or on demand. Controller unit form the heart of tracking unit, which acquires and process the position data from the GPS module. The GPS receiver of vehicle terminal receives and resolves the navigation message broadcasted by GPS position satellites, computes the longitude and latitude of vehicle coordinates, transforms it into the GSM message form by GSM communication controller, and sends the message to monitoring center via the GSM network.

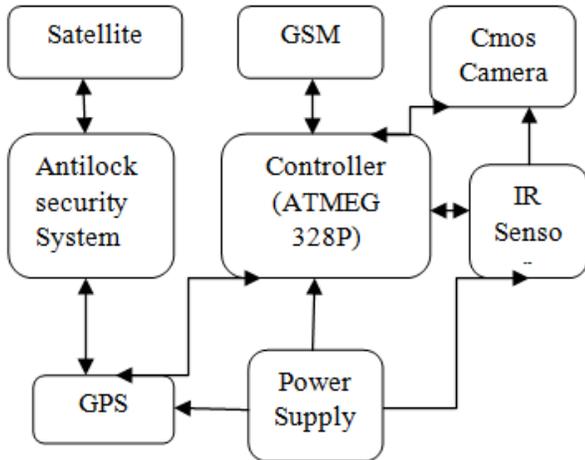


Fig 1: block diagram of tracking system

**GSM Hardware**

The core of data communication about this system lies in wireless communication control terminals that use GSM Modules to transfer long-distance data extensively and reliably. It Support instructions of AT commands. SIM300 can be integrated with a wide range of applications. SIM300 is a Tri-band GSM/GPRS engine that works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS1900 MHz SIM300 provides GPRS multi-slot class 10 capabilities and support the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. With a tiny configuration of 40mm x 33mm x 2.85 mm, SIM300 can fit almost all the space requirement in our application. Therefore, the CU can connect with GSM modules very expediently through serial interfaces. GSM modem as shown in Fig. 2.



Fig 2: GSM modem GPS RECEIVER

**3. Microcontroller**

1. A smaller computer
2. On-chip RAM, ROM, I/O ports.

Example ATMEG 328P perfectly fits many uses, from automotive industries and controlling home appliances, industries. It is also ideal for smart cards as well as for battery supplied devices of its low consumption EEPROM memory makes it easier to apply microcontrollers to devices where permanent storage of various parameters needed. Low cost, low consumption, easy handling and flexibility. The LPC2131/2132/2134/2136/2138 micro- controllers are based on a 32/16 bit ATMEG 328PTDMI-S CPU with real-time emulation and embedded trace support that combines the microcontroller with 32 kB, 64 kB, 128 kB, 256 kB and 512 kB of embedded high speed Flash memory. The hardware

interfaces for GPS units are designed to meet NMEA requirements. The GPS receiver provides data in NMEA 0183format with a 1Hz update rate. Generally message received by GPS is in NMEA [National Marine Electronics Association] message format and NMEA protocol which is most commonly used is NMEA0183 protocol. GPS sentences beginning with the following specifications: \$GPGGA, \$GPGSA, \$GPGSV, \$GPRMC, and \$GPVTG. And sentences also begins with \$GPMSS, \$GPZDA.

**4. IR Sensor**

The IR- sensor consist of Transmitter at one side of the track and another side (opposite) Receiver will be adjusted in site, all Four tracks the sensor are placed if any vehicle across over the signal. The IR sensor disconnect the incite and if will send the information to the controller and corresponding camera will capture the vehicle identification and it will send the message to concerned Traffic station.

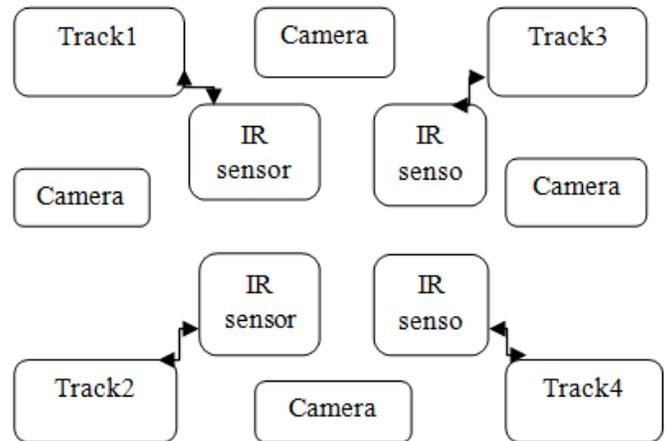


Fig 3: IR sensor Tracking System

**5. Result and Discussion**

Complete system as shown in fig.3 contains complete connection of 32-bit ATMEG 328P processor along with GSM and GPS system. With this system it becomes easy to keep track of the Vehicles. If the object resides in any location positional data in terms of latitude and longitude can easily be traced out also we can control our overtake vehicle by password like #2 as shown in fig 4.

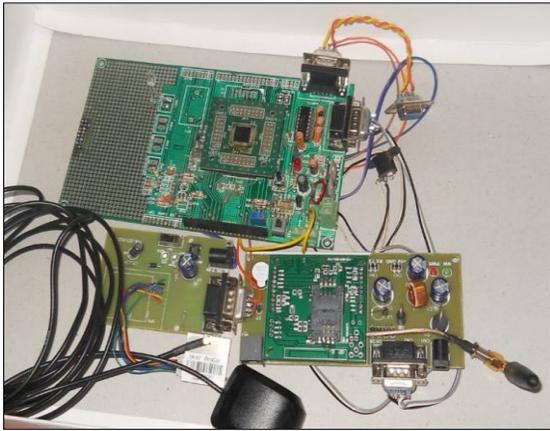


Fig 3: Tracking system.



Fig 4: message received by cellophane.

#### 4. Conclusions

The vehicles Tracking system is becoming increasingly important in large cities, Traffic signal and it is more secured than other systems. It is completely integrated so that once it is implemented in all Traffic controller, then it is possible to track anytime from anywhere. It has real-time capability, modern information technologies together and able to forms a real-time accurate, effective comprehensive Traffic signal system. This system has many advantages such as large capability, wide areas range, low operation costs, effective, Strong expandability and Easy to use in vehicle traffic administration. Upgrading this setup is very easy which makes it open to future a requirement which also makes it more efficient.

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