Estimation of performance parameters & Security System for four wheelers

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Abstract

The main concern in front of private as well as public transport services is safety & comfort of passengers. The existing private & public travelling services still use traditional ways. Due to lack of facilities, passengers & transport services has to go through many problems. Sometimes passengers have to face serious bottlenecks when there are technical faults in the vehicle at the remote places. One of the major problems is the accident. When a vehicle with full of passengers meets an accident & passengers gets seriously injured that time it's become very difficult to get this information to their relatives. Many times victims have to lose their lives due to delay in further primary health facilities. Existing transport services are facing this problem till today. It may be the thing that some unpredicted technical faults in the vehicle cause accidents. Another serious issue is the malfunctioning. Employees who use the vehicle can provide the fake accounts to owner for money. This is the unsolved headache for transport services. Security of passengers from negative resources in society has become the most critical issue nowadays as there is a high risk to carry responsibility of number of passenger lives at the same time. Being the private services it is not possible to provide security against inhuman activities. So from all this it can be easily concluded that existing services are not able to satisfy basic requirements of passengers of this era.

Keywords

GSM Module, microcontroller, sensors

1. Introduction

By considering today's need, private transport services coming forward to use technologies to solve problems. This system introduces much of the solutions over above discussed problems at lower possible cost. This system is divided into 2 parts i.e. in vehicle unit & base unit. The vehicle is equipped with different sensors to evaluate its performance. Temperature & air sensors detect the vehicle engine performance as well as external difficulties of vehicle. Metal sensor provides security against terrorism activities and pressure sensors detects accidents. Fuel sensor provides information about fuel content. System uses GPS [5] i.e. global positioning system to get the exact location & time of moving vehicle in terms of longitude & latitude. System is also atomized with voice messenger. Display is provided to show monitoring parameters in vehicle. Global system for mobile communication (GSM) technology is used to send & receive information in between vehicle and central office continuously [4]. On the office side the map of the vehicle route is provided which is designed by using graphical User Interface (GUI) to show the exact position on the roadsides. Vehicle performance parameters are gets monitored on display on the office side continuously. Alarm indicated that vehicle is in danger so that further controlling action is decided as early as possible. In this way, system overcomes much of the problems faced by transport services.

The need of this system lies in safety of the passengers. The existing private & public travelling services still use traditional ways. Due to lack of facilities, passengers & transport services has to go through many problems. Sometimes passengers have to face serious bottlenecks when there are technical faults in the vehicle at the remote places. One of the major problems is the accident. When a vehicle with full of passengers meets an accident & passengers gets seriously injured that time it's become very difficult to get this information to their relatives. Many times victims have to lose their lives due to delay in further primary health facilities. Existing transport services are facing this problem till today.

2. Architectre

2.1 Methodology

There will be separate unit for Transmission & Reception. The transmitter section is fitted into remote vehicle & the receiver section is fitted into office area.

Transmitter Section

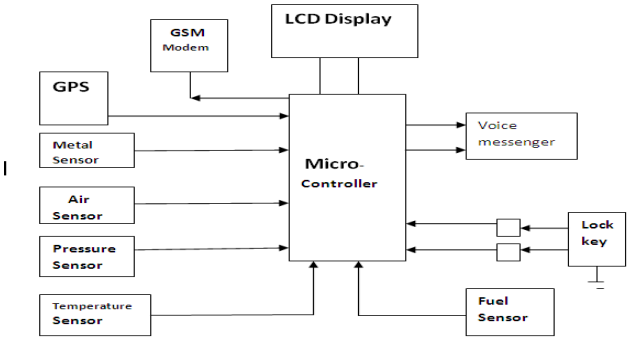

Fig 1 Transmitter

1] MCU: (microcontroller unit)

It is the heart of system. All the controlling functions, data transmitting function are done by this unit. Following functions will be carried out by microcontroller unit.

1. Check whether any sensor is active or not if active then do not allow ignition & inform the fault to monitoring station via sms.
2. Data from GPS will be received by MCU & send to monitoring station via sms.
3. To control the voice unit, activate it to announce the station.

2] GSM module:-

GSM SIM 300 is used as a media for communication between vehicle & server. Server will be informed time to time about status of vehicle via SMS. AT commands will be used.

3] Sensors:

- **Metal sensor:-**

Used to detect any arms & animation is carried by passenger.

- **Air sensor:-**

To check whether vehicle tyre is puncture or not. For this IR sensor is used.

- **Pressure sensor:-**

To detect accident.

- **Temperature sensor:-**

To check the temperature of water.

- **Fuel sensor:-**

To check the fuel level.

- **Lock key switch:-**

It is used to activate/deactivate the ignition.

4] Voice messenger:

In this circuit voice recorder/playback ic is used for example APR 9600 voice ic which provide 60 second voice record & play back with 8 channels. Bus stop will be stored & announced whenever required so that passenger will know about coming stop.

5] Power supply requirement:

Power supply required is 12v dc/2A max. For all system.

6] LCD:

20*4 line LCD is used to monitor the conditions of vehicle.

Receiver Section

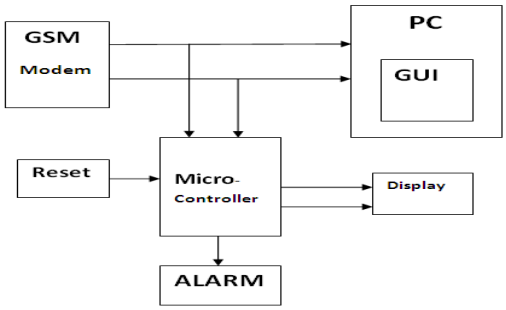

Fig 2 Receiver

Monitoring side:

1. At this side we will receive the data of position in terms of latitude & longitude given by GPS via SMS.
2. This data is given to PC through GSM modem SIM 300 via a max232 ic which is TTL-CMOS, CMOS-TTL converter to PC.
3. PC will contain GUI which will have map of area & through map we will plot position with the help of GPS data.
4. Also fault will be monitored & if fault occurs then alarm will be raised.

Methods Of Performance Monitoring

There are following methods of Vehicle Performance monitoring which are broadly recognized. Each method has many variants and dialects. Selecting and implementing a particular method depends on various factors Such as the accuracy required, time taken by that method etc. The methods are briefly explained below.

A. Vehicle Position finding Using GPS

A GPS is a device that uses the Global Positioning System to determine the precise location of a vehicle, person, or other asset to which it is attached and to record the position of the asset at regular intervals. The recorded location data can be stored within the tracking unit, or it may be transmitted to a central location data base, or internet-connected computer, using a cellular (GPRS), radio, or satellite modem embedded in the unit. This allows the asset's location to be displayed against a map backdrop either in real-time or when analyzing the track later, using customized software. A GPS technology uses the GNSS (Global Navigation Satellite System) network. This network incorporates a range of satellites that use microwave signals which are transmitted to GPS devices to give information on location, vehicle speed, time and direction. So, a GPS technology can potentially give both real-time and historic navigation data on any kind of journey.

B. Vehicle parameters Evaluation Using Sensors

Various types of sensors evaluate specific parameters of vehicle. The use of pressure sensor at right location on vehicle can detect heavy jerks and in tern accidents. Temperature sensor placed in the Engine section which is fully programmed to evaluate Engine performance can provide the best solution over technical issues of vehicle.

C. Information Exchange Using GSM

GSM based system make use of a well known technology Global System for Mobile communication. In this kind of system, SMS can be sent through GSM Module using AT

commands. Using the AT commands we can also retrieve the area ID and can send the area ID back in the form of message.

Conclusions

In this dissertation work, the aim is to develop a system that would continuously monitor the various performance parameters such as engine condition evaluated by temperature, tire conditions, security condition by detecting doubtful hazardous things in remote vehicle as well as detect the exact location of the vehicle & the time. This proposed work will help in detecting the accidental spots anywhere in the mentioned route, and also aids to the victims to rescue from the accidental location. The route is always under the observation of the system showing location information (latitude longitude) after specified time interval. The continuous monitoring of vehicle performance is useful for detecting the future dangers.

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