



Human Safety, Vehicle Safety Accident Avoiding and Detection Using GPS and GSM

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Abstract— In highly populated countries like, every day people lose their lives because of accidents and poor emergency facilities. These lives could have been saved if medical facilities are provided at the right time. This paper implies system which is a solution to this drawback. Vibration sensor can be used in car security system to sense vibrations in vehicle and GPS to give location of vehicle, so dangerous driving can be detected. When accident occurs, vibration sensor will detect signal and will send signal to controller, it will message with accident location is sent to preprogrammed numbers such as ambulance, police station, etc. via GSM. Alcohol sensor and Eye blink sensor for human safety. One time password (OTP) is used for vehicle safety. Before giving ignition the Person should give the one time password (OTP) which has been already received to the mobile. The processes are shown in the LCD display.

Index Terms— ATMEL Accelerometer, Alcohol sensor, Eye blink sensor GPS, GSM.

I. INTRODUCTION

In the developed world, road fatalities are the major concern. Now days the usage of private vehicles is increased by huge numbers of people. Day by day increased the use of transport, at present raising the number of fatalities. The main factors which are responsible for the most of the accidents are human carelessness, vehicle maintenance; drunk are the reckless driving and drowsy.

The accidents that occur in declined level of the driver vigilance of the driver are very serious when compared to other accidents, since drivers who are drowsy in the condition often don't take any actions which are avoidable prior to a collision. This system which can detect accidents in significantly less time and sends the basic information to first-aid center within a few seconds covering geographical co-ordinates, the time and angle in which the accident had occurred. Immediately, the GSM sends alert message to rescue team in a short time, which will help in saving the human lives.

In a world condition technological development increased at present security level is less condition. In [3], *Christo Ananth et al.* discussed to make the system more intelligent and advanced it is required to introduce some important developments that can help to promote not only the luxurious but also safety drive to the owner.

So this system provides more security to the vehicle by using One Time Password (OTP). It is one of the reliable identification method.

II. HARDWARE DESCRIPTION

A. Vibration Sensor:

The Accelerometers are sensors or transducers that measure acceleration. Accelerometers generally measure acceleration forces applied to a body by being mounted directly onto a surface of the accelerated body.

Accelerometers are useful in detecting motion in objects. This motion is indicative of motion in the larger object application in which the accelerometer is mounted. Thus, a sensitive accelerometer can quickly detect motion in the application.



Fig:1 Vibration Sensor

The accelerometer is connected with controller and placed in vehicle. If any accident occurs in the highways, the accelerometer sensor (vibration sensor) will indicate the controller and controller will in turn transmit the message to the hospitals and police stations through GSM technology. In



[4], Christo Ananth *et al.* discussed in which an eye blinking sensor is used to sense the blinking of the eye. spO2 sensor checks the pulse rate of the patient. Both are connected to micro controller.

A. GSM

One of the most leading digital systems is GSM. GSM uses narrow band Time Division Multiple Access (TDMA). Of all time GSM becomes the world's fastest growing communications technology. It is the leading global mobile standard.



Fig: 2 GSM Modules

GSM is an open, digital cellular technology, which is used for transmitting both data services and mobile voice. The operating frequency of GSM lies in between 900MHz and 1.8GHz bands. GSM is able to support data transfer speeds of up to 9.6 kbps. It also allows the transmission of basic data services such as SMS. GSM systems provide a number of useful features like Data networking, Call waiting, Call forwarding, Multi-party conferencing etc. GSM carriers usually have roaming contracts with other GSM carriers and it typically covers all rural areas completely when compared to the competing CDMA carriers. GSM also has taken the advantage of using Subscriber Identity Module (SIM) cards. The SIM card acts as a digital identity and it is tied to the mobile service carrier's network instead of to the handset. Due to this it allows for easy exchange from one mobile phone to another.

B. GPS

The Global Positioning System (GPS) is a navigation system which is satellite based. It sends and receives radio signals. By Using GPS technology, one can determine the exact location, time, velocity, 24 hours a day, in any weather conditions & anywhere in the world.

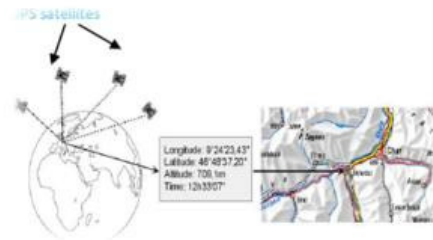


Fig: 3 Basic function of GPS

GPS was mainly intended for most of the military applications, but in the early 1980s, the government made the system necessary for civilian use. GPS receivers are used for locating; positioning, surveying, navigating and determining the time. GPS are employed by both private individuals and companies.

C. Alcohol Sensor

For Alcohol detection the most commonly used semiconductor sensor is MQ303A. It has fast response to alcohol, very good sensitivity and it is suitable for portable



Fig: 4 Alcohol Sensors

D. Eye Blink Sensor

Eye blink sensor is Infra Red based. As per eye blink the variation across the eye will vary. The output is high if the eye is closed otherwise it is low. Eye blink sensor is used to predict whether the eye is in closed position or in open position. The resultant output is given to a logic circuit to indicate the alarm. It is mainly used to prevent the accidents.

E. Liquid Crystal Display (LCD)

A liquid crystal display (LCD) is a flat, thin display device which is made up of number of monochrome or color pixels which are arrayed in front of reflector or a light source. The features of LCD are Energy efficient, cost effective, Space economy, reduction of radiation and lighter weight.

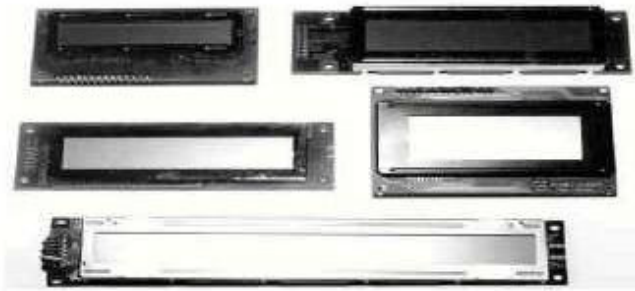


Fig: 5 Various Shapes and Sizes

III. EMBEDDED SYSTEM DESIGN

The Embedded system design consisting of Accelerometer sensor, GSM-global subscriber module, GPS-global position system, alcohol detector, eye blink detector, Most of the researchers tried to monitor the behavior of the vehicle or the driver in isolation, while others have focused on monitoring a combination of the vehicle, the driver and the environment in order to detect the status of the driver so as to prevent road accidents. And to safeguard our life and vehicle also. Embedded systems are compact, smart, efficient, and economical and user friendly, they are closed systems and respond to the real world situation very fast, closed system means, everything required for a specific application is embedded on the chip and hence, they do not call for external requirement for their functioning. Embedded systems basically consist of the following four segments. Embedded Controllers (8-bit, 16-bit, 32-bit, 64-bit, 128-bit,...). Embedded software's (RTOS) Embedded Memories (DRAM, SRAM, EPROM, Flash etc). Embedded Boards with high reliability, accuracy and precision, Embedded systems are operated with Real Time Operating systems like WinCE, RT Linux, VxWorks, PSOS, etc., Embedded systems are very popular these days. Most of the Electrical, Electronics, Mechanical, Chemical, Industrial, Medical, Space and many more areas have the embedded systems in their applications.

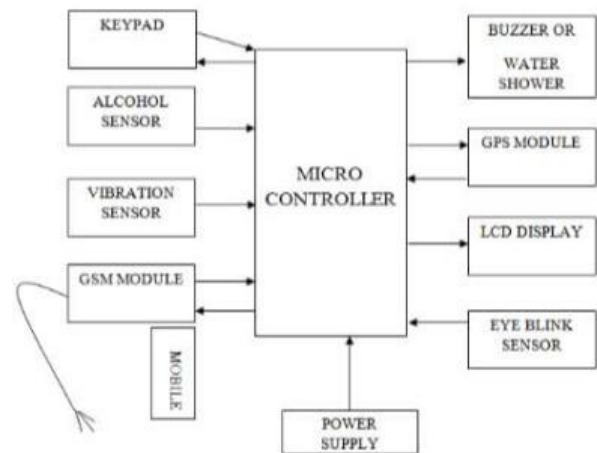


Fig: 6 Embedded Designs

IV. ONE TIME PASSWORD

OTP is nothing but it's a password which receives to the authenticated user. OTP is a 4 numbered password; the password is valid for 7 minutes. The OTP is used in car for vehicle safety if the user enters the password if the password Matches, the ignition of the car get started.

V. WORKING OPERATION

Different sensors (alcohol, Eye blink) are used to sense the alcoholic nature of the driver, the eye-lid movement of the driver. The output of different sensors is given to the microcontroller. The output of the microcontroller is displayed on the LCD. If any gas leakage occurs or when the driver is intoxicated with alcohol or if the driver blinks his eyes, immediately the motor of the vehicle will stop. If the accident occurs by vibration of rotating machinery of the vehicle, immediately the exact location of the accident is identified by an authority person through Global positioning system (GPS) and message is sent via Global system for mobile Communications (GSM). Keypad is used to type the One time password (OTP) received to the owner's

VI. TRACKING THE LOCATION OF THE ACCIDENT

Nowadays accidents occur on all the places. Major accidents occur in highways because of the high speed of the vehicle. The main objective of Global Positioning System (GPS) is to detect the accident if occurred and informs the respective authority. The GPS tracker will track the accident from at least three orbiting GPS satellites. The GPS tracker will transmit that related information to a server (computer), and it will display it on a web-based portal which is in line with mapping software. The information system of accident will get activated and the message will transmit immediately to the Respective authority whenever an accident occurs. This process is done by GSM. In case of any accident, the vibration



of vibration sensor increases beyond the limit and information is sent to GSM module. The GSM then sends message to the right person.

VII. RESULTS

S.no	Conditions	Result which is displayed on the LCD
1.	Driver in sleep condition	Driver in Sleep
2.	Driver in alcoholic condition	Alcohol detected
3.	Occurrence of accident	Accident detected
4.	Information to the authority person by using GSM	Message sent

Table: 1



Fig: 6 When the driver is in sleep



Fig:8 When the driver is intoxicated with alcohol.



Fig: 8 When the accident is detected



Fig: 9 Message sent to mobiles through GSM

VIII. SOFTWARE PROGRAM TESTING

The software program is written in c or assembly language and compiled using keil software. After compiler operation the hex code is generated and stored in the computer and then it tested using the Proteus 8.0. The hex code of the program is burnt into the controller using Programmer

IX. CONCLUSION

Automatic accident detection and reporting system is designed in this paper. When accident occurs, it is sensed by Acceleratometer. Short message including location of accident obtained using GPS, is sent via GSM network. It provides more than 70% safety for four wheelers. It is the fact that implementation of system will increase cost of vehicle but it is better to have some percent safety rather than having no percent of safety. And alcohol sensor and the eye blink sensors are use for the human safety and One Time Password (OTP) is used for the vehicle safety in better way.

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