

# Automatic Mobile Phone Usage Prevention While Driving Using GSM Technology

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## Abstract

Using a mobile phone while driving can affect the cognitive functions of a person; distract his or her visual concentration and also the speed of processing information. No matter how many times our elders told about the ill-effects of using cell phones while driving, but how many of us have taken their advises seriously. It is one of the major reasons for number of accident that are happening nowadays. Usage of cell phone is increasing, risk associated with usage of mobile phone while driving causes road accidents. According to Indian National Crime Records Bureau at least 14 people dies every hour in road accidents. Records prove that increase in accidents is due to mobile phone. In order, to overcome this issue, we are introducing a system which helps in reducing the mobile accidents.

**Keywords:** Mobile phone, GPS, GSM, sim, vehicle.

## 1. INTRODUCTION

Mobile phones can be an essential means of communication when we are away from the office or home and it can be an important security asset in the event of an emergency. However, there is a considerable concern that using a mobile phone while driving creates a significant accident risk to the user and to the other people on the road, because it distracts the driver, impairs their control of the vehicle and reduces their awareness of what is happening on the road around them. There are two types of distraction. They include Physical distraction (visual and mechanical) Cognitive distraction. To reduce the risk and accident due to mobile phone usage while driving we are developing a model to prevent the usage of mobile phone during driving. The system allows the call if it is emergency only, and when the call is attended the speed is automatically reduced and to show the vehicle is reducing the speed a backlight is provided. In school and hospital zone the speed of the vehicle is automatically reduced. Accident is detected using pressure sensor and using GPS the position of the vehicle is detected and message is sent to prestored number using GSM technology. The system also highlights the vehicle theft that is when vehicle is lost the driver can send message to the system's

microcontroller to 'STOP THE VEHICLE'. The vehicle will be stopped. Thus the accident due to mobile phone will be reduced to a large extent.

## 2. RELATED WORKS

Frederic Bauchot, Gerard Marmigere, "Secondo" *System For Controlling Wireless Communications From A Moving Vehicle* "10/978,721., (nov.1, 2004): The present invention is directed to a system for controlling, in a moving vehicle, wireless communications between a local and a remote party and more particularly to prevent any conversation in vehicles travelling above a predefined speed without cutting off wireless communication. If a wireless communication is detected and if the vehicle speed exceeds a first predefined speed limit, the wireless communication is suspended. When the vehicle speed decreases below a second predefined speed limit, the suspended wireless communication is re-established. The system comprises a wireless communication manager unit connected to both a conventional mobile communication system and a conventional free hand kit, the free hand kit being also connected to mobile communication system.

Yu-Fu-Fan, Hsin-Chu (TW), In-Ga Chiu, Tao Yuan Hsien (TW), 10/707, 516, US patent (dec.19,2003) "Method for automatically switching a profile of mobile phone": A method for automatically switching a profile of a mobile phone includes measuring a current environmental noise value of ambient noise surrounding the mobile phone. The current environmental noise value is then compared to a predetermined noise value, and a noise difference is calculated. Next, the profile of the mobile phone is switched based on the value of the noise difference.

### 3. PROBLEM DOMAIN

In this we Propose a concept for overcome this, it consists of two devices former the vehicle section once we start the ignition the RF signal transfer's from the vehicle to mobile immediately it changes to driving mode. If mobile receives the call, it attends and gives the voice information, if the call is emergency only means it will inform the driver through ringing. This Project designed with

- GSM
- Microcontroller
- RS232
- RF Technology
- GPS
- Radio Fencing

GSM Modem is interfaced with the microcontroller through RS232 converter. RS232 converter is used to convert RS232 logic to TTL logic vice versa because GPS receiver is the RS232 logic and microcontroller is the TTL logic. Here the microcontroller is the flash type reprogrammable microcontroller in which we have already programmed. Then dialing information signal is transmitted through GSM network or mobile. Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver. Radio fencing is a method where providing a transmitter at restricted areas and when it enters the signal is detected.

### 4. MOTIVATION

#### 4.1 REAL LIFE MOTIVATION

In the previous related paper the paper [2] only describes that mobile phone includes measuring a current environmental noise value and ambient noise value of surrounding. The current environmental noise value is then compared to a predetermined noise value, and a noise difference is calculated. Next, the profile of the mobile

phone is switched based on the value of the noise difference of the mobile phone.

Enhanced system receives calls which are only emergency calls. Under this condition the speed of the vehicle is measured continuously using a speed sensor. It is a counting sensor. The speed is determined by counting the number of pulses over a fixed period of time. Once our application gets any incoming call event it starts the following process to make user uninterrupted while driving based on various conditions. First the application checks for driving profile (i.e., the calls are diverted to a GSM module). If driving profile is disabled then all incoming calls will be allowed. Otherwise it will again check whether it is an emergency call once the speed is above threshold value. If it is an emergency call, application allows that call. Otherwise disconnect that call and sends a message to the calling party that user is driving. Thus incoming call can be detected.

#### 4.2 TECHNICAL MOTIVATION

This system save life by helping the drivers get medical treatment on time. The accelerometer is connected with microcontroller and is placed in the vehicle. If any accident occurs, the vibration sensor senses the vibration level and if it exceeds the threshold limit the system will consider that there is an occurrence of accident in that particular location and it will indicate the controller. The controller will in turn transmit the message to the Emergency Medical Service and to the family member through GSM technology. The message will contain the details of vehicle number, place of accident which was gathered using GPS. The function of Global Positioning System (GPS) is the most promising technology to acquire the position information in outdoor environments. If an accident occurs the vibration sensor senses the vibration level and if it exceeds the threshold limit, the system will consider that there is an occurrence of accident in that particular location. So accident detection is done.

### 5. PROBLEM DEFINITION AND STATEMENT

We proposed a safest application which will significantly reduce the risk of mobile phone accident at the same time the user don't have any stress on missing emergency calls. The system is compact and is aimed to be installed in the dash board section of the car.

The system comprises of cooperative components of a Microcontroller unit (MCU), GSM/GPS module, Speed

sensor, Vibration sensor, LCD display (16x2) and an Alarm unit. A high performance 16 bits MCU is used to process and store real-time signal from the accelerometer. System proves to be very cost effective and efficient, highly reliable (as it requires no costly software to be installed or costly hand set); Reduces the risk involved in mobile accidents significantly at the same time reduces the economic losses by ¼. The vehicle which is undergone to an accident can be identified by using tracking technology without any delay. Immediate medication will be provided to accident victims in remote areas.

Muting Mobile, Voice Mail Converter is the main ways by which we reduce the accidents. Although various rules and measures are placed on mobile phone usage, still it's highly impractical to prevent these types of events. In order to overcome this serious issue, we developed an application which helps in reducing the mobile accidents. Problem addresses the situation when a parent is permitted to receive three calls from home or office. When the third call is allowed to call through to the driver who can attend the calls, device permits and allows the call which is mounted inside the car near the driver. Besides the work also relates to possibility of a message which is predefined message in the event of an emergency such as an accident. GPS system messages the location coordinates to the prestored phone numbers.

## 6. PROBLEM CAPTURE

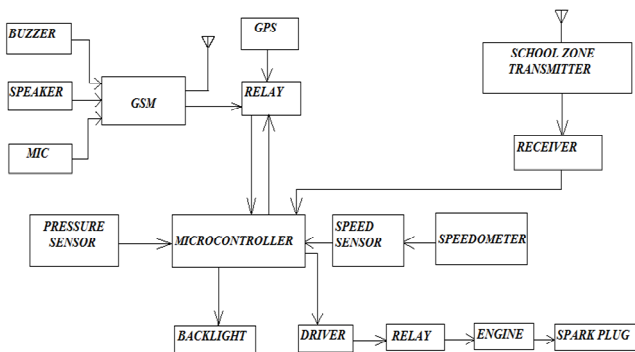


Fig. 1. Block diagram of automatic mobile phone usage while driving using GSM technology

The block consists of a GSM module connected with a buzzer, speaker, and a MIC. This it act as a modem in simple a mobile phone.

It includes GPS, microcontroller, a speed sensor and a driver.

It also includes two relays.

Signal when received to GSM from the transmitter.

It transmits the signal as call and is given to relay.

Relay controls the GPS and GSM.

If the speed is low then the signal is given to microcontroller.

Microcontroller is programmed in such a way that the emergency calls are only received.

Using speed sensor speed is detected and is measured using speedometer and if an accident occurs correspondingly inside the microcontroller it is programmed to send a message to nearby police station and to a family member number.

When speed is low only microcontroller provides an indicator such that vehicles coming in the back can divert the direction of travel.

It reduces the speed in each zonal area such as school, hospital. If the speed is low the vehicle moves otherwise the engine stops and vehicle stops.

It also acts as an anti-theft system.

Buzzer-A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke.

GSM- GSM Modem is interfaced with the microcontroller through RS232 converter. RS232 converter is used to convert RS232 logic to TTL logic vice versa because GPS receiver is the RS232 logic and microcontroller is the TTL logic. Here the microcontroller is the flash type reprogrammable microcontroller in which we

have already programmed. Information signal is transmitted through GSM network or mobile.

GPS- Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.

MIC-An instrument that converts sound waves into an electric current, usually fed into an amplifier, a recorder or a broadcast transmitter.

Relay-It is an electrically operated switch. Relays are used where it is necessary to control a circuit by a low –power signal.

Microcontroller-The AVR is a modified Harvard architecture 8-bit RISC single chip microcontroller which was developed in 1996. This is used as on-chip flash memory for program storage.

Pressure Sensor-It measures pressure, typically of gases or liquids. It acts as a transducer, which generates a signal as a function of the pressure imposed.

Speedometer- Speedometer is a gauge that measures and displays the instantaneous speed of a land vehicle. Speedometers for other vehicles have specific names and use other means of sensing speed.

Speed sensor- Used to detect the speed of an object, usually a transport vehicle

Device driver- It is a computer program that operates or controls a particular type of device that is attached to a computer. A driver typically communicates with the device through the computer bus or communications subsystem to which the hardware connects.

Spark plug- It is a device for delivering electric current from an ignition system to the combustion chamber of a spark ignition engine to ignite the compressed fuel mixture by an electric spark.

Engine- It is a machine designed to convert energy into useful mechanical motion.

Transmitter- It is an electronic device which, when connected to an antenna, produces an electromagnetic signal such as in radio and television broadcasting.

Receiver- A device, such as a part of a radio, television set, or telephone, that receives incoming radio signals and converts them to perceptible forms, such as sound or light.

Backlight-is a flat panel display. A type of spotlight, used in photography, which illuminates a subject from behind audio output that can be heard by the listener.

Speaker-Speakers are one of the most common output devices used with computer systems. The purpose of speakers is to produce audio output that can be heard by the listener.

### 7. ALGORITHM

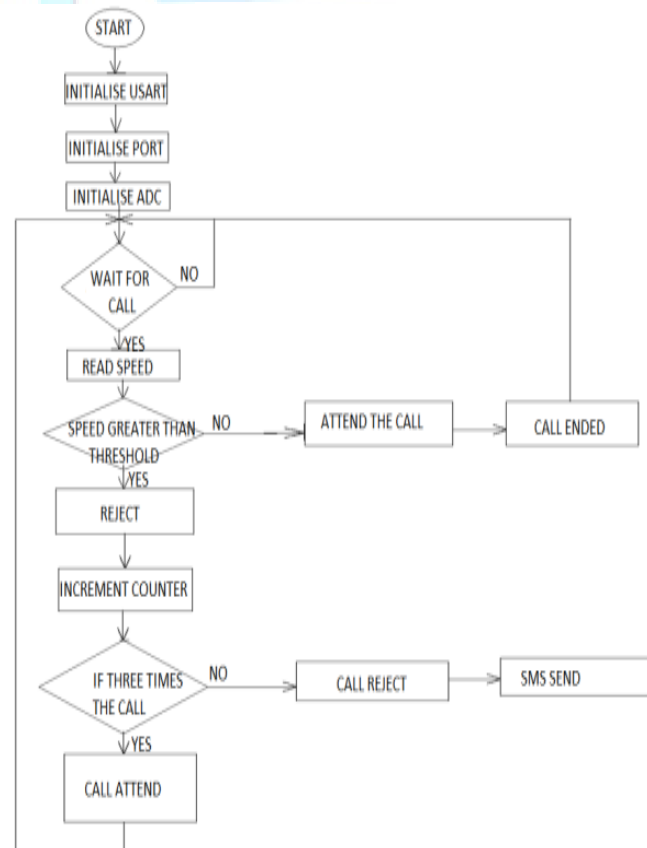


Fig .2 Flowchart



USART, ADC AND PORT are initialized. USART is initialized for GSM to send the message. ADC is initialized to read the speed of the vehicle. Port is initialized to activate relay. After initialization, call is being waited. If the call is not coming the USART, ADC and PORT are initialized again. The call is being introduced only if the speed is below the threshold value. After attending the call the call is disconnected after the speech process and again the ADC, PORT, USART are again it is initialized. If the speed is higher than the threshold value the call is rejected. A call is being initialized if and only if the counter value reaches three (Emergency call). If the counter value is less than three a message is send to the called party notifying the driver is busy. And the process is continued so on.

7805 is a regulator where 12V is converted to 5V. The 5 V is given to the whole circuit. There is a transistor and receiver to detect the incoming call. The GSM and GPS are controlled by relay. Relay used is SPD.

Speedometer is used to read the speed of the vehicle. Pressure sensor is used to detect the variation of pressure which where accident is 7805 is a regulator where 12V is converted to 5V. Relay has contacts NC, NO, COM as connections. When NC has no contact no message is sent. When NC and NO in contact GPS is being activated. Output is given to opamp and this is given to microcontroller and corresponding output is obtained.

LED provides backlight which indicates speed is reduced while driver attends the call. Coil connected to power supply controls the relay and makes the engine off when speed is high in zonal areas such as school or hospital.

## 8. CIRCUIT DIAGRAM

## 9. RANGE OF INPUT AND OUTPUT

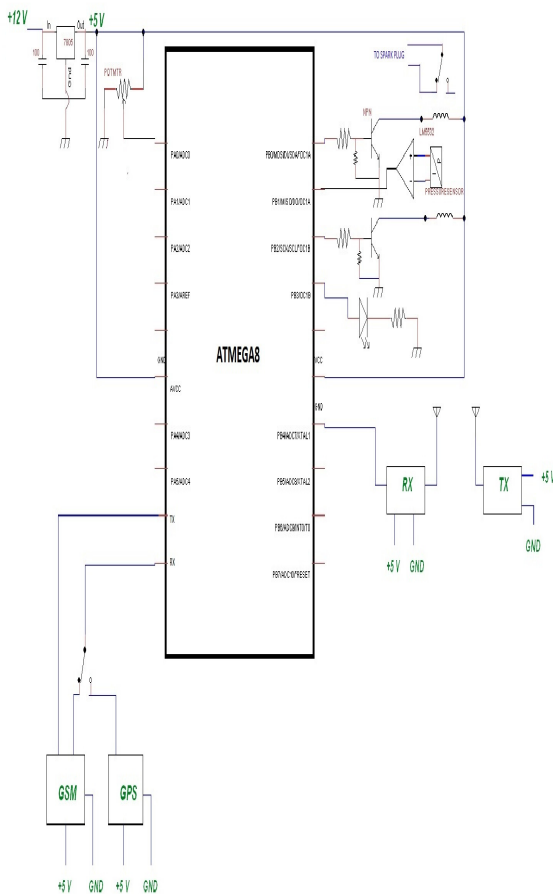


Fig.3 Circuit diagram

period else message is sent to the numbers. If call is

INPUT	OUTPUT	PROCESS
RECEIVER (FT8301A)	2Km distance is measured.	Speed is measured using speedometer. If speed is more than microcontroller is programmed in such a way that using spark plug the engine is made off. If speed is low then vehicle moves normally.
PRESSURE SENSOR (VANET) 100Km to 300 Km	ACCIDENT IS DETECTED	Pressure sensor senses the pressure, the output of sensor is given to Opamp. Opamp has a inverting and non – inverting terminal. This gives voltage. This is given to microcontroller. There will be two outputs logic high and logic low. If logic high it means accident is detected. If it is logic low normally the vehicle moves.
ATmega8(1.8V-5.5V)	CONTROL LED SPEED	Call is attended. Accident and position is detected. Message is send.

TRANSMITTER(ZIGBEE) RANGE: 10 TO 100 METERS AT A FREQUENCY IN 2.4GHz range	DETECT THE VEHICLE	This is kept in zonal areas such as school or hospital. To detect the presence of vehicle.
GSM(SIM 300) FREQUENCY RANGE: MHz RANGE	MESSAGE	When an accident occurs the GSM sends the message to the prestored numbers. For emergency call originating from outside the driver should attend the call. Emergency call is identified within 5 minutes calls are made from the same number. For all other calls other than emergency an automatic message is send to the caller intimating that driver is driving. For an ordinary call message is send.
GPS(SKYTRAK)	DETECTS POSITION OF ACCIDENT	When an accident occurs to the vehicle message is sent to the prestored numbers.
POWER SUPPLY(7805)	5V	Using regulator 12V to 5V and this 5V is given to the circuit.

## 10. RESULTS

Automatic mobile phone usage prevention using GSM technology is a key in reduction of accidents. Call is attended only if it is a emergency call under the time

attended then the backlight enables the drivers of other vehicles to divert and move. Using the transmitter the speed is reduced in the school and hospital zone. Hence noise and other factors are reduced in this zone. Using

pressure sensor accidents are detected and enabling GPS the position is detected and to the prestored number message is sent using GSM. If the vehicle is being lost by anyways it can also be recovered using GPS. The position can be obtained and by sending message the vehicle is stopped. Hence vehicle can be recovered. These all are applications which were developed in the system.



## 11. ANALYSIS OF RESULT

The problem domain of the system is valuated and correspondingly the output is obtained. The user attends only the emergency call. The message is send to the calling party that user is driving. When a call of three times is made by calling party the call is attended by the user. The call is prescribed under a time of five minute. If the calling party denies to call the user second time under this time duration the first call is discarded and calling party have to call another three times to make the user attend the call. At first two calls the message is sent to the calling party that user is driving. The third call is attended by the user. At this time speed of the vehicle is reduced automatically and a backlight is provided for other vehicles to understand that user is stopping the vehicle. So other vehicles can divert the direction of travelling. This calling pattern occurs when user is moving in a speed more than the threshold value. If user is moving in a speed less than threshold value the call is attended automatically and backlight is provided. Moreover the system provides few applications such as: it reduces the speed automatically in

school and hospital zone. If speed is more the engine is made off. System acts as an anti-theft system. The system realizes accident using pressure sensor and location of accident is detected by GPS and position is send to the prestored number.

## 12. COMPARISON OF RESULT

The previous related paper “Method for automatically switching a profile of mobile phone” includes measuring a current environmental noise value of ambient noise surrounding the mobile phone. The current environmental noise value is then compared to a predetermined noise value, and a noise difference is calculated. Next, the profile of the mobile phone is switched based on the value of the noise difference.

The work explains that the phone doesn't switch the modes according to surrounding condition. The calls can be diverted to the module in the vehicle. The module detects only the emergency call. Hence no calls are missed out. Moreover the system detects accidents and messages the position to the prestored numbers, the speed of the vehicle is automatically reduced in the school and hospital zone. This is a great advantage to reduce the speed. A backlight is provided to system when call is attended to make realize other vehicles that the vehicle is stopping so the other vehicles can divert direction. It also provides protection against theft and other damages. Hence the system is a great advantage to the society.

## 13. FUTUREWORK AND CONCLUSION

It can also provide Bluetooth device for calling other than connected phone system. In future, missed call message can be displayed using an LCD. These two are the future enhancement of the system. The system works successfully. Under higher speed, calls are attended under the condition. Hence the accidents are reduced. And if the speed is less, the call is attended automatically. To ensure other vehicles that user is stopping the vehicle a backlight is indicated. So other vehicles can divert the direction of travelling. The system detects accidents and send message to the prestored number. If the speed of the vehicle in school and hospital zone is greater than threshold value then the engine is

made off. Hence noise pollution and accidents are reduced.

The system acts as an antitheft system. Hence the project is a productive system to the automobile industry.

## REFERENCES

- [1] A fast method of hands free design technique for adaptive mobile communication system. S.Mohanram, B.Aarthi, C.Silambarasan, T.Joyce Selva Hephzibah.
- [2]Cell Phone Usage While Driving Avoidance with GSM-RF Based Accident Emergency Alert System Prof. Abhay P. Bagade Assistant Professor, Deptt. Of E & T Engg., B. D. College of Engineering, Sevagram, Maharashtra, India.
- [3]H.Abdul Shabeer, Dr.R.S.D Wahida Banu.“ An Analysis, Design and Precautionary Measure for Mobile Phone Accidents while Driving and Cost-Effective Fatalities”. 978-1-4577-0787-2//11/2011 IEEE.
- [4]Yu-Fu-Fan,Hsin-Chu(TW), In-Ga Chiu, Tao Yuan Hsien(TW), 10/707, 516,US patent (dec.19,2003)“Method for automatically switching a profile of mobile phone.”