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A PATH FOR HORIZING YOUR INNOVATIVE WORK

POST CRASH DRIVER ASSISTANCE WITH ENHANCE SECURITY SYSTE

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Abstract: Traffic accidents are one of the leading causes of fatalities. With the increase in the number of vehicles on road now a day it also causes a steep rise in the number of road accidents with a lot of people losing their lives. An important indicator of survival rates after an accident is the time between the accident and when emergency medical personnel are dispatched to the accident location. By eliminating the time between when an accident occurs and when the first responders are dispatched to the scene decreases mortality rates, we can save lives. One approach to eliminating the delay between accident occurrence and first responder dispatch is to use in-vehicle automatic accident detection and notification systems, which sense when a traffic accident is likely to occur and immediately notify emergency occurred. These in-vehicle systems however, are not available in all cars and are unaffordable to retrofit in older vehicles. Car stealing is now a day's common problem. Daily many cars got stolen. Many cars never get recovered and customer gets suffered due to this. Much security system work to keep cars safe from theft. But these options are useless once your car get stolen. No one can detect or recover stolen car easily.

Keywords: GPS technology, GSM technology, LCD

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INTRODUCTION

Consider the situation that a car is met with an accident in the middle of highway and there is no immediate assistance from anybody nearby. If any injury happened to the car driver or passengers there will be possibility of loss of lives due to delay in medical help. Keeping this idea in our mind, we are proposing a system where car itself intimates the concern emergency service for immediate reaction in case of accident or any emergency situation. Now consider one or more scenario where we are working in the office at high floor or watching the movie at cinema hall, etc. means we are away from our vehicle and a vehicle thief is trying to thief our car which is already enabled with security system which only prompt with a sound alert which is not possible to hear at long distance. We are trying to develop a system which is useful in case of above mentioned scenario. If a vehicle met with an accident, then the system will automatically activate itself but it will wait for one minute for user's response. In case, user is comfortable (fine) and situation is under control then the user deactivate the system manually. In case , if problem is serious and user is not able to respond then the system will switch to emergency mode and send the message or call to registered mobile numbers along with the geographical position of the incident. The coordinates sent by the system will help to find out the exact position of the vehicle on globe so that the emergency services will track the vehicle and can help with minimum amount of time. Car security is the major concern now a day. A car manufacturer tries to modify security system by implementing different technologies. Currently central locking system and theft detection system is available in the vehicle these can alert car owner for theft detection but major problem with all these system is it can alert local users only not to the remote one. Consider a situation where user is far away from vehicle and theft detection siren start then user will not be able listen and alert call made by the system. Consider a situation where owner is far away from his vehicle and willing to control his vehicle security remotely using any of the available technology but at this stage it is next to impossible. To overcome this type of problem we are trying to develop and implement a system which can be used to interact remotely.
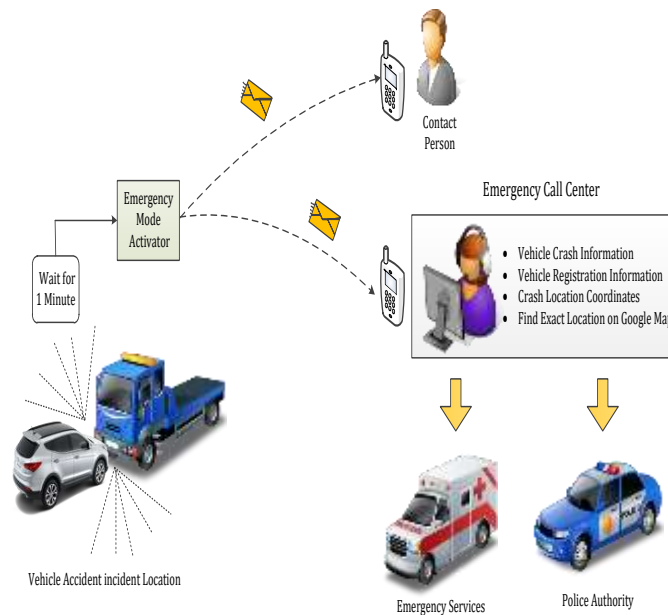
Fig.1.1 Post crash driver assistance mechanism concept

We are trying to develop a system where vehicle automatically inform the user via phone call directly on user's GSM phone. As soon as the thief tries to thieves the
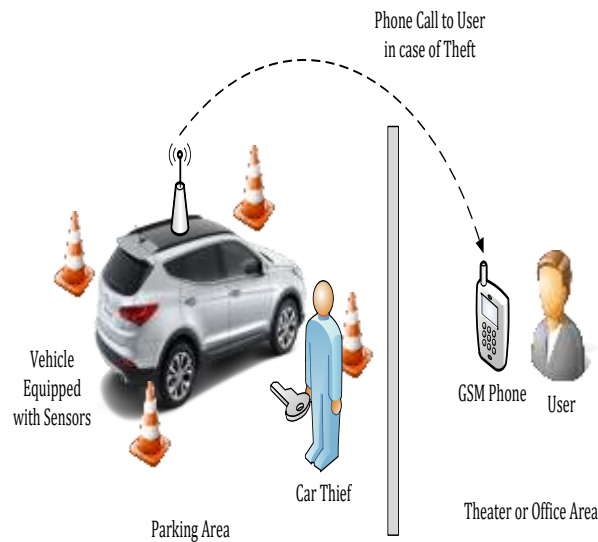

Fig 1.2 Theft Detection mechanism concept

Vehicle, system will automatically make phone call on user's phone. User will then take necessary action to save the vehicle. In this case, other people will not be harassed because of irritating sound created by sound alarm. Another advantage of system is that the user is always reachable by vehicle security system.

PROPOSED SYSTEM

Post-Crash Assistance Driver System

If a car met with a normal accident then the system which is inbuilt in the car activate automatically for 10 second. If the owner of car is safe then driver will deactivate the system within the 1 minute. In case of serious accident the system will sends the SMS to the owner's relative whose mobile number(s) are already available in the system, it gives the current location through GPS along with the car details. So that emergency services can be provided as earlier as possible.
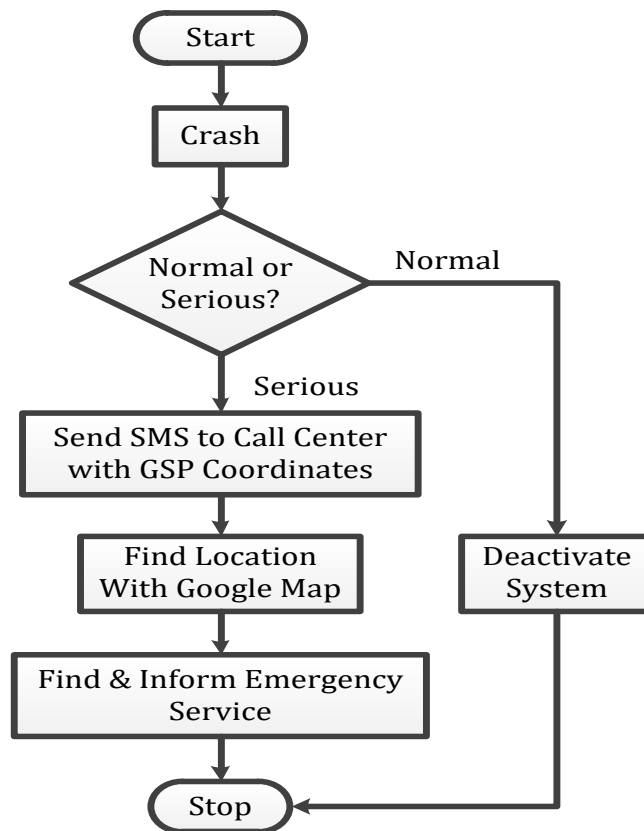

Fig. 2.1 System flow of Post-Crash Assistance Driver System

Theft Detection System

In case of vehicle security system if a stranger tries to open a car then the alert system will activated and send the call to the owner of car .This is another advantage of the system that we can track the car location just by sending the mobile SMS or making the call to the car. Owner's car is embedded with GPS device so it is possible to locate the car's location on Google map which is very easy. Here our antitheft detection system will send preformatted SMS to car owner including current cars longitude and latitude by using GPS device installed in car. Now user get the car location as SMS now he can use these details to track the car on Google map using software like Google earth.
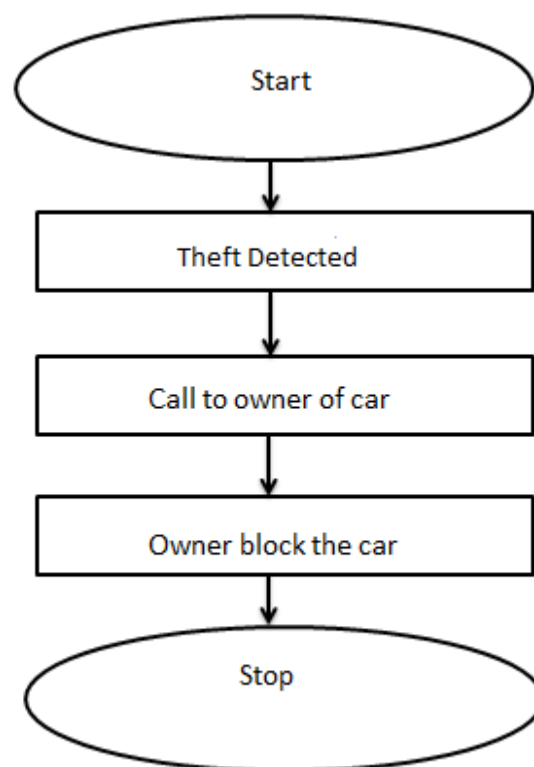
```
        ┌──────────────┐
        │    Start     │
        └──────┬───────┘
               │
        ┌──────▼───────┐
        │ Theft Detected │
        └──────┬───────┘
               │
        ┌──────▼───────┐
        │ Call to owner of car │
        └──────┬───────┘
               │
        ┌──────▼───────┐
        │ Owner block the car │
        └──────┬───────┘
               │
        ┌──────▼───────┐
        │    Stop      │
        └──────────────┘
```

Fig 2.2 Theft Detection System

Microcontroller

89C5 Microcontroller is used here to which are attached an LCD, Buzzer, Vibration sensors and GSM modem.

LCD

A 16*2 LCD is used for show the message when the car is vibrated.

Buzzer

It sounds when the vibration sensor catch signal on the car.

GSM modem

A GSM modem is a specialized type of modem which require a subscriber identity module (SIM) card and operates over a approval to a mobile operator just like a mobile phone. The working of GSM modem is based on commands, the commands always beginning with AT (which means Attention) and finish with a <CR> character. . In this system, IcomSat v1.1 SIM900 GSM modem is used. The GSM module is interact the microcontroller with mobile phones through UART.

GSM Technology

The global system is stand for mobile communication (GSM). It is widely used mobile communication system in the world. GSM modem is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands.

SIMULATION/EXPERIMENTAL RESULTS

This project is used to find perfect location of target. Vehicle tracking and locking system installed in the vehicle, to trace the place and location. The place of the vehicle identified using Global Positioning system (GPS) and Global system mobilization (GSM). These systems constantly watch a moving Vehicle and report the status on demand. When the theft identified, our propose system will send SMS to the microcontroller. In this application, the GPS is a radio navigation system that is uses to determine the exact location (longitude and latitude) of a any object or vehicle and to track the child or person in a particular area.
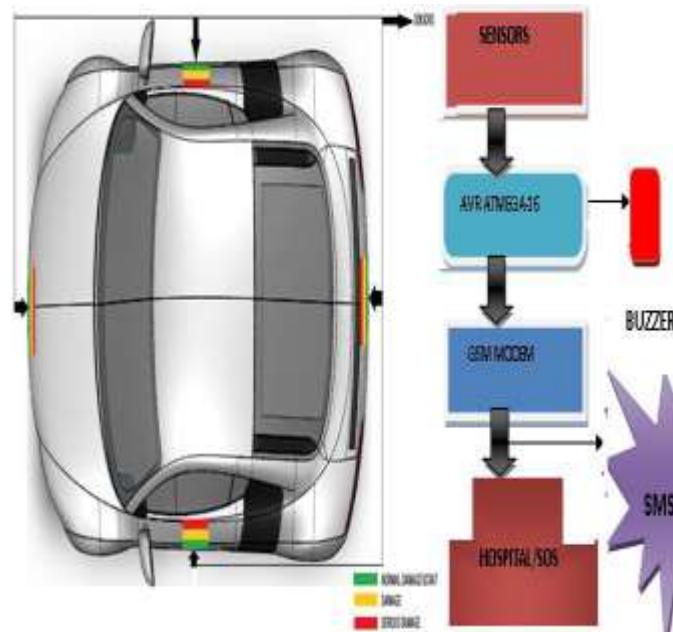
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Fig. 3.1 GSM Based Accident Alert System.

WORKING OF RESULT

Sensors are attached inside the car in four directions as shown in following figure. If there will be accident occurs, then sensor will be damaged and controller will consider a logical zero in the region of accident side and send a signal to the microcontroller for processing the message to the control room regarding the accident situation. For automatic emergency messaging system we used GSM modem. The GSM network is used to provide communication from one place to another. Using the GSM module consists of a Mobile Station (ME and SIM). The commands used to provide communication were AT commands. The AT commands specify the GSM technology and are related to SMS service. If an accident happens, the GSM modem is used as the automatic emergency messaging system. When the pressure sensor senses the pressure or change in g-forces in the vehicle at the time of accident, we set the flag of the microcontroller unit (MCU). MCU set the pin of LED for data indication. If LED is ON that means Vibration or pressure sensor has detected the crash. The MCU sends a command to the GSM modem to send a pre-stored message to a predefined telephone number, which may be a SOS number.
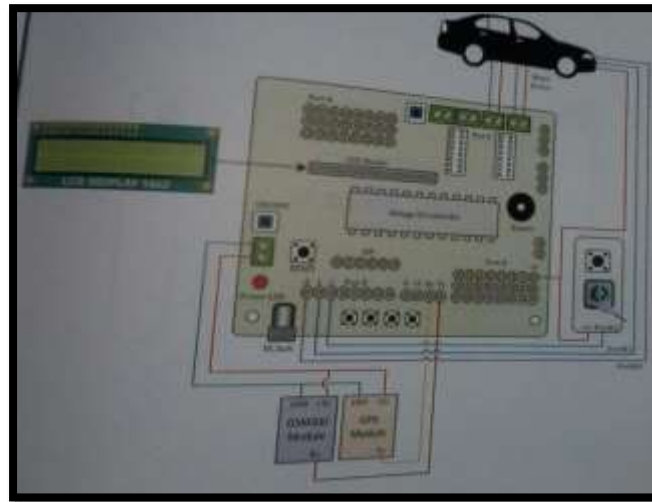
Fig.4.1 Interface diagram of post-crash driver assistance

First step, we need to make single side PCB layout for the given circuit diagram. After made the PCB the following process is required to complete the project. Assemble all the components on the PCB based on circuit diagram. TX and RX pins of the GSM modem to pins 13 and 14 of MAX 232 and insert a valid SIM in the GSM modem. Connect the GPS module according to circuit diagram. This project implemented and tested successfully by us. This system is very useful and secure for car owners.

CONCLUSION

After successful completion of this research the system we have developed can find the exact location of car and can assist the driver by sending the mobile SMS or making the call to the family members, nearest police station and hospitals. This vehicle accident detection and alert system provide emergency responders with crucial information at the earliest. In future we can interface different sensors with this system, such as alcohol detector, drowsiness detector, heart rate detector, etc. In terms of these we can really prevent accident and save life. Security sensors to identify theft can also be added. It can be reprogrammed to switch off vehicle and track the vehicle in theft.

ACKNOWLEDGEMENT

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