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# Car Black Box System Using Arduino Mega

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**ABSTRACT:** It is proved that 85 percent of road accidents are occurred due to the drivers that are not able to control or stop the car on time. So to prevent this we have come up with an idea of car crash prevention and detection at the same time. In this obstacle will be detected using ultrasonic sensor and the car will stop as the obstacle is nearby and accident will be prevented. Still if the accident occurs then to take in concern that the injured should get emergency treatment as soon as possible crash detection will be done using vibrator sensor, which on detection of crash will activate the circuit and an S.O.S message will be sent to the nearest hospital, police station, fire brigade and emergency number of user. A new concept of crash prevention has been introduced in this where on the mountainous roads where there are blind object detection used to notify the drivers on front side.

**KEYWORDS:** Accident detection, Prevention, Car black box system, Arduino, sensor

## I. INTRODUCTION

In today's world there is a severe increase in the use of vehicles. Such heavy automobile usage has increased traffic and thus resulting in a rise in road accidents. This takes a toll on the property as well as causes human life loss because of unavailability of immediate preventive and safety facilities. Complete accident prevention is unavoidable but at least repercussions can be reduced. This embedded system can prevent the accident to occur and proper preventive measures are taken in this system. The ambulance service and the police station can easily find the location as the location along with the Google map link was sent to their smart devices with mobile network accessibility.

The system consists of sensor, temperature sensor, alcohol sensor, switch, GPS module, GSM module, motor, buzzer, led etc. and all these devices are interfaced with the central micro controller unit. We are going to use sensor for detecting sleep by setting the certain time limit, if the driver gets sleepy, we can warn him. Temperature sensor helps us in detecting the heat of the engine and if the engine is overheated then that of a normal condition, we can warn the driver. Alcohol sensor helps us in detecting if the driver is drunk or not. If he/she is over drunk the vehicle provides warning and the engine stops functioning.

Switch detects the occurrence of accident and sends signal to the micro controller for further functioning. GPS module provides us the location, speed, time and date of the certain place where the vehicle is in the real time. If accident occurs, the location of accident that we get from the GPS is send to the ambulance service and police by the help of GSM module. Everything might be all right after a simple accident so the driver can re-inform the ambulance service and police station in this case.

Currently there is no technology for accident detection. As it is done manually there is loss of life in golden hours. The accident victim is dependent on the mercy of others to rush him to hospital. Many times an accident goes unnoticed for hours before help comes. Due to all these factors there is a high rate of mortality of the accident victims. In addition to this there is delay in the ambulance reaching the hospital to the traffic congestion between accident location and hospital which increases the chances of the death of victim.

Although automobiles save our lots of travelling time, the risk increases in travelling because of the accidents. For the prevention from such accidents, we can use modern additional technologies. In the context of our project, we have used some sensors, electronic modules and microcontroller unit which helps us in providing prevention from accidents, detects the accident if it occurs even after the preventive measures and reports the ambulance service.

## PROBLEM DEFINITION AND OBJECTIVE

The use of vehicles increases in the proportion of the population. Due to the traffic congestion, the accidents are also increasing day by day. This causes the loss of life dueto the delay in the arrival of

ambulance to the accident spot or from the accident spot to the hospital. So, it is necessary to take the accident victim to the hospital as soon as possible. Whenever, the accident occurs, it has to be informed to the investigation unit. So, it is also beneficial if the information is reached to the enquiry section so that the time for the investigation can be minimized.

The main objective of this project is to prevent the accident which happens due to alcoholism of driver, sudden asleep and due to the overheating of engine. Certainly, if the accident happens due to other cases, the used electronic devices will be able to provide the spontaneous message and exact location to police and ambulance in order to recover victims.

## II. RELATED WORK

The products available in the market are not reliable when it comes to synchronizing more than one parameter. The literature survey revealed that systems available in market has a major disadvantage, it is specifically designed for one sole purpose like Accident detection, Accident prevention or accident reporting.

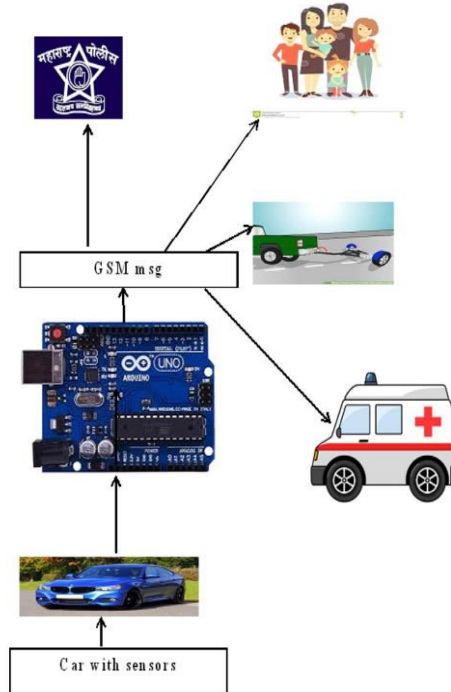
These systems on their own have many advantages but these systems, but from cost point we have to reconsider our decision to buy these products due to their lack of multitasking ability. These systems are useful as it improves their functionalities by adding a feature to the existing system will increase the redundancies. To overcome this disadvantage, we are proposing a system which could increase the functionality and reliability such that it can prevent the vehicle accident along with accident detection system and accident reporting to the ambulance service and police station.

Thus, our proposed system is much more advantageous over the existing system. Sensors are used in everyday objects such as touch-sensitive elevator buttons (tactile sensor) and lamps which dim or brighten by touching the base, besides innumerable applications of which most people are never aware. With advances in micromachinery and easy-to-use microcontroller platforms, the uses of sensors have expanded beyond the traditional fields of temperature, pressure or flow measurement, for example into MARG sensors. George Atwood invented the very first switch in the 1700s. The Atwood machine, as it was called, consists of masses on springs where the velocity is calculated based on displacements experienced.

The Global Positioning System (GPS), originally Navstar GPS, is a satellite-based radionavigation system owned by the United States government and operated by the United States Space Force. The GPS project was started by the U.S. Department of Defense in 1973, with the first prototype spacecraft launched in 1978 and the full constellation of 24 satellites operational in 1993. The Global System for Mobile Communications (GSM) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile devices such as mobile phones and tablets.

It was first deployed in Finland in December 1991. By the mid-2010s, it became a global standard for mobile communications achieving over 90% market share, and operating in over 193 countries and territories. 2G networks developed as a replacement for first generation (1G) analog cellular networks. Subsequently, the 3GPP developed third-generation (3G) UMTS standards, followed by the fourth-generation (4G) LTE Advanced and the fifth-generation 5G standards, which do not form part of the ETSI GSM standard.

### III. PROPOSED METHODOLOGY



**Fig 1. Proposed System Architecture**

Arduino is an open source hardware and software project, created with a simple aims in mind to be as simple as possible. Arduino is widely used by artists, hackers and professionals to casually design prototype and experiment with electronics. Can use it as brain for their robot, to build a new digital music instrument, or to make your house plant tweet you when it's dry. An Arduino contains a microchip, which is a very small processor that you can program. You can attach sensors to it so it can measure conditions like how much light there is in the room). It can control how other objects react to those conditions.

The project is based on microcontroller board designs, produced by several vendors using various microcontrollers. Microcontrollers use inputs and outputs like a computer. Inputs capture information from the user or the environment while outputs do something with the information that has been captured. A switch and a sensor could be a digital and an analog input respectively into the Arduino and any object we want to turn on and off and control could be an output. It could be a motor or even a computer. These systems provide sets of digital and analog input/output (I/O) pins that can interface to various expansion boards (termed shields) and other circuits.

The boards feature serial communication interfaces, including Universal Serial Bus (USB) on some models for loading programs from personal computers. For programming the microcontrollers, the Arduino project provides an integrated development environment (IDE) based on a programming language named processing, which also supports the languages, C and C++. The Arduino language is very similar to C. It's almost the same language but Arduino provides us with several libraries to make things a bit easier.





5. IR detects whether the driver seat belt connect or not. If the driver seat belt not connect then system warns him with alarm.
6. Continuously Temperature sensor helps us in detecting the heat of the engine and if the engine is overheated then that of a normal condition, driver gets red light alert else keeps moving.
7. If accident occurs, switch detects the occurrence of accident and sends signal to the microcontroller for further functioning.
8. GPS module finds the location and GSM module sends message with latitude, longitude and link of google map to emergency numbers of ambulance and police.
9. Once the system is on, it continuously checks all the sensors by the help of microcontroller (Arduino Uno) in order to perform all the prevention, detection and reporting works.

#### V.CONCLUSION

In this 21's century, with the continuous advancement in science and technology, more emphasis is given for vehicle safety. With the increase in number of vehicle, the number of road accident is also increasing day by day, so it is our duty to control it. Mostly the accident takes place because of drunk drivers, drowsiness while driving and overheating of engine causing fire. Implementation of this project will help to decrease the accident caused because of above reason. The system is automatic, low cost and power efficient which makes it easy to install in vehicle. Unfortunately, if accident happens to take place, the system detects it and with the help of GPS exact location can be pointed and informed to emergency unit using GSM module. This helps to save many lives by informing rescuing agent in time. Over all, this system is very affordable, targets common people and easily implemented in all types of vehicles.

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