# SMART VEHICLE PROTECTING SYSTEM

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*Abstract*—Security in travel is primary concern for everyone. This paper describes a design of effective alarm system that can monitor the vehicle / car condition, in travelling. The project name "SMART VEHICLE PROTECTING SYSTEM" shows that, the project is designed to prevent the accident and to inform emergency about an accident that has occurred. The system contains sensors like Alcohol sensor (which detects the consumption alcohol by the driver and automatically locks the engine so that the driver cannot start the vehicle), Temperature sensor (which senses any fire accidents inside the engine of the vehicle and alerts the driver about fire emergency), Ultrasonic sensor (which continuously monitors the nearby obstacles to the vehicle and alerts the driver during fog condition) and Pressure sensor connected to GSM and GPS system (which detects the accident to the vehicle and inform about the accident to predefined number with the actual location where the accident got happened).

Key words: Alcohol sensor, Ultrasonic sensor, GSM and GPS system, Temperature sensor.

#### I. INTRODUCTION

The use of vehicles increases in the proportion of the population. Due to the traffic congestion, the accidents are also increasing now days. Due to the delay in the arrival of ambulance to the accident spot or from the accident spot to the hospital it causes the loss of human life. So, it is necessary to take the accident victim to the hospital as early as possible. Whenever, the accident is occurred, it has to be informed to the investigation unit. So, it is also important if the intimation is reached to the enquiry unit so that the time for the investigation can be minimized.

The prototype model of a Smart Vehicle System includes Ultrasonic & Alcohol sensor, Fire & Smoke Sensor, LCD Display interfaced to an Arduino controller which helps in accident detection and GSM & GPS Module which helps in providing emergency information about an accident that has occurred to the predefined number along with the exact location.

Ultrasonic sensor is able to measure the distance from the ground of selected points of a motor vehicle. The sensor is based on the measurement of the time of flight of an ultrasonic pulse, which is reflected by the ground. A constrained optimization technique is employed to obtain reflected pulses that are easily detectable by means of a threshold comparator. If the distance is less than threshold value then danger message will be displayed in LCD display. This digital input can also be converted into voice or audio form and can be informed using speakers. If in case accident occurs, by using GPS and GSM module it sends message to the predefined number along with exact location.

A smoke detector or smoke alarm is a device that detects smoke and issues an alarm to alert nearby people that there is a potential fire.

According to the Department of Transport, people were killed in road accident occurred when driving over the legal limit for alcohol. So we use alcohol detector sensor which senses the alcohol content and automatically alerts the driver to stop the vehicle engine. If the alert is ignored, then our system ensures the stopping of vehicle's engine.

### **II.** LITERATURE REVIEW

For the implementation of the proposed project mainly six international journals are referred and the methods that are used in those papers are then modified. The system explained in [1] is automatic collision detection and warning system relying on a GSM modem. In the case of an accident the system detects it using the fact that the vehicle would be suddenly decelerated in such a condition. An accelerometer continuously monitors the acceleration of the vehicle and will detect decelerations greater than threshold value and send the data to the microcontroller via an analog to digital converter unit. The controller compares this with the threshold set value and immediately sends an emergency message to predefined number. This system will highly aid the search and rescue of vehicles that have met with an accident. This paper explains well about GSM module which will send message to the preset number but not the location. In our system, we use GSM module along with GPS to find out the location of vehicle. In this system they have used the technology for detection of accidents which depends upon the sudden deceleration of the vehicle. There might be chances that the driver has purposefully applied the break and accident didn't take place. Even at that time the emergency message goes to the predefined number. Hence, in our project we use pressure sensor which will send the information about the accident only when heavy force applied on it. There by we can reduce the misunderstandings.In the proposed system [2] an obstacle sensor i.e. the IR module is mounted in front of the car, such that the distance between the obstacles in front of vehicle is normally of 2ft. is sensed by the sensor module and instructs the microcontroller about the obstacles ahead. The Microcontroller then alerts the driver with an alarm and control the vehicle by stopping. With the alert message to the passengers and the driver inside the vehicle, it also includes a system which sends a SMS to the authorized user through GSM. The system explained in [3] uses an alcohol module to sense the alcohol. The analog output of that is given to the Arduino board. It also uses GSM and GPS module to send the SMS and track the position of vehicle. As given in [4], when a vehicle meets with an accident immediately Vibration sensor will detect the signal or if a car rolls over, and Micro electromechanical system (MEMS) sensor will detects the signal and sends it to ARM controller. Microcontroller sends the alert message through the GSM MODEM including the location to police control room or a rescue team. An automatic alarm device for traffic accidents is introduced in [5]. It can automatically find a traffic accident, search for the spot and then send the basic information. Here the sensor used is ultrasonic sensor to know the distance of obstacle. The system in [6] helps us to detect the fire accident which normally takes place and also it has an obstacle detection and identification system which helps to provide safety for the vehicle.

# III. METHODOLOGY

# FLOW CHART



Fig 3.1.Flowchart of the proposed system.

### BLOCK DIAGRAM



Fig 3.2. Block diagram of proposed system.

#### WORKING

The block diagram contains four systems in it they are:

- Anti-collision system
- · Alcohol detection and Automatic engine lock system
- Fire warning system
- Accident detection system

Due to poor visibility now a day the number of accidents taking place are more and more. In order to avoid this, in our system we are going to use ultrasonic sensors, where transmitter will generate ultrasonic pulses, receiver will wait for echo, the time required for echo will be the distance. If this distance is greater than the threshold it is the safe distance. Else we will inform the driver about some obstruction is in the range by playing back one pre-recorded audio message and the side at which the range is less will be indicated using LCD display.

Here the alcohol sensor is used to monitor users breath and constantly sends signals to the Arduino. The Arduino on encountering high alcohol signal from the alcohol sensor stops the dc motor to demonstrate as engine locking. The system needs a push button to start the engine.

The temperature sensor senses the heat and this sensed value is compared with threshold value, if the sensed value is greater than threshold value the temperature sensor will sends a signal to Arduino. Buzzer connected to Arduino gives us an alarm indication. Whenever fire triggered, it burns objects nearby and produces smoke. A fire alarm can also be triggered due that alarm goes on and also indicates through LED to driver. Buzzer or alarm is turned off whenever the temperature goes to normal room temperature.

The accident detection unit consists of two metallic plates which are kept at little distance apart from each other. In case of accident, if the car is hit to some other vehicle or an object then due to the impact the two metal plates will come in contact with each other. Due to this a signal will be sent to Arduino. Once Arduino gets signal from metal plates, then the GPS modem will send this information to the GSM modem, GSM modem is used to send this information via SMS. SMS will be sent to the family member of the driver, so that they can take immediate action to help the persons suffering due to this accident.

#### IV. RESULTS AND ANALYSIS

The figure 4.1 is a robotic setup which contains alcohol sensor connected to Arduino and motor driver. This system setup will lock the robotic engine when any trace of alcohol is sensed.



Fig 4.1. Alcohol detection and engine lock system model

Figure 4.2 shows the fire sensor interfaced to Arduino, buzzer, and warning light. This system senses the fire emergency and indicates it to the driver.



Fig 4.2. Setup for fire detection system

The system shown in figure 4.3 includes pressure sensor that senses the accident and sends the signal to Arduino which is connected to GSP, GPS system. Figure 4.4 includes the message that is obtained from GSM module to mobile phone and figure 4.5 shows the exact location using latitude and longitude values traced by the GPS system.



Fig 4.3. Setup for accident detection & automatic dialer system



Fig 4.4. Received alert message from GSM system



Fig 4.5. Traced location using latitude and longitude values

If in case obstacle comes near the vehicle, defined system indicates about it to the driver by displaying it on LCD display. Figure 4.6 is the setup that is made to do above defined system. It contains Ultrasonic sensor that is connected to Arduino, LCD display connected to Arduino.



Fig 4.6. Setup for anti-collision protection system



Fig 4.7. Total setup interfaced to robot vehicle



Fig 4.8. The final product

Fig. 4.7 and fig. 4.8 are the setups of the project. All above mentioned systems are interfaced together in this robot vehicle.

## V. CONCLUSION

This project describes a design of effective protecting system and alarm system that can monitor a vehicle/ car condition in travelling. The project shows that system is designed to prevent the accident by taking some type of measures and to inform emergency about an accident that has occurred to predefined number. As the system includes GSM & GPS modules, detection of actual location of accident will help to save lives. This system uses a pressure sensor that detects occurrence of accidents and heat sensor that detects any high variations in temperature due to fire in the vehicles. The ultrasonic sensor detects the obstacles and alcohol sensor detects if driver is consumed alcohol. All these sensors send a signal to Arduino. GSM and GPS modules are connected to the Arduino that sends a message to the predefined mobile or emergency number and informs about the accident. In total the system is aimed to provide a total protection to the vehicle.

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