

Research Article

**Life Saving Smart Automobile**

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**Abstract**

More than 40% of the road accidents occur due to falling asleep and crossing the edge line before waking up. Drivers' carelessness, reluctance to stop driving in spite of feeling tired are some of the factors contributing to sleep related accidents. The vehicle-based driver drowsiness detection system will continuously monitor driver's performance and psycho physiological status. The system is programmed to give an alarm signal when drowsiness is detected. In order to prevent accidents due to sudden heart attacks, heart rate is monitored and if any critical situation is detected, the system will automatically alert the driver using GSM, will slow down the vehicle and safely park it.

**Keywords:** *GSM, Bluetooth, Tracking, Pulse sensor, LCD, Microcontroller*

**Introduction**

The usage of vehicles has been increased drastically since the past decade. As the vehicle usage rate is increasing, the accident occurring rate is also increasing simultaneously. People occur at high risk, as 1,274 accidents occur per day and major accidents are caused due to several reasons such as alcohol consumption, high speed and so on. One among the reasons of occurrence of accident is drowsy driving. There is a survey that more than 1,00,000 accidents occur per year due to drowsy driving in which 1,550 deaths and 71,000 injuries are caused. To reduce this accident rate, we have developed, an optimum solution. The existing system consists of blink sensors to identify drowsiness and alert systems to make the driver awake. But the blinking sensor uses infrared rays which is not good for eyes as well as it fails to give accurate results. So, in our system we used camera to detect drowsiness and it not only alerts the driver when he is drowsy but also it prevents the accident due to lack of consciousness which has a high chance of occurrence. The system works in such a manner that when the driver is in drowsiness state, it alerts the driver for a particular period of time. Once the time exceeds, the vehicle automatically takes its control and moves to left of the road and stops, immediately the current location of the driver is sent to the registered number. Thus, our system plays a major role in accident prevention.

**Literature Survey**

Nimisha Chaturvedi, Pallika Srivastava. “Automatic Vehicle Accident Detecting and Messaging System Using GSM and GPS Modem “, Volume: 05 Issue: 03, Mar,2018. Automobile usages are getting increased. Many accidents are happening due to carelessness of the driver. In paper alerts the driver by using alarm. In this system accident gets detected and this information is passed to the rescue team. In case there are no causality, switching system is there to switch off. With the help of Vibration Sensor and MEMS sensor, accident gets detected. The particular angle at which the car gets rolled off is indicated via message. To improve the poor emergency condition, this application provides a better solution.

FEDERICO GUEDE-FERNÁNDEZ, MIREYA FERNÁNDEZ-CHIMENO, JUAN RAMOS-CASTRO, MIGUEL A. GARCÍA-GONZÁLEZ. “Driver Drowsiness Detection based on Respiratory Signal Analysis”, Volume:07 Issue:03, June 2019.

The proposed system analysis the respiratory rate variability which detects whether the person has slept or not. Better quality of respiratory signal is also proposed. The combination of these two methods decreases the improper alarms which occurs owing to the changes of measured RRV associated not with drowsiness but body movements. In order to perform the validation tests and external observers have rated the drivers’ state of alertness , a driving simulator has been used. Specificity of 96.6%, a sensitivity of 90.3%, and Cohen’s Kappa agreement score of 0.75 on average has been achieved by this algorithm . Thus , this algorithm achieves the validation to detect drowsiness state.

Accident Detecting and Alert System by T Kalyani,B Naresh, S Monika, Mahendra Vucha,” International Journal of Innovative Technology and Exploring Engineering”,Volume-8 Issue-4S2, 2018.

The main goal of the system is to control the accident by alerting the person who is driving the car with the help of prerecorded voice alert. So that driver can control the situation before it is going out of control. This objective will help to prevent the vehicle from accident. And if in case accident takes place then also this system will help the individuals to recover from the situation. When the accident occurs, this system is capable of sending the information about accident to the registered mobile numbers and also to the hospitals and Police help stations for the medical and rescue help. To provide the prevention from accident the system uses ultra-sonic sensors. These sensors enable the system to get the information about distance between the obstacle (vehicle ahead) and on the basis of that system then alert to the driver whether vehicle is too close to the obstacle or not.

Arif Shaik, Jennifer Bole,Natalie Bowen, Gary Kunzi, Kumar Yelamarthi, Daniel Bruce and Ahmed Abdelgawad, “Smart Car: Accident Detection System based on IOT”, IEEE Global Conference on Internet of Things (GCIoT), 2018.

When driver attempts to drive the vehicle after consuming alcohol then vehicle won’t start. The sensor detects different concentrations of alcohol. This uses semiconductor type of sensor to detect alcohol. In case if vehicle hit any obstacles then vibration sensor detects the collision then controller get information of the location of vehicles using GPS and send it to family or ambulance number. This paper focuses on automatic accident and prevention system ensures more safety, sophisticated security. This module monitors all hazards and threats. The proposed idea is user friendly. This finds useful in cab services, buses and trucks.

D Abha , S Krishna ,S Hardik , “Global Positioning System for Object Tracking”, International Journal of Computer Applications,Volume 109 – No. 8, January 2015.

This system has GSM and a Web Application. The GSM is used to find the position of the automobile and it sends the information about coordinates to the web application. GSM module which has a SIM card works in a same manner like usual mobile. The system also calculates the distance travelled between two stations. By using Web application (HTML based application), location of the target is displayed in Google map.

K.Praveen Kumar, Srinivasa Rao Thamanam, M. Naresh Kumar,” Identification of Driver Drowsiness Using Image Processing”, European Journal of Molecular & Clinical Medicine ISSN 2515-8260 Volume 7, Issue 4, 2020.

The vehicle driver's face is recorded regularly with a video camera mounted underneath the front mirror. To detect the yawn at first instance, it's required to detect and monitor the face using the camera's sequence of frame shots. The position of eyes and mouth is detected from the detected face. The closed eye movement is detected for yawning detection along with closed eyes. It makes the segmentation of false detection method more robust. The geometrical features of the mouth and eye are then used to identify the yawn. The device warns the driver of his fatigue using a beep or buzzer and the unsafe driving condition in case of yawning detection.

Darwin Nesakumar A , T Suresh , M Aarthi , K Gomathi , G Aarthi , P Mugilan,” Accident Detection, Alert and Tracking System Based on IoT”, European Journal of Molecular & Clinical Medicine, Volume 7, Issue 4, 2020

This proposed system is an IR based that keeps the vehicle secure and gives high security to drivers. When driver attempts to drive the vehicle after consuming alcohol then vehicle won't start. The sensor detects different concentrations of alcohol. This uses semiconductor type of sensor to detect alcohol. In case if vehicle hit any obstacles then vibration sensor detects the collision then controller get information of the location of vehicles using GPS and send it to family or ambulance number.

Poornesh, Sri Krishna Chaitanya Varma, Tarun Varma and Harsha; Automatic Vehicle Accident Detecting and Messaging System Using GPS and GSM Modems; International Journal of Scientific & Engineering Research, Volume 4, Issue 8, August-2013.

IR sensors are used to detect any obstacle and this will be sent to the microcontroller. If any vehicle met with an accident that information is received by GPS. The message will be sent to the registered number with the help of GSM. This message shows the exact location of the vehicle .LCD displays whether the message is received or not.

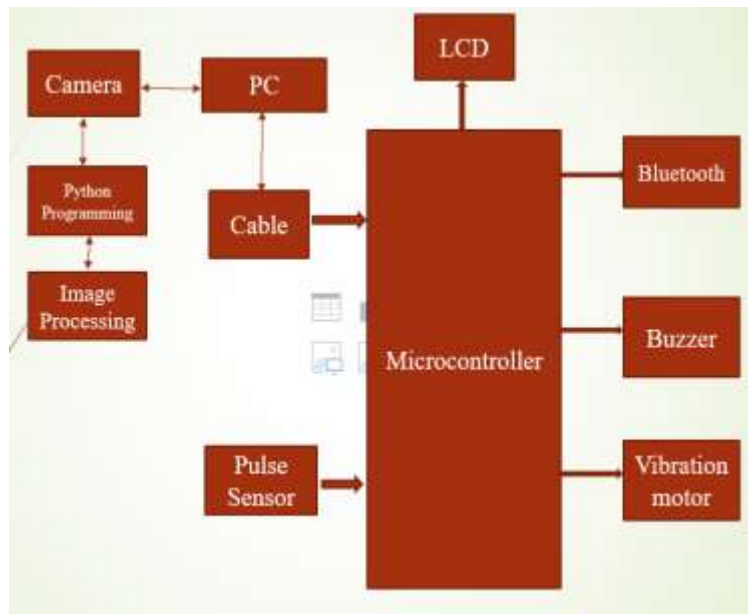
Amit Meena, Srikrishna Iyer, Monika Nimje and Saket JogJekar,” Automatic Accident Detecting and Reporting Framework for Two Wheelers”,2014, International Conference on Advanced Communication Control and Computing Technologies, 2014.

By using MEMS sensor and vibration sensor the accidents are detected and the particular information is sent to the mobile number. By using GPS the location also getting tracked. Thus we can avoid accidents by alerting as soon as possible. Fire sensor is also added to detect fire accidents.

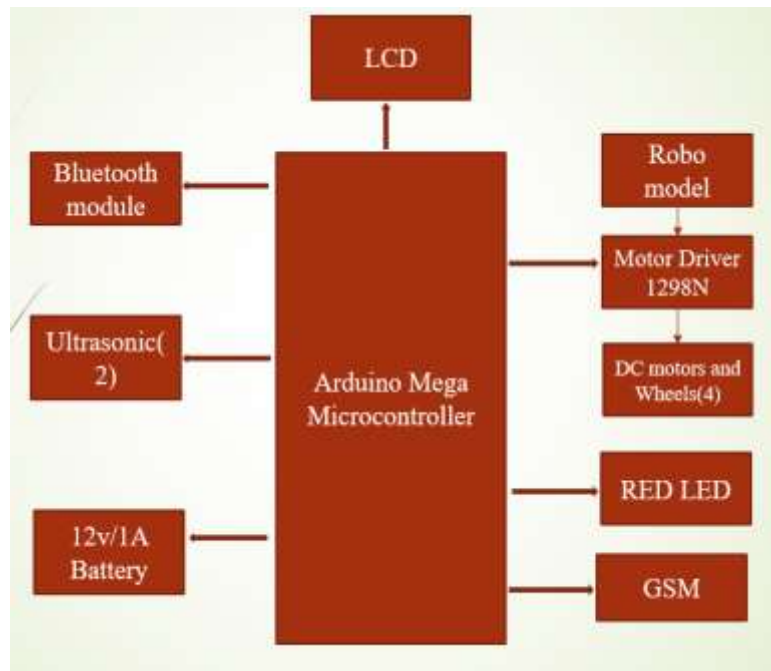
### **Materials And Methods**

Due to the carelessness of the driver many accidents are happening. In order to avoid this, the driver should be alerted in uncontrolled situations. If the system is working quickly, then only it will be possible to avoid accidents. In existing system, blinking

sensor is used to detect whether the driver has slept or not. However this sensor uses infrared which is not good for eyes as well as this will not give accurate results and another thing in existing system is lack of health monitoring system. This paper overcomes all the disadvantages in the existing system. This paper utilizes image processing for detecting whether the driver has slept or not, uses GSM for tracking the location and alerting the driver by using vibration sensor ,buzzer. The proposed system uses Arduino UNO, Arduino 2560 mega microcontroller , camera, battery, Bluetooth , Buzzer, vibration motor, pulse sensor, ultrasonic sensor, motor driver L298N, DC motors, GSM, Gas sensor. The block diagram consists of microcontroller, Bluetooth, camera, motor driver, buzzer , vibration motor and various kinds of sensors. The block diagram of the proposed system is shown in the figure1 and figure 2.



**Figure 1. Block diagram of proposed system(1)**



**Figure 2. Block diagram of proposed system(2)**

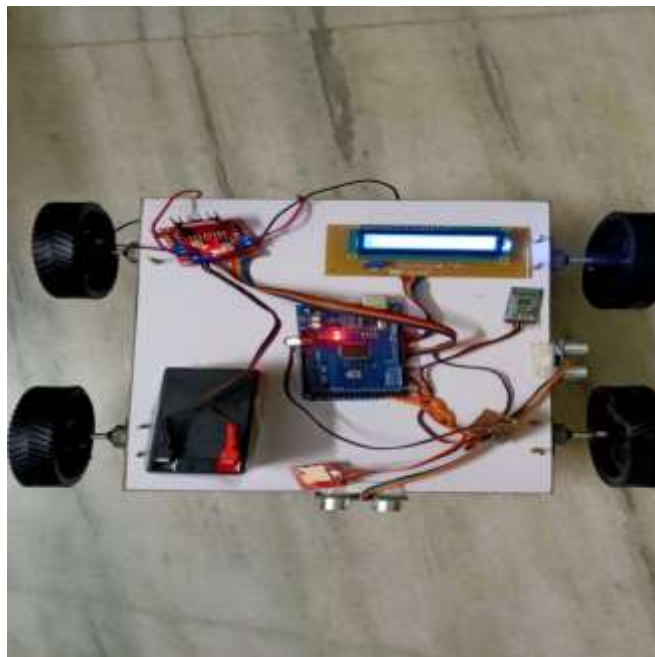
The Arduino 328p UNO and arduino 2560 mega is used as the major part in this system. In arduino 328p we connect 16X2 LCD display, Buzzer, vibration motor, Bluetooth module, alcohol sensor, pulse sensor. In the arduino 2560 , camera, Bluetooth, ultrasonic sensor, motor driver L298N, DC motors, GSM , Battery are connected.

We propose, a camera which is used to detect whether the driver has slept or not. The driver is continuously monitored to alert in abnormal situations. By using Gas sensor the consumption of alcohol is being detected and it will be displayed in 16X2 LCD display. In order to monitor the driver's health condition, we use pulse sensor which continuously monitors the driver's pulse and it will also be getting displayed in that LCD display. After identifying via camera that the driver's eyes has been closed for 2-3 seconds, then buzzer will gets activated. Even though the driver has not awake, then vibration motor will gets activated. Still the driver has not awake then this information will be transferred to another module through Bluetooth. Here we use image processing to detect the drowsiness state of the person. In this Haarcascade frontal face algorithm is used to detect the drowsiness state. This algorithm detects multiple faces also but the only one information is sent to the system. At the same time atleast one face should be detected for further process. At first face structure gets detected ,then the eye structure gets detected. HC-05 Bluetooth Module is an easy-to-use Bluetooth SPP module which is designed for transparent wireless serial connection setup. Its communication is through serial communication which makes an easy way to interface with controller. Now, Arduino mega microcontroller has another Bluetooth module which receives the information that the driver has slept. After receiving this information the vehicle gets turned into automatic mode. Here we use two ultrasonic sensors .One is for forward direction and another is for left. With the help of this obstacle detection takes place. Vehicle is moved to the left side with the help of DC motors and motor driver L298N which controls the direction of the vehicle. Now, the vehicle is parked to the left side and the emergency light is getting turned on. Finally the location will be tracked and the message will be sent to the registered mobile number with the help of GSM. GSM is considered as second generation

mobile phone system. It enables roaming .It facilitates the widespread implementation of data communication applications into the system. This paper focuses on avoiding accidents and saving the life of the people. Our proposed idea is useful in all the automobiles.

### **Result**

In existing system, the system alerts the driver only. However this is not effective and in some case it fails to save the life of the driver. This motivates us to develop the system in more effective way by alerting as well as saving the life of the driver. So, our proposed system intends to save the life of the driver by controlling the speed and parking alongside the road safely thereby sending a message to the registered number. By doing this the treatment can be started as soon as possible thereby saving many lives. Also this system works in a faster manner. The output of the proposed idea is shown in figure 3.



**Figure 3.Final Output**

### **Conclusion**

The project revolves around the prevention of accidents and safety of the drivers in spite of carelessness. It also serves as an alert system and comes into action when quick diagnosis is required for the driver. GSM is helpful in sending the message and with the addition of buzzer and vibration motor, the alert system works. By employing microcontroller, the parameters are detected and the speed is controlled accordingly.

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