



## SMART DRIVER MONITORING SYSTEM TO AVOID ACCIDENTS USING ARDUINO

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### Abstract

With the growing number of vehicles in the world there are many accidents and loss of life. Our research aims to serve the purpose of avoiding road accidents caused due to drivers' drunk driving or sudden health issues. Even though the Road Safety Department has taken many steps to alert the driver about the speed limits by placing many sign boards like "Don't Drink and Drive" there is only a little improvement. This system is focused on saving people's life from accidents. By using a temperature sensor, sweat sensor, and alcohol sensor we can sense the driver's condition. The data from the sensor gives it values to the Arduino Uno and the collected value in real time is displayed in the LCD. If the sensor value reaches above its threshold level the left indicator turns on and the engine motor turns off. The outcome of this paper can be stated that the system ensures the safety and security of both the driver and the vehicles in this project. The Alcohol Detection system works on a simple principle if a driver has been drinking, the alcohol breath analyzer sensor will detect the level of alcohol in the driver's breath and if it crosses a set threshold, an alert will come and the vehicle engine will stop immediately. Drinking and driving is already a serious public health problem, which is likely to emerge as one of the most significant problems in the near future. The system implemented by us aims at reducing the road accident in the near future due to drunken and drive

**Keywords:** Smart automobile, Alcohol detection, sensors, Accident avoidance, health issues, MQ3 sensor, Arduino.

### I. Introduction

The "SMART DRIVER MONITORING SYSTEM TO AVOID ACCIDENT USING ARDUINO" is predicated on the thought of a pre-crash system. Nowadays, the increasing range of traffic accidents because of a driver's diminished vigilance level has become a significant issue for society. A portion of these mishaps are the after-effects of the driver's medical condition. But a lion's share of these accidents is identified with driver's fatigue or hypo-vigilance. These technologies are used for detecting drowsiness and alcohol consumption by the driver for preventing road accidents. Some technologies prevent road accidents by detecting the health parameters of the driver and contacting the rescue system. Some other technologies avoid accidents by sensing and alerting the driver in case of over-speeding. The consumption of alcohol can be detected by using an MQ3 sensor. MQ3 sensor detects the consumption of alcohol from the breath of the person.

#### I.1. Proposed system:

Nowadays drinking and driving is the most common threat to their as well as others' life. We cannot stop people from drinking but we can avoid these accidents by checking the person of drinking also we can put these types of small devices in vehicles to assure that no drinking and drive can further take

place. Today we are going to make a simple alcohol indicator that can be used in small devices or for the demonstration of simple small projects for an Alcohol detector using Arduino. The Alcohol Detection system works on a simple principle, if a driver has been drinking, the alcohol breath analyser sensor will detect the level of alcohol in the driver's breath and if it crosses a set threshold, an alert will come and the vehicle engine will stop immediately. Drinking and driving is already a serious public health problem, which is likely to emerge as one of the most significant problems in the near future. The system implemented by us aims at reducing road accident in the near future due to drunken and driving. This paper presents the progress in using the alcohol detector, a device that senses a change in the alcoholic gas content of the surrounding air this device is more commonly referred to as a breath analysis, as its analysis the alcohol content from a person's breath.

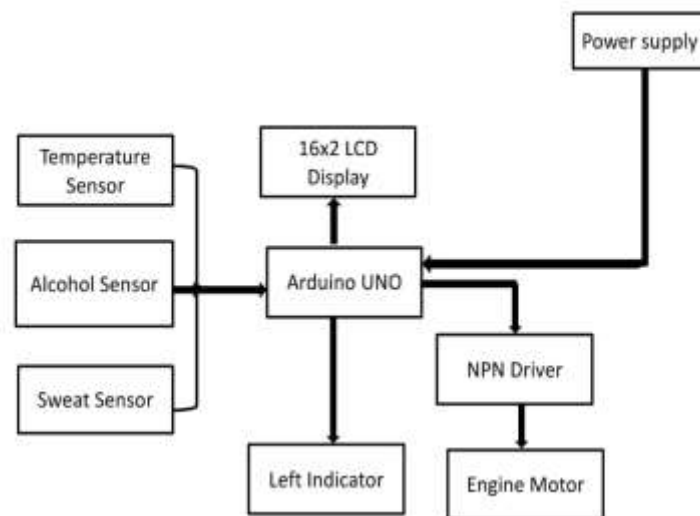


Figure 1: Block diagram of smart driver monitoring system to avoid accidents using Arduino

The design of “SMART DRIVER MONITORING SYSTEM TO AVOID ACCIDENT USING ARDUINO” mainly focuses on the point of road safety saving life by using the alcohol sensor, temperature sensor, and sweat sensor. Which is used to sense the driver's condition and perform the function. When alcohol and temperature is above the threshold value the dc motor turns off and stops the car by turning on the left indicator. Drinking and driving is already a serious public health problem, which is likely to emerge as one of the most significant problems in near future. The system implemented by us aims at reducing the road accident in the near future due to drunken and drive. Fig.1 presents the progress in using the alcohol detector, a device that senses a change in the alcoholic gas content of the surrounding air this device is more commonly referred to as breath analysis, as it analysis the alcohol content from person's breath.

The sensor is connected to the Arduino board which is debugged with the embedded c program and it connected to the LCD display. By using Arduino IDE, the embedded c program is debugged in Arduino and gets the input values from the temperature sensor, alcohol sensor, and sweat sensor. The output value is displayed in LCD display. These technologies are used for detecting health and alcohol consumption by the driver for preventing road accidents.

Fig 1 represents the block diagram of automatic car safety using an embedded system helps people to save their life while driving and to avoid accidents. This is one of the best solutions to reduce number of accidents. The system can be further improved by using another more accurate types of sensors better specifications of microcontrollers, stability systems, temperature sensors, LEDs to glow and better sound system. This system has various other advantages like small volume, small size or



compact in nature and more trustworthiness. This arrangement advances the care of human being and hence providing the actual growth in the industry concerning to reduce the accidents source due to alcohol.

### I.2. Working of this system:

Each sensors contains three pins of input, output and ground. The LCD display contains 6 pins in which 4 pins are data pin and remaining 2 pins are control pin. All the sensors are connected to Arduino board which is debugged with embedded c program and the output pin is connected to LCD display. Fig 4.2 represents the working of automatic car safety using embedded system. When the temperature and alcohol is high the DC motor turns off and it turn on the left indicator and stop the car. The threshold value of temperature sensor is 40 degrees Celsius and it reaches above 40 degree Celsius the DC motor turns off. The alcohol and sweat sensors are digital values when it goes high the DC motor turns off.

These technologies are used for detecting alcohol consumption and health of drivers for preventing the road accidents. All the values from the sensors are displayed in LCD display and if the values are high the motors turn off to avoid accident and loss of life. We have provided a very effective solution to develop an intelligent system for vehicles for alcohol detection whose core is Arduino. Since sensor has fine sensitivity range around 2 meters, it can suit to any vehicle and can easily be hidden from the suspects. The whole system has also an advantage of small volume and more reliability. As the growing public perception is that vehicle safety is more important, advances in public safety is gaining acceptance than in the past. Future scope of this system is to control the accidents causes due to alcohol consumption. This system improves the safety of human being. And hence providing the effective development in the automobile industry regarding to reduce the accidents cause due to alcohol. The system can be further improved by using other more accurate type of sensors better specifications of microcontroller, stability system, temperature sensors, LEDs to glow and better sound system.

This system has various other advantages like small volume, small size or compact in nature and more trustworthiness. This arrangement advances the care of human being and hence providing the actual growth in the industry concerning to reduce the accidents source due to alcohol. The designed system has been tested under various real-time driving conditions and has proved to be an efficient and cost-effective add-on to the vehicular technology, providing enhanced safety features for the drivers thereby reducing the probability of accidents. The accuracy and efficiency of the designed sub-systems is adequate, with certain limitations, however this field has a humungous scope of improvements and additions of more technologies. Detailed ECG signal processing can provide numerous parameters including murmurs, arrhythmias, etc., for better health monitoring of cardiac patients.

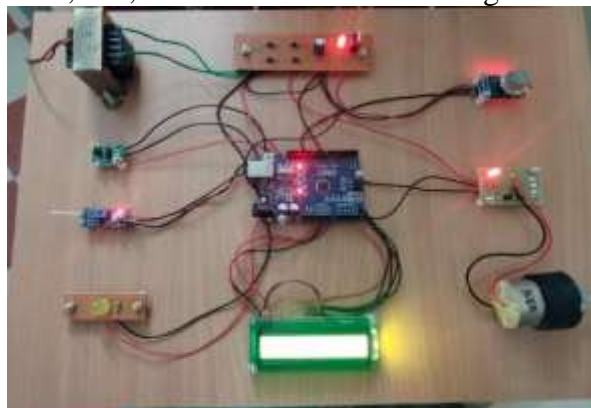


Figure 2 Working of Smart driver monitoring system to avoid accident using Arduino



Some additional features which may increase the fruitfulness of this research include power steering motor control considering car's speed, for better, accurate and safe lane changing, traffic monitoring during lane changing, and integration of the developed system with the existing android panel of the car. These technologies are used for detecting drowsiness and alcohol consumption by the driver for preventing the road accidents. Some technologies prevent road accidents by detecting the health parameters of the driver and contacting the rescue system. Some other technologies avoid accidents by sensing and alerting the driver in case of over-speeding. All these systems were designed using various techniques for the same purpose with varying performance versus cost trade-offs. This paper introduces a system that merges four features i.e., detecting the drowsiness level, alcohol consumption, monitoring the health parameters of the driver and switching the car to auto driving mode if the driver is identified unfit to drive.

## II. Literature

The "Smart Automobile" is predicated on the thought of a pre-crash system. Nowadays, the increasing range of traffic accidents because of a driver's diminished vigilance level has become a significant issue for society. Traditional transportation framework is never again adequate. Researchers have deployed different techniques and various technologies are being developed to solve this problem. These technologies are used for detecting drowsiness and alcohol consumption by the driver for preventing the road accidents. Some technologies prevent road accidents by detecting the health parameters of the driver and contacting the rescue system. Some other technologies avoid accidents by sensing and alerting the driver in case of over-speeding. All these systems were designed using various techniques for the same purpose with varying performance versus cost trade-offs. This paper introduces a system that merges four features i.e., detecting the drowsiness level, alcohol consumption, monitoring the health parameters of the driver and switching the car to auto-driving mode if the driver is identified unfit to drive. The objective here is to design an alcohol detection system that ensures the safety of drivers, pedestrians and vehicles under drunk driving circumstances. The system not only issues warning signals in case the driver's alcohol consumption raises above a certain threshold (BAC=400 as threshold 1) but also switches the car to the auto-drive mode in case of further liquor consumption as indicated by driver's Blood Alcohol Content (BAC=500 as threshold 2). This project contains GPS & GSM module. The main disadvantages of GSM are microcells affected by the multipath when the signal is loss and range problem in high area. Any kind of accident, the vibration sensor can detect the accident and send message to the contact number stored in the memory via GSM module monitoring the location tracked by GPS. Sometimes GPS signals aren't accurate and there are some obstacles to signals like buildings, trees and sometimes by extreme atmosphere condition like geomagnetic storms, hence it mainly leads to location inaccuracy and drifting signals. The acquired analog values after analog to digital conversion are compared with a predefined threshold. For comparison we have set two thresholds: the first threshold value is set at BAC=400 and the second threshold value are set at BAC=500.

If the person consumes alcohol during driving, then the system determines the course of action based on BAC threshold. Upon crossing the respective thresholds there are two stages of drunkenness to be determined. The first stage declares the person to be slightly drunk and sounds alarm for warning purpose and issues visual warnings on LCD. Water sensor can be used to detect the presence, the level, the volume and/or the absence of water. Here it is used to detect sweat of a person. The integrated system of smart automobile. This sensor is made up of two stainless steel electrodes which is used to identity the desired point for liquid detection. An activation of current to close one circuit within the sensor generates the signal when the fluid is detected.



### **2.1. Automotive safety system using can protocol**

This advanced system utilizes state-of-the-art technology to monitor car, alerting any possible danger and responding automatically in emergencies. It also features a wide range of features such as automatic emergency braking and lane departure warnings, giving you peace of mind while on the road.[1] This system is easy to install, with no complicated setup process and can be used in almost any type of vehicle. With our system, you can enjoy the benefits of improved safety while driving without having to worry about additional costs or complex installation processes. Many vehicles on the road today have driver assistance technologies, which help to save lives and prevent injuries on our nation's roads. While some driver assistance technologies are designed to warn you if you're at risk of an impending crash, others are designed to take action to avoid a crash. The continuing evolution of automotive technology, including driver assistance technologies and automated driving systems, aim to deliver even greater safety benefits.[3] The highest level of driving automation available to consumers requires the full engagement and undivided attention of drivers

The Controller area network or CAN protocol is a method of communication between electronic devices embedded in a vehicle, such as the engine-management systems, active suspension, central locking, air conditioning, airbags, etc. A vehicle contains a network of electronic devices that share data and information with one another. A spark-ignition engine, for instance, requires a spark to initiate the combustion chamber. Timing is important this occurs accurately it communicates with the vehicle's engine control unit, which chooses the ideal time for the ignition to provide the power and fuel efficiency. In electronics, a bus is simply a device that connects multiple electrical or electronic devices together.

### **2.2. Automotive safety system using GPS**

An automatic time adjusting device of a GPS of car safety control systems is disclosed there GPS receiver and some other components such as a plurality of image sensors, a speaker and a car display monitor. The GPS receiver receives the location information, clock signals of the Greenwich Mean Time (GMT). Due to connections between the car DVR, the GPS receiver, the time zone setting unit and the microprocessor, the current time data and location information. The latitude and longitude of vehicles is recorded. [5] Therefore, performance of the car safety control system is improved. This automobile is being developed by more of electrical parts for efficient operation and development of CAN based automobile control system CAN is a standard protocol for efficient and reliable communication between the sensor, actuator, controller and other nodes in real-time applications. CAN enable us to connect all the devices together using only two wires. [15] The efficient data transfer rate up to 1Mbps. The CAN Protocol is used to exchange information between ECU. To provide an accurate result to the driver different sensors are used like Temperature sensor, Fuel level sensor, RPM sensor Ultrasonic Sensors. CAN bus to implement the system to alert the driver.

Road traffic safety more broadly includes roadway design. One of the first formal academic studies into improving vehicle safety. Vehicles with some degree of driving automation have been anticipated for decades. The series of automated actions that these vehicles perform to transport people or goods make it possible to define them as vehicular robots. The detection of other road users and the monitoring of driver behaviour in case manual control needs to be reinstated. The CAN Protocol is used to exchange information between ECU. To provide an accurate result to the driver different sensors are used like Temperature sensor, Fuel level sensor, RPM sensor Ultrasonic Sensors. CAN bus to implement the system to alert the driver. This paper provides the development and implementation of various previously presented systems, which are useful to improve the driver vehicle interface. The highest level of driving automation available to consumers requires the full engagement and undivided attention of drivers.





### **2.3. Automobile safety, practice of design and regulation**

Safety and comfort on the roads, which is why we are proud to be at the forefront of automotive electronics.[2] As this field continues to grow, more and more safety, driver assistance, and infotainment devices are becoming standard features in modern day vehicles. Our cutting-edge technology ensures that drivers can enjoy a safe and comfortable ride while passengers can relax knowing they are in good hands. The products have been trusted by many of the world's leading car manufacturers. [5] There believe in providing a superior level of safety with our products so you can rest assured that your vehicle is running smoothly. Automobile safety is the study and practice of design, construction, equipment and regulation to minimize the occurrence and consequences of traffic collisions. Road traffic safety more broadly includes roadway design. One of the first formal academic studies into improving vehicle safety was by Cornell Aeronautical Laboratory of Buffalo, New York. The main conclusion of their extensive report is the crucial importance of seat belts and padded dashboards.[8] The primary vector of traffic-related deaths and injuries is the disproportionate mass and velocity of an automobile compared to that of the predominant victim, the pedestrian. This paper presents a literature survey on Automobile safety, practice of design and regulation.

The rising trend of autonomous things is largely driven by the move towards the autonomous car. That both addresses the main existing safety issues and creates new issues. The autonomous car is expected to be safer than existing vehicles, by eliminating the single most dangerous element - the driver. The Centre for Internet and Society at Stanford Law School claims that some ninety percent of motor vehicle crashes are caused at least in part by human error. The required safety, it is still a burden on the industry to demonstrate acceptable safety. The main conclusion of their extensive report is the crucial importance of seat belts and padded dashboards. The primary vector of traffic-related deaths and injuries is the disproportionate mass and velocity of an automobile compared to that of the predominant victim, the pedestrian.

### **2.4. Safety system assessment case study of automated vehicle**

Introducing Conditional Automation which allows human drivers to hand over the Driving Dynamic Task to an Automated Driving System (ADS). [7] There only be ready to resume control in emergency situations. This provides drivers with an opportunity to focus on non-driving-related tasks. This innovative technology can help you improve safety, reduce costs and increase productivity. [10] The proposed model is utilized to prioritize risks corresponding to the particular case study, based on real AV shuttle bus development, and focuses on the level hardware/software safety issues and improvements. In this study, a risk analysis model is developed, combining the fuzzy analytical hierarchy process and the Technique for Order of Preference by Similarity to Ideal Solution method. [13] These types of vehicles are usually low-speed and rely on a lidar-camera sensor set and a self-driving software stack. These new use cases are increasing these systems' safety demands. The efficient data transfer rate up to 1Mbps. The Protocol is used to exchange information between ECU. To provide an accurate result to the driver different sensors are used like Temperature sensor, Fuel level sensor, RPM sensor Ultrasonic Sensors. CAN bus to implement the system to alert the driver. The highest level of driving automation available to consumers requires the full engagement and undivided attention of drivers. There is considerable investment into safe testing, development and validation of automated driving system.

The continuing evolution of automotive technology, including driver assistance technologies and automated aim to deliver even greater safety benefits. The safety constraints of autonomous driving technology, and proposes corresponding safety constraint strategies. The automobile life cycle safety regulation system, the establishment of a new type of anti-deep learning algorithms. Vehicles with automated capabilities and automated vehicle services on the road network. There only be ready to



resume control in emergency situations. This provides drivers with an opportunity to focus on non-driving related tasks. This innovative technology that can help you improve safety, reduce costs and increase productivity.

### **2.5. Systematic literature survey on accident alert & detection system**

The research has been conducted to predict and detect vehicle accidents. However, there has not been any pre-intimation to drivers about the impending danger. [2] The objective to come up with an innovative solution that can accurately detect and predict vehicle accidents in advance, allow drivers to take preventive measures in order to reduce injury or even save life. A detecting the vehicle accident but there has not been pre intimation to the drivers about the accident. In this project, we propose to overcome the accident. The objective of this paper is to understand the various techniques that have contributed in the curb of accidents especially by preventing and detecting accidents. [6]A study on different proposed methodologies involving various techniques for the stages involved along with their advantages and disadvantages is done which can help in the determination and appropriation of an efficient, accurate accident alert and detection system. System specifications based on thorough analysis of existing solutions.

The proposed model is utilized to prioritize risks corresponding to the particular case study, based on real AV shuttle bus development, and focuses on the low-level hardware/software safety issues and improvements. In this study, a risk analysis model is developed, combining the fuzzy analytical hierarchy process and the Technique for Order of Preference by Similarity to Ideal Solution method. [13] These types of vehicles are usually low-speed and rely on a lidar-camera sensor set and a self-driving software stack. These new use cases are increasing these systems' safety demands. There Road accidents are very high especially for two wheelers. This system aims to alert the nearby medical centre about the accident to provide immediate medical aid. The attached accelerometer in the vehicle senses the tilt of the vehicle and a heartbeat sensor on the user body senses. The abnormality of the heartbeat to understand the seriousness of the accident. Thus, systems will make the decision and sends the information to connected to their accelerometer through GPS & GSM modules.

### **III. Conclusion**

The “SMART DRIVER MONITORING SYSTEM TO AVOID ACCIDENT USING ARDUINO” mainly focuses on the point of road safety saving life by using the alcohol sensor, temperature sensor and sweat sensor. Which is used to sense the driver's condition and perform the function. When alcohol and temperature is high the dc motor turns off and it turn on the left indicator and stop the car. The sensor is connected to the Arduino board which is debugged with the embedded c program and it connected to the LCD display and the value is displayed. It has great importance in termination and reduction to a large extent of an accidents and causalities in cramped areas. This system can be effectively used for any kind of automobiles such as heavy vehicles etc..., and we can modify the system with the help of additional components to identify the health issues. The device can not only be used for safety purpose but also for monitoring health. It is an automatic wireless device and therefore it is easy to use. The device is compact in size; hence it is portable. The device works with high precision and the manual switches facilitates better use of the device whenever required. With the advancement of technology, the device can be made to work under high precision. Some new sensors can be incorporated to increase its accuracy. If the device is used under any of the above discussed critical situations, then it will give an alert to the respective contacts/authorities along with location of the user. The same will happen if the user presses the manual switch to send an alert. In the upgraded



version it can be modified and we can attach the cameras and also by using lora we can send the notifications to the nearby vehicles.

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