# REPORT

# On

## Drunk Driver Detection with SMS Alert

**Course Title:** ***Microprocessor and Assembly Language Lab***

**Course Code:** ***CSE 322***

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## Abstract:

One of the major causes of road accidents, crashes, mishaps and fatalities globally all over the world is drunk driving. Though driving under intoxication is illegal, even then people restore to such hard-core habits often. In order to combat such risky situation on road, technological innovation needs to be implemented in a cost-effective, efficient and legal manner. This paper discusses design, development and live-performance test of the prototype of drink and drive situation detection and alert cum vehicle control system to minimize road mishaps and enhance public safety on road. It also analyses the response of breath –alcohol semiconductor sensor with respect to variation in distance from source which is critical part of system design. Based upon the recent smart gas sensing and integration of satellite and cellular wireless communication technologies, the proposed device quickly senses the drunken state of the driver during start-up/driving by estimating the equivalent breath alcohol concentration level corresponding to the legally permissible state's threshold blood alcohol concentration level. On detection of such situation, on-vehicle siren/audio alarm is activated to warn the persons on road and vehicle control system is triggered to lock ignition or stop the fuel inflow to the vehicle. Additionally, 'alert SMS' indicating drunk driver location, tracked by on board , along with vehicle number is communicated remotely to authorized (family members, traffic police) mobile user using GSM cellular network to take appropriate action thereafter. The live experiment results highlighted the successful working performance of the device in-housed at the steering wheel of the vehicle with the drunk driver.

# Introduction:

The project entitled “Drunk driver Detector using Arduino with SMS Alert and Sound Alarm” will be a great help in terms of preventing any danger caused by drunk driving. The purpose of this project is to detect the presence of Alcohol Detector system. Apart from sound alarm, an SMS alert will inform the authorized person. Descriptively, we use an Alcohol sensor .This proposed project will trigger the sound alarm. In addition, the authorized person will be informed about the leakage via SMS alert.

At present drunken drivers have increased enormously and so, the deaths due to drunken drivers. The main reason for driving drunk is that the police are not able to check each and every car and even if they catch any one the police can be easily bribed. So there is a need for an effective system to check drunken drivers.

In our alcohol detection system the ignition of the fuel is regulated by a sensor circuit. The sensor circuit is used to detect whether alcohol was consumed by the driver recently which is used to check whether alcohol is consumed while driving. If the breath sample contains no alcohol, the driver is given full control to the speed of the vehicle.

There are different types of vehicle accidents which occurred in day to day life time with variety of causes. Accidents may cause due to many reason it may a break failed system; it may occurred due to over drunken driver person or due to over speed .Accidents that are due to over drunken drivers and over speed driving are totally eliminated by applying control mechanism accordingly. Starting from this point of view we make a system which is installed inside the vehicle that eradicates the vehicle accident caused due to a drunken driver.

So our project is designed and developed as a system to bring the best solution by avoids such vehicle accidents happening due to drunker driver. The alcohol concentration sensor MQ-3 that detects the amount of alcohol taken by the driver accordingly the controller analysis and takes a decision on the motor of the vehicle if the amount of alcohol detected is greater than the sated value the motor does not work. In case the alcohol penetration speed in the blood may varies then it is difficult to detect at the starting but gradually as the time goes the driver breath with the correct content of alcohol that he/she have inside but since the circuitry is always active the it would cutting-off the Fuel supply and induce the alarm & Indicators (display the amount on, but also it enabling a person who is not drunk to drive the same vehicle exact concentration of the alcohol from the breath it may increase along the time so, since the detector.

## Objectives:

General Objective To layout and acquire a project Alcohol Detector using Arduino with SMS Alert and Sound Alarm". Methane outflow or any such petroleum centered on gaseous substance that can be discovered using MQ5 device

(1) to layout and set up an SMS centered Alert method send SMS alert missives to restrict mobile number enter inside the Arduino program.

(2) to layout and acquire a project that will fabricate a sound alarm during gas outflow and rest the alarm once Alcohol outflow is regulated

## Related Works:

Sampling of the works in the area of vehicle safety and security highlight the development of commercial devices for certain risks mitigation such as obstacle detection and anti-braking system air bag, anti-theft and vehicle tracking vehicle tracking etc. Also, innovative ideas and methodologies towards vehicle safety, traffic management etc. have been projected by researcher's/ project developers over the recent years globally In the case of alcohol detection, commercially and commonly used device is a breath analyzer which is a mouth device and requires blowing of deep breath to detect the alcoholic state of the driver.
Generally, the device is manually operated by the traffic police that stops and checks the driver breath alcohol concentration and if it exceeds legal threshold limits, penalty/punishment is put on the defaulter as per laws of the city/state. This procedure is time consuming, often causes traffic congestion at checking points, increases vehicle exhaust and pollution level and unnecessary harassment to others who abstain from drinking. Another commercially used device is ignition interlock that allows the driver to start the vehicle if the alcohol detection test is passed otherwise prohibits the driver to drive the vehicle. The device is generally fitted in the vehicle and requires the drive to undergo breath alcohol test and activate the ignition system if test is passed. This device monitors the alcoholic state of the driver and takes preventive action during start up but does not guarantee alcohol detection during vehicle run condition. In one of the recent joint research project on driver alcohol detection system for safety, the auto companies are investigating technological solutions based upon breath type and touch–type alcohol sensing methods that can be reliable, cost-effective and can be integrated seamlessly in Vehicle to stop the vehicle from moving once BAC of driver exceeds the limit , the legal limit in 50 states of USA .

A few of the works indicated different sensing methodologies for drunk driver detection such as the use of chemical gas sensor, design of more accurate alcohol sensor with electric fan suction and oxygen level detection of exhaled breath, use of body area sensors for alcoholic and mood functional detection and detecting behavior pattern of driver using iris image capture and processing to detect eyes condition that is affected by blood alcohol concentration level .Many proposed the embedded hardware of the system without discussing the results such as an alcohol sensor with GSM module to send message, use of global position system to track drunk driver location or use of additional ultrasonic sensor to detect accident and track location .Others, proposed additionally different ideas of vehicle control to prohibit driving under the detection of drunk driver condition such as triggering of ignition interlock system. Also, the idea to use latest technology of vehicular area networks by incorporating the sensors in vehicles to communicate with other vehicles and/or with roadside sparse network devices was proposed for detecting drunk drivers on road. This would enable timely sharing of collectively information of drunk drivers, accidents or road congestion problem etc. among the vehicles on the road thus enhancing on-road safety of many vehicles.

## Scope And Limitation:

Drinking driving is responsible for a high proportion of traffic accidents. To study the effects of alcohol on drivers and driving performance, 25 drivers' subjective feelings and driving performance data in different blood-alcohol concentration (BAC) levels were collected with simulated driving experiment. The investigation results revealed that alcohol affected drivers in many aspects, including attitude, judgment, vigilance, perception, reaction, and controlling. The analysis of accident rate showed that higher BAC level would lead to higher accident rate. The statistical analysis results of driving performance indicated that average speed, speed standard deviation, and lane position standard deviation were significantly higher under the influence of alcohol. They also had a statistically significant linear trend as the function of BAC level. The discrimination of drinking driving based on driving performance was performed with Fisher discrimination method. The results showed that drinking driving with higher BAC level was easier to discriminate from normal driving. Also, the results indicated that the three significant indicators on straight roadway could be used in the discrimination of drinking driving state. The conclusions can provide references for the study of drinking driving and the identification of driving state and then contribute to traffic safety.

## Methodology And Technical Background:

This technique is very easy to apprehend and utilize. The simplicity of this technique also makes it simpler to accomplish. The V-Model is based on the relationship of a testing stage for each corresponding improvement level. This means that for every single segment in the improvement drive, there is a directly correlated testing phase. This is a highly-restricted model and the next stage starts only after the end of the previous phase.

## Requirement Analysis:

On this phase, the hardware requirement used in the project was discussed.

a) The Arduino Software which is an open source (IDE) makes it simple to create code and upload it to the Arduino Uno board. It also needs a GSM module for the purpose of SMS alert, Buzzer or speaker for sound alarm, analog gas sensor.

b) The Arduino Uno is the microcontroller chip that is responsible for all function of our proposed project. It functions as the brain of this system. The microcontroller chip used is Arduino Uno manufactured by Arduino. The chip works to control the hardware and the interface with the transmitter part.

c) The actual writing of code in the system modules suggested in the design stage is taken up in the coding stage. The coding is presented based on the coding procedure and paradigms. The code goes through several code checks and is optimized for best execution before the final build is proved into the repository.

## PROPOSED SYSTEM:

Alcohol detection in vehicle system is continuously growing over years which could resolve drunken driving accidents worldwide.

## Hardware Requirement & Budget:

| | |
|---|---|
| • Arduino uno | 450 |
| • GSM Module | 450 |
| • Alcohol Sensor | 120 |
| • Buzzer | 10 |
| • Breadboard | 60 |
| • Connecting wire | 50 |
| • LED bulb | 10 |
| • Battery | 50 |
| Total budget of this project is | 1200TK only |

## Software Requirement:

- Arduino IDE
- Windows 10
- Programming Language

# Used Technology:

## ARDUINO

The arduino board is the central unit of the system. The arduino uno is the microcontroller board based on the ATmega 328. It is a programmable microcontroller for prototyping electromechanical devices. It has 14 digital inputs/output pins 6 analog inputs , a 16 MHz ceramic resonators the arduino differs from all preceding board is that it does not use the FTDI USB to serial driver chip.


**FEATURES**
Microcontroller ATmega328
Operating Voltage 5V
Input Voltage 7-12V
Input Voltage (limits) 6-20V
Digital I/O Pins 14
Analog Input Pins 6
DC Current per I/O Pin 40 mA
DC Current for 3.3V Pin 50 mA
Flash Memory 32 KB (ATmega328)
SRAM 2 KB (ATmega328)
EEPROM 1 KB (ATmega328)
Clock Speed 16 MHz

## ALCOHOL SENSOR (MQ-3)

The analog gas sensor- MQ-3 is suitable for alcohol detecting, this sensor can be used in a breath analyzer. It has a high sensitivity to alcohol and small sensitivity to benzene. The sensitivity can be adjusted by the potentiometer sensitive material of MQ3 gas sensor is SnO2, which with lower conductivity in clean air. When the target alcohol gas exist, the sensors conductivity is higher

along with the gas concentration rising, use of simple electro circuit, convert change of conductivity to correspond output signal of gas concentration.
MQ-3 gas sensor has high sensitivity to Alcohol, and has good resistance to disturb of gasoline, smoke and vapour. It has fine sensitivity range around 2 meters. The sensor could be used to detect alcohol with different concentration; it is with low cost and suitable for different application.


## Character configuration:

1. Good sensitivity to alcohol gas.
2. Circuit is simply driven.
3. Low cost and long life.
4. Small towards benzene and High sensitivity to alcohol .
5. Fast response and high sensitivity and stability and long life.

## Specification:

1. Power supply requires 5 volts.
2. Interference type: analog only.
3. Pin specification: 1-output, 2-GND, 3-VCC
4. High sensitivity and fast response.
5. Stable and long life
6. Small towards benzene and High sensitivity to alcohol

Simple drive circuit with size:40*20mm

## BUZZER

**Features:**

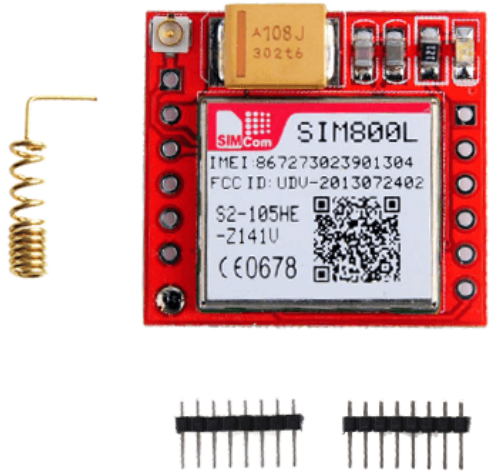
1. The PS series are high performance buzzers that employ uni-morph piezoelectric elements and are designed for easy incorporation into various circuits.
2. They feature extremely low power consumption in comparison to electromagnetic units.

3. Because these buzzers are designed for external excitation, the same part can serve as both a musical tone oscillator and a buzzer.
4. They can be use with automated inserters, moisture- resistant models are also available

## GSM Module

SIM800L Module is a small GSM/GPRS Module and ideal for small ideal projects. The module supports quad-band GSM/GPRS network, available for SMS and GPRS message data remote transmission. The SIM800L communicates with the microcontroller via UART port, supports command including 3GPP TS

The SIM800L can work up to 2Amps current at peak. It also has a low power consumption feature that consumes 1mA Current in sleep mode. You need to power the module from **3.7V to 4.2V** as per the datasheet. More than that will damage the module. You can use a buck converter to achieve this voltage range.




**Features:**

- 2G Quad-band 850/900/1800/1900MHz
- Receive and make calls using the speaker and microphone outputs
- Receive and send SMS
- Listen to FM radio broadcasts
- GPRS multi-slot class12 connectivity: max. 85.6kbps(download/upload)
- GPRS mobile station class B
- Controlled by AT Command (3GPP TS 27.007, 27.005 and SIMCOM enhanced AT Commands)
- Supports Real Time Clock
- Operating Voltage range 3.4V ~ 4.4V
- Supports A-GPS
- Low power consumption, 1mA in sleep mode
- Micro SIM Card

## System Design:

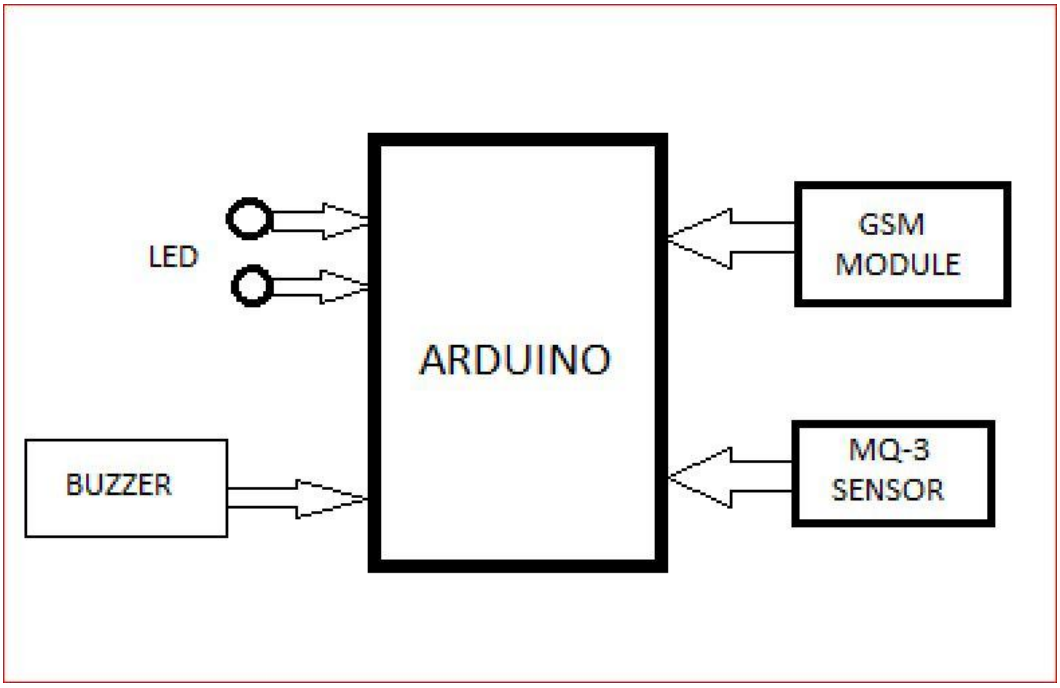



Fig:Block Diagram

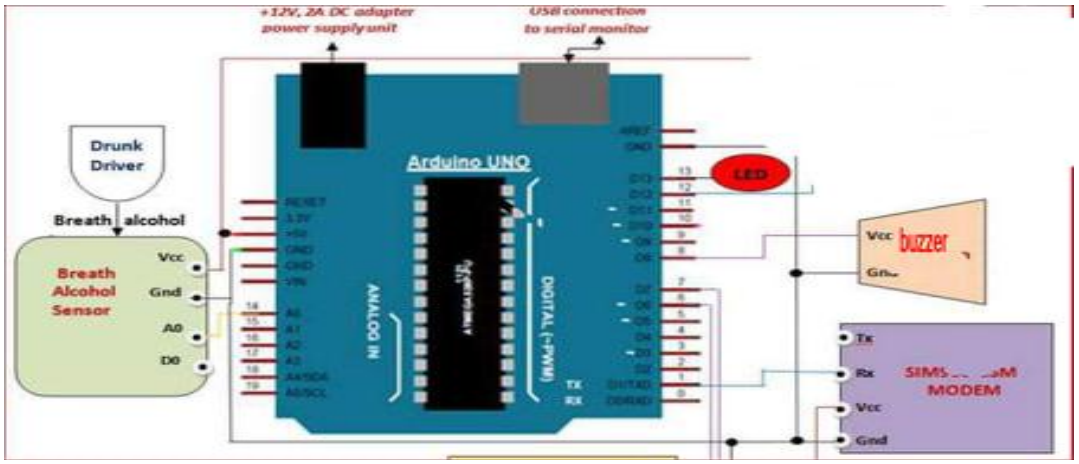
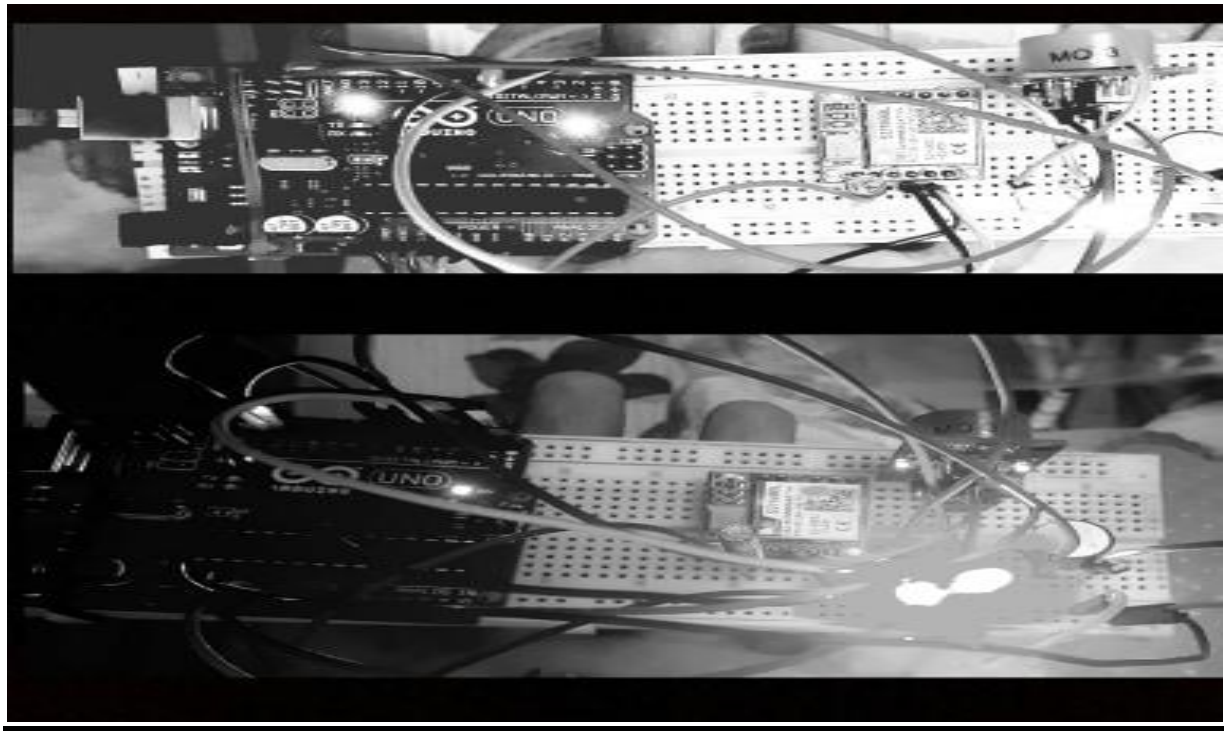



Fig: System Overview Diagram

# System Implementation code:

```
const int buzzerPin = 12;
const int alcoholPin = 11;
int Alcohol = HIGH;
int redled = 5;
int greenled = 6;
void setup()
{
  pinMode(buzzerPin, OUTPUT);
  pinMode(redled, OUTPUT);
  pinMode(greenled, OUTPUT);

  pinMode(alcoholPin, INPUT);
  Serial.begin(9600);
}

void loop()
{
  Alcohol = digitalRead(alcoholPin);
  if (Alcohol== LOW)
  {

     Serial.println("ATDxxxxxxxxx;"); // ATDxxxxxxxxxx; semicolon should be at the
last ;AT command that follows UART protocol;
    digitalWrite(buzzerPin, HIGH);
    digitalWrite(redled, HIGH);
    digitalWrite(greenled, LOW);
      Serial.println("AT+CMGF=1");    //Sets the GSM Module in Text Mode
     delay(1000);  // Delay of 1 second
     Serial.println("AT+CMGS=\"+8801717291214\"\r"); // Replace x with mobile
number
     Serial.println("DRUNK DRIVER DETECT");// The SMS text you want to send
     Serial.println((char)26);// ASCII code of CTRL+Z for saying the end of sms to  the
module
     //delay(100);


  }
  else
  {

    digitalWrite(buzzerPin, LOW);
    digitalWrite(greenled, HIGH);
    digitalWrite(redled, LOW);
  }
}
```

## System Testing:




## Advantages:

1. To prevent accident due to drunk and drive cases.
2. Easy and efficient to test the alcohol content in the body in a vehicle.
3. Quick and accurate results.
4. Helpful for Government bodies (police) and provides an automatic safety systems for cars and other vehicles as well.

## Future Scope:

In the coming years, such a system is going to be mandatory in vehicles and is going to play a major role in making lives secure during driving. Drunk-driver detection in vehicles makes better fleet management with high potential to save lives. Such a system in a vehicle will help parents to avoid the kids to drink and drive. Apart from this, vehicle location tracking and alter system of this kind

can be helpful both in case of personal as well as business purpose, improves safety and security of the person on road. In this paper the device prototype with preliminary experimental results depicting proof-of-the-concept was presented. To ascertain long-term working performance of the system more live tests with different level of drunken state of the driver can be conducted and analyzed. The system reliability can further be enhanced by the use of multi-sensor fusion using breath-based sensors at different locations in the vehicle, vision system to recognize facial/eyes expressions of the driver and/or use of touch sensor etc. There is possibility to incorporate others features such as different security mechanism in the vehicle such as theft, accident detection, fuel quality detection along with vehicle tracking system. Further, developing the system on the latest VANET technologies will help to share the information with others on the road effectively and efficiently

# Conclusion:

To explore the impact of alcohol on drivers and driving performance, the experiment was designed to collect 25 participants' subjective feelings and their driving performance data. The distribution of the questionnaire's result was summarized. The accident rate in different levels was statistically analyzed, and with repeated measures was used to analyze the signatures of driving performance under the influence of alcohol. Discrimination analysis with significant performance indicators was used to classify drinking driving states from normal driving states. According to the results in this research, the following conclusions can be obtained.

(i)Under the influence of alcohol, most of drivers tend to be more impulsive and adventurous and their abilities of judgment, vigilance, recognition, reaction, and controlling were impaired obviously.

(ii)The accident rate is of positive correlation with BAC level. Driving at higher level will be more dangerous, even in simple driving environment.

(iii)On urban straight roadway segment, and were all significantly higher when drinking driving than those when normal state. They all had statistically significant linear trend as a function.

iv)The above three indicators on urban straight roadway segments can be used to distinguish drinking driving state from normal driving state. The higher level is, the more accurate the discrimination is.

# References: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