MID-TERM PROJECT

PROJECT TITLE : ALCOHOL DETECTION SYSTEM

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BATCH : 17

Problem Statement-

Description: Develop a microcontroller based prototype which can detect the drink and drive issue of driver by detecting the consumption if alcohol by the drivers.

I. INTRODUCTION-

Road safety has always been an important topic in society. Governments around the world have introduced various signs, lanes and rules to prevent accidents and deaths. But a large part of our population still does not follow these rules. There are many deaths and injuries in traffic accidents, lane violations and drunk driving. Every other day there are accidents related to drunk driving where people either die or injure others or damage public and private property.

Drunk driving is already a major public health problem that is likely to become one of the most important problems in the near future. The aim of the implemented system is to reduce traffic accidents caused by drunk driving in the near future. This project shows the progress of use of alcohol detectors. A device that detects changes in the alcohol content of the surrounding air. This device is more commonly called a breathalyser because it analyses the alcohol content based on the person and breath and accurately detects if the individual is under the influence of alcohol .

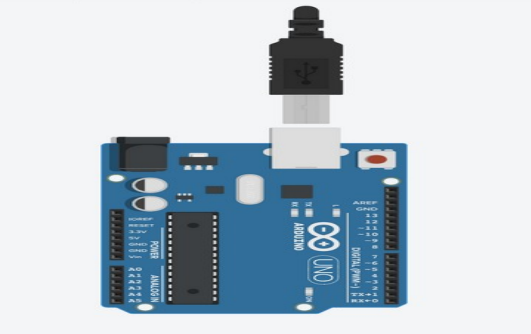
II. COMPONENTS REQUIRED -

Simulation software used -TinkerCAD

IDE-Arduino IDE

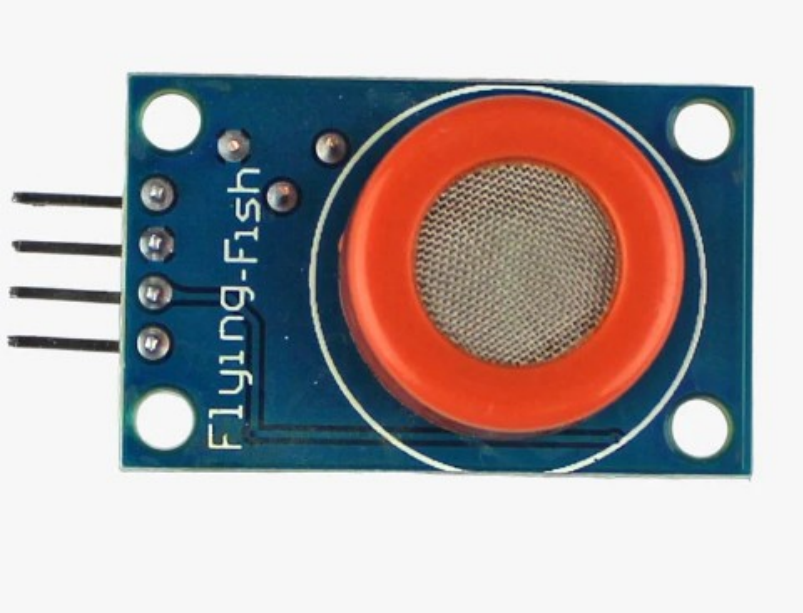
Name	Quantity	Component
U1	1	Arduino Uno R3
U2	1	LCD 16 x 2
R1	1	330 Ω Resistor
Rpot1	1	250 kΩ Potentiometer
GAS1	1	Gas Sensor
R2	1	4.7 kΩ Resistor

Arduino Uno Microcontroller (alternatively, 8051 works well)



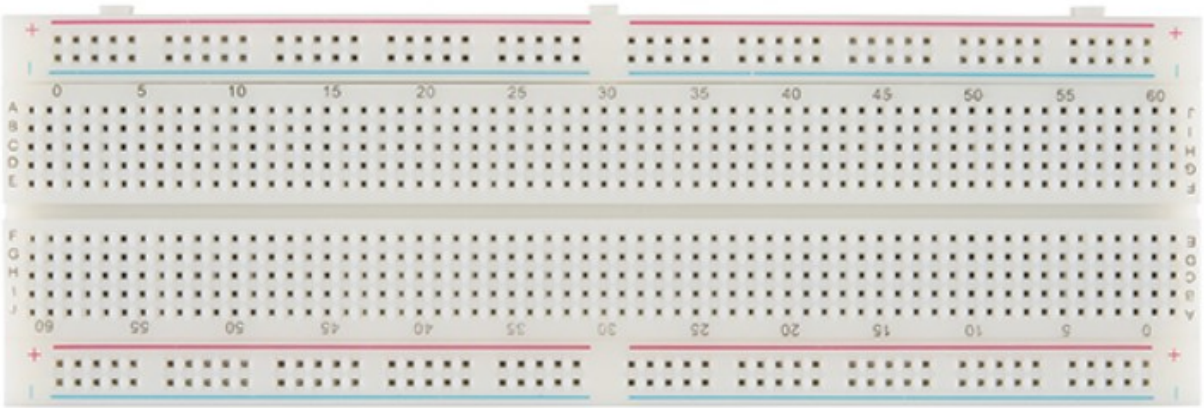
It is an open-source electronic platform based on easy-to-use hardware and software. It is used for sending, receiving and processing the signal and it helps to rotate the servo motor and shows the display on the screen.

MQ-3 gas sensor

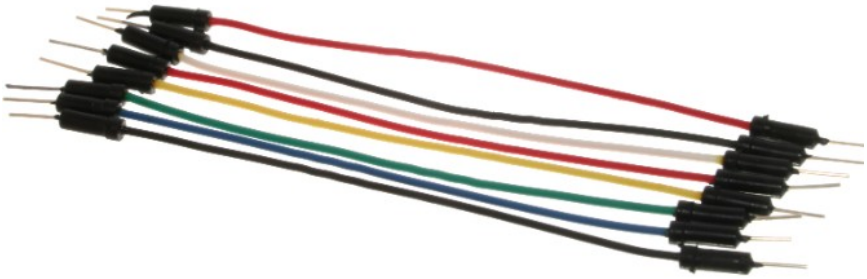


This MQ3 sensor is employed to detect alcohol. Its sensitivity to gases like CO and benzene is modest, whereas its sensitivity to alcohol is strong. SnO2 may be used to vary the sensitivity, making it useful for sensing alcohol. When the concentration of the alcohol is high the resistivity of the sensor will change and hence the output voltage will change. Within a 2-metre range, this can detect the presence of alcohol. Thus, the sensor is a very useful component in such a type of system which is used in sensing air from breath.

Breadboard



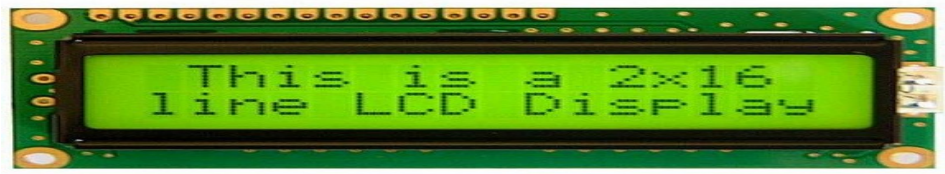
Jumper Wires



4.7 K Ohm resistor

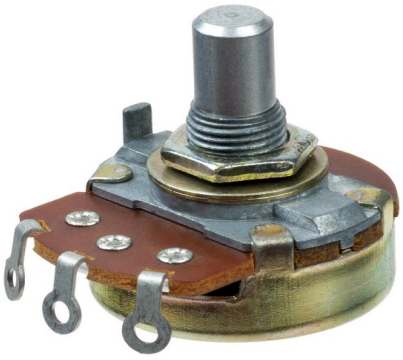
330 Ohm resistor

LCD 16X22



This is used to display the presence of alcohol if it is detected or not. It is basically a 7 segment display which can be programmed and can be used to operate with various other microcontrollers and other devices . Data registers are used to store the information that is to be exhibited on the LCD. The information is the ASCII value of the character which is displayed on the LCD.

Potentiometer



It is used for regulation of voltage. It consists of three pins. One is input and another one is output and ground.

This circuit creates and maintains the fixed voltage. It is prescribed limit which is tolerated by the electrical

circuit using of voltage

III. Theory and working principle-

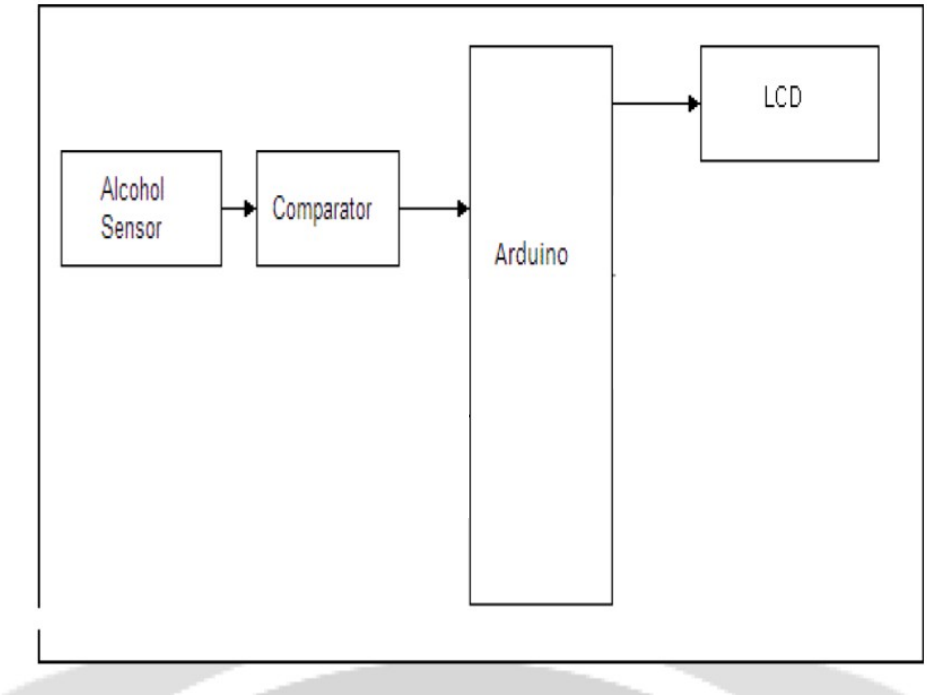
There are many MQ-X sensors available in the market for different uses but we are here going to use MQ-3 because it is best for detecting alcohol. The working of most of the MQ sensors is the same. They all contain a heating element that heats up a layer of conducting material whose resistance is continuously measured. Its resistance changes when fumes or smell from alcohol comes in contact with the MQ-3 sensor.The sensor gives both digital and analog output. The sensor is built out of LM393 IC which has an inbuilt amplifier that amplifies the voltage signal to the detectable range. Also, it has voltage comparators for efficient amplification. The amount of amplification can be adjusted with the help of potentiometers given on the sensor

An MQ-3 sensor is capable of identifying Alcohol, Benzene, CH4, Hexane, LPG, CO. It has a sensitive SnO2 material as a gas sensor, which has a lower conductivity in clean air .

Inside the sensor there is a resistance A and B which detects alcohol if their resistances are varied. If the concentration of alcohol is high , then the resistance is low and vice versa. The alcohol is then measured by using variable resistance.

Resistance value of MQ-3 is different for various kinds and various concentrations of gases. So, when using these components, sensitivity adjustment is very necessary. It is recommended to calibrate the detector for 0.4mg/L (approximately 200 ppm) of Alcohol concentration in air and use a value of Load resistance that (RL) is about 200 KΩ (100KΩ to 470KΩ). When accurately measuring, a proper alarm point for the gas detector has to be determined after considering the temperature and humidity influence.

IV. Hardware Modules-



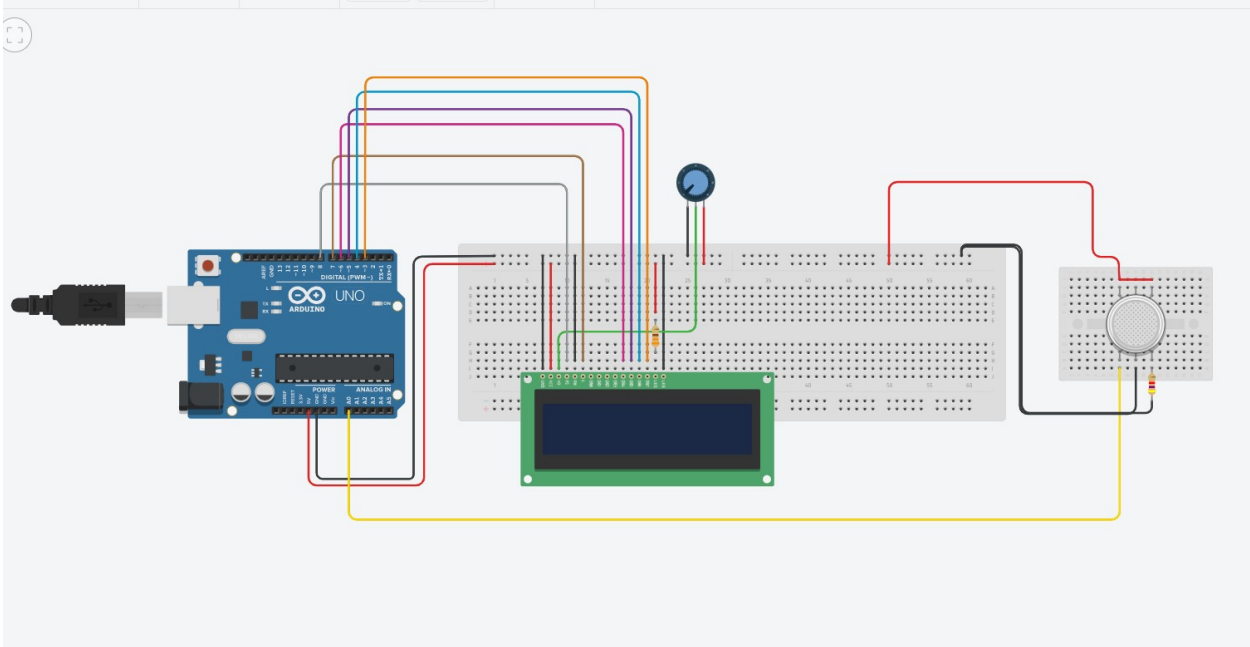
The entire system adopted the Arduino uno microcontroller board (Based on ATMEGA 328), the principle of the hardware chart as shown in fig1. The core functions modules are Arduino uno alcohol sensor module (MQ3), LCD display, buzzer, relay.

ARDUINO:- The arduino board is the central unit of the system. all the components are interfaced to the board and programmed as per their functionality to operate in synchronisation .

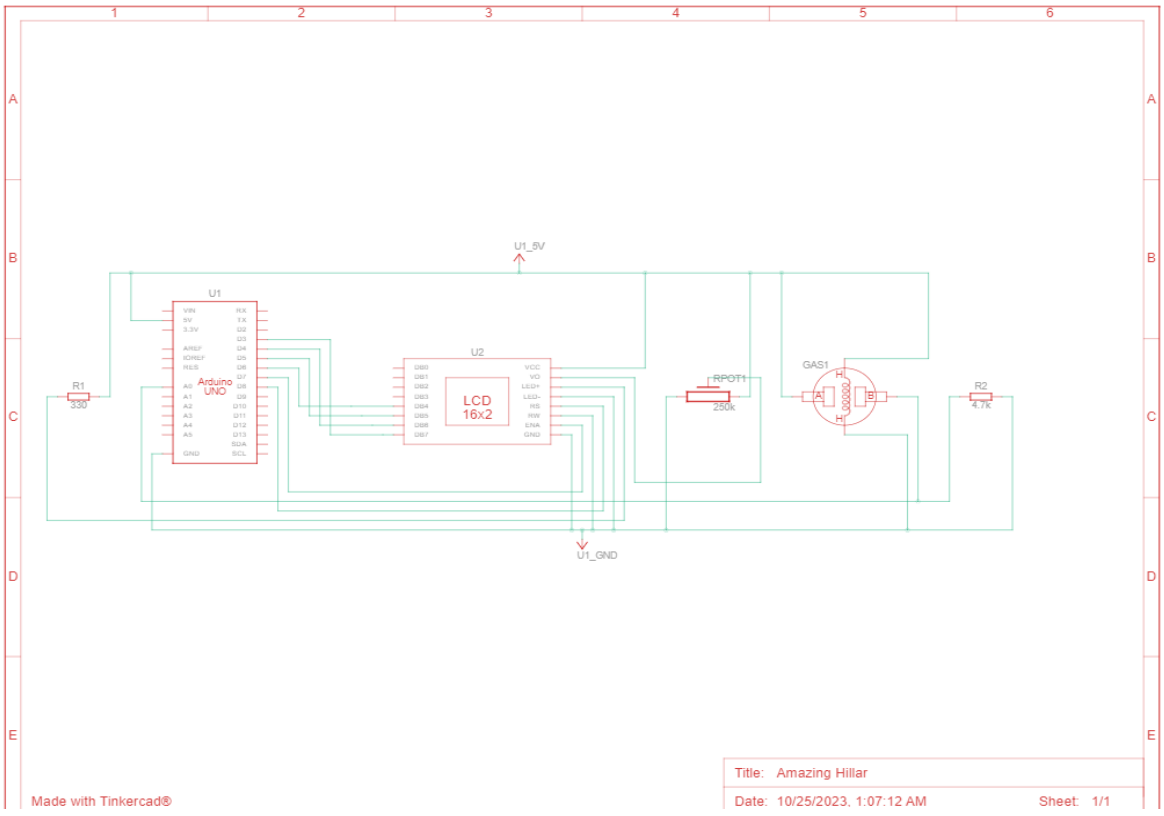
ALCOHOL MODULE:- It is used to sense the alcohol. The analog output of which is applied to the arduino board.

LCD:- If alcohol is detected it displays the message indicating “alcohol detected”.

V. Simulated Circuit-



VI. SCHEMATIC-



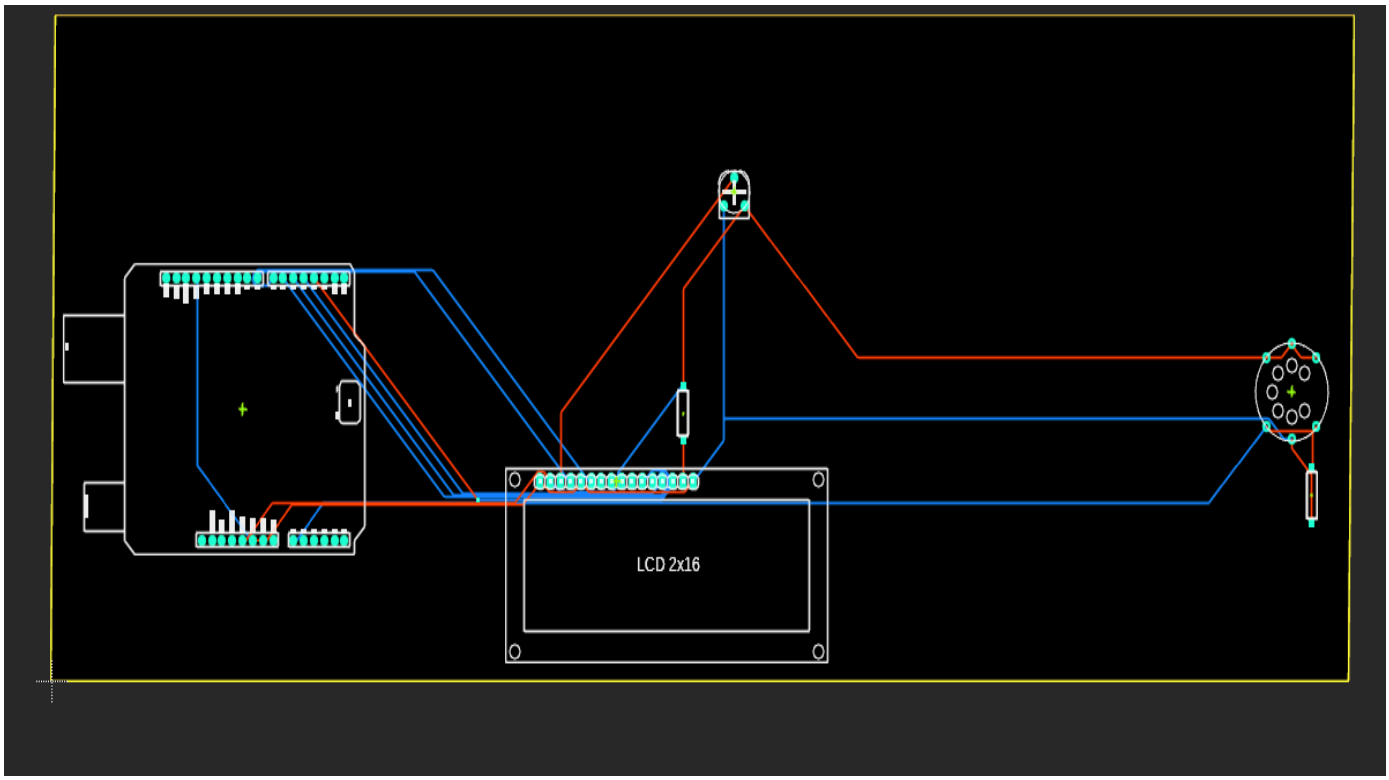
VII. Arduino Code-

Arduino Uno

alcohol_detection.ino

```
#include "LiquidCrystal.h"
LiquidCrystal lcd(8,7,6,5,4,3);

int LDR_VAL = 0;

void setup()
{
  pinMode(A0, INPUT);
  Serial.begin(9600);
  lcd.begin(16,2);

  lcd.setCursor(0,0);
  lcd.print("   GAS SENSOR  ");

}

void loop()
{
  LDR_VAL = analogRead(A0);
  Serial.println(LDR_VAL);


 if (LDR_VAL < 650)
 {
    lcd.setCursor(0,1);
    lcd.print("alcohol not Detected ");

 }
  else
 {
     lcd.setCursor(0,1);
     lcd.print("alcohol Detected");

 }

  delay(10); // Delay a little bit to improve simulation performance
}

```

VIII.GERBER FILE-



IX. Scope of Solution-

In this project , A prototype model has been developed that can detect when a drunken driver tries to drive a car. By using this alcohol sensor into the car, we can safeguard the life of the driver and also the remaining passengers. It is a very simple application. The lifetime of the project is high and also low maintenance and low power consumption. This project is developed to efficiently check drunken driving. By implementing this project, we can decrease the accident rates under the influence of alcohol.This system can be further modified for better improvement in future. The limitation can be overcome by using more precise and advanced software to be implemented.Including this process, a secondary alcohol sensor can be added so that it will support the functionality of alcohol sensor and will give an accurate output.

The development of a portable, reliable, sensitive, simple and affordable alcohol detection system was instinctively required not only in the traditional beer, pharmaceutical, food and clinical industries, but also in the rapidly growing fuel alcohol industry. Currently, highly sensitive, selective and reliable alcohol detectors are available, usually with complex instrument-based analyses, mostly limited to modern analytical laboratories. Thanks to the new interdisciplinary approaches and parallel knowledge of rapid detection systems targeting different purposes, progress is being made in converting concepts into commercially viable and environmentally friendly portable alcohol detection systems. . Here, we summarise the advances in alcohol detection systems over the years, focusing on recent advances in the development of portable, simple and efficient alcohol sensors.

X. CONCLUSION-

Alcohol detecting breathalyser has been designed using micro-controller.The micro-controller of choice is Arduino UNO. The device was built with simple electronic tools such as gas sensors (MQ-3 in this case) and LCDs. This helps in the overall cost of the system and is very feasible. The designed device is able to accurately detect if the individual is under the influence of permissible / functional amount of alcohol. This helps authorities catch the offenders and help save lives.

The future goal of this system is to control accidents caused by alcohol consumption. This system improves people's safety. And thus provide effective development in the automotive industry in terms of reducing accidents.As the growing public perception is that vehicle safety is more important, advances in public safety are gaining acceptance than in the past. Future scope of this system is to control the accidents caused due to alcohol consumption. This system improves the safety of human beings. And hence providing the effective development in the automobile industry regarding to reduce the accidents caused due to alcohol.

ADVANTAGES

1. To prevent accidents due to drunk driving.

2. Easy and efficient to test the alcohol content in the body.

3. Quick and accurate results.

4. Helpful for police and provides automatic safety systems for cars and other vehicles as well.

THANK YOU