

# **ALCOHOL DETECTION FOR CAR LOCKING SYSTEM**

Submitted in partial fulfilment of the required for the award

of

**Bachelor of Computer Science**

by

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**(REGISTER NO 40290057)**



**DEPARTMENT OF COMPUTER SCIENCE**

**SCHOOL OF SCIENCE AND HUMANITIES**

**SATHYABAMA**

**INSTITUTE OF SCIENCE AND TECHNOLOGY**

**(DEEMED TO BE UNIVERSITY)**

Accredited with Grade “A” by NAAC | 12B Status by UGC | Approved by AICTE

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**MAY – 2023**



# **SATHYABAMA**

INSTITUTE OF SCIENCE AND TECHNOLOGY

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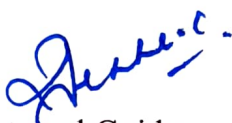
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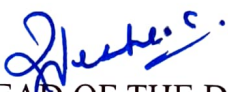
## **DEPARTMENT OF COMPUTER SCIENCE**

### **BONAFIDE CERTIFICATE**

This is to certify that this Project Report is the bonafide work of **MOHAMED ABUBACKER SIDDIQ M.A.K(40290057)** who carried out the project entitled “**ALCOHOL DETECTION FOR CAR LOCKING SYSTEM**” under our supervision from JANUARY 2023 TO MAY 2023.

  
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## DECLARATION

I am, **MOHAMED ABUBACKER SIDDIQ M.A.K (40290057)**, here by declare  
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CNOLOGY**, Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai-600 119 is submitted in partial  
fillment of the requirements for the award of Bachelor of Science degree in Computer  
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**MOHAMED ABUBACKER SIDDIQ M.A.K**

## ABSTRACT

In the present day's alcohol-attributable accidents are increasing rapidly where the concern as alcohol is a factor in many categories of injury. Every year it is reported about 2.3 million premature deaths due to harmful consumption of alcohol . In this paper we proposed an improved alcohol detection for use in an automobile ignition locking system using Arduino. A temperature sensor is used to measure the temperature of the breath sample to ensure that it is the same temperature as human breath. A sensor is used for a specific volume of the breath sample, which is used to determine the alcohol content. A Micro Controller is used to convert the output into a reading which represents the breath alcohol content of the breath sample. This analysis is used as part of an overall automobile ignition locking system which prohibits starting the car when the operator is intoxicating. The system also requires rolling retests to ensure that the driver is still sober. In this prototyped project, an attempt will be made to develop a locking system for cars so it would not start without alcohol checking mechanism. The system will take the advantage of a pre existing Alcohol sensor. In fact, the project is intended for granting a base start for further explorations in the future. This project aimed at the exiting efforts of accidents prevention system developments, in hope of implementing it in the real life to increase roads safety. The dangers of drunk driving and the need to prevent individuals from operating a vehicle while under the influence of alcohol. An alcohol detection system that can determine if a driver has consumed alcohol and prevent them from starting the car or driving it. The technology used system would likely use sensors to detect the presence of alcohol in the driver's breath or on their skin. This information would then be processed by a computer algorithm that can determine if the driver's blood alcohol content (BAC) is above the legal limit. The implementation work would be integrated with the car locking system, so that if the driver's BAC is above the legal limit, the car will not start or the driver will not be able to shift the car into drive. This integrated system will help to reduce the number of drunk driving incidents, potentially saving lives and preventing injuries. It can also provide a deterrent for individuals who may consider driving after drinking. Overall, an alcohol detection system integrated with a car locking system has the potential to greatly improve road safety by preventing drunk driving incidents. The benefits of an alcohol detection system that is integrated with a car locking system are significant. First and foremost, it can help prevent drunk driving incidents, which can lead to serious accidents, injuries, and fatalities. This technology can also help to reduce the burden on law enforcement by providing an additional deterrent for individuals who may consider driving after drinking. Additionally, it can provide peace of mind for parents or caregivers who may be concerned about underage drinking or drunk driving among family members.

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# CHAPTER 1

## INTRODUCTION

Roads safety have always been in the center of attention. The signboards, direction arrows and lanes have made following rules much easier and served as an excellent guide, nevertheless uncontrollable factors such as drunken drivers exits and thus accidents still happen. In the united states of America alone and during 2014 nearly “9,967 people died of alcoholimpaireddriving”, that is one alcoholimpaired driving fatality every 53 minutes. The list goes on and on for other countries too, therefore it is necessary to enhance and improvise new techniques. The current scenario shows that the most of the road accidents are occurring due to drunk-driving. The drivers who drink alcohol are not in stable condition and so, rash driving occurs on highway which can be risky to the lives of the people on road, the driver inclusive. The enormity of the dangerous driving transcends boundary. The laws in India are currently prohibiting drivers to drink and drive so that the fine can stop them to drink and drive. Whatsoever, effective observation of inebriated drivers could be a challenge to the policemen and road safety officers, the rationale for this stems from the natural inability of citizenry to be present additionally as state among identical house and time. This restricted ability of enforcement agents undermines each manual effort geared toward edge drink-driving. Therefore the need for an alcohol detection system that can function without the restriction of space and time. Drunken driving is a major public safety issue that contributes to a significant number of accidents, injuries, and fatalities each year. According to the organization, nearly 30 people die every day in motor vehicle crashes involving an alcohol-impaired driver. To address this problem, there have been many efforts to prevent individuals from driving while under the influence of alcohol, including laws and regulations, education campaigns, and technological solutions. One such technological solution is an alcohol detection system that can be integrated with a car locking system. This system uses sensors to detect the presence of alcohol in the driver's breath or on their skin, and then processes this information to determine the driver's BAC. If the driver's BAC is above the legal limit, the car will not start or the driver will not be able to shift the car into drive. This technology has the potential to greatly improve road safety by preventing drunk driving incidents. It can also provide a deterrent for individuals who may consider driving after drinking, potentially reducing the number of accidents and fatalities caused by drunk driving. While there are some concerns about the accuracy and reliability of these systems, they represent a promising solution for addressing the serious problem of drunk driving on our roads.

## CHAPTER 2

### LITERATURE SURVEY

#### 2.1 REVIEW ON LITERATURE WORK

**Paper 1 :** Automatic Engine Locking System Through Alcohol Detection

**Authors Name :** Sridhar singh, Dr. pavan Shukla

**Year of Publish :** May 2020

**Abstract :**

This project presents the design and implementation of an Alcohol Detection with Engine Locking for cars using the Ultrasonic Sensor and Arduino UNO as the MCU (Master Control Unit). The system will continuously monitor level of alcohol concentration in alcohol detection sensor and thus turn off the engine of vehicle if the alcohol concentration is above threshold level. The model will also send the message of whereabouts of the vehicle through SIM900A. The project provides an efficient solution to control accidents due to drunk driving.

**Paper 2 :** Alcohol Detection of Drunk Drivers with Automatic Car Engine Locking System

**Authors Name :** Emmanuel Gbenga Dada, Hamit Isseini Hamed

**Year of Publish :** September 2017

**Abstract :**

This study proposed an efficient technique for eradicating the upsurge in the number of cases of roads accidents caused by excessive intake of alcohol by drivers on the Nigerian roads. Material and methods: This study developed a prototype alcohol detection and engine locking system by using an Arduino Uno microcontroller interfaced with an alcohol sensor along with an LCD screen and a DC motor to demonstrate the concept. The system uses MQ-3 alcohol sensor to continuously monitor the blood alcohol content (BAC) to detect the existence of liquor in the exhalation of a driver. By placing the sensor on the steering wheel, our system has the capacity to continuously check alcohol level from the driver's breath. The ignition will fail to start if the sensors detects content of alcohol in the driver's breath. In case the driver got drunk while driving, the sensor will still detect alcohol in his breath and stop the engine so that the car would not accelerate any further and the driver can park by the roadside.

**Paper 3 : Intelligent Alcohol Detection System For Car Drivers**

**Authors Name :** Rahul Das, Monoram Das

**Year of Publish :** February 2020

**Abstract :**

Driving a car after the consumption of alcohol is one of the most dangerous things one can do. Several surveys show the reaction of a person during driving, that are seriously affected by alcohol. Concentrating on the safety of the people, driving a car, we propose a safety system for safe driving. We are implementing an Intelligent Alcohol Detection System with some other features to avoid accidents. The Alcohol Gas Sensor is used to sense the consumption of alcohol by the driver and this data is also given to ADC(Analog-to-Digital Converter). The ADC is used in this module to convert the analog signal to digital output. If the driver is tired and feeling sleepy, the eye blink sensor shall sense his condition and turn on the buzzer. We also used a tilt sensor to detect whether the vehicle is going in a normal condition or not. GSM (Global System for Mobile communication) and the GPS module is used to detect vehicle location. In this device we have implemented an alarm system if the alcohol level is above the normal permitted level, then the system will send car's location to the nearest police station or the relatives of the driver and the ignition system of the car will go off after the detection.

**Paper 4 : Evaluation of an Alcohol Ignition Interlock Program**

**Authors Name :** Marques et al.

**Year of Publish :** February 2021

**Abstract :**

Evaluation of an Alcohol Ignition Interlock Program for First Offenders: Patterns of Use and Interlock Removal" by Marques et al. This study evaluated an alcohol ignition interlock program for first-time DUI offenders in Washington State. The program required participants to install an alcohol ignition interlock device on their car, which prevented them from driving if their BAC was above a certain limit. The study found that the interlock program was effective in reducing the rate of repeat DUI offenses, and that the majority of participants complied with the program requirements. The program required participants to install an alcohol ignition interlock device on their car, which prevented them from driving if their BAC was above a certain limit. The study examined the patterns of use and removal of the interlock devices among program participants. The study found that the interlock program was effective in reducing the rate of repeat DUI offenses. Participants who completed the program had a lower rate of repeat DUI offenses compared to a control group of first-time DUI offenders who did not participate in the program. Additionally, the study found that the majority of participants complied with the program requirements, including the use of the interlock device and attending required counseling sessions.

**Paper 5 :** Assessing the Potential of Vehicle Technology to Prevent Alcohol-Impaired Driving

**Authors Name :** Peter paul.

**Year of Publish :** October 2022

**Abstract :**

"Assessing the Potential of Vehicle Technology to Prevent Alcohol-Impaired Driving Impact on DWI Fatalities and Injuries" by Fell et al. This study used a mathematical model to estimate the potential impact of different types of alcohol detection technologies on reducing drunk driving fatalities and injuries. The model found that integrating alcohol detection systems with car locking systems had the greatest potential to reduce drunk driving incidents and associated injuries and fatalities. Overall, this study provides evidence that alcohol ignition interlock programs can be effective in reducing repeat DUI offenses among first-time DUI offenders. However, it also highlights the need for ongoing support and resources to ensure that program participants can successfully comply with the program requirements. The study considered several types of alcohol detection technologies, including breath-based systems (like the alcohol ignition interlock device mentioned in the previous literature work), touch-based systems that measure alcohol through the skin, and systems that use sensors to detect alcohol in the driver's breath and on their skin. mathematical model estimated the potential impact of each technology on reducing drunk driving fatalities and injuries. The study found that integrating alcohol detection systems with car locking systems had the greatest potential to reduce drunk driving incidents and associated injuries and fatalities. In fact, the study estimated that integrating alcohol detection systems with car locking systems could prevent up to 85 percent of drunk driving fatalities and injuries. The study also found that touch-based alcohol detection systems had the least potential impact on reducing drunk driving incidents. The authors note that there are several challenges to implementing alcohol detection systems in vehicles, including concerns about the accuracy and reliability of the systems, the cost of implementing the technology, and potential legal and privacy issues. However, the study's results suggest that integrating alcohol detection systems with car locking systems has significant potential to prevent drunk driving incidents and improve road safety.

## **CHAPTER 3**

### **3. EXISTING SYSTEM**

In Existing system used Arduino uno microcontroller and alcohol sensor . In these system to measure the alcohol level of driver and give a buzzer alert .but drivers allow to start and drive the car so we developed our proposed system. There are several existing systems for alcohol detection in car locking systems. One common approach is the use of ignition interlock devices (IID), which require drivers to blow into a breathalyzer before starting the vehicle. If the breathalyzer detects alcohol above a certain limit, the car will not start. Another approach is to use a touch-based alcohol sensor that is integrated into the car's steering wheel. This sensor can detect alcohol on the driver's skin and prevent the car from starting if the alcohol level is above a certain limit. There are also smartphone-based alcohol detection systems that can be used in conjunction with a car locking system. These systems require drivers to blow into a breathalyzer that is connected to their smartphone before starting the car. If the alcohol level is too high, the car will not start. It's worth noting that these systems are not foolproof and can be bypassed by determined individuals. Additionally, some have raised concerns about the privacy implications of having alcohol detection systems integrated into vehicles.

#### **3.1 DISADVANTAGES**

- It give alert signal only
- Accuracy level is medium

#### **3.2 PROPOSED SYSTEM**

Our system can be divided into two major parts; the first part is the key component in this project which is the Alcohol sensor, its role, as its name implies, detecting alcohol by breathing directly into it. The second part is the controlling unit; it has the necessary functions to read alcohol sensor's output, furthermore, the microcontroller will act accordingly in response to the detected alcohol percentage by controlling the Relay (either ignition on/off) and visually indicating its status, Another proposed approach is to use a camera-based system that can detect alcohol on the driver's breath or skin. This system would use computer vision algorithms to analyze the driver's face or breath and determine if the alcohol level is above a certain threshold. The system would then

communicate with the car's locking system and prevent the car from starting if necessary. It's worth noting that these proposed systems are still in the development stage and have not yet been widely adopted. Additionally, there are concerns about the reliability and accuracy of non-invasive alcohol detection systems, as well as potential privacy implications

### 3.3 ADVANTAGES

- It give alert signal and take corresponding action.
- To control car Ignition.
- High accuracy.
- To prevent accident due to drunk and driving.
- Easy and efficient to test the alcohol content in the body.
- Quick and accurate results.
- Helpful for police and provides automatic safety systems for cars and other vehicles as well.
- **Safe driving:** There are many accidents in which the driver often loses his precious life under the influence of alcohol.
- **Prevents traffic chaos:** A person under the influence of alcohol doesn't have control over his actions as it impacts synchronized coordination of brain and body, as a result, he/she violates the traffic rules which can prove to be fatal. The proposed system takes action based on the alcohol content.
- **Compact size:** Only the MQ-3 alcohol sensor has to be placed on the steering wheel and the rest of the components are hidden. The MQ3 sensor doesn't occupy more than 3 inches space.

CHAPTER 4  
SYSTEM DESIGN :

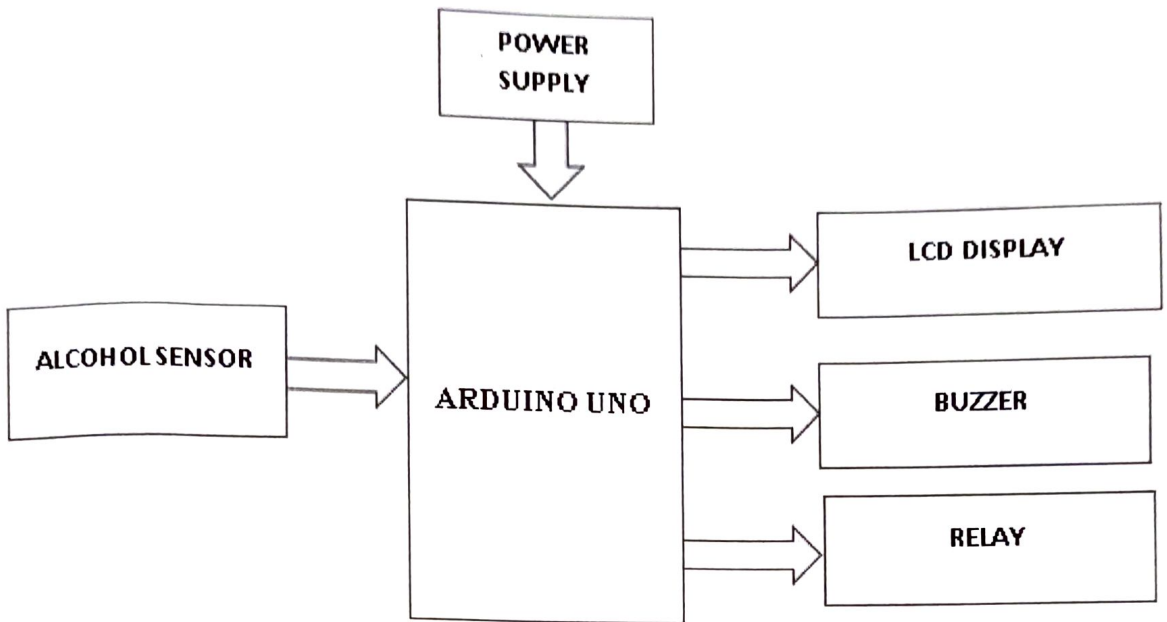


Fig.1

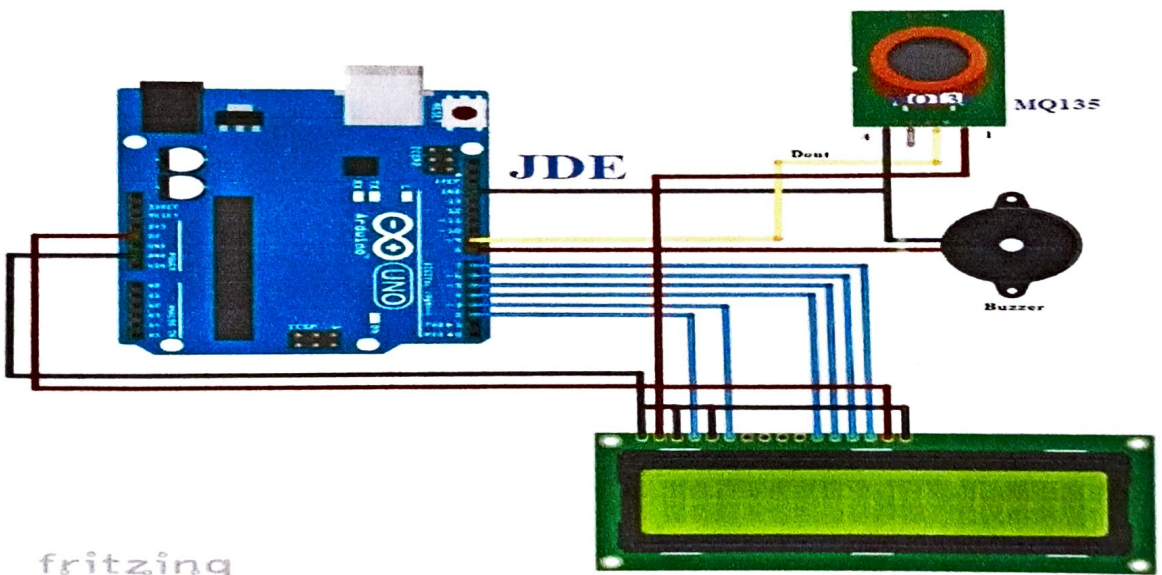


Fig.2

## 4.1 ARCHITECTURE

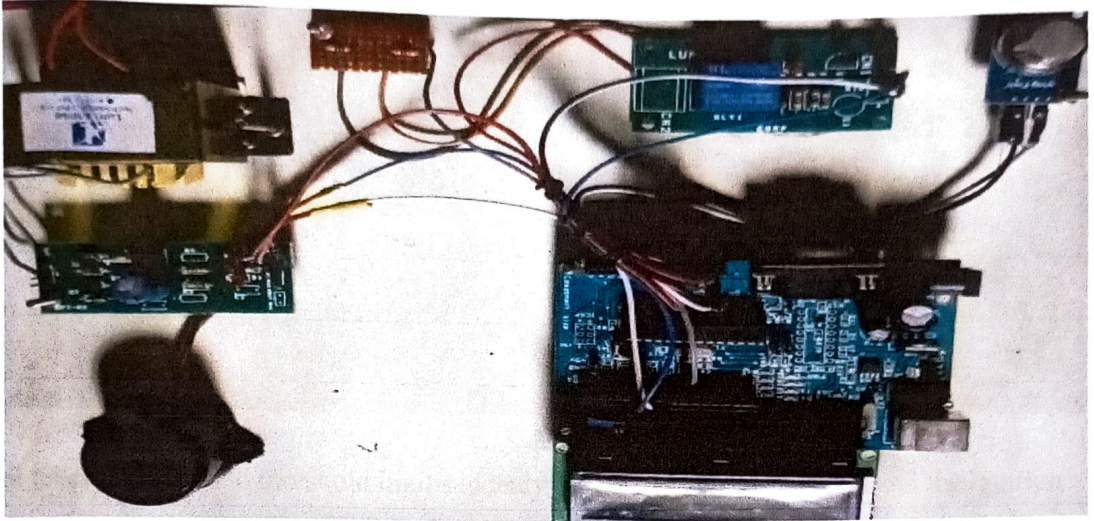
Fig.2 illustrates the construction of the system developed. The Arduino Detector Shield uses a MQ3 alcohol based sensor to identify the existence of alcohol in the breath. LCD is used to display the PPM (Parts per million) amount of the alcohol. An LM358 IC is analog to digital converter which gives digital of alcohol sensed. A buzzer is also place for indicating high alcohol level. The preset voltage at pin 7 is compared with present voltage of alcohol sensor through a comparator. Alcohol sensor output and Buzzer are placed at Pin A0 & D9. For initiating the recording from alcohol sensor a push button is used at Arduno.

An alcohol detection system for a car locking system typically consists of an alcohol sensor, a microcontroller, a display unit, and a locking mechanism. The alcohol sensor is responsible for detecting the presence of alcohol in the driver's breath, while the microcontroller processes the signals from the sensor and makes decisions based on those signals. The display unit provides feedback to the driver about the status of the system, such as whether the driver is authorized to start the car or not. The locking mechanism is used to prevent the car from starting if the driver is found to be under the influence of alcohol. The system works by detecting the alcohol level in the driver's breath when they attempt to start the car. If the alcohol level is below a predetermined threshold, the microcontroller unlocks the car and allows the driver to start it. If the alcohol level is above the threshold, the microcontroller keeps the car locked and prevents the driver from starting it. An alcohol detection system for a car locking system can help prevent accidents caused by drunk driving and increase road safety

## CHAPTER 5

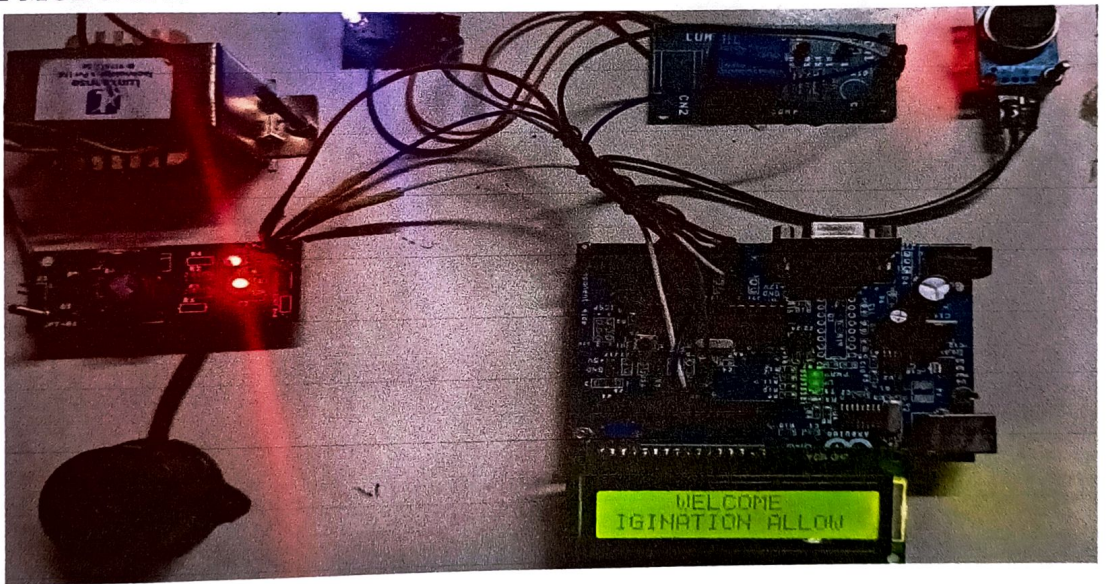
### MODULES :

#### 5.1 MODULE 1:



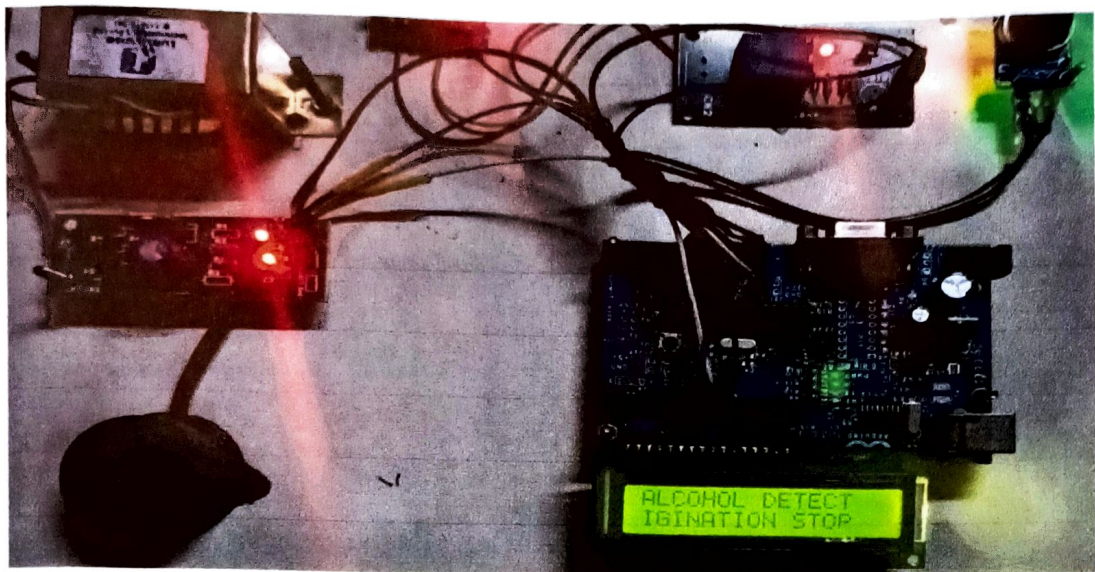
Alcohol sensor detect and measure the alcohol level of the driver .Then the information send to Arduino.

#### 5.2 MODULE 2:



Alcohol level and Vehicle status (ignition on/ignition off) is show on LCD Display

**5.3 MODULE 3:**



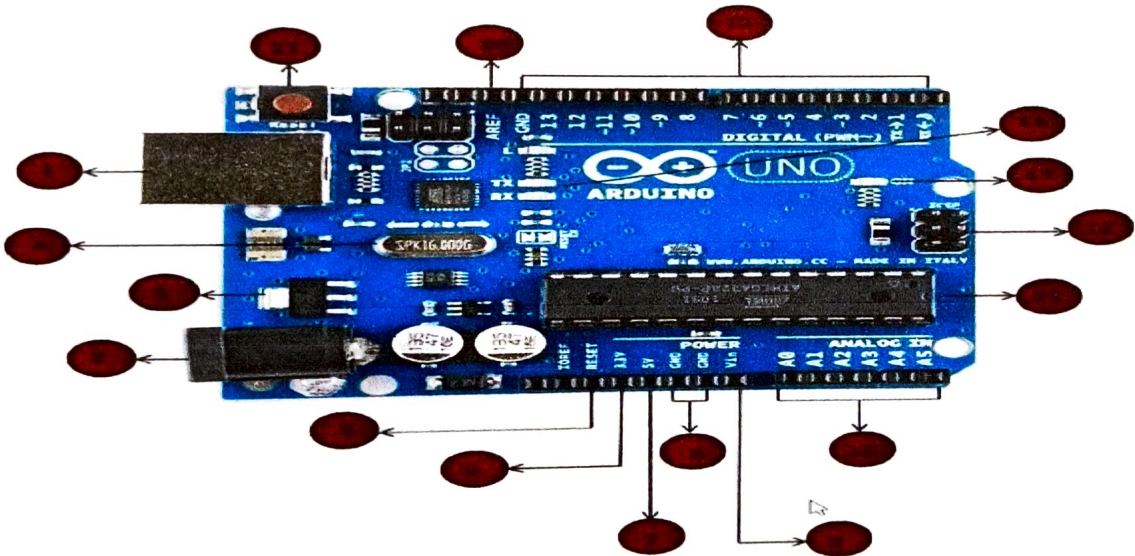
Alcohol level is reached to threshold limit suddenly the buzzer give alert signal and the ignition will be off state.

## CHAPTER 6

### HARDWARE REQUIREMENTS

- Arduino UNO
- Alcohol Sensor
- LCD Display
- Buzzer
- Relay
- Step down transformer
- Bridge rectifier

#### 6.1 Arduino UNO :



The Uno is a great choice for your first Arduino. It's got everything you need to get started, and nothing you don't. It has 14 digital input/output pins (of which 6 can be used as

PWM outputs), 6 analog inputs, a USB connection, a power jack, a reset button and more. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

Arduino is probably the first thing that comes to mind for most hobbyists and students when they think about embedded systems. It has certainly gained its name among the electronics community. Easy-to-use programming environment and vast support from the online community have made it the first choice for anyone who wants to make cool electronics projects. It's cheaper, easy to use, and easily available everywhere.

So, let's talk about What is Arduino?; In simple words, Arduino is an Embedded development platform that consists of both the hardware as well as software parts. Let's have a look at the hardware side. As we know like any other development board, the Arduino is also made of many basic components. In this article, we will discuss what are those basic components or parts of an Arduino Board. This article is completely focused on Arduino UNO only, if you want to know about the other options you can check out our previous article on Different Types of Arduino Boards where we have compared all the popular Arduino boards and their specifications.

The board can be used for a variety of applications, such as controlling lights, motors, and sensors, as well as for creating interactive projects, prototypes, and gadgets. The Arduino community is also constantly developing and sharing new libraries, sketches, and projects, making it easy to learn and create with the platform. Overall, the Arduino Uno is a great tool for beginners and advanced users alike who want to explore the world of electronics and programming.

## Arduino - Hardware Design

What's Arduino hardware?

It's a PCB-mounted microcontroller that you can program and use for simple daily tasks, mathematical computations, and prototyping and testing. An Arduino development board consists of the core microcontroller with its supplementary components and the necessary circuitry to communicate with the PC which we will be using for both communications as well as programming the microcontroller. For communication or programming purposes, we will be using a USB to TTL converter, which will be embedded within the Arduino board. So, if we look into an Arduino board at a block level it will look like this.

The above Arduino block diagram shows the important modules on an Arduino UNO board. When you think about the Arduino board the first image that comes to your mind might be that of an Arduino UNO or an Arduino Nano. That is because they are the

most popular board among the community. That doesn't mean the Arduino is limited to the capabilities of an ATMEGA328 chip. There are plenty of board variants available, with an entirely different set of features like different microcontrollers, layout, number of I/O ports, etc. We will take Arduino UNO as an example and will discuss each component in it.

Let's have a look at the basic parts or components of Arduino UNO. It will vary from board to board, depending on the Controller used and features. Here we will be looking at an Arduino Uno as an example. I have marked the main components/parts on a UNO in the image below.

### **USB - B Socket :**

The USB socket on the UNO has two functions. One is for communication, to connect with the computer through a USB port, and also to load the firmware into the Arduino with the help of the bootloader. The second is to power the Arduino. You can use the USB port to power the Uno directly from any USB port.

### **ISCP Pins :**

In the UNO you can find two 6 pin connectors. One is near the USB – TTL Chip and the other one is at the end of the board. These pins are used to program those two microcontrollers. The USB – TTL chip on this board is an ATMmega16U. The connector marked as 1 is used to program the USB-TTL firmware into this chip. And the connector marked as 2 is used to burn the bootloader into the ATMega328 microcontroller.

### **Reset Button :**

As the name indicates this tactile switch is used to reset the ATMega328 microcontroller. It's connected to the PC6/Reset pin, which is pulled up through a 10K. When the switch is pressed the pin is pulled to the ground and the chip will reset.

### **USB-TTL Interface Chip :**

To communicate with the computer, the Arduino relies on a USB-TTL interface. In UNO, ATMega16U with custom firmware act as a USB – TTL interface chip.

### **Crystal Oscillator/ Ceramic resonator :**

For a microcontroller to work it needs a clock source. The clock circuit determines the speed with which the microcontroller operates. How many instructions per second it will execute is dependent on the clock frequency. The ATMega series microcontrollers can use two types of clock sources. One is an internal RC oscillator that is already built into the microcontroller. But the drawback of using the internal oscillator is that its maximum frequency

is limited and it is not that accurate. That is where the second option comes into place, i.e., using an external clock generator. In this case, we will be using a Quartz crystal oscillator or a ceramic resonator for this purpose.

In the picture below, you can see two components are marked. The first one is a 16MHz crystal oscillator used for the ATmega16U2 chip and the second one is a 16MHz resonator used for the ATmega328P microcontroller

### **Power Path control :**

If you inspect a UNO, you can find an LM358. You might think what's its role here. It's used as a comparator to control the input power path. When the input power is provided through the barrel jack or Vin pin the power path control circuit will cut off the USB power pin from the circuit which in fact will protect the USB port.

### **Voltage Regulator :**

The ATmega328 and ATmega16U2 have a maximum input voltage of around 5V and most modules or accessories work on either 5V or 3.3V. The Arduino can accept 7-12V through the Vin pin or the DC barrel jack. So, to step it down, there are two regulators onboard. One is a 5V regulator (marked as 1) for the microcontrollers and the other one is a 3.3V regulator which is used to provide 3.3V through 3.3V pin.

### **DC Barrel Jack :**

The DC barrel jack is used to supply power to the UNO. We can supply 7-12V through it and hence we can use a 12V DC adapter or 9V DC adapter on this Jack to power the Arduino board.

### **Digital and Analog I/O :**

The Arduino UNO has 14 digital I/O pins and 6 Analog inputs. The digital I/O pins are 5V logic level and you can also use the Analog pins as digital I/O too. Arduino UNO supports 6 channel 10 bit ADC inputs through A0-A5, which can be sampled and analyzed using UNO.

### **Status LEDs and Inbuilt LED :**

Uno has 4 LEDs onboard. One is used as a power indicator and two are used to show the activity of the Rx and Tx pin. The other one is tied to the Digital pin 13, which can be used to test the Arduino board or simply as an indicator.

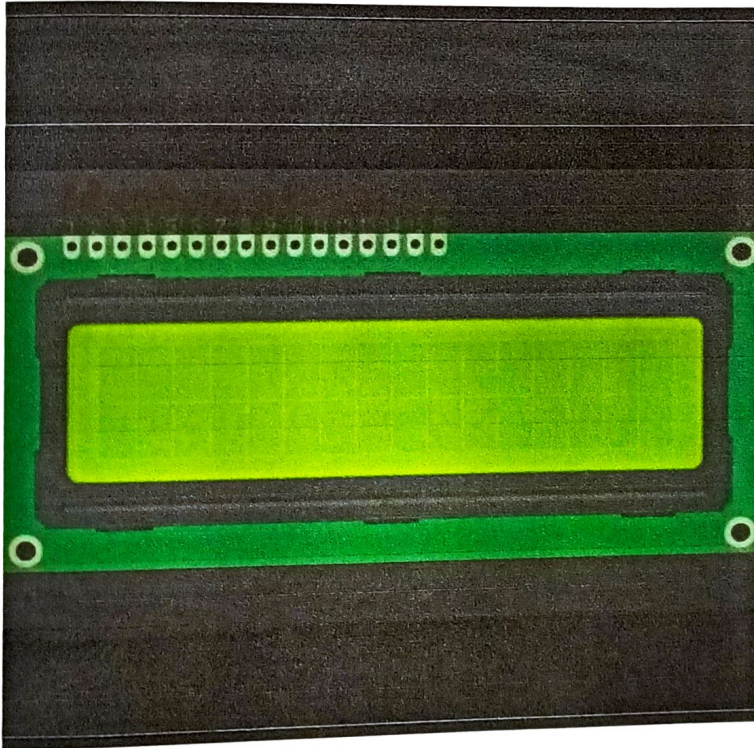


oxygen. Now current can flow through the sensor, which generated analog voltage values. These voltage values are measured to know the concentration of gas. Voltage values are higher when the concentration of gas is high

### 6.2.1 Applications :

These sensors are used to detect the presence of gases in the air such as methane, butane, LPG and smoke but they are unable to distinguish between gases. Thus, they cannot tell which gas it is. Module version of this sensor can be used without interfacing to any microcontroller and is useful when detecting only one particular gas. This can only detect the gas. But if ppm has to be calculated then the sensor should be used without module. This sensor is also used for Air quality monitoring, Gas leak alarm and for maintaining environmental standards in hospitals. In industries, these are used to detect the leakage of harmful gases. Some of the alternatives of the MQ2 gas sensor are MQ-6, M-306A, AQ-3 sensors.

### 6.3 LCD Display :



#### 6.3.1 LCD 16×2 Arduino:

this is all about LCD 16×2 datasheet, which includes what is a 16X2 LCD, pin configuration,

working principle, and its applications. The main advantages of this LCD device include power consumption is less and low cost. The main disadvantages of this LCD device include it occupies a large area, slow devices and also lifespan of these devices will be reduced due to direct current. So these LCDs use AC supply with less than 500Hz frequency. Here is a question for you, what are the applications of LCD?

### **16×2 LCD Commands :**

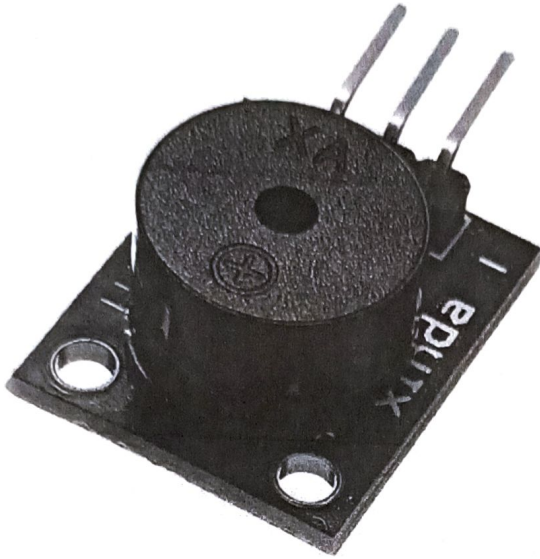
The commands of LCD 16X2 include the following :

For Hex Code-01, the LCD command will be the clear LCD screen For Hex Code-02, the LCD command will be returning home For Hex Code-04, the LCD command will be decrement cursor For Hex Code-06, the LCD command will be Increment cursor For Hex Code-05, the LCD command will be Shift display right For Hex Code-07, the LCD command will be Shift display left For Hex Code-08, the LCD command will be Display off, cursor off For Hex Code-0A, the LCD command will be cursor on and display off For Hex Code-0C, the LCD command will be cursor off, display on For Hex Code-0E, the LCD command will be cursor blinking, Display on For Hex Code-0F, the LCD command will be cursor blinking, Display on For Hex Code-10, the LCD command will be Shift cursor position to left For Hex Code-14, the LCD command will be Shift cursor position to the right For Hex Code-18, the LCD command will be Shift the entire display to the left For Hex Code1C, the LCD command will be Shift the entire display to the right For Hex Code-80,.

### **6.3.2 What is the LCD 16×2?**

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc. These displays are mainly preferred for multisegment light-emitting diodes and seven segments. The main benefits of using this module are inexpensive; simply programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc.

## 6.4 Buzzer :



An audio signaling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound.

Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren. The pin configuration of the buzzer is shown below. It includes two pins namely positive and negative. The positive terminal of this is represented with the '+' symbol or a longer terminal. This terminal is powered through 6Volts whereas the negative terminal is represented with the '-' symbol or short terminal and it is connected to the GND terminal.

### Specifications :

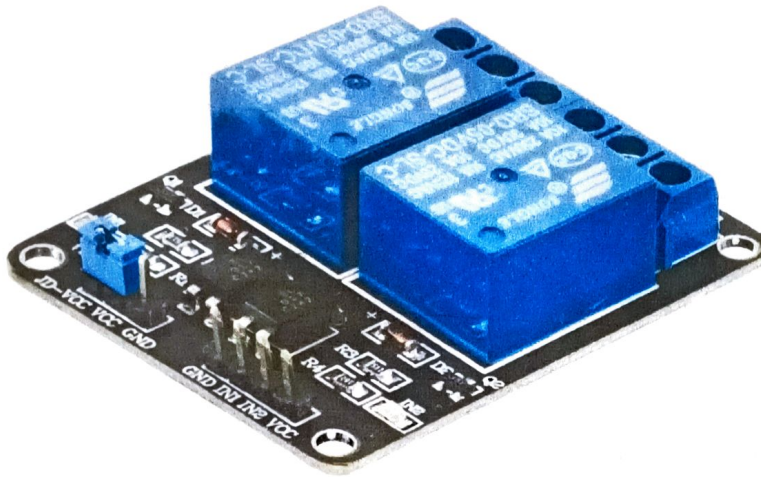
The specifications of the buzzer include the following :

Color is black, The frequency range is 3,300Hz, Operating Temperature ranges from  $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ , Operating voltage ranges from 3V to 24V DC, The sound pressure level is 85dBA or 10cm, The supply current is below 15mA.

The most common types of 12-volt buzzers are electromagnetic and piezoelectric buzzers. Electromagnetic buzzers consist of an electromagnet and a diaphragm, while piezoelectric buzzers use a piezoelectric crystal to generate sound when an electric current is applied. The sound produced by a buzzer can vary depending on its design and intended use. Some buzzers produce a continuous tone, while others produce a pulsating tone. The frequency of the sound can also vary, typically ranging from a few hundred hertz to several kilohertz. 12-volt buzzers are widely used

in automotive and industrial applications, such as in alarm systems, doorbells, warning devices, and electronic timers. They are also used in hobbyist projects and DIY electronics. When connecting a 12-volt buzzer to a power source, it is important to make sure that the polarity of the buzzer is correct. Most 12-volt buzzers have a positive and negative lead, which must be connected to the appropriate terminals of the power source. Applying a voltage of the wrong polarity can damage the buzzer or cause it to malfunction. Overall, 12-volt buzzers are a simple and reliable way to produce audible alerts and warnings in a wide range of applications

## 6.5 Relay :



### 6.5.1 Definition:

The relay is the device that open or closes the contacts to cause the operation of the other electric control. It detects the intolerable or undesirable condition with an assigned area and gives the commands to the circuit breaker to disconnect the affected area. Thus protects the system from damage.

### Working Principle of Relay :

It works on the principle of an electromagnetic attraction. When the circuit of the relay senses the fault current, it energises the electromagnetic field which produces the temporary magnetic field.

### Construction of Relay :

The relay operates both electrically and mechanically. It consists electromagnetic and sets of contacts which perform the operation of the switching. The construction of relay is

mainly classified into four groups. They are the contacts, bearings, electromechanical design, terminations and housing.

#### **Contacts :**

The contacts are the most important part of the relay that affects the reliability. The good contact gives limited contact resistance and reduced contact wear. The selection of the contact material depends upon the several factors like nature of the current to be interrupted, the magnitude of the current to be interrupted, frequency and voltage of operation.

#### **Bearing :**

The bearing may be a single ball, multi-ball, pivot-ball and jewel bearing. The single ball bearing is used for high sensitivity and low friction. The multi-ball bearing provides low friction and greater resistance to shock.

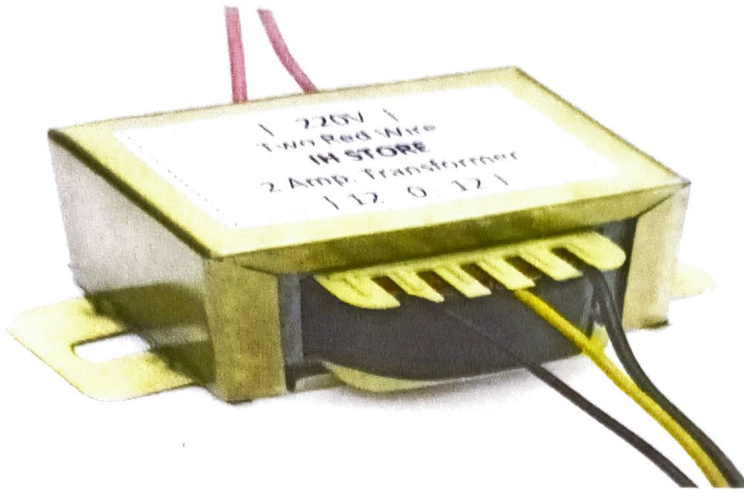
#### **Electromechanical design :**

The electromechanical design includes the design of the magnetic circuit and the mechanical attachment of core, yoke and armature. The reluctance of the magnetic path is kept minimum for making the circuit more efficient. The electromagnet is made up of soft iron, and the coil current is usually restricted to 5A and the coil voltage to 220V.

#### **Terminations and Housing :**

The assembly of an armature with the magnet and the base is made with the help of spring. The spring is insulated from the armature by moulded blocks which provide dimensional stability. The fixed contacts are usually spot welded on the terminal link.

## 6.6 Stepdown transformer:



The transformer that has a larger number of turns in the primary winding and a smaller number for the secondary winding is called a step-down transformer. So as we can see from the previous equation for the relation between the number of turns in winding and voltage if the number of turns in the primary is greater than the number of turns in the secondary, then the EMF generated in the secondary is less than the primary input. Hence, we get a lower voltage in the secondary coil of a step-down voltage transformer. As the name indicates, the step-down transformer is used for converting higher voltage power into lower voltage power.

step-down transformer is an electrical device that reduces the voltage of an alternating current (AC) power supply. It consists of a primary winding, a secondary winding, and an iron core. When an AC voltage is applied to the primary winding, it creates a fluctuating magnetic field in the iron core. This magnetic field then induces a voltage in the secondary winding, but at a lower voltage level than the primary winding. A transformer works on the mutual induction principle, also known as Faraday's Law of Electromagnetic Induction, which states that the magnitude of voltage is directly proportional to the rate of change of magnetic flux.

### Step Down Transformer Formula:

Now let's understand the above process with an example.

Suppose we have an AC source that can produce 210 V. If we use a transformer having  $N_p$  (number of turns in the primary coil) = 20000, And  $N_s$  (number of turns in secondary) = 100,

Then  $V_s$  (voltage at the secondary coil) is given by-

$$V_s = (V_p * N_s) / N_p$$

Put the above values in this equation to calculate the voltage at the secondary coil. I have left this work for you. Mention the right value in the comments.

## 6.7 Bridge rectifier :



Bridge rectifier is a type of full-wave rectifier that uses four or more diodes to convert alternating current (AC) to direct current (DC) efficiently. The three most common types of rectifiers include half-wave rectifiers, full-wave rectifiers, and bridge rectifiers. All these rectifiers work to convert AC into DC. However, not all these three rectifiers do the conversion process efficiently, only the center-tapped full-wave rectifier and bridge rectifier are able to efficiently convert the Alternating Current (AC) into Direct Current (DC). In electronic power supplies, a bridge rectifier circuit is a common component. A bridge rectifier is the most efficient circuit among different rectifiers. The power conversion in this device is very efficient. Bridge rectifiers are therefore a form of full wave rectifier that converts alternating (AC) current to direct (DC) current efficiently by using four or more diodes in a bridge circuit design.

### What is Bridge Rectifier?

The Bridge Rectifier is a circuit that is widely used among many electronic circuits for supplying power to various electronic basic components.

The purpose of the Bridge Rectifier is to efficiently convert AC power into DC power. Many electronic circuits require a rectified DC supply to power the electronic components from the available AC mains supply.

The bridge rectifier consists of four diodes connected in a bridge configuration, hence the name. The input voltage is applied across two of the diodes, and the output voltage is taken from the other two diodes. The diodes allow current to flow in only one direction, effectively converting the AC input voltage into a pulsating DC output voltage.

The output voltage of a bridge rectifier is not a pure DC voltage, as it contains a large amount of ripple voltage due to the pulsating nature of the rectified waveform. In order to obtain a smoother DC voltage, a filter capacitor is typically connected across the output terminals of the bridge rectifier. This capacitor charges during the peaks of the rectified waveform and discharges during the troughs, effectively smoothing out the voltage waveform and reducing the amount of ripple.

There are various types of bridge rectifiers available, including single-phase and three-phase rectifiers. Single-phase rectifiers are used for low-power applications, while three-phase rectifiers are used for high-power applications.

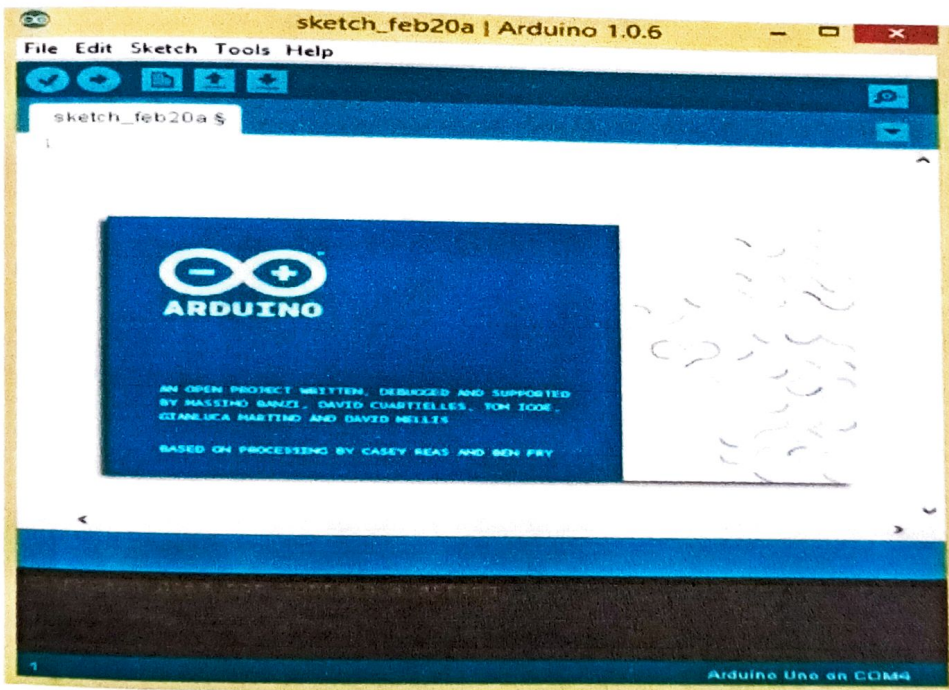
In summary, a bridge rectifier is an important component in the design of power supplies for electronic devices. It is used to convert AC input voltage into DC output voltage, and can be combined with a filter capacitor to reduce ripple voltage and obtain a smoother DC voltage. With its simple design and ease of use, the bridge rectifier remains a popular choice for power supply applications.

## CHAPTER 7

### SOFTWARE REQUIREMENTS :

- Arduino IDE
- Embedded C Language

#### 7.1 Arduino IDE :



The Arduino IDE is an open-source software, which is used to write and upload code to the Arduino boards. The IDE application is suitable for different operating systems such as Windows, Mac OS X, and Linux. It supports the programming languages C and C++. Here, IDE stands for Integrated Development Environment.

The program or code written in the Arduino IDE is often called as sketching. We need to connect the Genuino and Arduino board with the IDE to upload the sketch written in the Arduino IDE software. The Arduino Integrated Development Environment (IDE) is an open-source software application used to write and upload code to Arduino microcontroller boards. It is available for free and can be downloaded from the official Arduino website.

The Arduino IDE provides a user-friendly interface for writing, editing, and uploading code to an Arduino board. It includes a code editor with syntax highlighting and auto-completion features, as well as a serial monitor for debugging and testing the code.

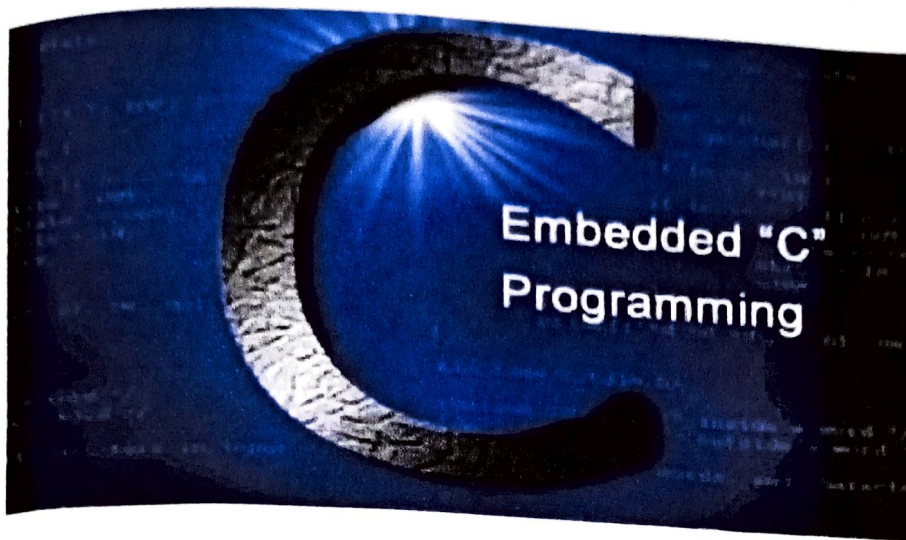
To use the Arduino IDE, you first need to select the appropriate board and serial port in the Tools menu. You can then write your code in the code editor, save it, and upload it to the board using the Upload button. The serial monitor can be used to display data from the board or to send commands to the board.

The Arduino IDE supports the programming languages C and C++, as well as a simplified version of C++ called Arduino Programming Language. The IDE also includes a library manager for easily adding and managing libraries of pre-written code.

One of the key advantages of the Arduino IDE is its large community of users and developers. There are many resources available online, including tutorials, forums, and code examples, which can help you learn and develop your skills.

In addition to its basic features, the Arduino IDE can be extended with plugins and add-ons, allowing you to customize and enhance its functionality. For example, you can add support for additional boards or programming languages, or add new features such as debugging tools or code analysis tools.

## 7.2 Embedded C Language :



Before the C language was introduced, developers used basic programming (assembly-level) to develop embedded applications. These assembly level programming were not portable in nature, which acted as a restriction for the developers, as they were not able to fully engage in the process of the development of embedded applications. With the improvements in the embedded programming language many new programming languages were introduced such as C, BOCOL and Pascal, these relatively newer languages helped in overcoming many problems that were faced by the developers when working with assembly level programming. One of the most noticeable breakthroughs in the development of embedded programming was seen with the introduction of the C programming language. There are many advantages that can be exploited by developers when developing embedded applications such as the embedded c programming provides portability and is easy to work with due to its simplicity. Embedded c programming is more reliable and scalable when compared to assembly level programming. Embedded systems are able to perform various assigned tasks with the help of embedded c programming, as the programming guides the processor of the respective embedded systems. Embedded C language is one of the most widely used embedded programming languages for programming microcontrollers.

Embedded C programming typically requires nonstandard extensions to the C language in order to support enhanced microprocessor features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations. The C Standards Committee produced a Technical Report, most recently revised in 2008[1] and reviewed in 2013,[2] providing a common standard for all implementations to adhere to. It includes a number of features not available in normal C, such as fixed-point arithmetic, named address spaces and basic I/O hardware addressing. Embedded C uses most of the syntax and semantics of standard C, e.g., main() function, variable definition, datatype declaration, conditional statements (if, switch case), loops (while, for), functions, arrays and strings, structures and union, bit operations, macros, etc

## CHAPTER 8

### CONCLUSION & FUTURE WORK

#### 8.1 CONCLUSION :

The prototype has successfully demonstrated the ability to detect, and hence, identify a concentration of a gas; the Butane gas in this case. It complied with the given requests and acted upon it in terms of controlling the ignition of the 2-wheeled car and indicating the exceedance of a specific prohibited gas threshold. One key challenge in developing an effective alcohol detection system is ensuring that the system is accurate and reliable. Non-invasive alcohol detection can be challenging, as the concentration of alcohol in a person's breath or skin can be influenced by various factors, such as temperature, humidity, and diet. Researchers must continue to explore ways to improve the accuracy of the system, such as using multiple sensors, developing more advanced algorithms for processing sensor data, or calibrating the sensors more precisely. Another important area of future work is developing real-time monitoring systems that continuously track the driver's alcohol level while they are driving. This could be achieved using wearable devices or other sensors that are integrated into the car's interior. These systems could alert the driver if their alcohol level becomes too high and could even take control of the car to bring it to a safe stop if the driver becomes incapacitated. As autonomous vehicles become more prevalent, alcohol detection systems could be integrated into the vehicles themselves. This could be particularly useful for commercial fleets or other situations where the driver's behavior is closely monitored. However, this also raises important questions around privacy and security, and the development of these systems must be carefully designed to balance the need for safety with the driver's privacy and autonomy. Overall, the development of an alcohol detection system for car locking is a complex and multifaceted problem, and there are many potential areas for future work. Continued research and development in these areas can help to improve the accuracy, safety, and privacy of these systems, and ultimately help to reduce the incidence of drunk driving. While these systems will not completely solve the problem of drunk driving, they can be an important tool in reducing the number of alcohol-related accidents and fatalities on our roads. In conclusion, the development of an alcohol detection system for car locking is a crucial step towards improving road safety and protecting the lives of drivers and passengers. With continued research and innovation, we can develop systems that are accurate, reliable, and easy to use, and that can help to prevent alcohol-related accidents and fatalities on our roads.

## 8.2 FUTURE WORK :

In Future We add some additional features like send a SMS notification and upload the Alcohol level and driver health parameters and vehicle details on a IOT web page.

**Improved Accuracy:** The accuracy of an alcohol detection system is critical for ensuring that drivers are not falsely accused of driving under the influence. There are several factors that can affect the accuracy of the system, such as the sensitivity of the sensors, the ambient temperature and humidity, and the presence of other substances in the driver's breath or skin. Researchers could explore ways to improve the accuracy of the system, such as using multiple sensors to cross-check readings, using more advanced algorithms for processing sensor data, or calibrating the sensors more precisely.

**Real-Time Monitoring:** In addition to detecting alcohol levels at the time of ignition, a real-time monitoring system could continuously track the driver's alcohol level while they are driving. This could be achieved using wearable devices or other sensors that are integrated into the car's interior. The system could alert the driver if their alcohol level becomes too high, and could even take control of the car to bring it to a safe stop if the driver becomes incapacitated. However, such a system would need to be carefully designed to balance the need for safety with the driver's privacy and autonomy.

**Integration with Autonomous Vehicles:** As autonomous vehicles become more prevalent, alcohol detection systems could be integrated into the vehicles themselves. This would enable the vehicle to automatically detect if a driver is under the influence of alcohol and take appropriate action, such as contacting law enforcement or refusing to start the vehicle. This could be particularly useful for commercial fleets or other situations where the driver's behavior is closely monitored.

**Privacy and Security:** An alcohol detection system raises important questions around privacy and security. Drivers may be concerned about the collection and storage of their personal data, particularly if the system is continuously monitoring their alcohol level. It will be important to implement robust security measures to protect this data and to provide clear and transparent policies around data collection and usage. Additionally, the system should be designed to minimize false positives and negatives, which can have serious consequences for drivers who are falsely accused of driving under the influence.

Overall, the development of an alcohol detection system for car locking is a complex and multifaceted problem, and there are many potential areas for future work. Continued research and development in these areas can help to improve the accuracy, safety, and privacy of these systems, and ultimately help to reduce the incidence of drunk driving.

## CHAPTER 9

### APPENDIX :

#### 9.1 SOURCE CODE :

```
#include <LiquidCrystal.h>
```

```
const int rs = 13, en = 12, d4 = 11, d5 = 10, d6 = 9, d7 = 8;
```

```
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
```

```
int gas=A0;
```

```
int buzzer=6;
```

```
int relay=5;
```

```
void setup()
```

```
{
```

```
  lcd.begin(16, 2);
```

```
  Serial.begin(9600);
```

```
  lcd.print("ALCOHOL DETECTION");
```

```
  lcd.setCursor(5,1);
```

```
  lcd.print("SYSTEM");
```

```
  delay(2000);
```

```
  lcd.clear();
```

```
pinMode(gas,INPUT);  
pinMode(buzzer,OUTPUT);  
pinMode(relay,OUTPUT);
```

```
}
```

```
void loop()
```

```
{
```

```
int level=analogRead(gas);
```

```
Serial.println(level);
```

```
if(level>500)
```

```
{
```

```
digitalWrite(relay,HIGH);
```

```
digitalWrite(buzzer,HIGH);
```

```
lcd.print("ALCOHOL DETECT");
```

```
lcd.setCursor(0,1);
```

```
lcd.print("IGNITION STOP");
```

```
}
```

```
else
```

```
{
```

```
digitalWrite(relay,LOW);
```

```
digitalWrite(buzzer,LOW);
```

```
lcd.setCursor(4,0);
```

```
lcd.print("WELCOME");
```

```
lcd.setCursor(0,1);
```

```
lcd.print("IGNITION ALLOW");
```

```
}
```

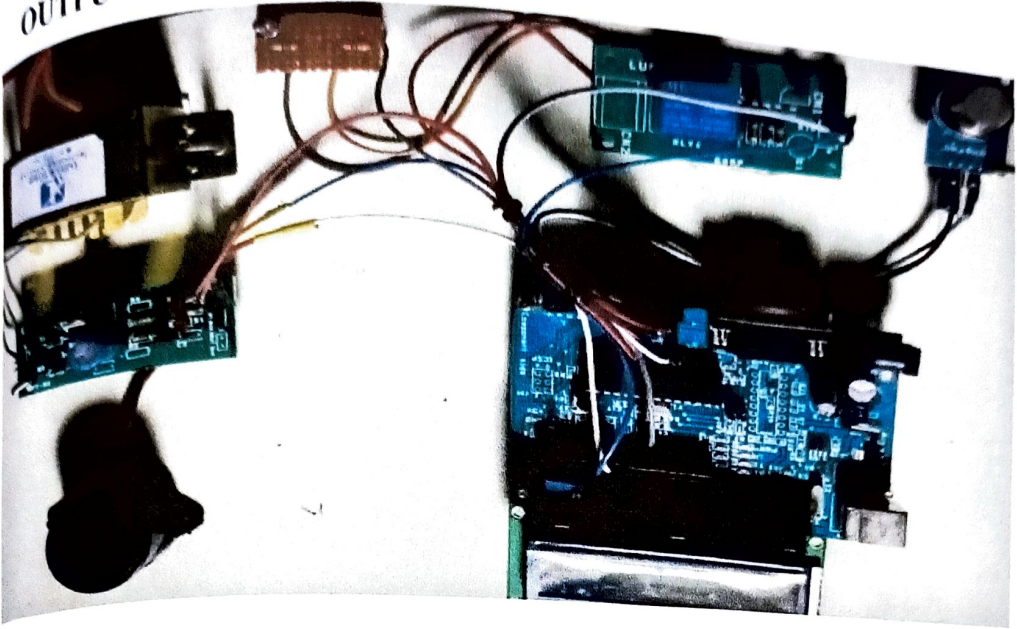
```
delay(500);
```

```
lcd.clear();
```

```
}
```

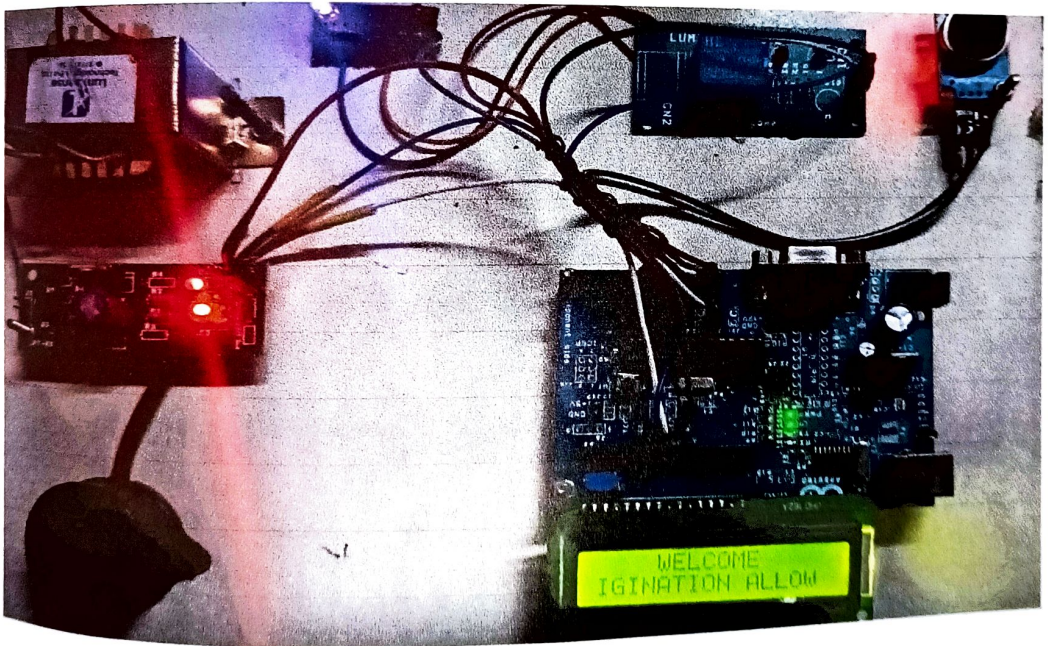
## 9.2 OUTPUT :

### OUTPUT 1:



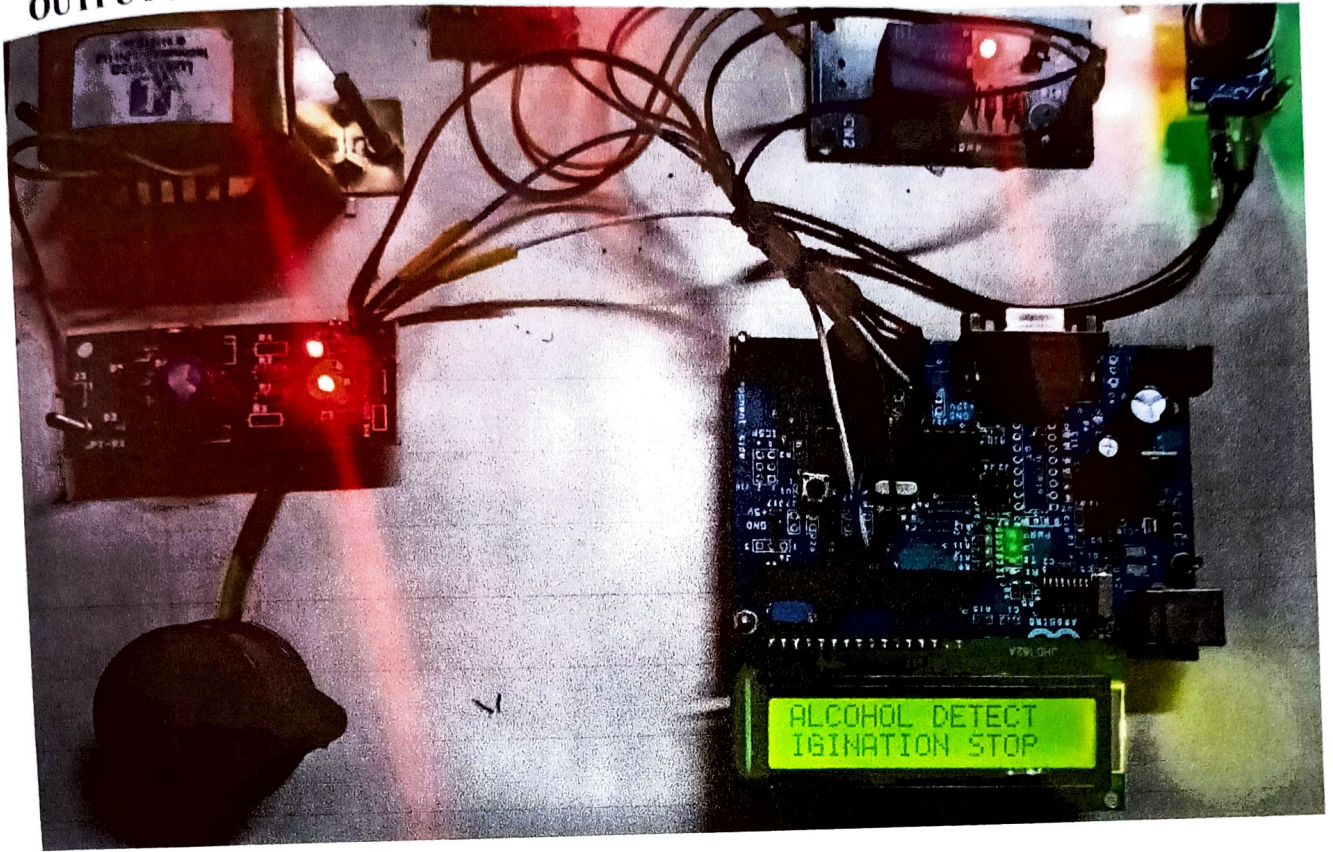
Alcohol sensor detect and measure the alcohol level of the driver .Then the information send to Arduino

### OUTPUT 2 :



Alcohol level and Vehicle status (ignition on/ignition off) is show on LCD Display

### OUTPUT 3:



Alcohol level is reached to threshold limit suddenly the buzzer give alert signal and the ignition will be off state

## **CHAPTER 10**

### **REFERENCE :**

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