An Ingenious Method for Detecting Harmful Alcohol Consumption in Restricted Areas

[1]Sri Ram S K, [2]Kavin P, [3]Sam Santhosh Kumar S and [4]Amit Kumar
Department of Mechanical Engineering,
Sri Eshwar College of Engineering, Coimbatore, India.
[1]sriram.sk2021mech@sece.ac.in , [2]samsanthoshkumar.s2021mech@sece.ac.in, [3]kavin.p2021mech@sece.ac.in,
[4]amitkumar@sece.ac.in

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Abstract – The paper objective is to outline our effort to decrease violations and increase driver safety. Alcohol sensor and an Arduino board were combined to create this project. The Arduino ATmega328 processor is capable of carrying out more operations than conventional microcontrollers. Using a sensor for alcohol Identification of the presence of alcohol in human breath is the aim of this study, MQ3. The sensor may be used with any vehicle and is easy to hide from suspects because its precise sensitivity range is only a few metres. This project is installed anywhere. The project is designed to ensure human security**.**When some people's drinking becomes excessive, it can have a negative impact on their interactions with others. Some people grow drunk and potentially loud and boisterous as they drink more. And because they are less inhibited, they may disregard boundaries, making people around them uncomfortable or even dangerous. This project is basically used for avoid these problems in public places by IOT technology. In this process whenever a drunken person enters through the detector placed entrance it will indicates and such new sense caused by drunken people can be avoided in public places such as theatres, school, colleges andplaces where family spendtime.Here we are using Arduino boards through which codes can be uploaded and we are using an MQ-3 alcohol sensor andabuzzer.The alcohol sensor will sense the consumption of alcoholby a person when he enters and indicates to the buzzer and the buzzer will blow.

Keywords – IOT Technology, Arduino, MQ-3, Alcohol Sensor, Buzzer.

I. INTRODUCTION

The drunkometer, created by Indiana University School of Medicine professor Rolla Neil Harger, was the first practical roadside breathalyser in 1931. The drunkometer collected a motorist's breath sample directly into a balloon inside the machine.A straight forward but efficient tool for determining the amount of alcohol in a person's breath is an Arduino-based breathalyser that uses a MQ3 Alcohol detection sensor and an SSD1306 OLED display. A metal oxide semiconductor (MOS) sensor called the MQ3 modifies its electrical resistance in response to the amount of alcohol in the air. The sensor's output is read by the Arduino microcontroller, who then turns it into a digital reading. The estimated blood alcohol content (BAC) level is then displayed on the SSD1306 OLED display from this digital readoutBreath, blood, and urine tests are the three most often used BAC testing procedures. While many states demand a breath test Today, we construct alcohol detectors with Arduino, LEDs, buzzers, and MQ3 alcohol sensors. As it is the best sensor for detecting alcohol, MQ-3 is utilised in this instance. This sensor has a heating element within that warms a layer of conductor material, and we continuously monitor this resistance. The MQ-3 sensor's resistance changes when alcohol odour comes into touch with it. Moreover, the sensor has an integrated power and status led those blinks when it senses alcohol vapours. Both digital and analogue outputs are offered by the sensor. Sensor values might differ in distance and are dependent on the sensors' source. The sensor outputs digital and analogue data. The distinction between the two is very straightforward: in a digital output, only a high or low value, which corresponds to either 1 or 0, is transmitted to a microcontroller. James et al. [1]The device comprises of an alcohol sensor that is installed on the vehicle's steering wheel. The sensor detects alcohol content each time the driver turns the ignition on.Bhutaetal.[2]This magazine identified the driving state in a real-time setting, and we suggest that alcohol be detected using an Arduino-connected alcohol detector.Seelam and Lakshmi [3] This essay discusses aspects of road discipline like horn management in no-horn zones and speed control in various locations. This document includes features such as vehicle speed control in school zones and vehicle speed control in various zones such as bridges, highways, cities, and suburbs.Gasparsc et al. [4] To stop drunk

driving, the system may analyse a breath sample for alcohol content and regulate the ignition system's operation. The use of virtual instrumentation also offers a lot of versatility.Youif et al. [5]The system will utilise the already-installed alcohol sensors. In actuality, the effort intends to create the foundation for later investigation. Shukla et al. [6] This project demonstrates how to build and implement detection of alcohol system with an engine lock for cars utilising an ultrasonic sensor and an Arduino UNO as the MCU. (Master Control Unit). If the alcohol concentration is above the threshold, the system will continuously check the alcohol detecting sensor's level of concentration and shut off the engine. Anthony et al. [7] The goal of the research is to create a device that can gauge the driver's blood alcohol content. The proposed system's goal is to deter users from driving while intoxicated and, in turn, lower the frequency of collisions brought on by such behaviour. Arduino is used in the creation of the suggested model.Vani et al. [8] A measurement used to prevent drunk driving is blood alcohol concentration (BAC). The high expense of equipment and upkeep, however, makes this technology still challenging to utilise. An IoT-based NODEMCU and a MQ3 gas sensor make up the alcohol detector used in this project.Garg et al. [9]The current study is an example of technological work that shows how human driving may be improved safer to prevent accidents and make roads safer for the driver and passengers to travel on. This work is the result of the integration of a microcontroller and a sensor for measuring alcohol concentration. Karhale et al. [10]Compared to other typical microcontrollers, the ATmega328 is more versatile and capable of a larger range of tasks. In the earlier study **Fig1** depict the timeline associated with the alcohol detected with the breath tester.It depends on how much the person drank. Alcohol is eliminated at constant rate of about 0.15% BAC per hour, which is about one drink an hour. The maximum intoxication they might have would about 0.2%. within one hour, their alcohol level would be about zero. The amount of time it takes to detect alcohol varies depending on the body system and test employed. In most circumstances, depending on the type of detection test utilized, alcohol can remain in your system for 6 to 72 hours. Alcohol can remain in the body for up to 6 hours in the blood, 12 to 24 hours on the breath, 12 to 24 hours in the urine (72 or more hours with more sophisticated detection methods), 12 to 24 hours in the saliva, and up to 90 days in the hair. Alcohol has a half-life of 4-5 hours.

The MQ3 module is used to detect alcohol particles. It can be installed in any kind of vehicle and has a respectable sensitivity range of two metres. The connection diagram is shown **Fig 2**.

This Project mainly based on reducing the intoxication of alcohol among the people. It will be more efficient in testing of alcohol content in the body.The results provided by the sensors will be more accurate and faster.It provides an automatic safety system inpublic and will be helpful for police. This will be at a cheaper priceand have a high sensitivity.It has a long life andprovides high stability.

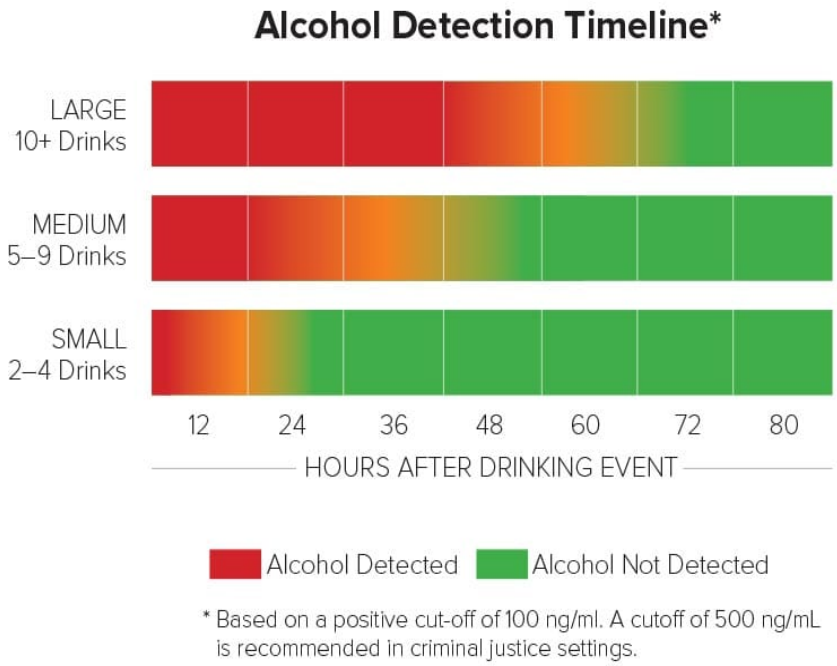

Fig 1. Alcohol Detection Timeline.

II. METHODOLOGY ADOPTED

This project is based on IOT technology this project is mainly considered for Public Safety and prevents intoxication among the peoples. This Project includes Arduino, mq-3 sensors and respective codes added to the Arduino, in which the signal gets noted by the micro controller and it transmits the signal to the buzzer which produces sound and the lights connected to the board will blink. The alcohol sensor senses the alcoholic odour from the drunkard. The mq-3 sensor

senses a level from 0.05mg/L to 10mg/L. and it is slightly sensible for benzene. The MQ-3 Sensors working is demonstrated. The LED is off when there is no alcohol around; but, because we had the code to do so, when we added a small bit of IPA, the LED turned on. The LED will glow brighter the more alcohol is present in the surrounding area; it will shine brightest when there is 500 ppm of alcohol in the air [11-15].

III. ARDUINO MQ3 CONNECTION DIAGRAM

MQ-3 Sensor

Alcohol, smoke, methane, LPG, hydrogen, NH3, Benzene, and Propane are just a few of the many gases that MQ gas sensors are capable of detecting. These sensors are made up of an electrode that has a sensing material applied to it that has been heated to boost its reactivity and sensitivity [16]. The diagram model is represented in the **Fig1** present above.

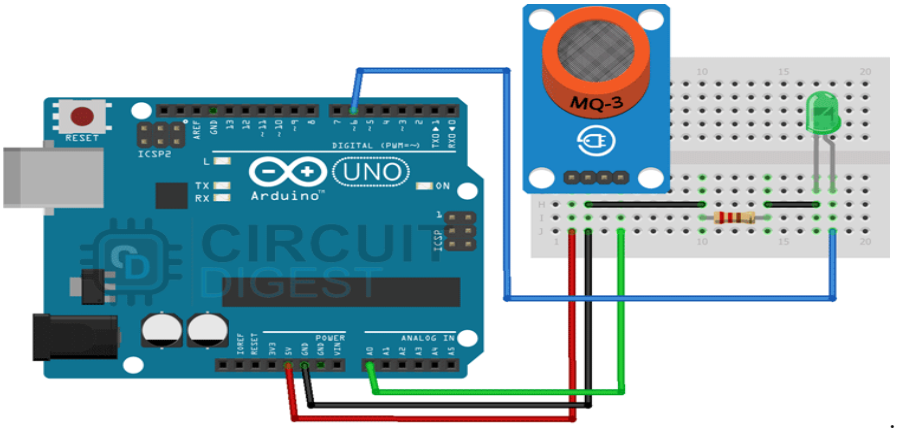

Fig 2. Connection Diagram MQ-3 sensor and Arduino

We have a container containing IPA.The concentration of gas increases when it is sprayed in the area. The alcohol content rises again when we pour it a second and third times. As the level of alcohol grows, the sensor's output voltage rises, as visible on the multimeter. When it crosses a specific threshold, the green LED on the module turns on (the threshold can be adjusted using the potentiometer).

MQ-3 sensor is used

- Sensitivity is good
- Cheaper in cost
- Easy to use and fix
- Adjustable value

The block diagram explains about the working of MQ3 Sensor connected with Arduino with the respective code feeded in it. Where the Arduino plays the major role in this project. The MQ3 Sensor detects alcohol, ethanol, smoke this sensor. If the intoxication is proved then the buzzer will blow with the beep sound. Then the percentage of alcohol is displayed in the shown LCD Panel. For more references **Fig 3** presents above. This is the ingenious method for detecting harmful alcohol consumption in restricted places.

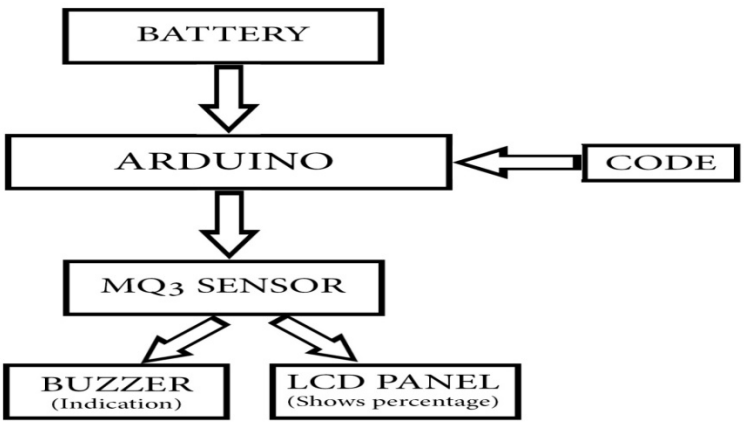

Fig 3. Block Diagram of Indication of Alcohol.

This project can be used incompanies, collegesand schools to detect whether the employeeor students have consumed alcohol. It is cheaper in cost;it is more reliable. So, it can be used for a long period of time. It can be modified and can be used invehicles to avoid accidents.It can be applicable in many places where people spendtimes with families such as malls, theatres etc.From the literature survey, different Researchers and their findings are presented in **Table 1**.

Table 1. Researchers and Their Findings

Sl No.	Title	Outcomes and Findings	Researchers
1	Alcohol Detection System	This device offers a special way to stop intoxicated persons. The car's steering has a sensor for alcohol built in the system. The sensor detects alcohol levels whenever the motorist turns on the ignition.	James et al. [1] [2014]
2	Alcohol Detection and Vehicle Controlling	This publication has calculated the driver's condition in a real-time setting, and we suggest detecting alcohol using an Arduino-connected alcohol detector.	Bhuta et al. [2] [2015]
3	An Arduino based embedded system in passenger car for road safety	This essay addresses issues of road discipline, such as horn management in horn-restricted regions and speed control in various locations. The characteristics of this paper cover speed control of vehicle in school zones as well as vehicle speed control in other zones like bridges, highways, cities, and suburbs.	Seelam& Lakshmi [3] [2017]
4	Driver Alcohol Detection System Based on Virtual Instrumentation	In order to stop drunk driving, the system may analyse the alcohol concentration in a breath sample and regulate the ignition system's operation. Additionally, using virtual instrumentation allows you a lot of flexibility.	Gasperseet al. [4] [2018]
5	Alcohol detection for car locking system	The system will benefit from an existing alcohol sensor. In actuality, the project is meant to serve as a foundation for later studies.	Youifetal.[5] [2018]
6	Automatic Engine Locking System Through Alcohol Detection	The Ultrasonic Sensor and Arduino UNO as the MCU are used in this project to build and implement an alcohol detection system with engine locking for automobiles. (Master Control Unit). The device will continuously check the alcohol detection sensor's level of concentration and, if it rises above a certain level, will shut off the vehicle's engine.	Shukla et al. [6] [2020]
7	Alcohol Detection System to Reduce Drunk Driving	The development of a device that could measure the amount of alcohol drank by the vehicle's driver is the primary goal of this research. The proposed system's goal is to keep users from operating a vehicle while intoxicated, which will lower the frequency of accidents involving drunk drivers. The proposed model was made with Arduino.	Anthony et al. [7] [2020]

8	Alcohol Detection Using Automation	The test for drunken driving is the blood alcohol content (BAC). However, because of the expensive equipment and maintenance requirements, this technology is still difficult to employ. The alcohol detector utilised in this project is made up of an IoT-based NODEMCU and a MQ3 gas sensor.	Vani et al. [8] [2022]
9	Alcohol Detection System in Vehicle Using Arduino	The goal of the current research is to serve as an example of technological work done in the form of a project that shows how human driving may be made safer in order to prevent accidents and make the roads safer to drive on for both the driver and commuters. The project was created by combining alcohol content detecting sensors with microcontrollers.	Garg et al. [9] [2022]
10	A Brief Review Alcohol Detection System in Vehicle Using Arduino	The ATmega328 microcontroller board, which is more adaptable and capable of carrying out a larger range of functions than any other conventional microcontroller, was used in conjunction with gas sensors for measuring alcohol content to construct the work. The MQ3 module, which works with any kind of vehicle and has a respectable sensitivity range of two meters, is employed to find alcohol vapours.	Karhale et al. [10] [2023]

IV. FUTURE DEVELOPMENT

- This circuit can be used to manage the vehicle after alcohol detection with minor modifications.
- We may also incorporate GPS and GSM into this project so that the location of the drunkard can be determined once the alcohol has been detected.

V. CONCLUSIONS

Based on the study the basic working corresponds to alcohol detector, we can avoid the happening of the new sense and unwanted behaviour of people who drunken in the public places. Here we have provided a sensor which has detection range of around 2 meters and this alcohol detector can also be placed in vehicles to avoid accidents. In this project the basically when a drunken person breathes near the alcohol sensor it detects the ethanol in his breathe and provides an output based on alcohol concentration. The future of this projectis to control the drunken free society in public and restricted places such as hospitals, theatres, schools, colleges and etc. It is more reliability and also improves the safety of the human beings.

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