

**GLOBAL JOURNAL OF ENGINEERING SCIENCE AND RESEARCHES****Smart Alcohol Detection Using IoT****Sai Vaishnavi Marla, R.Aishwarya, N.Srinidhi, Ms. PR.Anisha, Dr.BV Ramana Murthy and  
Mr.C Kishor Kumar Reddy**Stanley College of Engineering and Technology for Women, Chapel Road, Abids, Hyderabad, 500001.**ABSTRACT**

Now-a-days we come across numerous street mishaps which occur due to drinking and driving. This paper tells about the advantages of IoT and how we can use it to distinguish liquor utilization in a specific individual. This aides in improving the general public a spot to live and spares numerous lives. Liquor is damaging to our wellbeing and can be unsafe to the lives of numerous other individuals. To take care of this serious issue and to decrease the danger of such mishaps, we have come up with an alcohol detection framework that can recognize/distinguish regardless of whether a driver who is going to drive the vehicle has consumed liquor. When the framework identifies hints of liquor, it conveys a message which incorporates the vehicle subtleties to all the contacts in the favorite list of the enlisted portable and a duplicate of a similar message to the close-by police station. Thusly the police can take the required actions relying upon the dimension of liquor recognized. This framework moves in the direction of the security of the driver and the general population going out and about. Along these lines by utilizing this framework we can limit street mishaps caused because of drinking and driving.

*Keywords: IoT, Alcohol Sensor, Cloud, BAC, NodeMCU, Application.*

**I. INTRODUCTION**

In the present world, day by day, many cars are being created and being utilized by every person. Because of a larger than usual variety of vehicles, traffic will likewise be increased and rash driving of cars will likewise increment. In after effects of that situation, accidents also increments quickly. By breaking down some of the reports, the majority of the mishaps happen because of rash driving of the vehicle by an alcoholic driver. Hence drunk and driving is the most common reason of mishaps in practically all nations throughout the world. This framework will be introduced in the vehicle. This proposed framework is for the most part used to identify the intoxicated drivers and control their vehicles to reduce road accidents. This system helps us by detecting alcohol in the breath of the driver of the car. When it detects alcohol above the standard level, it sends a notification to the favorite contacts of the driver and another notification to the nearest police station. The notification being sent to the contact would contain a message stating that the driver is drunk. The notification being sent to the police station would contain the details of the car and the location of the driver. This way, the police would take the necessary and required actions.

**II. LITERATURE REVIEW**

In paper[1], the authors have proposed a framework for Alcohol Detection System in vehicles by incorporating liquor sensor with Arduino board. The sensor utilized has affectability that ranges around 2 meters. It can suit to any vehicle and can without quite a bit of a stretch be gotten away from the suspects. This endeavor is fitted inside the vehicle. The endeavor is proposed for the security of people sitting inside the vehicle.

In paper [2], the author endeavors to investigate the likelihood of utilizing the innovation that would recognize the dimension of liquor in the blood and forestall "very-begin" of the engine vehicle. The model gadget goes for keeping the client from driving when tanked and lessens the quantity of mishaps happening because of plastered driving. The model is made utilizing Arduino Uno and Alcohol identifying sensor. The liquor recognizing sensor (MQ-3) when associated with an Arduino UNO R3 recognizes the dimension of liquor content in blood by investigating driver's breath.

In paper [4], the authors are presenting a smart helmet framework which recognizes that, the individual wearing protective cap or not and furthermore the framework distinguishes if the individual is tanked, if the driver utilizing

mobile phone amid driving methods the bicycle will be stuck gradually. Here they have transmitter in the head protector and beneficiary at the bicycle. A switch will be there to guarantee that the individual is wearing the head protector or not. And furthermore a liquor sensor is put in the cap close to the mouth of the driver to check whether the driver is smashed. In the event that a vehicle over this framework, at that point the headlight is naturally darkened and plunged. In this framework there is a switch guarantees the setting of the head protector in appropriate way.

In paper[6], they proposed a proficient method to kill the reasons for street mishaps caused because of the unreasonable admission of liquor by utilizing microcontroller interfaced with a liquor sensor and it plainly gives a precise stream about working of the proposed framework. Results from testing the framework sufficiently coordinated the necessities.

In paper [7], the reason for the project is to advocate a solid method to lessen the smashed driving cases. Different parameters are considered to recognize whether an individual is tanked. Maybe a couple of the many being beat rating, outward appearance, speeding up and ordinary movement of the vehicle. This paper determines the benefits and faults of every part.

In paper [8], A superior comprehension about the unfavorable impacts of drinking and driving can be obtained and it encourages us consider the conceivable approaches to explain. The point is to evaluate the causes and other contributing parts provoking end in Road traffic scenes with alcohol usage and to think about the component of alcohol present in body by examination of blood.

In paper[9], Drinking besides, driving is starting at now a real broad medicinal issue, which is likely going to create as a champion among the most vital issues within the near future. The activity of alcohol in surge hour gridlock security has made a more noteworthy number of dialogs than some other topic. Alcohol and driving don't mix, yet in the meantime, various people love to drink and drive achieving different road difficulties a slosed driver is a potential executioner as he can't play out his endeavors without risks and jeopardizes road prosperity. A genuine drive against inebriated driving is the need of extraordinary significance to propel road prosperity. It is basic to begin essential steps to achieve this by beating all of the challenges.

In paper[10], a brief but a detailed description of Internet of Things is presented which gives a broad idea about the possible technologies that can be developed using Internet of Things. It is a Research paper on Internet on Things that depicts about the objectives and the logical difficulties which can be experienced.

In paper [20]. This paper talks about structure, improvement and live-performance trial of the model of drink and drive circumstance recognition and ready cum vehicle control framework to limit street disasters and upgrade open security on street. In view of the ongoing savvy gas detecting and incorporation of satellite and cellular wireless correspondence advances, the proposed gadget rapidly faculties the plastered condition of the driver amid start-up/driving by assessing the identical breath liquor fixation level comparing to the lawfully passable state's edge blood liquor fixation level. On location of such circumstance, on-vehicle alarm/sound caution is enacted to caution the people on street and vehicle control framework is activated to bolt start or stop the fuel inflow to the vehicle. Moreover, 'ready SMS' showing tanked driver area, followed by locally available GPS collector, alongside vehicle number is imparted remotely to approved versatile client utilizing GSM cell system to make fitting move from there on. The live analyze results featured the effective working execution of the gadget in-housed at the controlling wheel of the vehicle with the alcoholic driver.

In paper[21], To conquer the issue of caused by the drunken driving in a progressively prudent manner, a clever framework has been imbedded, one in the key of the vehicle and the other in the controlling wheel of the four wheeler or quickening agent of the bike which will always check the BAC of the driver while he/she is driving the vehicle. Moreover, on national expressways the greater part of the mishaps happen at the intersection between the paths or at the clumsy destinations, to conquer this issue a RF recipient is presented in the framework which will get the signs from the transmitters set on the national interstate intersections and the clumsy destinations the nation over which will alarm the driver when he/she is moving toward them.

In paper[22], a system which is compact and less costly with the mere need in future has been proposed. It aims at minimizing the road accidents caused due to drunk and driving and making driving vehicle safer than before. It utilizes a unique method to curb drunken drivers by means of alcohol detection system. The system uses MQ3 sensor, stepper motor, linkages and buzzer and many more.

In paper[23], the proposed framework would be always observing the driver breath by setting it on the guiding. So if a driver is flushed and attempts to drive the framework distinguishes liquor nearness in his/her breath and hinders the fuel supply to the motor with the goal that the vehicle neglects to begin. For another situation, the vehicle would not quicken any further and driver can control it to roadside. In this framework we use PIC16F877A microcontroller interfaced with a liquor sensor alongside a LCD screen and a dc engine to exhibit the idea. The microcontroller on experiencing high liquor motion from the liquor sensor shows level of liquor in LCD. On the off chance that there is no liquor content and in the opening state of vehicle we give the highlights of Accident Alert utilizing Vibration sensor which recognizes the mechanical worry because of mishaps sends SMS to the rescue vehicle about the area of the vehicle. At long last the framework likewise distinguishes knock and pit gives alert message and a notice flag to avert mishap.

In paper [24], the system depicts the technique of making driving more secure than before which is accomplished by utilizing ATmega8 microcontroller and MQ-3 liquor sensor. They have taken the driver's conditions continuously condition and mean to identify the liquor utilizing liquor sensor associated with microcontroller to such an extent that at the point when the dimension of liquor crosses an allowable cut off, the vehicle motor framework kills and the GPS module catches the present area of the vehicle which is sent to pre-registered telephone numbers utilizing GSM module.

In paper[25], the author intended place to liquor sensor inside the vehicle and maintain a strategic distance from tanked drive. Furthermore, in the event that the driver is drinking, at that point through the control unit the vehicle entryway isn't opening and in the event that entryway isn't bolted, at that point motor isn't lighted. The point of this paper is to recognize driver conduct utilizing liquor sensor and contamination gas level utilizing alcohol and CO2 sensor. GPS will follow the vehicle when vehicle is in risk circumstance. The estimations of the liquor and CO2 sensor are shown on LCD which will demonstrate every single activity of the proposed framework.

### III. PROPOSED SYSTEM

In this proposed system, we will be identifying whether the person who is driving the car has drunk alcohol or not. The alcohol sensor will detect the content of alcohol in the driver's breath as soon as he or she sits in the driver's seat. This system is only devised for the detection of alcohol only for the driver and not for the other front seat. This can be achieved by using an Ultrasonic sensor that will help us set a parameter for the alcohol detection. This way, even if the person sitting beside the driver has drunk alcohol, the sensor will not sense it. The alcohol sensor that we will be using is the MQ3 alcohol sensor. It has high sensitivity to alcohol and has a long and stable life which is required for better functionality of the proposed system.

#### Architecture



Figure 1: Architecture

Device - A Device may be any kind of microprocessor or controller connected to sensors and activators.

Communication - These are the web protocols which transfer the information.

For Ex: http, https, mqtt, coap etc.

Cloud platform - Cloud computing is the use of use if various services, such as software development platforms, servers, storage and software, over the internet, often referred to as the 'Cloud platform'.

Ex: AWS, IBM, MICROSOFT ASSURE, UBI DOTS etc.

Applications - It comes out from the technologies that uses the internet and remote services to maintain its data. It is the used to describe a new class of cloud computing is a general term network based computing that takes place over the internet, basically a step on from utility computing.

Security - Application security is the use of software, hardware and procedural methods to protect applications from external threats.

### Block Diagram

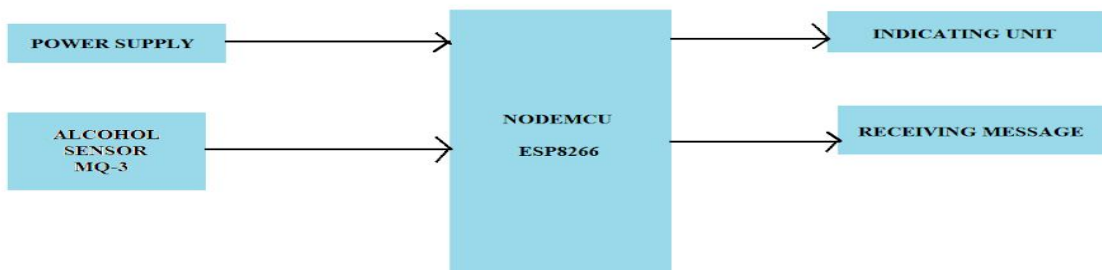


Figure 2: Block Diagram

Power supply - Our framework is controlled with a 9V battery. A 5V DC supply as required by the microcontroller, sensor and show unit. While different parts like DC engine require 1.5V and the LEDs need 2V. The NodeMCU has just been intended to work without the utilization of transformer, the framework can be controlled by means of the USB association from PC or with an outer power supply of 7 to 12V. The External (non-USB) power can come either from an AC-to-DC connector (divider mole) or battery. Any voltage that is above 12V will make the control gadget to consume in this way obliterating the board. It is prudent to utilize voltage between 7 - 12v.

NodeMCU - NodeMCU is an open source IoT platform. It incorporates firmware which keeps running on the ESP8266 Wi-Fi SoC from Espressif Systems, and equipment which depends on the ESP-12 module. The expression "NodeMCU" as a matter of course alludes to the firmware as opposed to the improvement units. The firmware utilizes the Lua scripting language. It depends on the eLua venture, and based on the Espressif Non-OS SDK for ESP8266. It utilizes many open source ventures, for example, lua-cjson and SPIFFS. NodeMCU was made not long after the ESP8266 turned out. On December 30, 2013, Espressif Systems started creation of the ESP8266. The ESP8266 is a Wi-Fi SoC coordinated with a Ten silica Xtensa LX106 core, [citation needed] broadly utilized in IoT applications (see related activities). NodeMCU began on 13 Oct 2014, when Hong submitted the main record of nodemcu-firmware to GitHub. Two months after the fact, the undertaking extended to incorporate an open-equipment stage when designer Huang R submitted the Gerber document of an ESP8266 board, named devkit v0.9. Later that month, Tuan PM ported MQTT customer library from Contiki to the ESP8266 SoC platform, and focused on NodeMCU venture, at that point NodeMCU had the capacity to help the MQTT IoT convention, utilizing Lua to

get to the MQTT intermediary. Another essential refresh was made on 30 Jan 2015, when Devsaurus ported the u8glib to NodeMCU project, empowering NodeMCU to effortlessly drive LCD, Screen, OLED, even VGA shows.

In summer 2015 the makers deserted the firmware venture and a gathering of free benefactors dominated. By summer 2016 the NodeMCU included in excess of 40 distinct modules. Because of asset limitations clients need to choose the modules pertinent for their undertaking and manufacture a firmware.

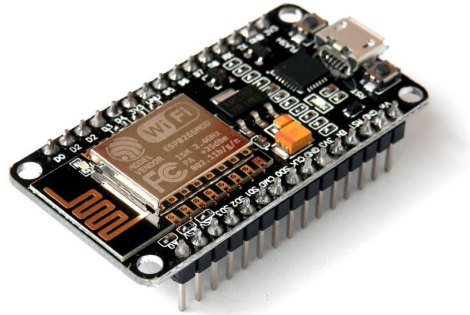


Figure 3: Node MCU

NodeMCU provides access to the GPIO (General Purpose Input/Output) and a pin mapping table is part of the API documentation.[17]

I/O index	ESP8266 pin
0	GPIO16
1	GPIO5
2	GPIO4
3	GPIO0
4	GPIO2
5	GPIO14
6	GPIO12
7	GPIO13
8	GPIO15
9	GPIO3
10	GPIO1
11	GPIO9
12	GPIO10
D0	(GPIO16) can only be used for GPIO

It does not support open-drain/interrupt/PWM/I<sup>2</sup>C or 1-Wire.

Node RED is a programming apparatus for wiring together equipment gadgets, APIs and online administrations in new and fascinating ways. It gives a program based editorial manager that makes it simple to wire together streams utilizing the wide scope of nodes in the palette that can be conveyed to its runtime in a single click.

Features

- Browser-based flow editing
- Built on Node.js
- Social development

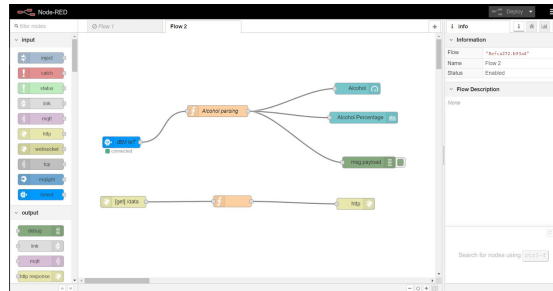


Figure 4: Node RED

Alcohol sensor MQ-3 - This module is made utilizing Alcohol Gas Sensor MQ3. It is a minimal effort semiconductor sensor which can identify the nearness of liquor gases at focuses from 0.05 mg/L to 10 mg/L. The delicate material utilized for this sensor is SnO<sub>2</sub>, whose conductivity is lower in clean air. It's conductivity increments as the centralization of liquor gases increments. It has high affectability to liquor and has a decent protection from unsettling influences because of smoke, vapor and gas. This module gives both computerized and simple yields. MQ3 liquor sensor module can be effectively interfaced with Microcontrollers, Arduino Boards, Raspberry Pi and so on.

This liquor sensor is appropriate for distinguishing liquor focus on your breath, much the same as your normal Breathalyzer. It has a high affectability and quick reaction time. Sensor gives a simple resistive yield dependent on liquor fixation. The drive circuit is extremely straightforward, all it needs is one resistor. A straightforward interface could be a 0-3.3V ADC.

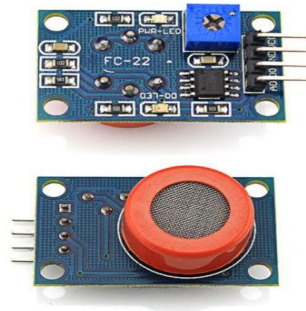


Figure 5: MQ3 Sensor

Jumper wire - Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed.

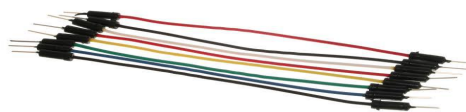
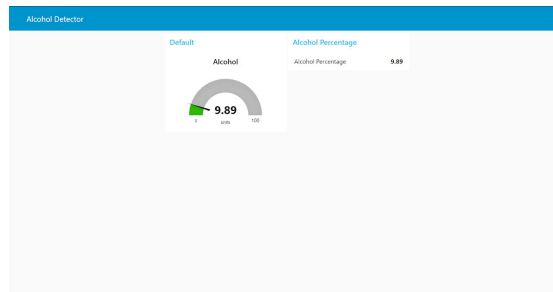


Figure 6: Jumper wires

**Indicating unit**

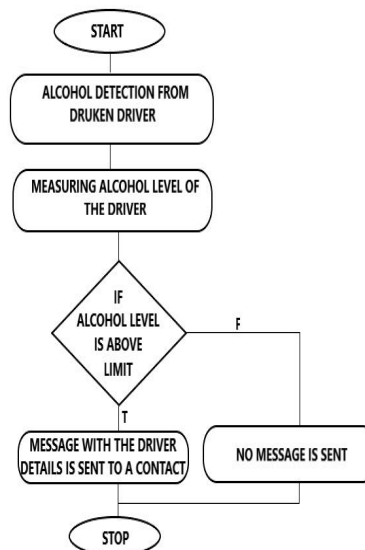


**Figure 7: Alcohol detector**

**System flow chart**

The flow chart of the system is shown in figure . The system consists of three major parts. First is to boot up the system, next is the estimating state, this stage measure the measure of alcohol level from the drivers. A recommended set breaking point will be given as contribution to the microcontroller, when the alcohol level exceeds, a message is sent.

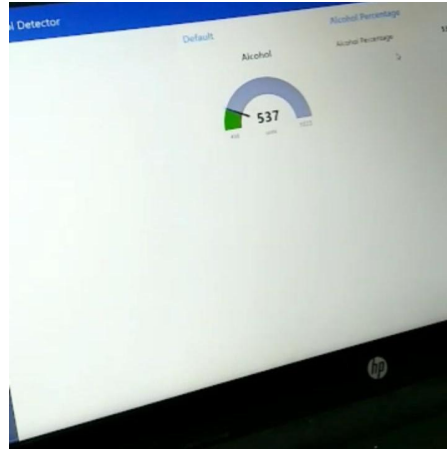
- STEP 1: Power on the system
- STEP 2: checks for alcohol concentration
- STEP 3: if alcohol is detected
  - STEP 3.1: Message is sent
- STEP 4: Else
- STEP 5: No message is sent
- STEP 6: Stop



**Figure 8: Flowchart**

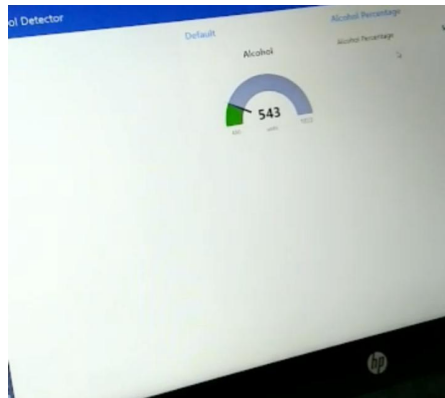
#### IV. RESULT & DISCUSSION

The following result is achieved when the MQ3 sensor senses the presence of alcohol in breath of the person driving the car. The result will be seen only when the alcohol content is above the limit mentioned. The following figure shows the alcohol detector that shows us the content of alcohol in the breath of the driver.



*Figure 9: Alcohol content*

When the presence of alcohol is detected by the sensor, a noticeable change in the meter can be observed in the figure. The value keeps increasing with the increase in the content of alcohol. The readings for different samples of alcohol fluctuates depending on the content and concentration.



*Figure 10: Increase in the level of alcohol.*

Here, we have replaced the alcohol sample with the one containing an increased concentration of alcohol when compared to the previous one. Now, as we move the canister containing alcohol closer to the MQ-3 sensor, increase in the percentage of alcohol can be noticed as observed in the above figure. Once the alcohol content exceeds the threshold limit, a message is sent to the registered mobile number.

#### V. CONCLUSION

This paper gives us information on how we can use IoT (Internet of Things) and can detect alcohol in the breath of the person driving the car and can reduce the number of road accidents caused by drunk and driving. The system mentioned above works on a sensor called MQ3 alcohol sensor that helps in sensing the driver's breath and



analyzing whether he or she has drunk alcohol or not. This system works towards the safety of the driver and the lives of innocent people. This system is cost friendly and is very efficient.

## VI. FUTURE SCOPE

In the coming years, such a framework will be required in vehicles and is going to assume a noteworthy job in making lives secure amid driving. Drunk driver discovery in vehicles has high potential to spare lives. Such a framework in a vehicle will help parents maintain distance between their children and drinking and driving. This system will be used in most of the cars and will ensure the safety of the driver and the people travelling along the same road. The system can have a few developments in the future which will help the system better in its functionality and efficiency. The use of this system in cars can reduce the rate of accidents taking place on an everyday basis. The requirement of this system will increase because drunk and driving is one of the most dangerous things and has taken the lives of so many people, including the lives of innocent ones. More and more people are becoming aware of the problems faced due to this disastrous habit and due to this, the demand of this system will increase in the future.

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