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# Development of an IoT-Based Alcohol Detector Using Blynk and NodeMCU

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Abstract: Although the consumption of alcoholic beverages has been a part of human society for a very long time, it is also a big contributor to accidents and health problems. Driving under the influence of alcohol is a leading contributor to death and injury on the roads across the globe. Individuals continue to operate motor vehicles while under the influence of alcohol, despite the existence of stringent regulations and awareness efforts, which poses a risk to both themselves and others who are on the road. With the intention of preventing drunk driving and promoting road safety, an Internet of Things (IoT)-based alcohol detector has been developed utilising Blynk and NodeMCU. This detector was developed to address this issue. The amount of alcohol that is present in a person's blood, urine, or breath can be determined with the help of a device known as an alcohol detector. Using a gas sensor, the device is able to determine the amount of alcohol that is present in the breath of the user. A connection has been made between the sensor and the NodeMCU, which is tied to the Blynk application. The NodeMCU receives the information that is gathered by the gas sensor that is incorporated within the device. This sensor monitors the amount of alcohol that is breathed by the user. Through the use of a smartphone application, Blynk is an Internet of Things platform that gives consumers the ability to control and monitor connected devices. This alcohol detector that is based on the Internet of Things is extremely portable, which is one of its most significant features. A cost-effective solution has been developed through the utilisation of open-source technologies such as Blynk and NodeMCU. This has enabled the device to maintain its accuracy and quality without compromising its functionality.

Keywords: IoT, Alcohol, MQ 3, Blynk, NodeMCU.

### I. INTRODUCTION

Consumption of alcohol has been a part of human civilization for ages, but it is also a key contributor to the occurrence of accidents and health problems. According to estimates provided by the World Health Organisation (WHO), alcohol use is responsible for three million fatalities worldwide each year. Sensors that detect alcohol are utilised in this situation. Measurement of the amount of alcohol present in a person's breath, blood, or saliva can be accomplished with the help of a device known as an alcohol sensor. As the number of accidents involving intoxicated drivers has increased over the years and the need for stricter enforcement of alcohol regulations has grown more apparent, these sensors have become increasingly popular[1-15].

The level of alcohol that is present in a person's breath, blood, or urine can be determined with the help of a device known as an alcohol detector. Additional names for this device include a breathalyser and an alcohol breath tester. Law enforcement officers frequently make use of these devices in order to ascertain whether or not a person is under the influence of alcohol while driving or in other circumstances where it is essential to have an accurate understanding of the amount of alcohol that is present in a person's body[16-30].

Considering the fact that the number of accidents and fatalities that are caused by alcohol consumption continues to climb, the utilisation of alcohol detectors has become increasingly significant in today's society. According to information provided by the National Highway Traffic Safety Administration, in 2019, alcohol-impaired driving was responsible for 28 percent of all fatalities that occurred as a result of transportation-related incidents in the United

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States. Therefore, it is imperative that stringent measures be taken to prohibit anyone from operating a motor vehicle while under the influence of alcohol[31-45].

Alcohol detectors have been shown to be an effective method for detecting and preventing driving under the influence of alcohol. This has been shown through numerous observations. There is a direct connection between the quantity of alcohol that is present in a person's system and the concentration of alcohol that is present in their breath or blood, which is how the device determines the amount of alcohol that is present in a person's body. After that, the results are displayed on a computerised screen, which offers an accurate measurement of the level of intoxication that the individual is experiencing at the moment[46-60].

An alcohol breathalyser is the sort of alcohol detector that is utilised the most frequently. A chemical reaction takes place when a sensor is brought into touch with a person's breath, and this response is what allows this gadget to determine the amount of alcohol that is present in a person's breath. The results are subsequently shown on a computerised screen, which provides an exact measurement of the individual's blood alcohol content (BAC = blood alcohol concentration).

Additional types of alcohol detectors are also available, and these detectors can determine the amount of alcohol that is present in a person's blood or urine. When it comes to determining the level of drunkenness of individuals who are unable to produce a breath sample, these devices are most frequently utilised in hospitals or by law enforcement officers.

The application of alcohol detectors has not been restricted to the usage of law enforcement organisations; rather, it has gained popularity in a variety of settings, including businesses, schools, and even for personal use. Today, a significant number of businesses have adopted the stringent policy of administering alcohol tests to their staff members in order to guarantee a secure and productive working environment. Alcohol detectors are also used in educational institutions, such as schools and universities, to discourage drinking by minors and to encourage students to develop responsible drinking habits[61-68].

While alcohol detectors have been beneficial in avoiding drunk driving, they have also proven helpful in reducing the number of accidents and fatalities that are due to alcohol in other countries. Some nations, for instance, have made it obligatory for commercial drivers, such as truck drivers and pilots, to submit to alcohol testing in order to guarantee not just their own safety but also the safety of others.

There is significant cause for concern regarding the accuracy of alcohol detectors due to the fact that some elements, including mouthwash, specific drugs, and even specific foods, have the potential to influence the results. Technology has, however, led to the creation of alcohol detectors that are more precise and trustworthy than those that were previously available.

In conclusion, alcohol detectors have developed into an indispensable instrument for the purpose of enhancing road safety and reducing accidents and fatalities that are caused by alcohol consumption. It is no longer the case that these gadgets are just utilised by law enforcement authorities; rather, their application has spread to other domains, including workplaces and educational institutions. Alcohol detectors will continue to play an important part in safeguarding the safety of individuals when they are driving, as well as in promoting healthy drinking habits. This is because technological breakthroughs are always being made.

Technology has become an indispensable component of our day-to-day lives as a result of the fast-paced environment we live in today. Smartphones [1] and smart houses [2] are only two examples of the many technological devices that are all around us and make our lives simpler and more productive. This is [3, 4]. The Internet of Things (IoT) is one example of a technology that has seen a meteoric rise in popularity over the past several years [5, 6, 7]. The term "Internet of Things" (IoT) refers to the interconnection of commonplace objects through the internet, which enables these objects to send and receive data. Another one of the most recent applications of the Internet of Things is in the form of an alcohol detector. This technology has revolutionised a variety of different businesses.

Through the use of a smartphone application, Blynk is an Internet of Things platform that gives consumers the ability to control and monitor connected devices. It is possible to create Internet of Things projects by utilising the Wi-Fi module with the help of NodeMCU[6], which is an open-source development board. These various technologies have been combined in order to develop a detector that is both efficient and compare for alcohol use. This Internet of Things-based alcohol detector has a straightforward operation. The apparatus is nade up of a gas

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sensor that is able to identify the presence of alcohol in the breath of the individual who is using it. The sensor is linked to the NodeMCU, which in turn is linked to the Blynk application at the same time. Through the process of exhalation into the device, the gas sensor is able to determine the amount of alcohol present and then transmits this information to the NodeMCU. Following this, the NodeMCU transmits this information to the Blynk app, which then displays the amount of alcohol consumed on the user's mobile device. When the user's blood alcohol concentration is higher than the permissible limit, the application notifies them that they should not operate a motor vehicle [10].

This alcohol detector that is based on the Internet of Things is extremely portable, which is one of its most significant features. Because the device is so compact that it can be housed in a pocket, it is quite convenient to carry around. In addition, it is relatively simple to install in a vehicle, which makes it a practical choice for motorists. Also, the Blynk app enables real-time monitoring, which guarantees that the results will be correct and delivered on time [11]. The fact that this equipment is inexpensive is yet another significant advantage it possesses. Typical alcohol detectors are not only costly but also require routine maintenance throughout their lifetime. On the other hand, this Internet of Things-based solution is reasonable in price, which makes it available to a larger number of people. Developing a solution that is both cost-effective and accurate has been made possible by the use of open-source technologies such as Blynk and NodeMCU [12]. This has been accomplished without compromising the device's quality or accuracy.

Not only does this Internet of Things-based alcohol detector have the potential to prevent drunk driving, but it also has many other applications. It is possible to use it at restaurants and bars to monitor the amount of alcohol that clients consume, so guaranteeing that they only drink in a responsible manner. In addition, it can be utilised by law enforcement agencies in order to carry out alcohol alcohol testing on the spot. There is also the possibility of incorporating this device into smart cars, which would allow it to turn off the ignition if the driver's blood alcohol content is higher than the permissible limit [13,14].

In conclusion, the Internet of Things-based alcohol detector that makes use of Blynk and NodeMCU is an intriguing solution that has the potential to fight the problem of drunk driving. Because of its small size, low cost, and ability to monitor in real time, it has the potential to save a great number of lives and encourage safe drinking. As technology continues to advance, we should assume there will be more innovative and significant applications of the internet of things in a variety of facets of our life.

### **II. METHODOLOGY**

This alcohol detector that is based on the Internet of Things operates in an easy manner. Using a gas sensor, the device is able to determine the amount of alcohol that is present in the breath of the user. A connection has been made between the sensor and the NodeMCU, which is tied to the Blynk application. The NodeMCU receives the information that is gathered by the gas sensor that is incorporated within the device. This sensor monitors the amount of alcohol that is breathed by the user. This information is obtained from the NodeMCU by the Blynk app, which then makes use of it to display the user's concentration of alcohol on their mobile device. In the event that the user's blood alcohol level is higher than the permissible limit, the application will alert them to refrain from driving. Once we have determined that the excreted concentration has reached the level that we have established, we will send out a notification informing you that alcohol has been found.

### **Components Required**

- Alcohol sensor- MQ3
- NodeMCU Board
- Mobile phone

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Figure 1- Proposed System

Figure 1 shows the connection of proposed method.

### **III. RESULTS AND DISCUSSION**

Figure 2 shows the connection setup for proposed system .

Connect the VCC pin of the MQ3 sensor with the VIN pin of the NodeMCU.

Attach the GND pin of the MQ3 sensor with the GND pin of the NodeMCU.

Join the data pin of the MQ3 sensor with the analog-0 pin of the NodeMCU as shown above.

Connect the NodeMCU with the mobile hotspot or a wifi router with a good internet connection.

Figure 2- Connection setup

To configure the project settings, click on the newly created project(Figure 3). Give your project a name, and choose NodeMCU as the device. Select WiFi as the connection type.



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To your project, add a gauge widget and a notification.

You can move the notification widget and gauge around the screen to suit your preferences. Next, press the button that is highlighted to configure the pins and value of the MQ3 alcohol sensor as shown in Figure 4.

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### Figure 4- Notification Adjustment

Now press the play button to begin running this. When the NodeMCU is powered on, the gauge will display the measured output(Figure 5).



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Figure 5- Display of output **DOI: 10.48175/IJARSCT-18231** 



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### **IV. CONCLUSION**

Users of the Blynk Internet of Things platform have the ability to operate and monitor linked devices by means of a mobile application with the platform. The portability of an alcohol detector that is based on the Internet of Things is one of the most significant advantages it offers. The utilisation of open-source technologies like as Blynk and NodeMCU has made it possible to design a solution that is both cost-effective and does not compromise the device's accuracy or quality. The Internet of Things-based alcohol detector that makes use of Blynk and NodeMCU is an option that shows promise in the fight against the problem of drunk driving. Because of its small size, low cost, and ability to monitor in real time, it has the potential to save a great number of lives and encourage safe drinking. We should anticipate more imaginative and impactful applications of the Internet of Things (IoT) in numerous facets of our life as technology continues to accelerate its development.

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