Journals Pub

International Journal of

Chemical Separation Technology

ISSN: 2456-6691
Volume 10, Issue 1, 2024
DOI (Journal): 10.37628/IJCST

https://chemical.journalspub.info/index.php?journal=JCCST

Review IJCST

Development of IoT-Based Alcohol Detector Using Blynk and Node MCU

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Abstract

Despite its long history in human society, alcohol consumption has a substantial negative impact on health and accidents. Worldwide, drunk driving is a leading factor in traffic fatalities and accidents. People still drive while intoxicated, endangering both themselves and other drivers, in spite of strong legislation and awareness programmers. Using Blynk and Node MCU, an Internet of Things-based alcohol detector had been created in response to this problem with the goal of preventing drunk driving and enhancing road safety. A device called alcohol detector serves to measure the amount of alcohol present in a person's breath, urine, or blood. A gas sensor built into the device calculates how much alcohol is in the individual's breath. The sensor has been coupled to the NodeMCU, and that's connected to the Blynk app. The device's gas sensor calculates how much alcohol the user exhales and sends the data to the Node MCU. Through a mobile application, users can operate and keep an eye on linked devices with the Blynk IoT platform. The portability of this Internet of Things-based alcohol detector is one of its biggest benefits. The development of an affordable solution without compromising the precision and quality of the device has been made possible by the use of open-source technologies such as Blynk and Node MCU.

Keywords: Blynk, NodeMCU, MQ 3, IoT, alcohol, alcohol detector, breathalyser

INTRODUCTION

Although alcohol usage has long been an aspect of human civilization, it also contributes significantly to mishaps and health issues. According to WHO estimates, alcohol usage results in three million fatalities worldwide annually. This is the application of alcohol sensors. A tool called an alcohol sensor can be utilised to gauge how much alcohol is present in someone's saliva, blood, or breath. With the growth of drunk driving incidents and the requirement for stringent enforcement of alcohol laws, these sensors have grown in popularity over time. An alcohol detector is a tool used to determine how much alcohol is in someone's blood, urine, or breath. It is sometimes referred to as an alcohol breathalyser or breathalyser. Law enforcement officers frequently utilise these devices to find out whether someone is impaired by alcohol while operating a vehicle or in other circumstances where knowing the amount of alcohol within an individual's system is important [12].

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Received Date: May 03, 2024
Accepted Date: June 09, 2024
Published Date: August 01, 2024

Citation: Kazi Kutubuddin, Sayyad Liyakat,. Development of IoT-Based Alcohol Detector Using Blynk and Node MCU. International Journal of Chemical Separation Technology. 2024; 10(1): 8–14p.

As the frequency of alcohol-related mishaps and fatalities rises, using an alcohol detector is growing more and more crucial in today's culture. In accordance with information gathered by NHTSA-National-Highway-Traffic-Safety-Administration, alcohol-impaired driving was the cause of 28% of all traffic-related fatalities in the United States in

2019. This emphasises the necessity of stringent policies to deter people from operating a vehicle while intoxicated. It has been demonstrated that using an alcohol detector is an efficient technique to identify and stop drunk driving. In order to determine how much alcohol is in a person's system, the equipment measures the amount of alcohol in their blood or breath. An accurate assessment of the subject's degree of intoxication is subsequently provided by the results, which are shown on a computer screen [34]. Breathalysers are the most widely used kind of alcohol detectors. When a person's breath comes into touch with a sensor, a chemical reaction takes place that allows the gadget to measure the quantity of alcohol present in their breath. Following that, a digital screen presents the results, giving a precise indication of the subject's blood alcohol content (BAC). The amount of alcohol within an individual's blood or urine can also be measured by different kinds of alcohol detectors. These devices are more frequently employed by law enforcement officers or hospitals to assess the degree of drunkenness in people unable to submit a breath sample [56].

Alcohol detectors are no longer just used by police enforcement; they are becoming increasingly common in businesses, educational institutions, and even for private use. Nowadays, a lot of businesses have tight policies requiring employees to submit to alcohol tests in order to maintain a secure and efficient workplace. Alcohol detectors are another tool used by colleges and universities to stop underage drinking and encourage students to have responsible drinking habits. Alcohol detectors have proved useful in lowering alcohol-related accidents and fatalities in several areas in addition to preventing drunk driving. To protect their safety and the safety of others, some nations, for example, have made alcohol testing for commercial drivers—such as truck drivers and pilots—mandatory.

The accuracy of alcohol detectors has under criticism because of the potential for interference from mouthwash, specific drugs, and even particular foods. But technological developments have resulted in the creation of increasingly precise and trustworthy alcohol detectors. In conclusion, alcohol detectors are now a vital component of traffic safety campaigns aimed at reducing the number of alcohol-related collisions and fatalities. These gadgets are now used in more places than only police enforcement, including businesses and educational institutions. As long as technology keeps developing, alcohol detectors will be essential for encouraging responsible drinking and safeguarding people's safety when driving.

Today's fast-paced society has rendered technology an indispensable aspect of our everyday lives. Our everyday lives are made simpler and more efficient by the devices that surround us, whether smartphones [7] to smart houses. Internet of Things (IoT) is one of these technologies that has become extremely popular in recent years [810]. The term "internet of things" (IoT) describes how common devices are connected to each other over the internet and can exchange data. Numerous sectors have been transformed by this technology, and one of the newest uses of IoT is the alcohol detector.

Through a mobile application, users can operate and keep an eye on linked devices with the Blynk IoT platform. Using the Wi-Fi module, Node MCU [11] is an open-source development board that makes it possible to create Internet of Things projects. These technologies have come together to provide a small yet effective alcohol detector.

An IoT-based alcohol detector operates in a straightforward manner. The gadget has a gas sensor which detects the amount of alcohol in the user's breath. The Node MCU, that is linked to the Blynk app, is connected to the sensor. The gas sensor in the gadget measures the amount of alcohol exhaled by the user and transmits the information to the Node MCU. The Blynk app receives this data from the Node MCU and uses it to display the user's alcohol level on their smartphone. The app alerts the user not to drive if their blood alcohol content is higher than the permitted limit [10]. The portability of this Internet of Things-based alcohol detector is one of its biggest benefits. The gadget is simple to bring around because it is lightweight enough to put in a pocket. It is also a practical solution for drivers because it is simple to mount in an automobile. Furthermore, real-time monitoring is made possible with the Blynk app, guaranteeing prompt and accurate results [11]. The affordability of this gadget is

yet another significant benefit. Conventional alcohol detectors are costly and need constant upkeep. But since the IoT-based technology is reasonably priced, more people may use it. Utilising open-source technologies such as Blynk and Node MCU has allowed for the development of an affordable option without sacrificing the device's precision and quality. This IoT-based alcohol detector has other potential uses in addition to stopping drunk driving. It can be used in restaurants and bars to track patrons' alcohol intake and promote responsible drinking. Law enforcement organisations can also utilise it to do quick alcohol testing. In the event that a driver's blood alcohol content exceeds the permitted limit, this gadget may additionally be installed into smart cars and block the ignition.

A promising way to address the problem of drunk driving is the Internet of Things-based alcohol detector that makes use of Blynk and NodeMCU. It has the potential to save many lives and encourage safe drinking because of its small size, affordability, and real-time monitoring. We should expect more innovative and significant uses of IoT in many facets of our life as technology advances.

Blynk and Node MCU

Blynk is a popular platform for creating IoT projects and one of its most commonly used hardware is the Node MCU. As someone who has used both Blynk and NodeMCU extensively for my own projects, I can confidently say that this combination is a powerful and versatile tool for creating connected devices [1].

Firstly, the Blynk app offers a user-friendly interface that allows even beginners to easily create their own IoT projects. The drag-and-drop functionality makes it easy to add various widgets and connect them to the NodeMCU. This allows for quick and hassle-free prototyping, which is essential for any DIY project [10].

Moreover, Blynk offers a wide range of widgets such as buttons, sliders, graphs, and notifications, which can be easily customized to fit the specific needs of your project. This makes it possible to create a variety of projects, from simple home automation systems to more complex data monitoring and analysis projects [11].

The Node MCU, on the other hand, is a powerful microcontroller that is based on the ESP8266 chip, making it affordable and widely available. It has built-in Wi-Fi capabilities, which makes it perfect for IoT projects that require internet connectivity. Additionally, the NodeMCU is compatible with the Arduino IDE, making it easy to program and integrate with other sensors and modules.

One of the biggest advantages of using Blynk with NodeMCU is the cloud-based server. This means that your project can be remotely controlled and monitored from anywhere in the world, as long as it has an internet connection. This makes it ideal for creating smart home systems or projects that require remote data monitoring.

Another great feature of Blynk is its ability to integrate with other IoT platforms and devices, such as Amazon Alexa, Google Assistant, and IFTTT. This opens up endless possibilities for creating advanced and interconnected projects.

However, one downside of using Blynk and NodeMCU is that it requires a stable internet connection for your project to function properly. This can be a limitation for projects that need to work offline or in areas with poor internet connectivity.

Blynk and Node MCU make a powerful combination for creating IoT projects. The user-friendly interface, wide range of widgets, and cloud-based server make it easy to create and control connected devices. I highly recommend this combination for anyone looking to get started with IoT projects.

Methodology

The operation of this Internet of Things-based alcohol detector is simple. The device measures the quantity of alcohol within the individual's breath using a gas sensor. The sensor is connected to an Node MCU, which is linked to Blynk app. The device's gas sensor calculates how much alcohol the user exhales and sends the data to the Node MCU. The Node MCU provides this data to the Blynk app, which utilises it to show the user's alcohol consumption level on the device they are using. If the user's blood alcohol level is beyond the allowed limit, the app warns them not to drive. When the excreted concentration hits the predetermined level, an email alerting the recipient that alcohol has been found will be sent.

The following components are needed: smartphone; NodeMCU board; alcohol sensor (MQ3)

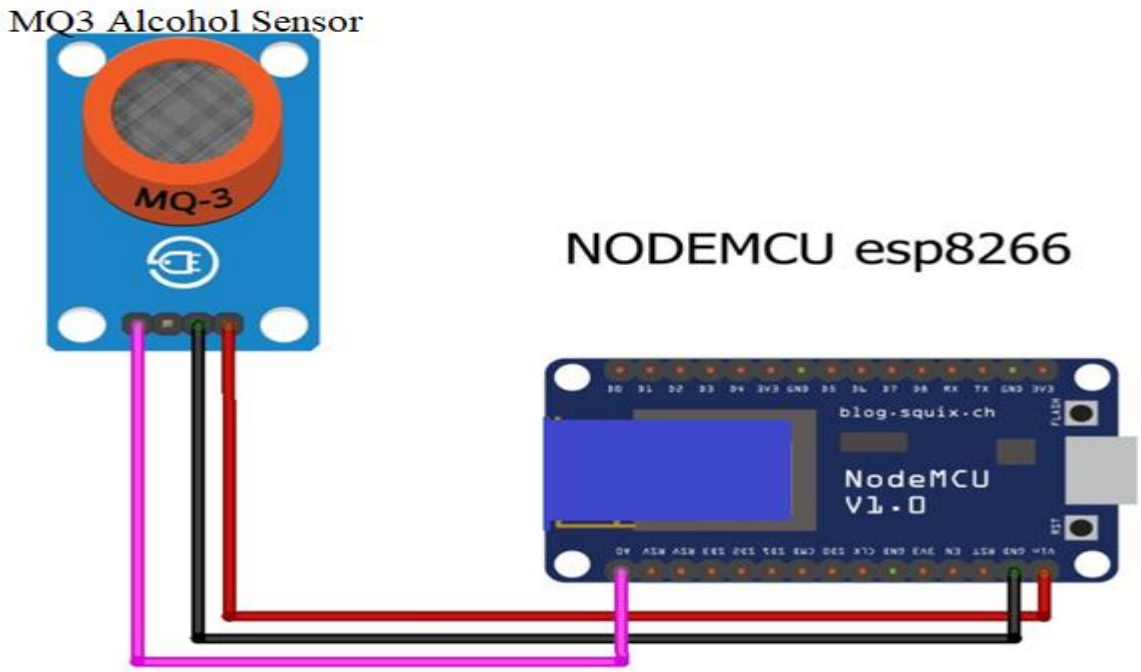

Figure 1: Suggested Framework

The suggested method's connection is depicted in Figure 1.

Findings and Discussion:

The suggested system's connection configuration is depicted in Figure 2.

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: Establishing a connection

Click on the newly established project (Figure 3) to modify the project settings. Choose the device to be NodeMCU and give you're project a name. Choose the WiFi connection type.

Figure 3: A fresh endeavour on Blynk

Include a gauge widget and a notice in your project.To customise the screen to your liking, you can reposition the gauge and notification widget. Next, as indicated in Figure 4, push the highlighted button to configure the MQ3 alcohol sensor's pins and value. Figure 4: Notification Modification

To start this, click the begin playing button now. The gauge will show the measured output whenever the Node MCU has been turned on (Figure 5).

Figure 5: Output display

CONCLUSION

The Blynk IoT platform allows users to monitor and manage linked devices via a mobile application. One of the main advantages of an IoT-based alcohol detector is its portability. By utilising open-source technologies like Blynk and NodeMCU, a cost-effective solution has been developed without compromising the accuracy and quality of the device. An effective way to address the problem of drunk driving is the Internet of Things-based alcohol detector that makes use of Blynk and NodeMCU. It has the potential to save many lives and encourage safe drinking because of its small size, affordability, and real-time monitoring. We should expect more innovative and significant uses of IoT in many facets of our life as technology advances.

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