IOT Project:

Alcohol Detection System

Implementation:

To implement an alcohol detection system using NodeMCU, Blynk app, breadboard, buzzer, 180-ohm resistor, relay module, motor, and MQ-3 sensor, you can follow these steps:

Components Required:

1. bread board
2. esp8266 NodeMCU
3. buzzer
4. 180-ohm resistor
5. relay module
6. I2C Module
7. Motor
8. MQ3 sensor
9. 9V battery
10. 16X2LCD display soldered with I2C module
11. Jumper wires
12. Led

Circuit Setup:

1. Connect the MQ-3 sensor to NodeMCU by using the following configurations.
   Connections:

NodeMCU	MQ3
VIN, VCC	GND, GND
A0	A0

2. Connect the buzzer to NodeMCU. Use a 180-ohm resistor in series to limit the current flowing through the buzzer. One pin to GND and other to D4 of NodeMCU
3. Connect a LED to NodeMCU. One pin to GND and other to D5 of NodeMCU.
4. Connect the relay module to NodeMCU, ensuring proper connections to control the motor. Motor is connected to D3 of NodeMCU using the relay module

Calibration:

Calibrate the MQ-3 sensor by exposing it to known alcohol concentrations and mapping the sensor's response to these concentrations. Obtain calibration data to convert sensor readings into alcohol concentration values.

Blynk App Setup:

1. Install the Blynk app on your mobile device and create a new project.
2. Obtain the authentication token provided by Blynk for your project.
3. Add widgets (e.g., graphs, gauges, buttons) to the Blynk app interface to display data and control the system.

Programming:

1. Write the code for NodeMCU using the Arduino IDE.
2. Configure the code to read analog values from the MQ-3 sensor and convert them to alcohol concentration using the calibration data.
3. Implement logic to compare the alcohol concentration with predefined thresholds.
4. Control the buzzer and relay module based on the alcohol concentration readings.
5. Establish communication between the NodeMCU and the Blynk app using the Blynk library and the authentication token.

6. Send alcohol concentration data to the Blynk app for real-time monitoring and display.

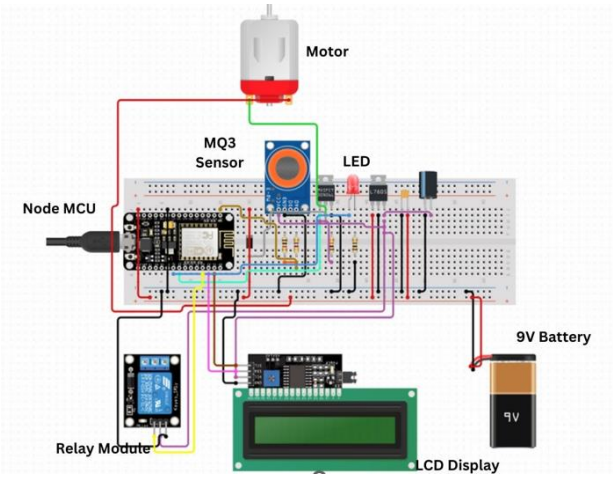
Upload and Test:

1. Upload the code to NodeMCU using the Arduino IDE.
2. Power up the system and ensure all connections are secure.
3. Open the Blynk app on your mobile device and connect to the project using the authentication token.
4. Monitor the alcohol concentration readings and verify that the buzzer and relay module function as expected.

Safety Considerations:

1. Ensure proper electrical safety measures, such as using appropriate voltage levels, insulating exposed connections, and following safety guidelines.
2. Consider housing the system in a suitable enclosure to protect the components and prevent accidental contact.
3. Remember to consult the datasheets and documentation for each component to ensure accurate wiring and programming.

Circuit Diagram:



MQ3 Sensor:

The core component of the MQ-3 module is the gas sensor itself. It consists of a sensitive layer made of tin dioxide (SnO2) that exhibits changes in electrical resistance when exposed to alcohol vapours. The resistance of the sensor decreases in the presence of alcohol.

Advantages of MQ3 Sensor:

- The sensitivity of Alcohol, Ethanol is good
- Easy to use and fix
- Adjustable value
- Low price
- Can be used in various alcohol detection projects

Here are some more useful specifications that we need to know before using this low cost MQ3 sensor.

Operating voltage	5V
Load resistance	200 KΩ
Heater resistance	33Ω ± 5%
Heating consumption	<800mw
Sensing Resistance	1 MΩ – 8 MΩ
Concentration Scope	25 – 500 ppm
Preheat Time	Over 24 hour

NodeMCU:

NodeMCU Development board is featured with wifi capability, analog pin, digital pins, and serial communication protocols.

To get started with using NodeMCU for IoT applications first we need to know about how to write/download NodeMCU firmware in NodeMCU Development Boards. And before that where this NodeMCU firmware will get as per our requirement.

There are online NodeMCU custom builds available using which we can easily get our custom NodeMCU firmware as per our requirement.

Relay Module:

The relay module is an essential component in an alcohol detection system, serving to control external devices based on the detected alcohol concentration. It allows the system to trigger actions such as activating a motor, switching on or off an alarm, or interfacing with other devices or systems.A relay module consists of an electromechanical relay and associated circuitry.

It acts as a switch that can control high-power or high-voltage devices using a low-power control signal from the microcontroller, such as NodeMCU . In an alcohol detection system, the relay module is connected to the microcontroller (NodeMCU o) and receives control signals based on the alcohol concentration readings.

For example, when the alcohol concentration exceeds a certain threshold, the microcontroller sends a signal to the relay module to close the relay's contacts. This, in turn, allows current to flow to the connected external device, such as a motor or alarm, activating it.

I2C Module

In an alcohol detection system, the I2C module is typically used to interface with I2C-compatible sensors, such as the MQ-3 alcohol sensor. The microcontroller communicates with the sensor through the I2C bus, using the I2C module to handle the communication protocol. This allows the microcontroller to read alcohol concentration data from the sensor and perform necessary processing or actions based on the readings.

Using the I2C module in the alcohol detection system simplifies the wiring and minimizes the number of required pins on the microcontroller. It provides a standardized and efficient method of communication between the microcontroller and I2C devices, streamlining the integration and operation of multiple devices within the system.

When working with the I2C module and I2C devices, it's important to ensure that the devices have unique addresses to avoid conflicts on the bus. The addresses are typically specified in the datasheets of the respective devices and can often be configured through hardware or software settings.

Overall, the I2C module enhances the versatility and expandability of the alcohol detection system, allowing for seamless integration of various I2C devices and simplifying the communication between the microcontroller and these devices.

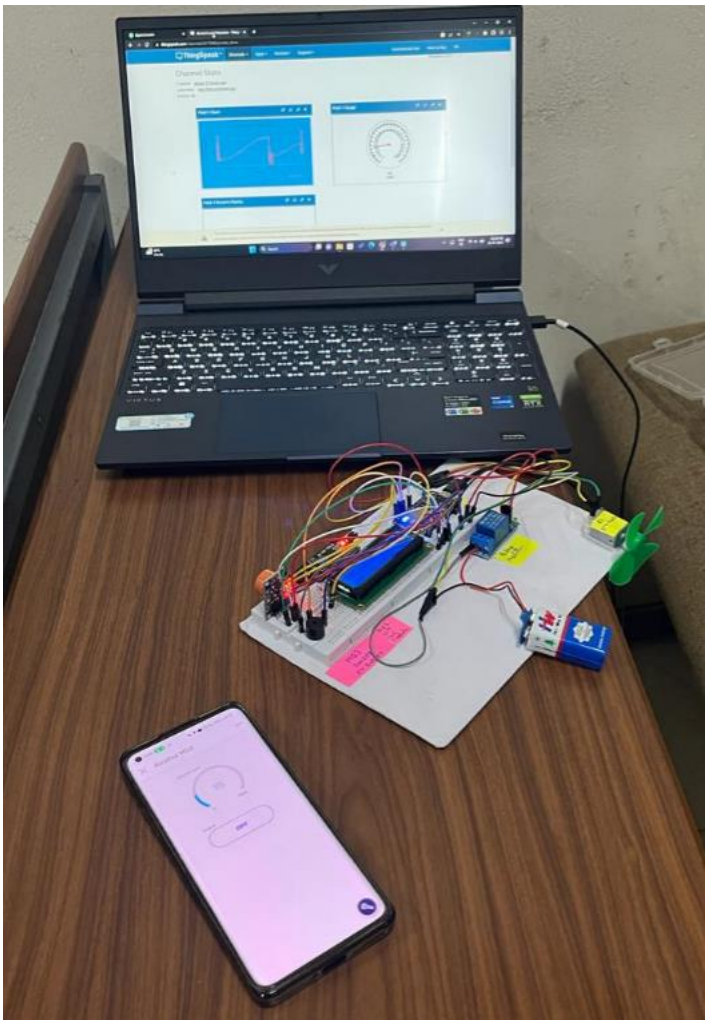
Applications of Alcohol Detector in Car:

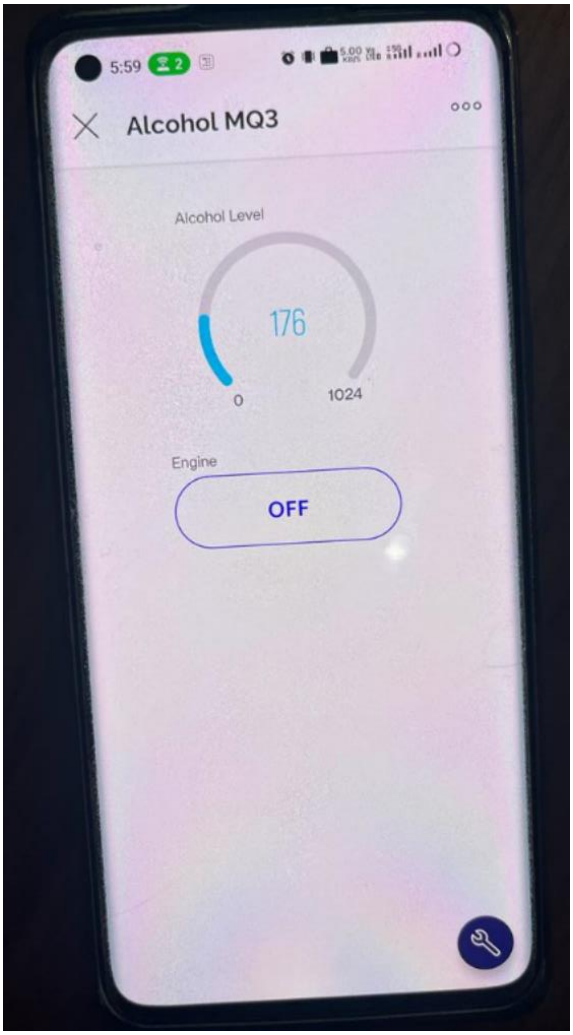
Alcohol Detection system can be used in various vehicles for detecting whether the driver has consumed alcohol or not. We have shown this application through our project where we can turn off the engine of the car remotely through the Blynk if alcohol is detected.

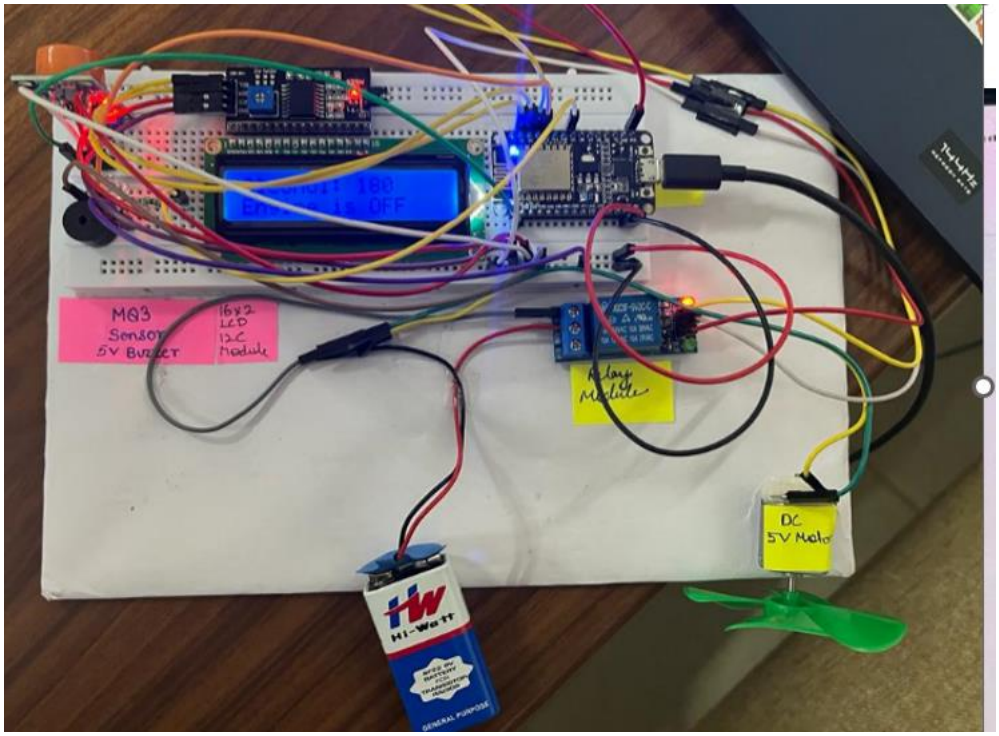
Future Development of the project:

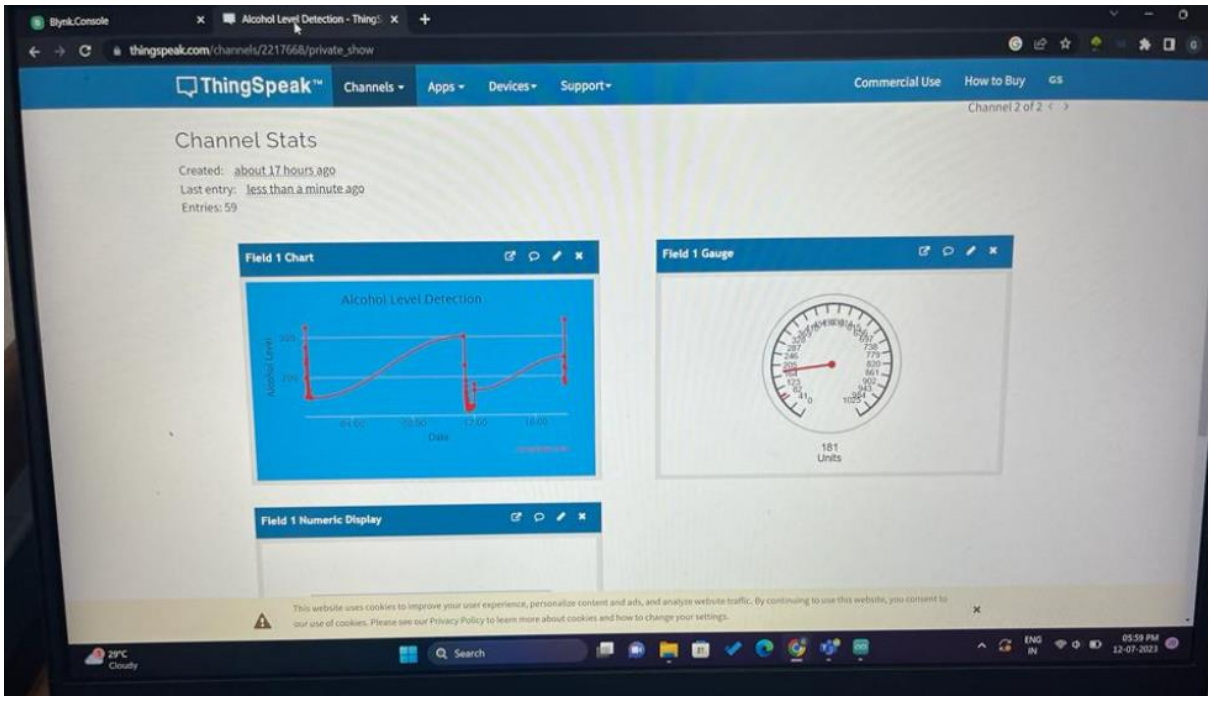
1. We can implement GSM technology with an alcohol detector. So Alcohol detection & vehicle controlling through text SMS will inform the relatives or owners of the vehicle about the alcohol consumption.
2. We can implement GPS technology so that once alcohol detection is done, the system will find out the location of the vehicle. This project is called GPS tracker and alcohol detector with engine locking system using GSM

Output related pictures:









Link for the video output:

https://drive.google.com/file/d/1IhDrRYuvZrZv6xCanp1M7fKG5vk1Xek_/view?usp=drive_link

THANK YOU!