

Smart Detection System (Alcohol)

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Abstract: The key idea to propose this system is to provide road protection from drunk drivers. By providing road protection from drunk driver, a smart detection system is designed to detect alcohol using the MQ3-sensor. As the device senses alcohol in human breath, the direct current (DC) motor that indicates the ignition of the car is turned off and the buzzer is triggered to warn the surroundings that the driver is not able to drive the car with caution. In addition, when the blood alcohol concentration (BAC) level is above the threshold, the position of the drunk driver will be transmitted to our mobile using the Blynk application. This machine can be evidence of performance by solving any constraint, as the internet connectivity of the WiFi module can be enhanced.

Keywords: MQ3-Sensor, Alcohol, Nodemcu, Blynkapp, IoT Project,

1. Introduction

Driving while intoxicated is one of the crimes that can be prosecuted as it will cause death or road accident. However, the authorities have taken action on the problem of driving while intoxicated, but the action taken by the authorities is very minimal. According to the Royal Malaysian Police, the death from a drunk driving accident registered in Malaysia in 2018 was 0.85 percent, although the figures were poor in 2018, which indicates that Malaysian people are one of the world's heavy drinkers [1]. The origin of the idea to create this system is because lately accidents that cause drunk drivers have increased and it has also caused death. This system was created to reduce accidents as a result of drunk drivers. Mq3-sensor is used to detect the level of alcohol in the driver's breath whether the driver is intoxicated or not. If the driver is not intoxicated, the driver can turn on their car normally, but if the driver is intoxicated this system will prevent the driver from turning on their car. Direct current (DC) motor used in the production of this project is intended to give the impression that the car starter can be turned on or not. Global positioning system (GPS) module is used as a steppingstone to track the location of the system. The location of the system can also be detected, if the driver tries to drive in a drunken state, through the Blynk application that has been added in the production of this system.

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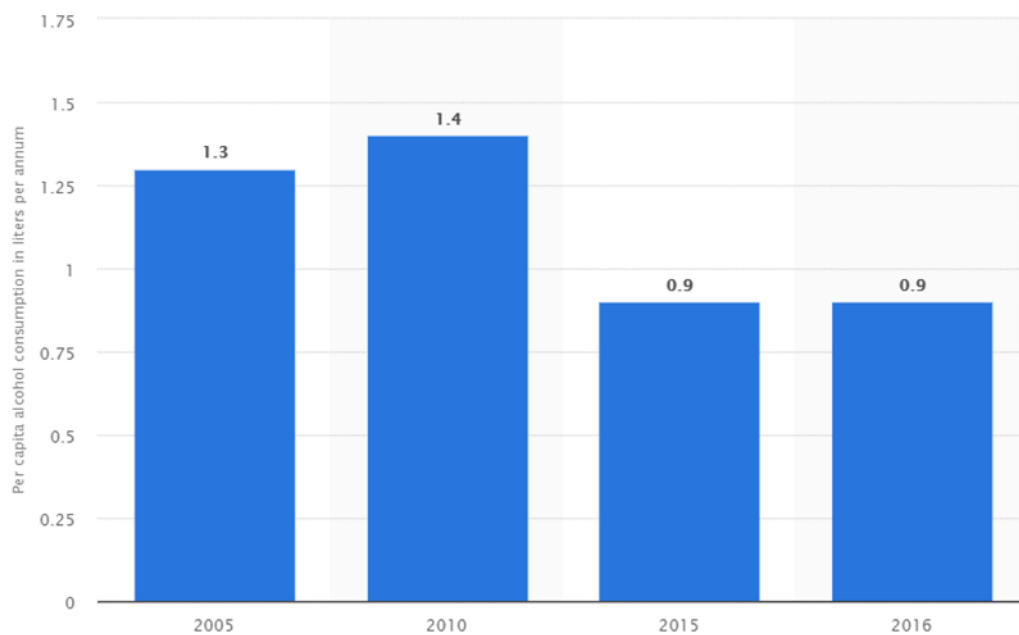


Figure 1: Per capita alcohol consumption in Malaysia [1]

1.1 Related works

Implementation of Android G1 phone that build with the accelerator and sensor to detect the drinking driving behaviour and give early alert to the driver [2]. Phone that have been programmed with identification of drunk driving behaviour. The phone been programmed with identification of drunk driving behaviour. Phone will calibrate the drunk driving pattern and alert the driver if the drunk driving pattern match with current situation of driving [2]. Component used to detect drunk driving behaviour are monitoring daemon module, calibration module, data processing, pattern module and alert module [2].

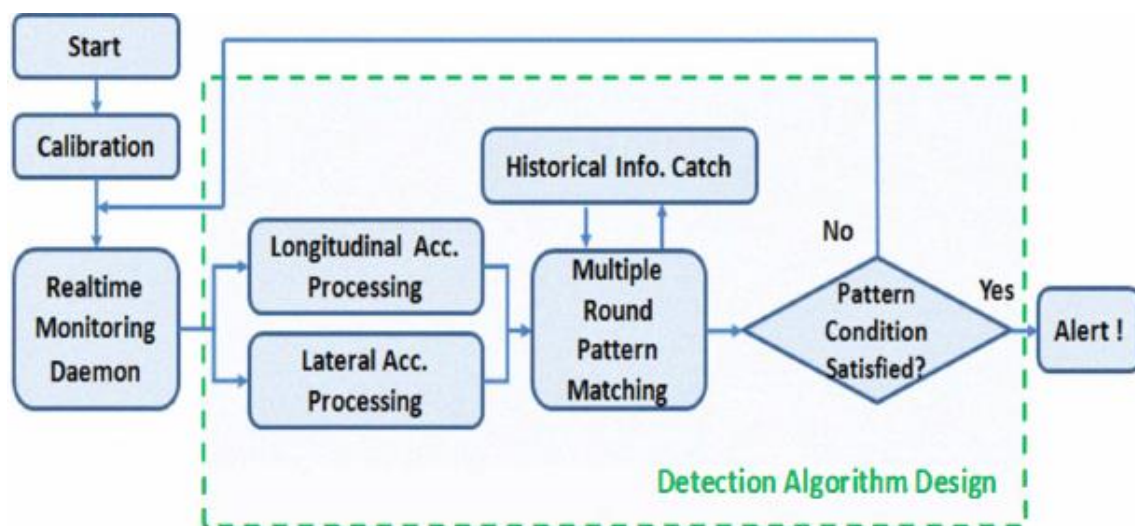


Figure 2: Working Procedure of drunk driving detection system [2]

2. Materials

This system consists of two-part swhere the use of software and hardware have been implemented into the invention of the system.

2.1 Hardware

1) NodeMcu

The UbloxNEO-6 M is the equipment of global positioning system (GPS) receiver with an all-in-one high-performance GPS chipset built-in. This equipment provide position, velocity, and time reading precisely and also had high tracking capabilities and sensitivity. The Ublox NEO-6 M global positioning system (GPS) package that has been built with a ceramic patch antenna, on-board memory chip, and also a battery as a backup that capable of operating in a broad range of microcontrollers.

2) Mq-3 sensor

Mq-3 sensor is susceptible to alcohol. This sensor is one of the sensors that have long-lifespan, and affordable to the student [3]. This sensor has a very high sensitivity toward alcohol but has low sensitivity toward benzene. After recognizing the effect of temperature and humidity, the correct warning point for the gas detector must be calculated while correctly calculating [4].

3) Piezo buzzer

This item is connected to the output pin Nodemcu, so that it can function properly [4]. This item is used to signal people in the surrounding area that the driver cannot drive in good condition because the driver is intoxicated. The resonant frequency of this buzzer is 2.3 kHz.

4) Dc motor

The operating theory of the dc motor is based on the premise that the current conductor is put in the magnetic field and that it encounters a mechanical force. Dc motor is used as an indication that the car can be turned on or not. The conventional DC motor has built-in positive and negative directions.

2.2 Software

2.2.1 Arduino IDE

Arduino integrated development environment (IDE) is widely used to download, import, and program all kinds of Arduino based applications. The software is free to run on the Arduino.cc website, which is required to create the equipment and is able to be compiled on the go. Arduino IDE is a cross-platform framework written in the Java programming language for Ubuntu, MacOS and Windows [5].

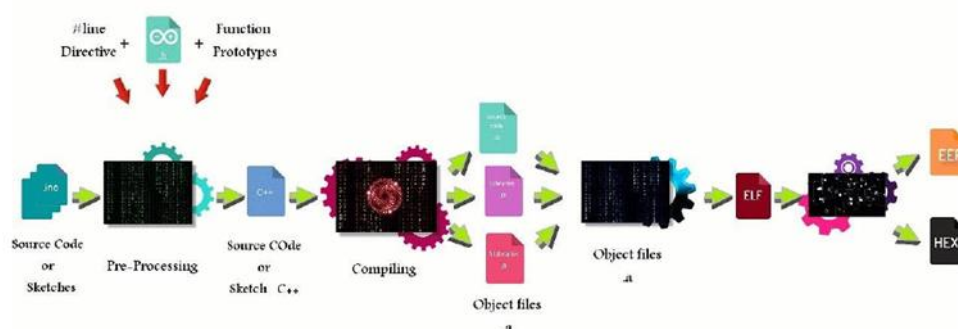


Figure 3: Block diagram of IDE process

2.2.2 Blynk Application

Blynk application is one of the latest technologies that capable to be link with your daily device and that are phone with IOS or Android software. Software have been built with digital dashboard with user-friendly interface simple as dragging and releasing widget for our project development. One of Blynk's strongest features is that we will build a local Blynk node, meaning that we can have it on our

own home network. This is particularly useful if a network is set up remotely, or if users are concerned about traffic passing through other cloud computers.

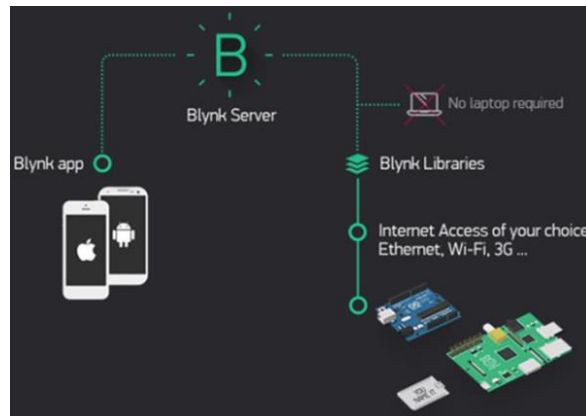


Figure 4: Process of blynk application

3. Method

Figure 4 shows the block diagram of the whole device where the key component of this system is NodeMcu with Esp8266 WiFi attached to it to allow communication between the system with smartphone. The mq3-sensor will detect the blood alcohol concentration (BAC) level in the driver's mouth and calculate whether it exceeds the threshold or not. The Buzzer is used to bring additional protection to the immediate environment, where people outside the system are warned that the driver is not ready to run the vehicle with caution. Dc motor is used as an indication that the car can be turned on or not.

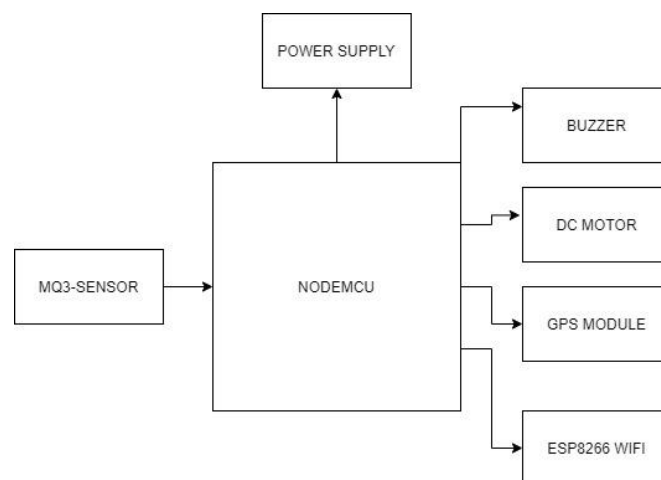


Figure 5: Block diagram of Smart Detection System (Alcohol)

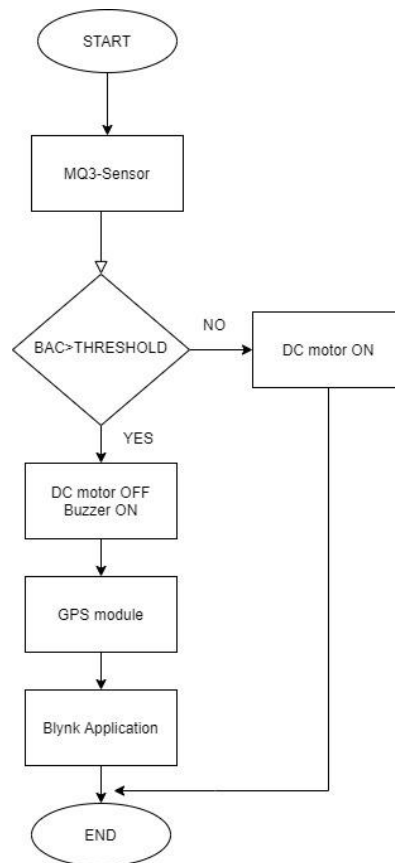


Figure 6: Flowchart of whole system

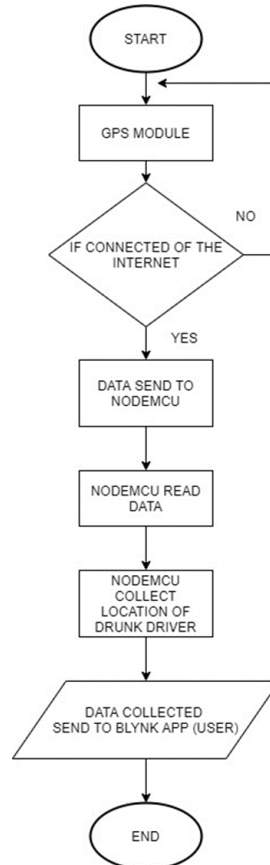


Figure 7: Flowchart of GPS tracker

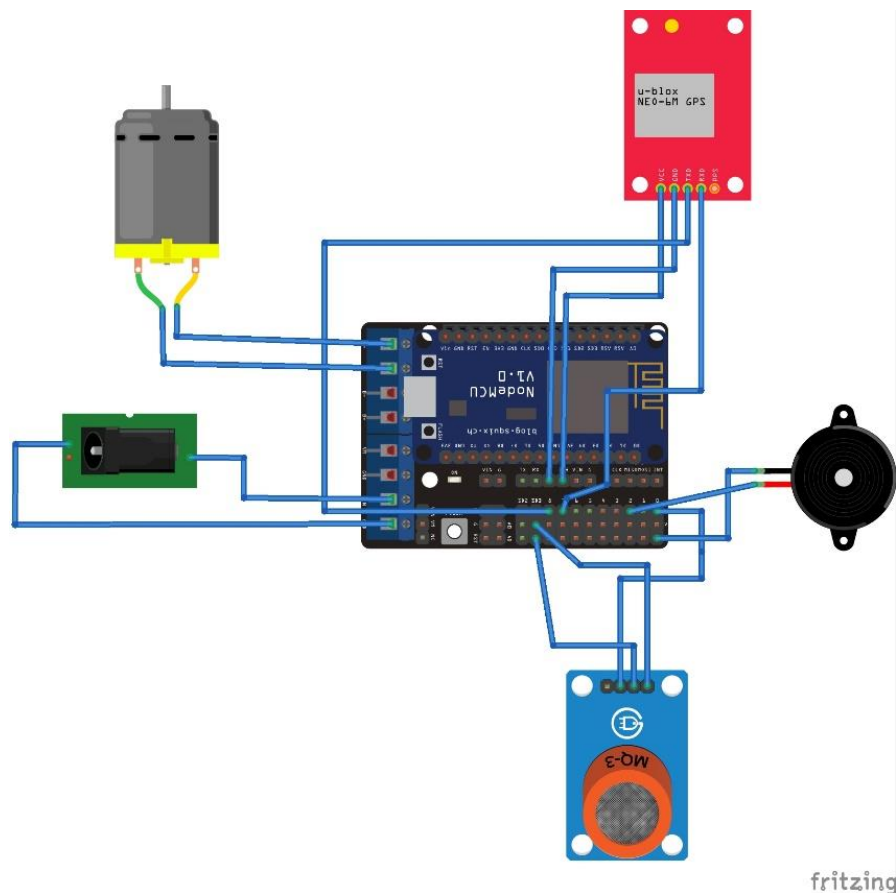


Figure 8: Circuit Diagram Whole Project

4. Results

The whole system is controlled with nodemcu which contains wifi module. The mq3-sensor is the only output that sends data to NodeMcu whether or not the output can be triggered. The global positioning system (GPS) module that is attached to NodeMcu is used to identify the location of the entire device using a smartphone through a blynk application. The issue occurs where the mq3-sensor cannot distinguish between alcoholic drinks or perfumes containing alcohol, since the sensor senses the ethanol present in each of them. Table 1 shows that in order for the mq3 sensor to function properly, the distance between the alcohol and the sensor must be accurate so that the sensor can read the bac level accurately. The analog value of the blood alcohol concentration at each distance is also gotten. Threshold used to ensure that the sensor can identify the blood alcohol concentration (BAC) level in alcohol is 244 (analog value). Table 1 obtained from the article and Table 2 obtained from the study that has been done show a significant difference is because the rate of evaporation in the cup and in human breath is different because human breath is hotter compared to the rate of evaporation in the cup. The rate of evaporation in a cup varies depending on the weather. Therefore, to ensure that this system can reduce the road accident rate, this system uses a lower bac rate because the bac rate set by Malaysia is very high at 0.8 g / l [7]. Power supply that powered the whole device is a matter of concern, as the 9 v and 12 v batteries cannot last longer than they should be, to address this issue, the 5 v adapter is required to support the whole system.

Table 1: Bac level (g/l) vs Distance (cm) [7]

Distance (cm)	BAC(g/l)	Analog Value
0	0.66	320
10	0.53	260
20	0.32	155
30	0.26	126
40	0.19	94
50	0.18	87

Table 2: Bac level (g/l) vs Distance (cm)

Distance (cm)	BAC(g/l)	Analog Value
0	0.4	200
10	0.35	175
20	0.28	132
30	0.20	100
40	0.15	89

Figure 9 shows that the sensor detects open air and the only output that activated was dc motor that indicated the car can be ignite.

**Figure 9: Smart detection system**

Figure 10 shows that if the mq3 sensor finds that the blood alcohol concentration (BAC) level in alcohol exceeds the threshold, the direct current (DC) motor will stop spinning and the buzzer will sound, implying that the driver cannot drive the car in good condition because he is in a drunken state. NodeMcu will send the location to the mobile phone via the blynk application. Figure 11 is the location found in the mobile phone.

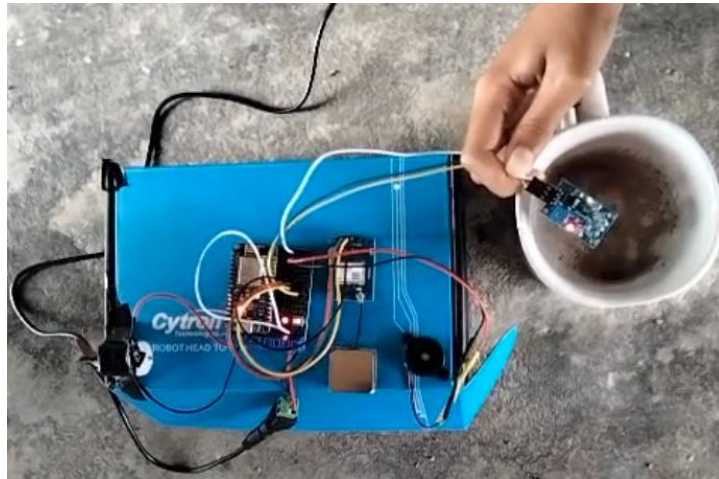


Figure 10: Smart detection System

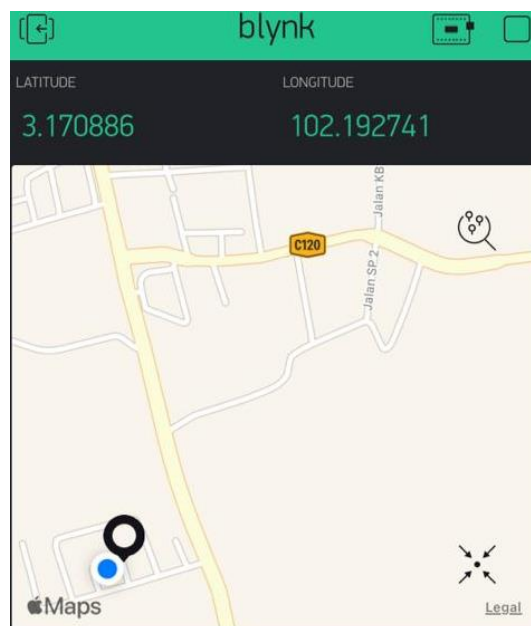


Figure 11: Location of system through blynk application

5. Conclusion

From the findings of this study, it has been shown that the device is capable of minimizing the amount of injury incurred by drunk driving. The machine will warn the local area that the driver is not in sufficient shape to run the vehicle with caution. However, the position of the device is not quite precise due to the satellite's response. The device can be updated by using a web server to give the authority the whereabouts of a drunk driver so that the authority can apprehend a drunk driver before he or she commits a crime since driving under the influence of alcohol is a crime in Malaysia. The used power supply can be replaced with a universal serial bus (USB) car power charger that is compatible with the car's own system such as Figure 12, to power the whole system.



Figure 12: Universal serial bus (USB) phone auto car charger

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