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ALCOHOL DETECTION ALERT SYSTEM IN VEHICLE USING IOT

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ABSTRACT: Drink and drive issue have become solemnly that needs immediate attention. This is due to driver's ignorance towards road rules and regulations and their selfish attitude that caused loss of innocent lives. Although previously there is a drunk detecting mechanism using breath analyzer but it isn't suitable for current fast-paced lifestyle. Therefore, to overcome these issues, this system is proposed. This system is fixed on vehicle's steering to measure alcohol concentration reading using MQ-3 sensor from the driver's exhaled breath. If the driver found to be drunk beyond the threshold level of 500ppm, then ignition lock is activated and the car engine does not start till alcohol concentration falls to a safe level. Or, if the driver consumes an alcoholic drink while driving, upon exceeding permissible limit, the car slows down till it stops. Then, the location of the vehicle is tracked and sent as Google Map integrated link via text message to authorized unit. Simultaneously, the car buzzer goes on while the car slows down so that surrounding road users are aware of the driver's condition and drives at a distance. The proposed detection system is highly potential to be implemented for reducing the drunk and drive accidents.

Keywords: *Breath Analyzer, MQ-3 sensor, Drunk detection, GSM, Ignition lock, Buzzer.*

I. INTRODUCTION:

The old-fashioned method used by officers to detect alcohol in the driver is by using Breathalyzer. Even though it has proved its function, however this method is not efficient. Nevertheless, it is impossible to do road block all the time and check driver of each car using Breathalyzer. Breathalyzer is a device to check alcohol presence in the driver's breath by making them blow into it. This method is not as practical as it can cause congestion and traffic during peak days. In addition, there are chances of the driver to bribe officers just to avoid being summoned. If they escape this road block, and continue to drive in a drunken state, they are risking every other road user.

This project has overcome previous paper limitations as a part and parcel of the system. The system uses MQ-3 sensors to detect the presence of alcohol in the driver's breath. MQ-3 is designed to test for combustible gases such as LPG. It can be tested for alcohol too, but MQ-3 sensor is specially made to test for alcohol vapor in which it has a more accurate reading and higher sensitivity than MQ-2. Then, another method that was used to detect presence of alcohol is from driver's sweat using the IR sensor whereby neither using the air-conditioner nor opening the window will crash the system functionality totally. And besides, every human's perspiration rate differs when consuming alcohol. A lack of accuracy will lead to poor or no result of the presence of alcohol in driver's sweat.

Furthermore, the system has everything except for buzzer and led. As such, while on the road, if the driver is consuming alcohol and it is within the range, any moment, it can go over the threshold level. Led light is the indicator for the driver's soberness in a car which can be seen by others road vehicle, and buzzer is necessary to alert any road user that the driver is not conscious enough to drive his vehicle. So, lack of this does make a little impact which can cost a life.

There is no tracking system or any alert system except alcohol detection, which is not enough to take any further action. Although, the car does not start up upon detecting alcohol in the driver's breath, this system was not tested for the condition whereby a driver gets drunk while driving. And another important point would be the system was tested with butane from lighter than ethanol.

Thus, the solution for this is by creating this system with engine lock using GSM, which is embedded into every four-wheel vehicle. This system automatically detects the driver's intoxication level using an alcohol sensor (MQ-3 sensor). By using ignition, the engines lock if the driver is found to have exceeded the threshold limit of alcohol upon starting the car or slow down a moving car in case the driver consumes alcohol while driving. This system analyses alcohol consumption by a vehicle driver and alerts authorized person if the driver is drunk by sending the vehicle's location using GPS module. Hence, this system can reduce drunken driving accidents and alert other vehicle users besides alerting officers so legal actions can be taken.

II. PROPOSED METHOD:

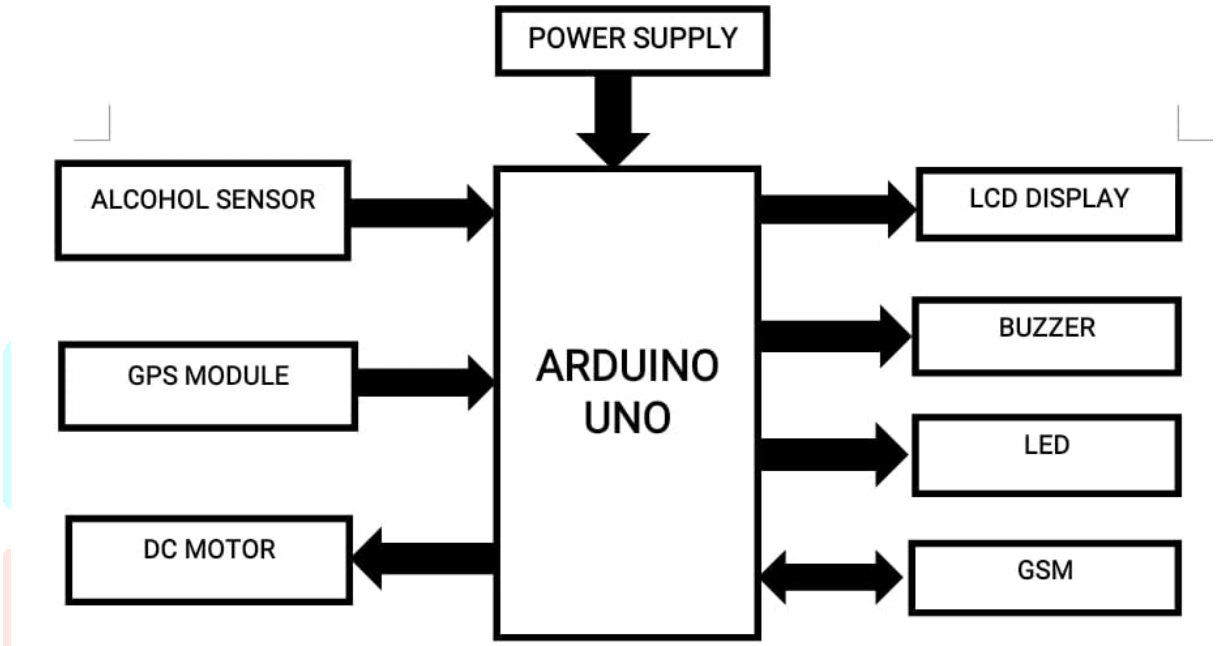

Fig.1 Block diagram

Fig. 1 shows the block diagram of the proposed system. All the components are embedded to Arduino UNO. Alcohol sensor, MQ-3 is the input to the Arduino UNO because it detects the presence of alcohol in the driver's breath and sends data to the Arduino UNO for the further action. As seen from the block diagram, LED, LCD, Buzzer, DC motor are connected to an output from the Arduino UNO. GPS and GSM modules are also connected to get the desired result.

When the system is started, alcohol sensor is activated by the car engine. It will measure the presence of alcohol in the driver's breath and display his condition in LCD. If the driver is found to be intoxicated by alcohol sensor, then ignition shuts down. Next, Buzzer rings continuously to alert other vehicle user on the road. Then, the location of the vehicle is tracked down and the details are sent to concerned person via SMS notification.

When alcohol value exceeds threshold level, a buzzer rings continuously first. Then, data is sent to GPS tracker. This module the track position of the vehicle and sends the details back to the Arduino. From there, GSM module is activated. A SMS notification and vehicle current location will be sent to related persons of the vehicle user. Those are preregistered numbers which are saved on the SIM card of GSM module. The process ends once the respective people receive text and are able to track down the vehicle.

III. HARDWARE DESCRIPTION:

Arduino UNO board -It is an open-source electronic platform based on easy-to-use hardware and software. It is used for sending receiving and processing the signal and it helps to rotate the servo motor and shows the display on the screen.

Fig.3 ARDUINO UNO

MQ3 Sensor – This MQ3 sensor is employed to detect alcohol. Its sensitivity to gases like CO and benzene is modest, whereas its sensitivity to alcohol is strong. SnO2 may be used to vary the sensitivity, making it useful for sensing alcohol. When the concentration of the alcohol is high the resistivity of the sensor will change and hence the output voltage will change. Within a 2-meter range, this can detect the presence of alcohol. Thus, the sensor is very useful component in such type of system which is used in sensing air from breath.

Fig.4 MQ3 Alcohol Sensor

DC Motor – DC or direct current motor works on the principal, when a current carrying conductor is placed in a magnetic field; it experiences a torque and has a tendency to move. This is known as motoring action. If the direction of current in the wire is reversed, the direction of rotation also reverses. When magnetic field and electric field interact, they produce a mechanical force, and based on that the working principle of DC motor is established. In our project DC motor is using as engine starter which would be connected to crank of the engine The speed of a dc motor is directly proportional to the supply voltage, so if we reduce the supply voltage, the motor will at half speed. The speed controller work by varying the average voltage sent to the motor. This voltage is depending upon the alcohol sensor (mq3). That means when the alcohol sensor sensed the alcohol percentage less than 40%, the motor will run. But if the sensor sensed the alcohol percentage above 40%, the motor will stop.

Fig.5 DC Motor

Liquid Crystal Display-16X2 LCD is a device used to display messages in the form of text and numbers. It is easy to program and can be used with various microcontrollers. It is preferred over the 7-segment display for ease of use and convenience. The 16X2 LCD has two registers, command and data. The command registers stores command instructions given to the LCD. Commands are instructions given to the LCD to perform predefined tasks such as initialization, clearing the screen, setting cursor position, controlling the display, etc. Data registers store the data displayed on the LCD. The data is the ASCII value of the characters displayed on

the LCD. In our project the LCD plays a very important role in displaying information about the current status of the system.

Fig.6 LCD Display

Buzzer-The system can use buzzers to warn nearby people, analyse the situation and take necessary actions accordingly. The buzzer is connected to pin of the Arduino Uno. Activated whenever the MQ3 sensor detects alcohol. Its frequency and tone can be changed and used as needed. So, it's an easy and cheap way to get people's attention to warn them and show them that something is wrong. The motor and buzzer are connected to a transistor BC547 which acts as a driver IC. Control the function of these components based on the voltage they receive.

Fig.7 Buzzer

GPS MODULE-In this project we have used NEO 6m GPS module. GPS receivers actually work by figuring out how far they are from a number of satellites. They are pre-programmed to know where the GPS 32 satellites are at any given time. The function of the GPS module is to calculate the speed and location of the vehicle. The satellites transmit information about their position and the current time in the form of radio signals towards the Earth. These signals identify the satellites and tell the receiver where they are located

Fig.8 GPS Module

GSM MODULE-In this project we are using sim800L.The SIM800L module is a complete Quad-band GSM/GPRS solution in a LGA type which can be embedded in the customer, it has a set of TTL level serial interface, a set of power supply interface. Besides, there are a set of antenna interface on this module. The function of GSM module is to send the SMS to the respected authorities given in the number when the speed is more than a threshold value.

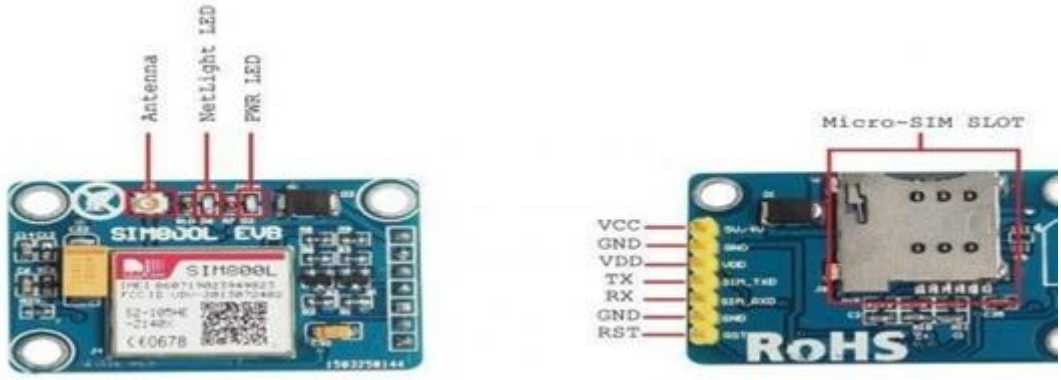

Fig.9 GSM Module

IV. RESULT:

Once the hardware is completed, the system is powered by using 5V power supply. When an alcoholic attempts to drive a car, an alcohol sensor detects the presence of alcohol. When the alcohol value measured is less than 500 ppm, the LCD displays "NO ALCOHOL DETECTED" as shown in Fig.10(a). Next, when alcohol is in the range above 500 ppm, the LCD displays "AlCOHOL DETECTED", as shown in Fig.10(b).

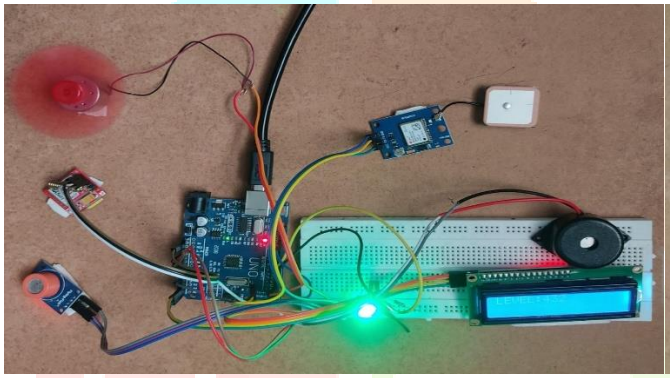

Fig.10(a) No alcohol detected

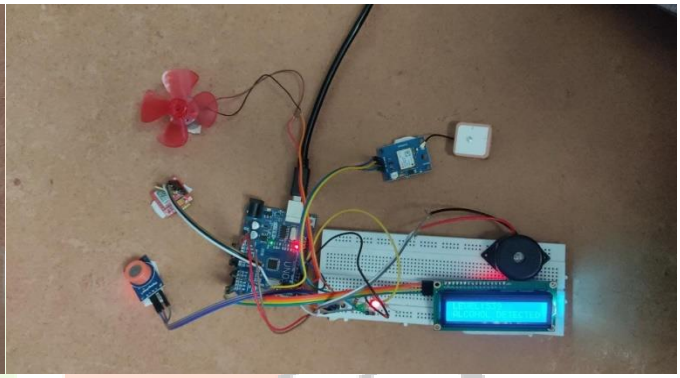

Fig.10(b) Alcohol detected

The fig.10(a) shows that initially no alcohol is detected hence the motor is in ON condition, green LED glows and the buzzer is in off state. The fig.10(b) shows that whenever the alcohol is detected in the breath of the person driving the vehicle automatically the motor is in OFF condition, green LED OFF, red LED glows and the buzzer is in ON state gives indication alcohol is detected. However, our system can be integrated to not only 2 wheelers, but also with any kind of vehicle thereby preventing more accidents and saving more people. All equipment is totally tested and connected as there by giving us the needed result required.

Before interfacing GPS location to GSM module to send text messages to the person in-charge, both the modules are tested separately for its functionality. For GPS module, latitude and longitude were recorded live and is displayed in serial monitor. Then, for GSM module, a reloaded SIM card is placed in the module, which will send a text message to respective person upon obtaining the location of drunk drivers. Upon integrating both these modules, the location of the drunk driver vehicle which is sent via text message together with Google map location.

V. CONCLUSION AND FUTURE SCOPE:

In this project we have developed a proto type model that can automatically lock the engine when a drunken driver tries to drive a car. By fitting this alcohol sensor into the car, we can safe guard the life of the driver and also the remaining passengers. It is a very simple application. The life time of the project is high and also low maintenance and low power consumption. This project is developed to efficiently check drunken driving. By implementing this project, we can decrease the accident rates under the influence of alcohol.

This system can be further modified for better improvement in future. The limitation can be overcome by using more precise and advanced software to be implemented. Voice feedback can be used in GPS module. Including this process, a secondary alcohol sensor can be added so that it will support the functionality of alcohol sensor and will give an accurate output. Rather than sending text messages to concerned person, it is best to send the location to a system base web browser for automatic location tracing and emergency unit for the treatment of alcoholic person.

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