A Review of Alcohol Sensing Alert and Engine Locking System

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Abstract: Drinking of alcohol and driving the vehicle is a serious offence in the eyes of law. This issue also causes a serious public health problem and accidents, thus unsafe for the public. This project presents an alcohol sensing alert with engine locking. Here an Arduino unoR3, alcohol sensor MQ3 is used. The LCD display is connected to Arduino to display alcohol detected. This device detects the alcohol level concentration and if alcohol concentration is above specific concentration level, then the ignition system of automobile is stopped i.e., the automobile will not start; by the use of above device, we can save the accidents which cause due to drunk and drive. The work is developed by integrating sensors based on alcohol content detection conglomerating with Microcontroller board like Arduino, The MQ3 module is used to detect the alcohol particle which has reasonable sensitivity range around two meters, and is suitable for any kind of vehicle. The sensor has one more unique quality that it can simply be unseen from the defendants.

Keywords - Arduino uno R3, Alcohol sensor MQ3, LCD, Alcohol Dectector, PPM (Parts Per Million)

1. INTRODUCTION

Drunk driving is a very dangerous behavior. People will become slow in reacting and can't control their actions. Drunk drivers aren't able to deal with the emergency situations when they are driving. The investigation done by the World Health Organization in 2008 shows that about 50%-60% of traffic accidents are related to drunk driving. The drunk driving has been listed as the main reason for the fatal car accident. The investigation discusses the development in alcohol sensor that read a change in the alcohol particle present in the air.

Such kind of detector is known as a breath analyzer, as it used to finding the analysis of the alcohol content present in human breathe. The product incorporates detector, microcontroller and other electronic components find the existence of alcohol nearby instantly block the fuel and hence the engine stop working. This activity will not permit drunken driver to run the engine and thus the arrangement enables passengers to be safe.

2. METHODOLOGY

This is focusing on three main operations. First is sensing of alcohol, second is alerting the driver and third is engine locking. The complete system uses the Arduino Uno (Based on ATMEGA 328). MQ3 module, LCD display, buzzer, relay is handled by Arduino Uno. All the modules are interface and programmed in a way to wok the entire module in synchronization. The panel can be linked to the personal computer and the programming of the microcontroller can be done for sensor to work and can sense breathe. The reading will be demonstrated on the LCD board which is interfaced with the Arduino Uno board. Once the sensor detects it transfer the information to car ignition system which will not start the engine of the vehicle. The practical block diagram of the arrangement is presented in fig.- 1.
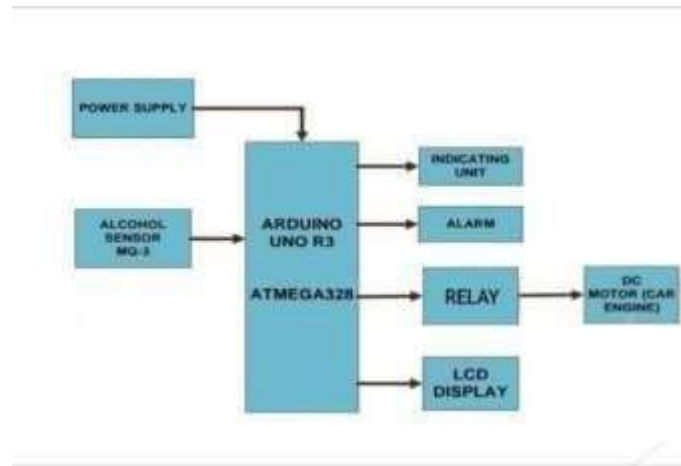
Fig. 1. Block Diagram

Arduino uno board uses the IC ATmega328 as the micro controller processor The Arduino Uno board comes with 14 digital input or output pins (which 6 can be used as PWM 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP head and a reset button, as shown in fig.- 2

Fig. 2. Arduino micro controller board

Alcohol sensor MQ3 is a detector uses in indoor and outdoor. The sensor is characterized by its high sensitivity and fast response time, this enabling an almost immediate data retrieval of the measured gases, as shown in fig.- 3.

Fig.3. Alcohol Sensor MQ3

Here DC motor is used with 12 volt, 100rpm and weight 125gms, as in fig.- 4.

Fig.4. DC motor

An LCD display is needed with operating voltage of LCD is 4.7V- 5.3V, as shown in fig.- 6

Fig. 6. LCD Display

In this project we use Arduino, MQ3 sensor, lcd display, buzzer, led, dc motor. In MQ3 sensor it contains 4 pins VCC, GND, DO, AO. Here VCC and GND are grounded and DO is connected to D2 of Arduino and AO pin of sensor is connected to A1 of Arduino. In buzzer and LCD negative terminals are grounded and positive terminals of buzzer and led is connected to D3 and D4 of Arduino respectively. In the case of motor, it contains 2 terminals VCC, GND, and are connected to Vin, GND and of Arduino respectively. To alarm the status of the presence of alcohol is done through buzzer. As shown in fig. 6 the buzzer uses piezoelectric crystal type buzzers with small diaphragm attached to it. This type of buzzer consumes low power and can be easily integrated into other circuits. System flow chart of the system wherein when alcohol sensor detects the presence of alcohol the ignition will start simultaneously the LCD panel will show the presence of alcohol and buzzer will start ringing. In the absence of alcohol content detection, the ignition will start and the buzzer will be silent.

This paper defines a very real solution to cultivate a smart system for alcohol detection which mainly based on Arduino. The advantage of this system is its range of detection which can be customized as per the requirement of the vehicle and can be placed without getting noticed from accused. The whole embedded system is connected to the vehicle electronic system which will disable the car ignition system when it is detected that driver is drunk. This is one of the best solutions to reduce number of accidents. This arrangement advances the care of human being and hence providing the actual growth in the industry concerning to reduce the accidents source due to alcohol. The legislation instead of putting more police such systems can be inbuilt in the vehicle by the vehicle manufacturers so that driver or person driving the vehicle is alert and make himself responsible.
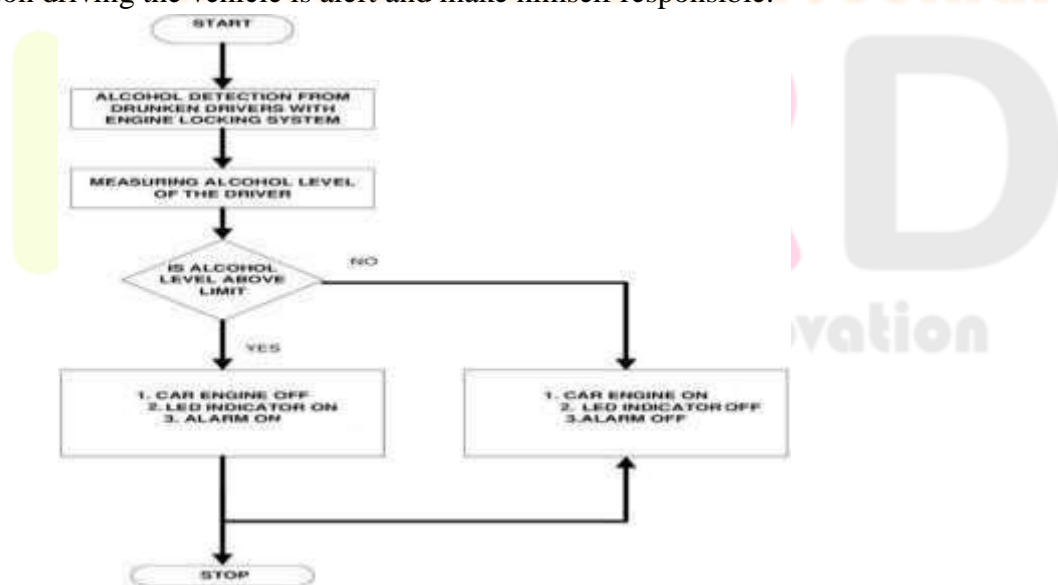

Fig.7. Flow chart of the working model

3. RESULTS AND DISCUSSION

A major problem of automobile accident due to alcohol is discussed in this paper. The alcohol sensor first senses the presence of alcohol content present closely in the atmosphere and then it will go to Arduino board where it is compared with preset voltage. The comparator output goes to the LCD interface to display the presence of alcohol as shown in fig. 8. And at the same time buzzer will sound and the ignition will be turned off by operating relay. The graph shows that below 2V the alcohol content is less but above 4 V the engine gets automatically locked due to the higher content of alcohol presence. The X axis of this graph shows the alcohol presence which is detected by giving in parts per million (ppm). The Y axis shows the alcohol sensor value.

It's time to develop a kind of system which can stop the drunk driving effectively. As we try to develop this system which can be made available on every car. This system won't cost much, but it will bring much for it concentrates on human's safety. This system has a preventative effect which can stop accidents from the beginning.
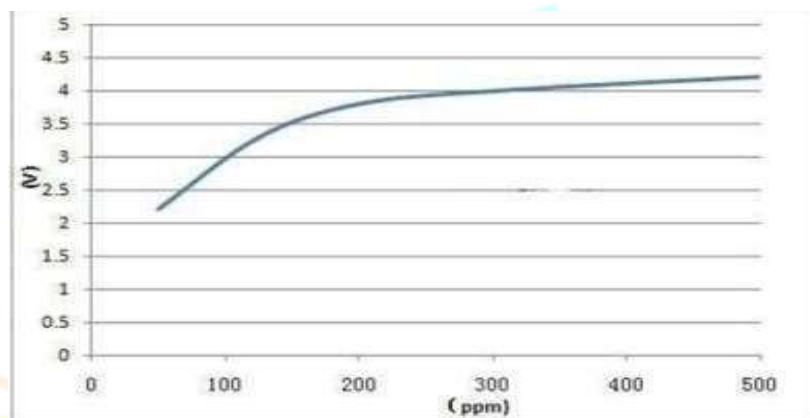

Fig. 8. Graph showing alcohol concentration

4. CONCLUSION

Many processes and techniques are being used for overcoming the accidents that causes due to the over drinking of alcohol by the drivers. There are usually more than one method and technique; some adopt different technique like locking of steering, ignition interlock, vehicle interlock system and many more. The technique includes many considerations; some of these considerations include cost, appearance, application of technique and many more. In this project, we have tried our best to find out the golden mean through which we can restrict the driver, if he/she is not in his conscious mind due to the over concentration of alcohol. Through this way we can prevent the road accidents on daily basis. By using such technique, the rate of road accidents can be prevented whose main cause is drink and drive. The program has successfully demonstrated the ability to detect, and hence, identify a concentration of a gas. It complied with the given requests and acted upon it in terms of controlling the ignition. Nevertheless, this is the program and it could be used as a base for other improvised systems that could incorporate other functions which in return leads to enhanced systems filling the needs and niches of markets and allowing customizability.

5. FUTURE SCOPE

We can implement GSM technology with an alcohol detector. So, alcohol detection and vehicle controlling through text SMS will inform the relatives or owners of the vehicle about the alcohol consumption. 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.

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