ALCOHOL DETECTION AND VEHICLE IGNITION LOCKING SYSTEM

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ABSTRACT

In the present day's alcohol-attributable accidents are increasing rapidly where the concern as alcohol is a factor in many categories of injury. Every year it is reported about 2.3 million premature deaths due to harmful consumption of alcohol [1]. In this paper we proposed an improved alcohol detection for use in an automobile ignition locking system using Arduino. A temperature sensor is used to measure the temperature of the breath sample to ensure that it is the same temperature as human breath. A sensor is used for a specific volume of the breath sample, which is used to determine the alcohol content. A Micro Controller is used to convert the output into a reading which represents the breath alcohol content of the breath sample. This analysis is used as part of an overall automobile ignition locking system which prohibits starting the car when the operator is intoxicating. The system also requires rolling retests to ensure that the driver is still sober.

Key words: Arduino, Temperature sensor, Micro controller, Ignition locking.

1. INTRODUCTION

The growth of automotive vehicles has been increasing gradually day to day, which in turn lead to the increased growth of road accidents. The numbers of these totalities that take place in India are ranked to be in the top most position in the world. The number of road deaths is high mainly in cosmopolitan and metropolitan cities. According to the survey Delhi ranks first in the position, Bangalore in fourth place and Hyderabad in ninth place in these road accidents [2]. Improved alcohol detection is analyzed for use in an automobile ignition locking system.

Internet of Things (abbreviated as IoT) has been coined by industry researchers but has emerged into mainstream public view in recent years only. IoT is a network of devices like smartphones, vehicles, home appliances, and more, that connect to and exchange data with computers and web connectivity- that empowers these objects to collect and exchange data.
The internet of things allows objects to be sensed and controlled remotely across existing network infrastructure .

The Internet of Things (IoT) are the other objects embedded with electronic objects, software, sensors, etc. and connectivity with which allows these things to connect and exchange data, creating opportunities for more direct integration of the physical world into computer-based systems, resulting in efficiency improvements, economic benefits, and reduced human exertions[4].The present invention relates generally to the alcohol detection devices and more specifically to an improved devices and sensors

which are used in an automobile ignition locking system which prevents a car from starting when the driver is intoxicated and which requires periodic rolling retests while the car is being operated.

A temperature sensor measures the temperature of the breath sample to ensure that it is the same temperature as human breath. A sensor is used for a specific volume of the breath sample, which is used to determine the alcohol content. A Microcontroller is used to convert the output into a reading which represents the breath alcohol content of the breath sample. This analysis is used as part of an overall automobile ignition locking system which prohibits starting the car when the operator is intoxicating. The system also requires rolling retests to ensure that the driver is still sober.

Drunk driver can be prevented from starting a car at initial stage itself by using a simple alcohol sensor. This will mandate the driver to blow into a device which collects breath sample of the driver to process further to determine the output signal. The car alcohol sensing device will have a threshold to allow the driver to start the car. The driver can start car only when he consumes alcohol lower than the threshold level. Ignition interlock systems which meets federal standards requires test on engine start and also require a test every few minutes while driving is called as rerolling test. This is going to be a simple fool proof system which does not allow a drunk driver to start his car, until his alcohol consumption level goes below the threshold. Threshold should be adjustable, in case government changes the permissible level, ultimately threshold could also be changed. While the traditional use of the breath analyzing devices has been by law enforcement officers to test a suspected intoxicated driver, the breath analyzing devices now are being used in combination with an ignition locking system to prevent an intoxicated driver from being able to start the vehicle .

The further sections of this paper are organized as follows – Section 2 gives brief description about sensors used in the proposed framework. Section 3 and 4 describes about working of Arduino and DC Motors respectively. Section 5 gives the working design of the framework. Section 6 presents the results and section 7 discuss about future work to be done.

2. SENSORS

2.1. Sensor Modules

Sensor senses the future trouble and helps in not being the victim of accident

2.2. Smell Sensor Module

The MQ3 is the alcohol detection sensor. They are highly sensitive towards alcohol and benzene they have special quality of sensitivity adjustment. Sensitivity is that if that gases in the air is approximately to 0.4mg/L the alarm point and the vibration sensor will be activated.

2.3. Smell Detector for Alcohol Consumption

Sensor used: MQ3sensor

If (alcohol consumption==0.4mg/L)

Message ("alarm gas sensor and Vibration sensor will be activated");

Else

Message ("not activated");

2.4. Alcoholic Sensor Module

The Detects the breath of the driver continuously and tracks the driver driving state and intimates through voice message.
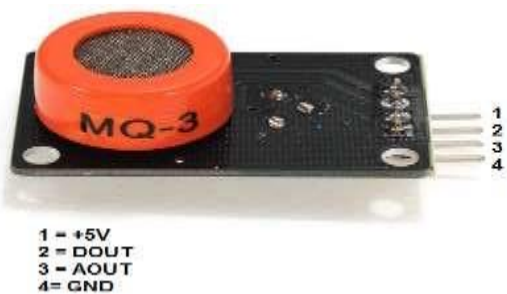

Figure 1 MQ-3 sensor for alcohol detection

Breath detector for Alcohol Consumption

Sensor used : Alcohol sensor

If(breath rate checked==alcoholic consumption)

Voice message ("you have consumed alcohol"); else

Voice message(not activated);

The alcohol sensor used here is the MQ-3 sensor. MQ-3 sensor is not only sensitive to alcohol, but also sensitive to ethanol, which is one type of alcohol found in wine, beer, and liquor.

MQ-3sensor circuit can be used as a breath analyzer to check a person's blood alcohol level. Just as we exhale carbon dioxide when we breathe out, we also breathe out some alcohol if we have alcohol in our blood. Any alcometer device can measure this alcohol content.

The more ethanol in your blood, the more there is in the air on exhalation. This alcohol content gives an indication for if a person is drunk and how much percent drunk they are.

The amount of alcohol exhaled into the air is proportionate to the amount of alcohol which will be found in a individual's blood. Alcometers use an in-built formula to guesstimate blood alcohol content from exhaled air alcohol content.

For different countries, the level of alcohol in the blood that defines a person as over the limit for driving varies. The range ranges from 0.01 to 0.10. Most countries have a limit of about 0.05.

3. ARDUINO

Arduino is an open source microcontroller which can be effortlessly programmed, erased and reprogrammed at any prompt of time. It is also proficient of receiving and sending information over the web with the help of various Arduino shields. Arduino uses a hardware known as the Arduino development board and software for developing the code known as the Arduino IDE (Integrated Development Environment). Built up with the 8-bit Atmel AVR microcontroller's that are manufactured

by Atmel or a 32-bit Atmel ARM, these microcontrollers can be programmed simply using the C or C++ language in the Arduino IDE.

4. DC MOTOR

The working principle of DC(Direct Current) motor is, when a conductor, is placed in a magnetic field, it experiences a torque and has a propensity to move. This is known as motoring action. If the path of current in the wire is inverted, the way of spin also reverses. When magnetic field and electric field interact, they produce a mechanical force, and based on that the working principle of DC motor established. The direction of rotation of DC motor is as defined by Fleming's left hand rule.

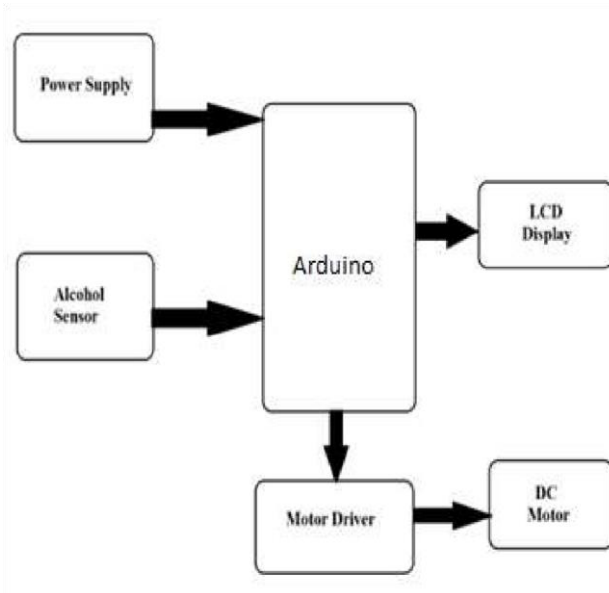**Figure 2** DC Motor

5. DESIGNED STRUCTURE

Figure 3 MQ-3 Alcohol sensor circuit schematic

Here we propose a system where the person is detected for alcohol level in his body to avoid accidents. drivers will be sensed before they start their vehicle. Driver will be sensed by an sensor once he sited on the driver seat by his breath. sensor is placed in the steering to monitor the breath level if the alcohol content in breath is 0.08% then car engine will not ignite. in this system if the driver is not drunk he can drive otherwise he can't drive until the alcohol content decreases.

This is the structure where the sensor is placed in the steering. it will sense the driver's alcohol content in his breath.

Arduino is configured and connected with the sensor also LCD display and one dc motor is connected. Once the connection is given power supply is given to it so that the motor will start running. Now alcohol is sprayed in it where the alcohol content is above 0.08% so the LCD display will show that alcohol content is overflow, dc motor will stop running and ignition also stopped.

This process is implemented same in all vehicle where the car engine will be connected to the sensor. Once the sensor sensed its output will be sent to the motor by referring the range engine will stop its execution While implementing this proposed system we can reduce the accidents by 75% and reduce the loss of property and lives.

5.1. MQ-3 Alcohol Sensor Circuit Schematic

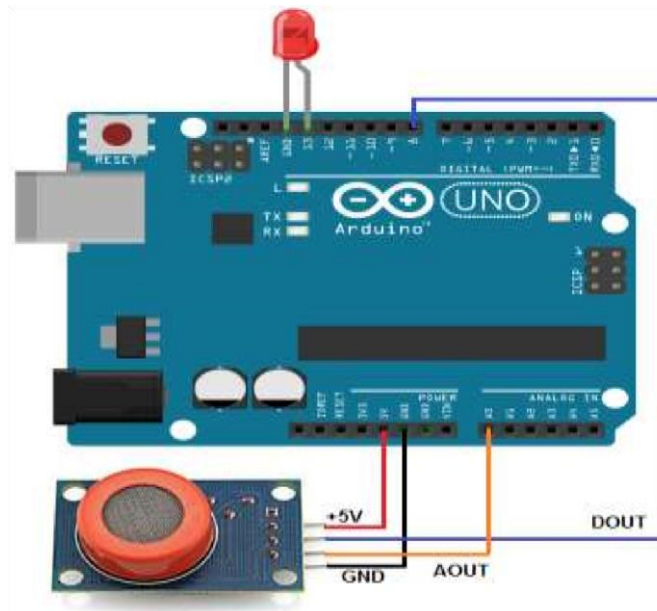The alcohol sensor circuit we will build with an MQ-3 sensor integrated with an Arduino is shown below

Figure 5 MQ-3 Alcohol sensor circuit schematic

6. RESULTS

6.1. Arduino Alcohol Detector Circuit Board

When Driver is not in Drunken State the below message came on LCD in the On-Board Unit.

Figure 6.LCD Output of alcohol detection when driver in not in drunken state

When Driver is not in Drunken State the below message came on LCD in the On-Board Unit.

Figure 7 LCD Output of alcohol detection when driver in druken state

7. CONCLUSIONANDFUTURE WORK

Authors of proposed a solution for alcohol detection in vehicles, but it gives an alert to the driver. An operative solution is provided to develop the smart system for vehicles which will perceive various parameters of vehicle in between constant time period and this is done by using platforms like Arduino, alcohol sensor, dc motor, LCD display. The whole system has the advantage of small volume and high reliability. Future scope of this system is to control the accidents and reducing the rate of the accidents this system brings innovation to the existing technology in the vehicles and also improves the safety features, hence proving to be an effective development in the automobile industry.

Our aim is to identify when periodical retests are not done, then it has to analyze whether the vehicle is moving or met with an accident. If accident is detected then it shares the accident location to the emergency services using GSM and GPS. But, when vehicle is still moving even after alcohol detection then the location of the vehicle is sent to concerned authorized services.

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