

Automatic Engine Locking System When Alcohol Detected

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ABSTRACT: Breath alcohol detector or better known as Breathalyzer plays a vital role in monitoring alcohol concentration in a person's bloodstream. This project involves the design and development of Breathalyzer device which checks the presence of alcohol in the breath and controls the engine system through the Arduino UNO Microcontroller. The hardware modules include the IC ATMEGA328P Microcontroller, Alcohol sensor and Motor driver engine system. The software components include the programming and source code which is implemented via the Microcontroller. Upon assembly, the system can detect alcohol concentration in a person's breath sample and notify the microcontroller. Then according to the amount, the microcontroller decides whether to enable or disable the engine system.

KEYWORDS: Microcontroller, Switching circuit, Sensors, Liquid crystal displays, Hardware.

I. INTRODUCTION

The breath alcohol sensor is an electronic device that is used to measure and test the blood alcohol content in a person's blood stream by checking the person's breath. Commonly known as 'Breathalyzer' which means breath analyser, the breath sample of person will be examined by the system through an alcohol sensor, which checks its alcohol content. Initially, the breath alcohol detectors usages are quite limited and only being utilised in purpose to detect blood alcohol concentration only. However, as the number of drunken driving cases increased in recent years, extensive researches and developments have been done in applying these devices in vehicles in effort to prevent individuals who consume excess alcohol beverages from driving vehicles.

This project, Automatic Engine Locking System when alcohol detected, senses the alcohol in the driver's breath using a MQ-303A breath sensor and sends the signal to the microcontroller which decides if the level of alcohol is a safe magnitude or not. It further controls vehicle by not allowing the engine to start if the concentration is above or a safe or permissible limit.

The breath alcohol detector which controls the engine switch using microcontroller is implemented. When alcohol presence is detected in the breath of driver, the tester will be programmed to control the engine, as well as a buzzer and initiates necessary measures to ensure that the user does not continue to drive the vehicle in an inebriated state. The fundamental components of this system are the ATMEGA328P IC, L293D IC, a buzzer and a sensor. Before the must breathe into the device. If the analysed result is over a programmed predetermined concentration, the vehicle will not be allowed to start.

Principle of Testing

The concentration of the alcohol in the alveolar air is related to the concentration of the alcohol in the blood. As the alcohol in the alveolar air is exhaled, it can be detected by the breath alcohol testing device. So instead of having to draw a driver's blood to test his alcohol level, an officer can test the breath on the spot and determine whether there is a reason to arrest driver.

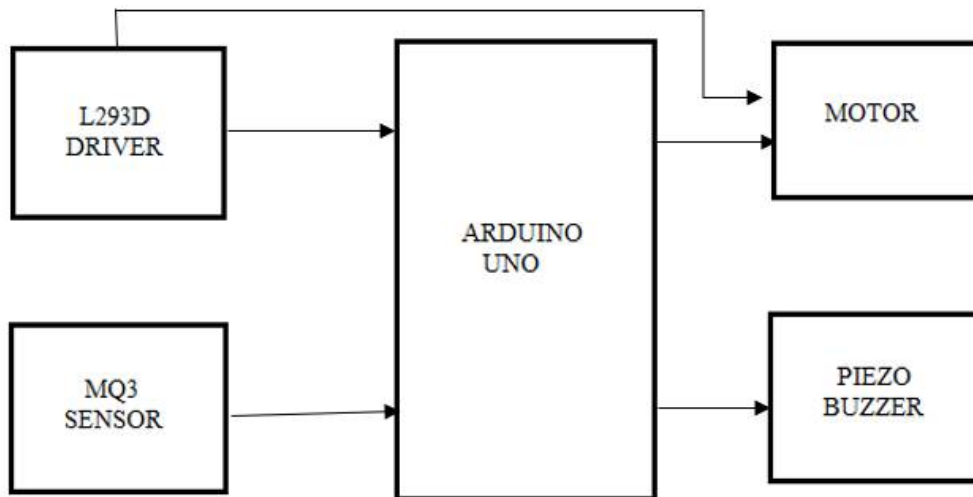
Because the alcohol concentration in the breath is related to that in the blood, you can figure the BAC by measuring alcohol on the breath. The ratio of breath to blood alcohol is 2,100 to 1, this means that 2,100 millilitres of alveolar air will contain the same amount of alcohol as 1 millilitre of blood.

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II. BLOCK DIAGRAM



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III. IMPLEMENTATION

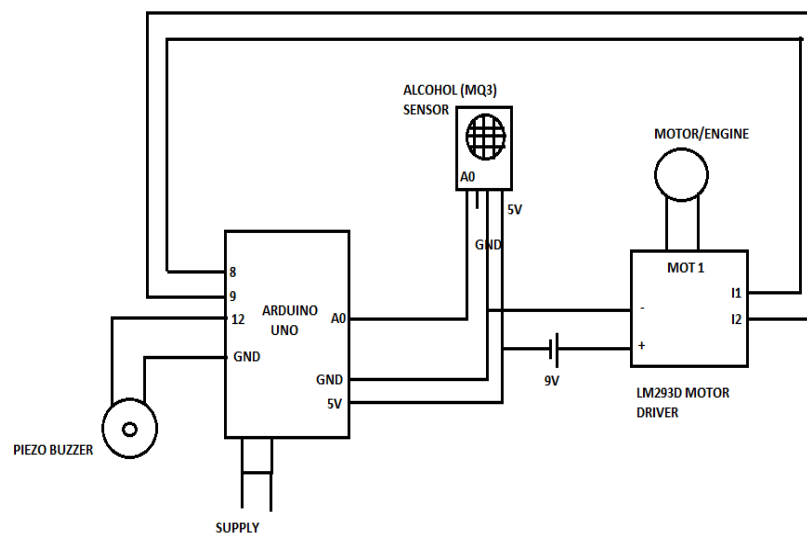


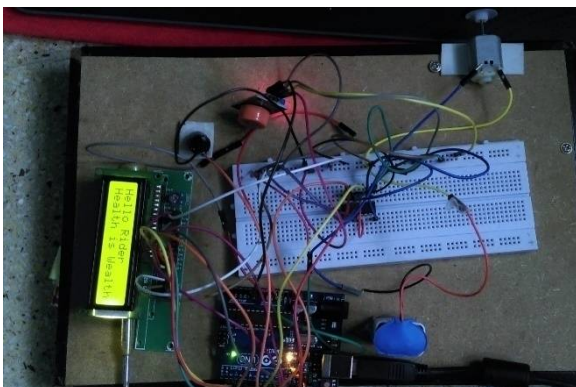
Fig :2 circuit connection

The most important task in this section is the calibration of alcohol sensor. The input voltage that is fed into the microcontroller is not entirely linear overall concentrations of ethanol. Hence, careful attention had to be placed so that the calibration was over the linear, or near linear region. Attention was also paid to the possibility of saturating or even damaging the sensor if too high concentration was placed on the sensor. Each prepared ethanol concentration was placed against the sensor and the voltage level, VRL, was viewed on the multimeter.

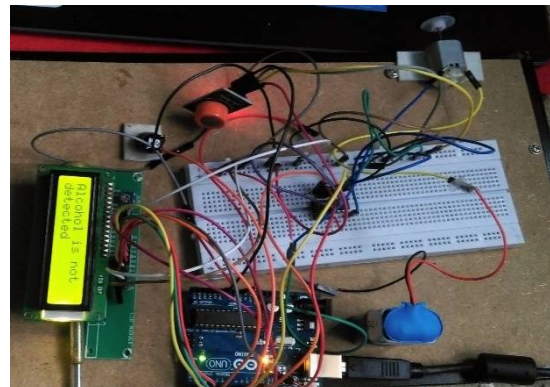
IV. RESULT

First the completed circuit without the alcohol sensor was put through functional testing. After fixing sensor to the driver and connecting it to the mother board, output voltage from the sensor at normal room temperature is taken. This output voltage is set as the reference voltage for the calibration purpose. Then, human breath sample is blown at the sensor and the subsequent output voltage is taken. Finally, the sensor is then tested using alcohol substance and its output voltage is taken as well.

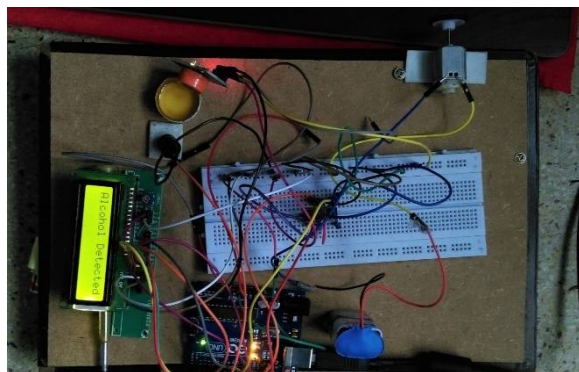
Below given are the figures of the output. Fig(a) shows the starting of the function, that when engine is started the LCD displays the following welcome lines to the rider. Fig(b) shows the sensor detecting alcohol concentration and finds No Alcohol and hence the following display. Fig(c) shows the sensor detecting alcohol concentration and finds Presence of Alcohol. Fig(d) shows looping back to the code when alcohol is not detected.



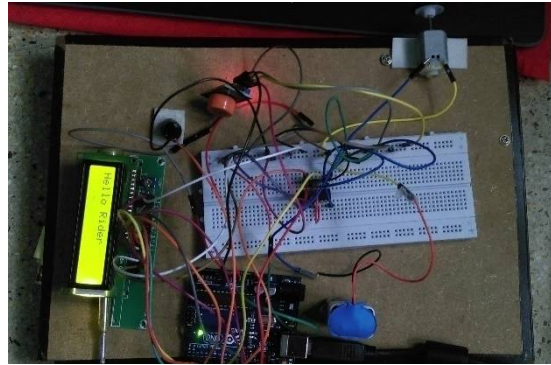
a)



b)



c)



d)

- Fig: (a) When engine is started
(b) Display of the LCD when alcohol is not detected
(c) Display of the LCD when alcohol is detected.
(d) Loops back to the start of the code when alcohol is not detected

V. CONCLUSION

Upon the completion of the project, numerous technical issues and non-technical issues are found related with the design of the project. Compared to other type of breath alcohol detector, semiconductor model has much cheaper cost and considerably effective as well. Furthermore, it can be interfaced to a microcontroller with ease as the output yield is in voltages. However, it is found at the value of the concentration becomes saturated for BAC (%) more than 0.2 even though alcohol concentration is more than that value.

When power dissipation comes into concern, the semiconductor sensor model has very low power dissipation although it works with presence of heat because it only needs low voltage value in the range of 3.3v to 5v as its input. The sensitivity of the sensor is also relatively high compared to the other models. Although the sensor can detect other substances and misinterpret it as alcohol, but the sensitivity towards alcohol is much higher and this makes it very reliable alcohol detecting device.

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