

High Sensitive Alcohol Sensor with Auto-Car Ignition Disabling Function

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Abstract

Now a day's every system is automated in order to face new challenges. In the present days Automated systems have less manual operations, flexibility, reliability and accurate. Due to this demand every field prefers automated control systems. Especially in the field of electronics automated systems are giving good performance. The purpose of this project to develop vehicle accident prevention by method of alcohol detector in an effort to reduce traffic accident cases based on driving under the influence alcohol. This project is developed by integrating the alcohol sensor with the Arduino Uno. MQ-3 is used to detect the alcohol content in human breath and display the breath value on LCD display. IR sensor is used to detect the person. An ignition system automatically turns OFF the vehicle motor if the driver is alcoholic.

Keywords: ARDUINO UNO, MQ-3 Alcohol sensor, IR sensor, Buzzer, LCD display, DC motor.

1. Introduction

According to a survey done by W.H.O Almost every 90 seconds, a person is injured in a drunken driving crash. One in three people will be involved in an alcohol-related crash in their lifetime. In America on average, nearly 12,000 people die every year in DUI-related accidents. 900,000 are arrested each year for DUI/DWI and a full 1/3 of those are repeat offenders. Because of Drunk and Drive the people are highly injured or sometimes dead.

Drinking and driving is already a serious public health problem ,which is likely to emerge as one of the most significant problems in near future .the system implemented by us aims at reducing the road accident in the near future due to drunken

and drive . This paper present the progress in using the alcohol detector ,a device that senses a change in the alcoholic gas content of the surrounding air these device is more commonly referred to as a breath analysis, as it analysis the alcohol content from person's breath. The system detects the presence of alcohol in the vehicle and immediately locks the engine of the vehicle

This is killing not only the driver but also the co passengers travelling on the road at the same time. In order to overcome this problem scientists proposed a project "High Sensitive Alcohol Sensor with Auto Car Ignition Disable Function"

2. Literature Survey

In this paper author describes the alcohol detection system for vehicle by using alcohol sensor, GPS and GSM module. [1]

In this paper author discuss about the smart helmet system using alcohol detection for vehicle protection. [3]

This paper introduces methods such as alcohol detection, heart beat rate monitoring system and personal identification system and discuss how they can be implemented to avoid accidents.[4]

Instead of using Arduino board in this project they used microcontroller 16F877A [5].

In this paper author discuss about driver's behaviour, safety application & auto theft prevention system [6].

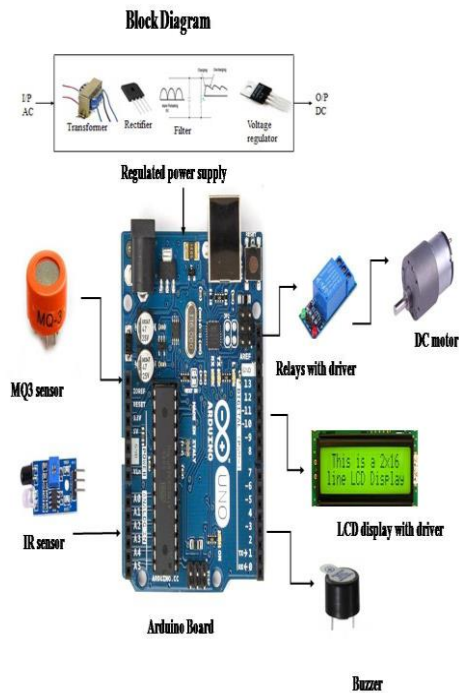
This paper represents accident vehicle automatic detection system by image processing [7].

In this paper they describe about body area sensing, alcohol detection craving [8].

In our paper we discuss about the alcohol detection system for vehicle using alcohol sensor

MQ3, IR sensor, DC Motor, LCD display and Buzzer using Arduino.

3. Implementation:



inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller. To get started, we need to connect this with the computer using USB cable or can also be started using AC-to-DC Adapter.



MQ3 SENSOR:

The alcohol gas sensor detects the concentration of alcohol gas in the air and outputs its reading as an analog voltage. The concentration sensing range of 0.04 mg/L to 4 mg/L is suitable for breath analyzers. The sensor can operate at temperatures from -10 to 50°C and consumes less than 150 mA at 5 V.



The MQ3 Gas sensor has very high sensitivity to alcohol gas. The reason behind this is the fact that this sensor uses SnO₂ (sensitive material) which is having low conductivity in clean air. When the target alcohol gas exist, the sensor's conductivity is higher along with the gas concentration rising. MQ3 GAS sensor has high sensitivity to Alcohol, and good resistance to disturb of gasoline, smoke and vapor. The sensor could be used to detect alcohol with different concentration; it is with low cost and suitable for different application.

The controlling device of the whole project is Arduino Microcontroller. IR sensor, Alcohol sensor, LCD display, Buzzer, DC motor along with Relay driver are interfaced to the Arduino microcontroller. The Arduino continuously read the data from sensors. When the driver enters the car and sits in the driving seat the IR sensor and alcohol sensor activated simultaneously. The IR sensor first detects the person and sets a range to alcohol sensor i.e. the area that should be covered by the alcohol sensor. Then the alcohol sensor gets activated and checks the breath of driver. The alcohol sensor constantly checks the breath i.e. for every 5 seconds the breath is analyzed and display the breath value in the LCD. If the driver alcoholic then the Arduino control the ignition through Relay.

4. Related Work:

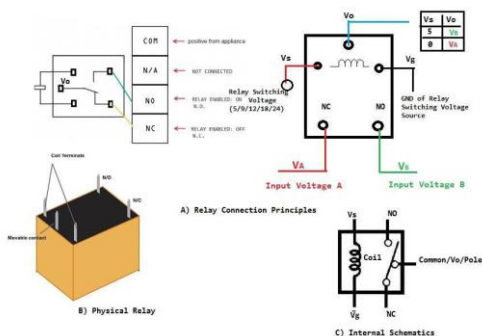
The brief introduction of different modules used in this project is discussed below:

ARDUINO UNO:

The **Arduino Uno** is a microcontroller board based on the ATmega328. It has 14 digital input/output pins. 6 of the 14 digital input/output pins can be used as PWM outputs. It has 6 analog

IR SENSOR:

IR Sensor module has great adaptive capability of the ambient light, having a pair of infrared transmitter and the receiver tube, the infrared emitting tube to emit a certain frequency, encounters an obstacle detection direction (reflecting surface), infrared reflected back to the receiver tube receiving, after a comparator circuit processing, the green LED lights up, while the signal output will output digital signal (a low-level signal), through the potentiometer knob to adjust the detection distance, the effective distance range 2 ~ 10cm working voltage of 3.3V-5V. The detection range of the sensor can be adjusted by the potentiometer, with little interference, easy to assemble, easy to use features, can be widely used robot obstacle avoidance, obstacle avoidance car assembly line count and black-and-white line tracking and many other occasions.

RELAY:

Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically. They are very useful devices and allow one circuit to switch another one while they are completely separate. They are often used to interface an electronic circuit (working at a low voltage) to an electrical circuit which works at very high voltage. For example, a relay can make a 5V DC battery circuit to switch a 230V AC mains circuit. Thus a small sensor circuit can drive, say, a fan or an electric bulb.

DC MOTOR:

The DC motor you will find in modern industrial applications operates very similarly to the simple DC motor described earlier in this chapter. Figure 12-9 shows an electrical diagram of a simple DC motor. Notice that the DC voltage is applied directly to the field winding and the brushes. The armature and the field are both shown as a coil of wire. In later diagrams, a field resistor will be added in series with the field to control the motor speed. When voltage is applied to the motor, current begins to flow through the field coil from the negative terminal to the positive terminal. This sets up a strong magnetic field in the field winding. Current also begins to flow through the brushes into a commutator segment and then through an armature coil. The current continues to flow through the coil back to the brush that is attached to other end of the coil and returns to the DC power source. The current flowing in the armature coil sets up a strong magnetic field in the armature.

BUZZER:

Basically, the sound source of a piezoelectric sound component is a piezoelectric diaphragm. A piezoelectric diaphragm consists of a piezoelectric ceramic plate which has electrodes on both sides and a metal plate (brass or stainless steel, etc.). A piezoelectric ceramic plate is attached to a metal plate with adhesives. Applying D.C. voltage between electrodes of a piezoelectric diaphragm causes mechanical distortion due to the piezoelectric effect. For a misshaped piezoelectric element, the distortion of the piezoelectric element expands in a radial direction and the piezoelectric diaphragm bends toward the direction. The metal plate bonded to the piezoelectric element does not expand. Conversely, when the piezoelectric

element shrinks, the piezoelectric diaphragm bends in the direction. Thus, when AC voltage is applied across electrodes, the bending is repeated. Thus, producing sound waves in the air.

LCD (LIQUID CRYSTAL DISPLAY):

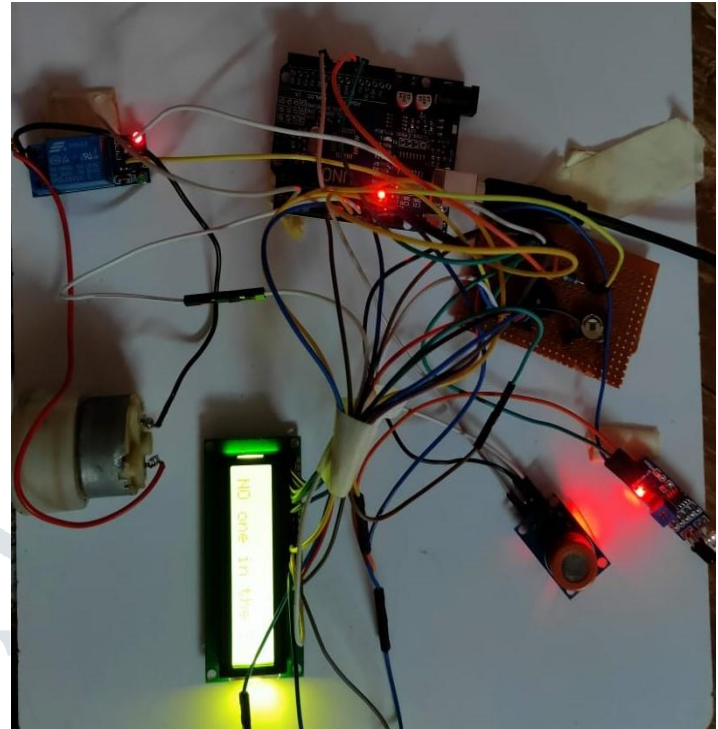


One of the most common devices attached to a micro controller is an 16x2 LCD display. This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively. The project status will display on LCD.

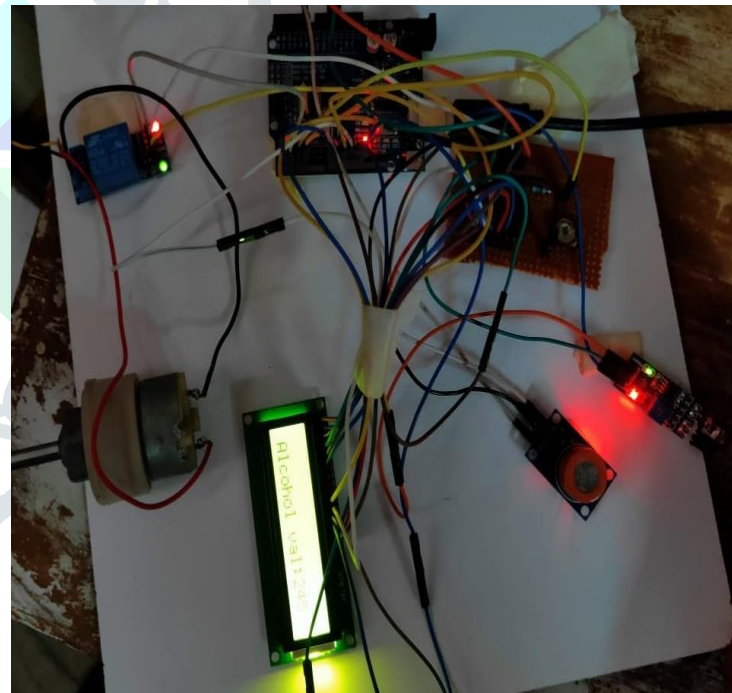
4. CONCLUSION:

Tests found that this system is highly effective and it's efficient in testing the alcohol percentage of the human beings and if it crossed the threshold value the dc motor will stop working. This just not take at the time of igniting the car but also after few minutes because there is a chance of taking Alcohol at the time of driving so this project is highly useful for the safe and secure drive. To reduce that risk, we will monitor the breathe constantly. There is also possibility of reducing the drunk and drive accident. This will save millions of lives from dyeing due to accidents which is caused by drunk and drive.

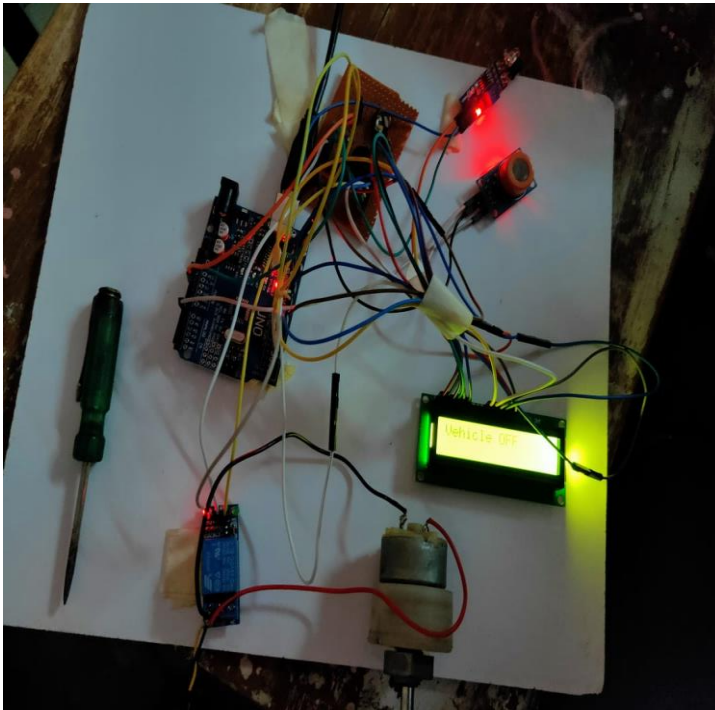
5. RESULTS:



No one is sitting in the seat



Engine on when no alcohol is detected.



Engine off when alcohol is detected



Alcohol value exceeded the pre-defined value as displayed on screen

6. ACKNOWLEDGEMENT

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