

Alcohol Detection System Using Arduino

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Abstract

The aim of our research paper is to represent our project which makes human driving safer and to overcome accidents. This project is developed by integrating alcohol sensor with Arduino board. Arduino processor ATmega328 is able to handle more functions than conventional microcontrollers. The alcohol sensor used in this project is MQ3 which to detect the alcohol content in human breath. Since sensor has fine sensitivity range around 2 meters, it can suit to any vehicle and can easily be hidden from the suspects. This project is fitted inside the vehicle. The project is designed for the safety of people sitting inside the vehicle.

Keywords- Arduino ATmega328, alcohol detector, MQ3, LCD, Buzzer.

I. INTRODUCTION

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.

II. 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].

This paper author discuss about driver's behavior, safety application & auto theft prevention system [6].

This paper represents accident vehicle automatic detection system by image processing [8].

In this paper they describe about body area sensing, alcohol detection craving [9].

In our paper we discuss about the alcohol detection system for vehicle using alcohol sensor MQ3 and buzzer using Arduino.

PROBLEM STATEMENT

Drunken driving is considered as one of the major reason of accidents in worldwide. Drivers under the influence of alcohol shows a clear failure of perception recognition and vehicle control. So, by this accident occurs.

PROPOSED SYSTEM

Alcohol detection in vehicle system is continuously growing over years which could resolve drunken driving accidents worldwide.

III. HARDWARE MODULES

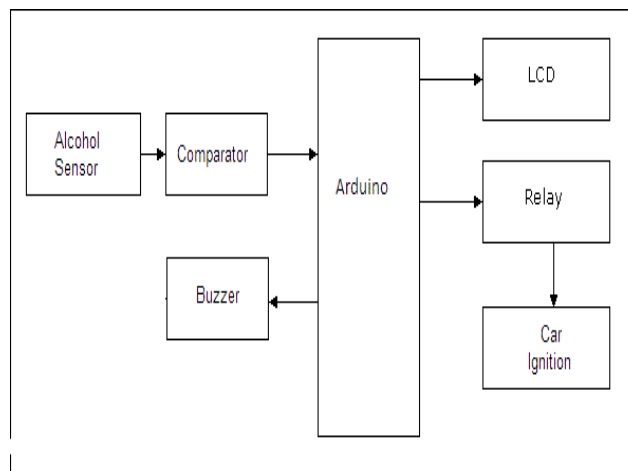


Fig1. Hardware Modules

The entire system adopted the Arduino uno microcontroller board (Based on ATMEGA 328), the principle of the hardware chart as shown in fig1. The core functions modules are Arduino uno alcohol sensor module (MQ3), LCD display, buzzer, relay.

ARDUINO:- The arduino board is the central unit of the system. all the components are interface to the board and programmed as per their functionality to operate in synchronization .

ALCOHOL MODULE:- It is used to sense the alcohol. The analog output of which is applied to the arduino board.

LCD:- If alcohol is detected it displays the message indicating “alcohol detected”.

1. ARDUINO BOARD

The arduino board is the central unit of the system. The arduino uno is the microcontroller board based on the ATmega 328. It is a programmable microcontroller for prototyping electromechanical devices.it has 14 digital inputs/output pins (of which 6 can be used as PWM output),6 analog inputs , a 16 MHz ceramic resonators the arduino differs from all preceding board is that it does not use the FTDI USB to serial driver.



Fig2. Arduino Board Description

FEATURES

Microcontroller	ATmega328
Operating Voltage	5V
Input Voltage	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14
Analog Input Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328)

2. ALCOHOL SENSOR (MQ3)

The analog gas sensor- MQ3 is suitable for alcohol detecting, this sensor can be used in a breath analyzer. It has a high sensitivity to alcohol and small sensitivity to benzene. The sensitivity can be adjusted by the potentiometer sensitive material of MQ3 gas sensor is SnO₂, which with lower conductivity in clean air. When the target alcohol gas exist, the sensors conductivity is higher along with the gas concentration rising, use of simple electro circuit, convert change of conductivity to correspond output signal of gas concentration.



Fig3. Alcohol Sensor

MQ-3 gas sensor has high sensitivity to Alcohol, and has good resistance to disturb of gasoline, smoke and vapour. It has fine sensitivity range around 2 meters. The sensor could be used to detect alcohol with different concentration; it is with low cost and suitable for different application.

Sensitivity Adjustment:

Resistance value of MQ-3 is difference to various kinds and various concentration gases. So, when using these components, sensitivity adjustment is very necessary. It is recommended to calibrate the detector for 0.4mg/L (approximately 200ppm) of Alcohol concentration in air and use value of Load resistance that (RL) about 200 K Ω (100K Ω to 470K Ω). When accurately measuring, proper alarm point for the gas detector has to be determined after considering the temperature and humidity influence.

Character configuration:

1. Good sensitivity to alcohol gas.
2. Circuit is simply driven.
3. Low cost and long life.
4. Small towards benzene and High sensitivity to alcohol.
5. Fast response and high sensitivity and stability and long life.

Specification:

1. Power supply requires 5 volts.
2. Interference type: analog only.
3. Pin specification: 1-output, 2-GND, 3-VCC
4. High sensitivity and fast response.

- 5. Stable and long life
 - 6. Small towards benzene and High sensitivity to alcohol
- Simple drive circuit with size:40*20mm

3. LIQUID CRYSTAL DISPLAY

Liquid crystal display screen is the electronic display module and find a wide ranges of applications. A 16*2 LCD display is very basic module and it is very commonly use in various devices and circuit. These modules are preferred to seven segments and other multi segments LEDs. The reason being: LCDs are economical; easily programmable; have no limitation of displaying special and even custom characters (unlike in 7 segments), animations and so on. A 16*2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5*7 pixel matrix. This LCD has 2 registers, namely command and data.

How to use an LCD display



Arduino Tutorial

Fig4. LCD Display

The command registers stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. the data registers stores the data to be display on the LCD. the data is the ASCII value of the character to be displayed on the LCD.

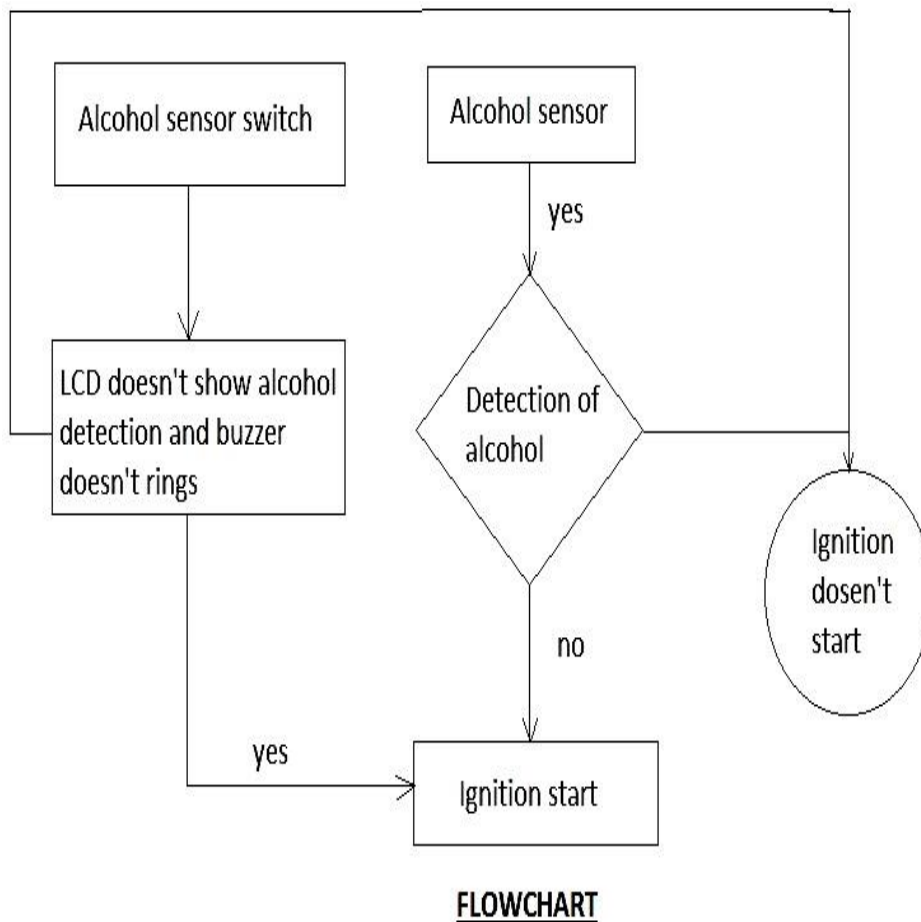
4. Buzzer-



Fig5.Buzzer

Features:

1. The PS series are high performance buzzers that employ uni-morph piezoelectric elements and are designed for easy incorporation into various circuits.
2. They feature extremely low power consumption in comparison to electromagnetic units.
3. Because these buzzers are designed for external excitation, the same part can serve as both a musical tone oscillator and a buzzer.
4. They can be use with automated inserters, moisture- resistant models are also available

IV. SYSTEM FLOW CHART**ADVANTAGES**

1. To prevent accident due to drunk and driving.
2. Easy and efficient to test the alcohol content in the body.
3. Quick and accurate results.
4. Helpful for police and provides and automatic safety systems for cars and other vehicles as well.

APPLICATIONS

1. "Alcohol detector project" can be used in the various vehicles for detecting whether the driver as consumed alcohol or not.
2. This project can also be used in various companies or organizations to detect alcohol consumptions of employees.

V. RESULTS & DISCUSSION

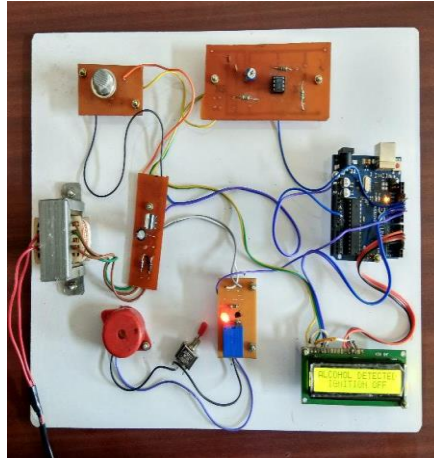


Fig6. Hardware setup



Fig7. Output on LCD

When the drunken driver enters in the vehicle alcohol sensor senses the alcohol, therefore buzzer rings and LCD displays that alcohol is detected as shown in fig.6 and ignition of vehicle automatically turns off by relay. So, by this the purpose of our project succeeds.

VI. CONCLUSION

We have provided a very effective solution to develop an intelligent system for vehicles for alcohol detection whose core is Arduino. Since sensor has fine sensitivity range around 2 meters, it can suit to any vehicle and can easily be hidden from the suspects. The whole system has also an advantage of small volume and more reliability. As the growing public perception is that vehicle safety is more important, advances in public safety is gaining acceptance than in the past. Future scope of this system is to control the accidents causes due to alcohol consumption. This system improves the safety of human being. And hence providing the effective development in the automobile industry regarding to reduce the accidents cause due to alcohol.

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