



International Journal of Intellectual Advancements and Research in Engineering Computations

Experimental analysis of alcohol detection with engine locking system

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ABSTRACT

Now-day's accident due to alcoholic drink consumed by car drivers has increasing and drivers are often not found by police. So in this project we designed a system using a MQ3 alcohol sensor that will stop the engine of the vehicle if it detects the alcohol consume by the driver. In this project, the alcohol is detected and the engine is locked by using an arduino with alcohol sensor along with LCD display and a engine. The alcohol sensor monitors blood alcohol content to detect the liquor. By placing the sensor on the steering wheel, our project has the capacity to continuously check alcohol level from the drivers breathe. The ignition will fail to start if the sensor detects content of alcohol in the drivers breathe and the engine could not accelerate any further.

INTRODUCTION

One major reason of deaths on Indian roads is accidents due to drunken driving. This happens because of drunken people being able to take control of vehicle even after being drunk [1]. In our project, we propose to solve this problem by designing a system which automatically switches off the vehicle's engine whenever alcohol of certain quantity is detected in the driver's breath [2]. As soon as the presence of alcohol is detected, the microcontroller stops the engine of the vehicle and a siren is blown to alert nearby people to convey that something is wrong with the vehicle and a message "Alcohol Detected" is flashed on the LCD screen which is installed in the system, so that nearby people can interpret gravity of the situation and inform the concerned authorities to avoid any kind of incident. This system when implemented in vehicles will not only avoid the deaths and property loss due to drunken driving, but will also help in reducing the total number of accidents which occur due to this. Moreover, people in other vehicles or pedestrians will be much safer

because of the vehicle being stopped right away [3-5]. Drunken drivers are in an unstable condition and so, rash decisions are made on the highway which endangers the lives of road users, the driver inclusive. The enormity of this menace transcends race or boundary. In Nigeria, the problem is being tackled by issuing laws prohibiting the act of drivers getting drunk before or while driving as well as delegating law enforcements agents to arrest and persecutes culprits [6-9].

LITERATURE REVIEW

The author has proposed a method to detect alcohol but uses GPS and GSM module which increases the overall cost which could be avoided. In our project, we are using a siren which will be more cost efficient. Use of siren will alert the people nearby and hence any kind of necessary action can be taken.

The authors propose to use a smart helmet to avoid accidents. There are many flaws with their design. A major short coming is the limitation of

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the its application to only vehicles which use helmets, i.e. 2 wheelers which is not a feasible idea while driving, especially for short distances. Another drawback being, the system when implemented makes the helmet too heavy which is not favorable for driving. Also, they have used an expensive microcontroller Whereas we are using open source hardware, which is very cheap.

The authors discuss about complex health monitoring systems and infrared sensor to detect the presence of alcohol. A major drawback of this system is the possibility of a false alarm. The system is designed in a manner that even a slight change in some particular condition can result in ringing false alarms even though everything was normal. In our project, we are using only the required technology thereby making the system

more reliable and cost effective when implemented.

COMPONENTS USED MQ3 SENSOR

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.



Fig1: MQ3 sensor

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 chip. The proposed system is built around ATmega328 Arduino Uno microcontroller board.



Fig 2: Arduino board

The unit consists of 14 pins which allows inflow and outflow of feeding (it is possible to use 6 of those pins as Pulse Width Modulation signal outputs), 6 continuous signal with time changing

quantity, 16 megahertz electronic oscillator, a Universal Serial Bus port, a power connector, an on-board voltage regulator, ICSP header, and a reset button.

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. The command registers stores the command instructions given to the LCD.



Fig 3: Liquid Crystal Display

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.

A buzzer is used in the system to alert the people nearby so that they can analyze the situation and take necessary action accordingly. The buzzer is connected to pin 3 of the Arduino Uno. It gets activated whenever alcohol is detected by the MQ3 sensor.



Fig 4: Buzzer

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 buzzer are connected to BC547 transistor drivers with en character to be displayed on LCD. In our project, LCD plays a very important role of displaying information related to the current status of the system.

Its frequency and tone can be changed and used according to the requirements. Hence, it is an easy

and cheap way to alert people and grab attention to point out that something is wrong. The motor and the buzzer are connected to BC547 transistor which acts as a driver IC. It controls the working of these components based on the voltage that they receive.

1. Alcohol dete drivers with en
2. Car engine O
3. Red light ind
4. Alarm ON
5. Green light i

BUZZER

Block diagram

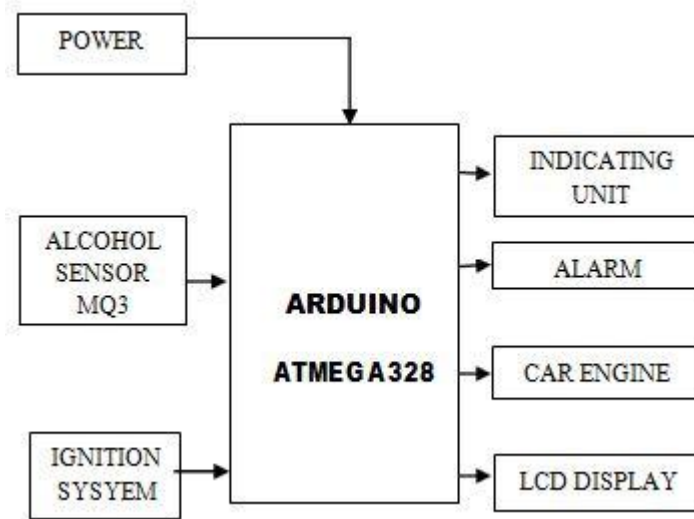
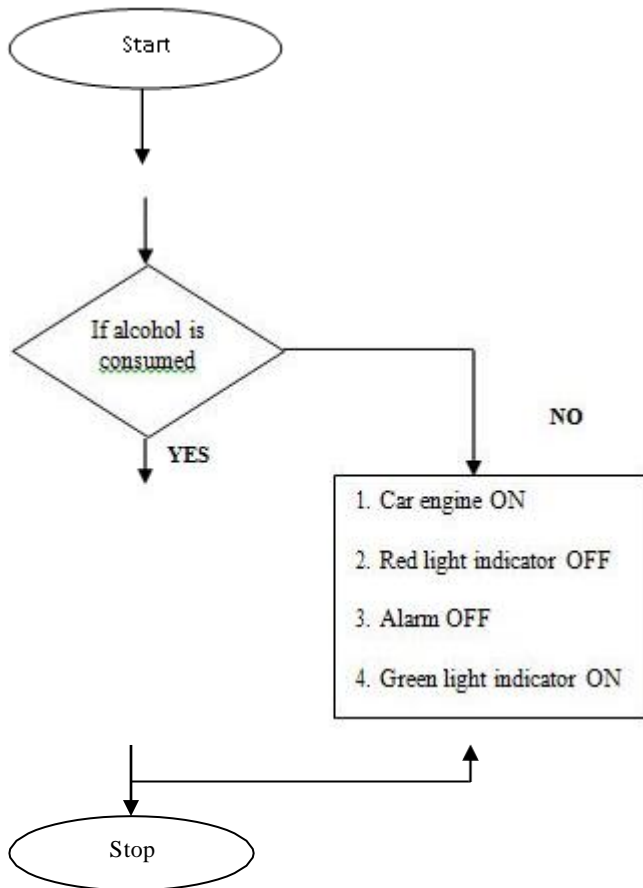


Fig 5: Block Diagram

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 automatic safety systems for cars and other vehicles as well.
5. The chance of loss of life and property due to drunken driving is minimized.
6. Simple implementation leads to accurate results.
7. Can be implemented on various types of vehicles.
8. Less accidents, more safety.

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.
3. It can also be used by various organizations or authorities to monitor its employees and keep a check on them.

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

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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.

RESULTS & DISCUSSION

Whenever a drunken person tries to take control of vehicle, the alcohol sensor will detect the presence of alcohol and if presence of alcohol is detected by the sensor, it will shut down the vehicle's engine and sound an alarm thereby alerting the nearby people. The LCD screen present in the vehicle will display "Alcohol Detected" so that people are aware of the situation and hence can take the necessary action that may be required. Therefore, by using this system on a vehicle, any kind of loss of life or damage to property can be avoided. Simulation of the system has been done in Proteus software. All the components have been tested and connected as required thereby providing us with the desired result.

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