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A project report on

ALCOHOL DETECTION SYSTEM

PHY1999 INTRODUCTION TO INNOVATIVE PROJECTS

WINTER SEMESTER 2019/2020

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1. ABSTRACT

The number of accidents in the world is increasing day by day and among these accidents, more than 60% are caused due to menace of driving under the influence of “unreasonable” alcohol consumption. Therefore, since the death due to drunken-driving has assumed proportion larger than one can imagine, it requires immediate attention. This paper attempts to explore the possibility of using the technology that would detect the level of alcohol in the blood and prevent “very-start” of the motor vehicle. The model device aims at preventing the user from driving when drunk and reduces the number of accidents occurring due to drunken driving. The model is created using Arduino Uno and Alcohol detecting sensor. The alcohol detecting sensor (MQ-3) when connected to an Arduino UNO R3 detects the level of alcohol content in blood by analysing driver’s breath.

The MQ-3 alcohol sensor is embedded (placed) at the middle of the steering wheel (Internet of things) so that whenever the driver exhales the sensor measures the alcohol level, analyses whether it is within the “safe” limit or not before allowing the ignition of the “motor-engine”. The “stipulated” legal limit of alcohol level in India is 0.03%, which means 30 microliters of alcohol in 100 milli liters of blood. Needless, to say as and when the excess-alcohol content gets detected it sets up alarm or buzzer. The placing of the alcohol-sensor at the centre of the steering wheel ensures that the detection of alcohol-content is limited to the driver’s seat and does not take into the account the alcohol content in the blood of the fellow-passengers. The paper attempts to produce the design and operation of the “model-device” that when produced commercially can help save precious life lost to reckless driving under the influence of alcohol.

2. AIM OF THE PROJECT

The main aim of this project is to design an embedded system for implementing an efficient alcohol detection system that will be useful to not only avoid accidents but also help us identify the presence of alcohol in other day to day items.

The alcohol sensor we have used is the MQ-3 sensor. This is a sensor that is not only sensitive to alcohol, particularly ethanol, which is the type of alcohol which is found in wine, beer, and liquor. This type of sensor circuit can be used as a breathalyser to check a person's blood alcohol level. Just as we exhale carbon dioxide when we breathe out, we also will breathe out some alcohol if we have alcohol in our blood. The more ethanol in your blood, the more there is in the air on exhalation.

This alcohol content gives a good indication for if a person is drunk and how drunk they are. The amount of alcohol exhaled into the air is proportional to the amount of alcohol which will be found in a person's blood.

Alco meters use a built-in formula to estimate blood alcohol content from exhaled air alcohol content.

3. OBJECTIVE

The main objective of this alcohol detector would be its low production cost, hence making it available to all.

This low-cost alcohol detector can be used in college campuses, hospitals and various companies. This low-cost alcohol detection system can be installed in a vehicle to detect if the driver is under the influence of alcohol.

After making it available for all, we can make necessary changes to the circuit for different applications and uses like checking the level of alcohol in the soil, checking alcohol content in food and soon.

4. COMPONENTS REQUIRED

S.NO	Components Name	Quantity
1	Arduino Pro Mini (ATmega328)	1
2	MQ-3 Gas Sensor	1
3	10K Resistors	2
4	1K Resistor	1
5	10K Potentiometer	1
6	Servo Meter	1
7	LED	1
8	LCD Display	1

5. HARDWARE REQUIREMENTS

The circuit is based on Arduino Pro Mini. The MQ-3 sensor, LCD display, Servo motor and LED are connected to the Arduino board. The circuit connections are as follows:

5.1 Power Supply -The circuit needs a 5V regulated DC for its operation. An 18V battery can be used as the primary source of power. The supply from the battery can be regulated to 5V using 7805 voltage regulator IC. The pin 1 of the voltage regulator IC should be connected to the anode of the battery and pin 2 of it should be connected to the ground. The voltage output must be drawn from pin 3 of the 7805IC.

5.2 MQ-3 Sensor-MQ-3 is an analog as well as a digital sensor which detects alcohol consumption by the smell of the breath. The sensor has four pins -Analog Out, Digital Output, VCC, and Ground. The VCC and ground are connected to the common VCC and Ground. The digital output pin is not used therefore is kept not connected. The output of the sensor is drawn from the analog output pin which is connected to the pin A0 of the Arduino board.

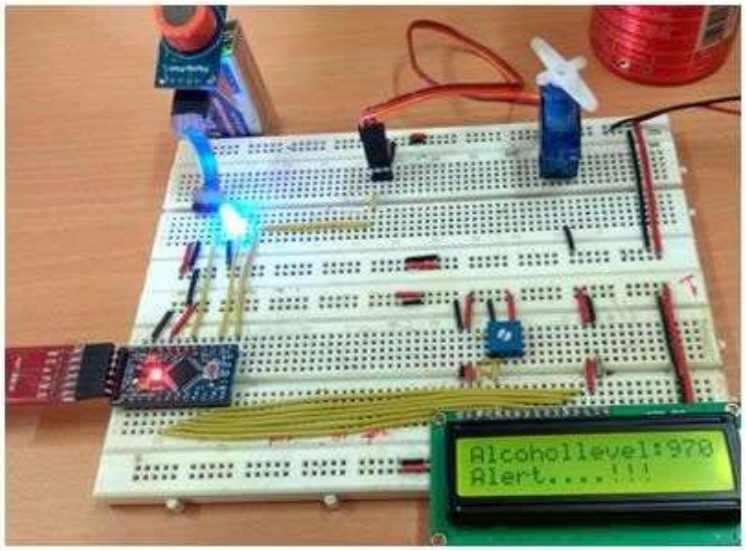
5.3 16X2 LCD-The 16X2 LCD display is connected to the Arduino board by connecting its data pins to pins 4 to 7 of the Arduino board. The RS and E pins of the LCD are connected to pins 2 and 3 of the Arduino board respectively.The RW pin of the LCD is grounded.

The standard open-source library for interfacing LCD with Arduino UNO is used in the project. The library works as expected and needs no changes or modifications.

5.4 Servo Motor-The servo motor is used to rotate a dial indicating a dangerous level of alcoholic consumption. The servo motor has three terminals -VCC, Ground, and Control. The VCC and Ground are connected to common VCC and Ground respectively. The control terminal of the motor is connected to pin 10 of the Arduino board. A pulse width modulated signal need to be passed to the control terminal of the servo in order to rotate it between angles 0 and 180 degrees.

6. WORKING

Once the device is powered on by attaching a battery, the Arduino sketch starts running. It loads the required Arduino libraries and initializes the LCD display. Some initial messages are displayed on the LCD. The Arduino starts detecting analog voltage from the sensor and converts it to a digital value using inbuilt Analog to Digital convertor. The reading is displayed on the LCD screen which by default remains to zero.



When someone catches a suspect and tests his/her breath, the MQ-3 sensor outputs a higher voltage at its analog output pin. The voltage is converted to a digital value using inbuilt Analog to Digital convertor and displayed on the LCD screen. The in-built ADC channel is 10-bit long and can have digitized reading up to 1000. After calibration, the level of alcohol beyond the legal limit is found to result in digitized reading beyond 500.

Therefore, the digitized reading of the sensor is compared with 500 and if it is found beyond 500, the servo motor is rotated by an angle of 100 which results in rotation of the dial by the same angle. The standard Arduino library function is used to implement the rotation of servo in which the angle of rotation can be directly passed as a parameter. At the same time, a HIGH logic is passed to the pin connecting the LED indicator setting the LED ON.

If the level of alcohol digitized to 10-bit value is less than 500, the servo is maintained at 0-degree angle and LED is kept OFF by passing a LOW logic at the respective pin.

7. PROGRAM

The Arduino sketch imports Servo.h for controlling servo motor and LiquidCrystal.h for LCD display. An object of LCD type is instantiated and assigned controller pins. Variables denoting LED and pin connection of MQ-3 sensor are declared and assigned controller pins. An object of servo type is declared and variables to store sensor value and servo angle are declared.

```
#include <Servo.h>

#include <LiquidCrystal.h>
LiquidCrystallcd(2, 3, 4, 5, 6, 7);
int ledPin= 12;
int sensorPin= A1;
Servo myservo;
int pos = 0;
int value;
```

The setup() function is declared which runs for once after the controller is powered on. In the function, the baud rate for serial communication with the LCD module is set to 9600 baud per second. The LCD object is initialized to 16 by 2 character LCD mode and the pin connecting LED is set to digital output using pinMode() function. The servo motor is rotated to 10-degree angle by default.

```
void setup()
{
Serial.begin(9600);
lcd.begin(16,2);
pinMode(ledPin,OUTPUT);
myservo.attach(10);
}
```

The loop() function iterates infinitely. In the function, the sensor value is read using analogRead() function and stored in a variable. A message indicating current reading is printed on LCD. The value is compared with 100 and if it exceeds 100, the LED is set ON and the servo motor is rotated by an angle of 100. An alert message is printed on LCD. Otherwise, the normal value is printed on LCD and servo is maintained at 0 degree. The LCD display is cleared in each iteration.

8. CODE

```
#include <Servo.h>
#include <LiquidCrystal.h>

LiquidCrystal lcd(2, 3, 4, 5, 6, 7);
int ledPin = 12;
int sensorPin = A1;
Servo myservo;
int pos = 0;
int value;
void setup()
{
Serial.begin(9600);
lcd.begin(16,2);
pinMode(ledPin,OUTPUT);
myservo.attach(10);
}
void loop()
```

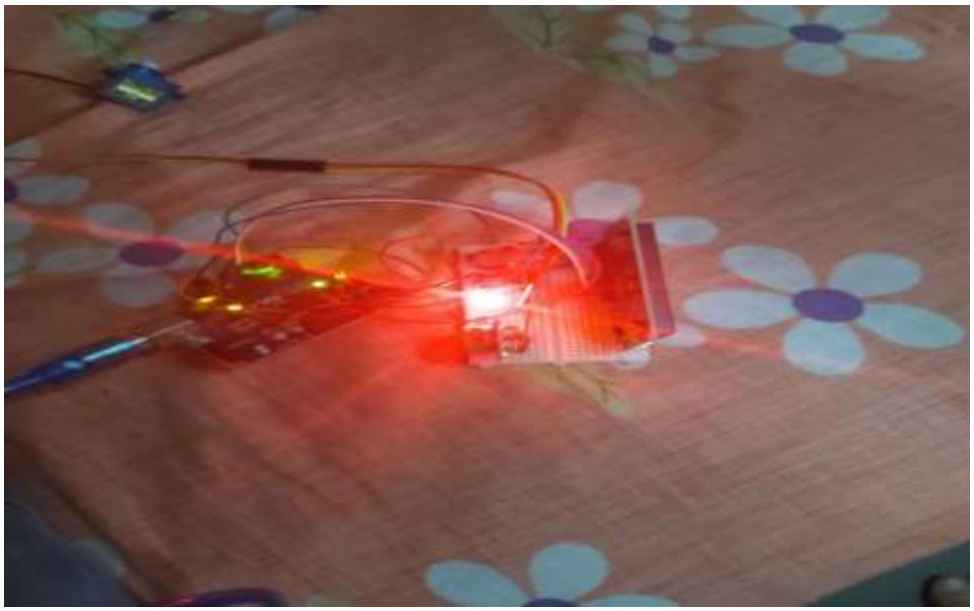
```
{
Serial.begin(9600);
lcd.begin(16,2);
pinMode(ledPin,OUTPUT);
myservo.attach(10);
}
void loop()
{
int Value = analogRead(sensorPin);
value = analogRead(A1);
lcd.print("Alcohollevel:");
lcd.println(value);
Serial.println(value);
```

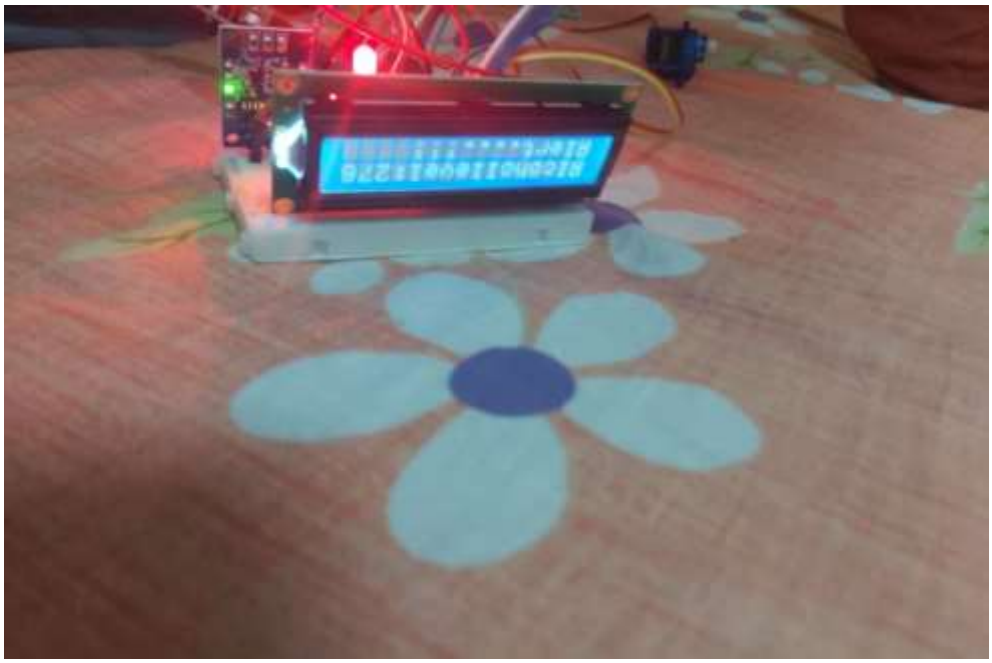
```
if (Value > 500)
{
digitalWrite(ledPin,HIGH);
lcd.setCursor(0, 2);
lcd.print("Alert....!!!");
Serial.print ("Alert");
myservo.write(100);
```

```
 }
else
{
digitalWrite(ledPin,LOW);
lcd.setCursor(0, 2);
lcd.print("Normal... :)");
Serial.print("Normal");
 myservo.write(0);
 }
delay(1000);
lcd.clear();
}
```

9. *RESULT*

The circuit was done, and the result was obtained. Hence, the project was successful.





10. APPLICATION

•“Alcohol Detector project” can be used in various vehicles for detecting whether the driver has consumed alcohol or not.
•Breathing analyser project can also be used in various companies or organization to detect alcohol consumption of employees. Alcohol detection system in an automobile is a must feature which every car or bus should have.

11. ADVANTAGE

•The main advantage of this system is its low-cost implementation. Because of this low cost, it can be used at many places. The normal alcohol detectors which are available in market have a considerable cost, so everyone cannot afford those systems.

12. FUTURE DEVELOPMENT

With extra modification in this circuit, it can be used to control the vehicle after alcohol detection.

•We can implement GSM technology with alcohol detector. So If microcontroller detects presence of alcohol then it will send SMS to the owner of the Car or to the family members of the person driving the car.

•Alcohol detection & vehicle controlling through text SMS will inform the relatives or owners of the vehicle about the alcohol consumption.

•We can implement GPS technology so that once alcohol detection is done, the system will find out the location of the vehicle.

•Modifying the circuit further would help us find alcohol level in soils which can be used by farmers as well.

13. CONCLUSION

When the drunken driver enters in the vehicle alcohol sensor senses the alcohol, therefore buzzer rings and LCD displays that alcohol is detected. So, by this the purpose of our project succeeds.

•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.

14. REFERENCE

- https://www.projectsof8051.com/alcohol-detector-with-buzzer-indicatormini-project/
- https://www.projectsof8051.com/alcohol-detection-with-vehicle-controlling/
- Wikipedia
- Google.com
- GitHub