

Automotive Safety System “A Mechanism to Detect Alcoholic Driver and Prevent Ignition”

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Abstract: In this mechanism an alcoholic detection system is deployed with a prime motive to counter the road accidents which may lead to auto crash, roadway wounds and vehicular passing to increased liquor content. Despite of heavy penalties by the traffic authorities this still remains a serious issue. In this mechanism the BAC (Blood alcohol content.) acts as an input to the system. The mechanism uses a DC motor which acts as an engine. The battery provides the required ignition to the system. The MQ-3 sensor is fixed to the steering of the vehicle is association with the Aduino Uno, LCD display and a buzzer. A threshold alcohol value is set, violation of which leads to discontinuity of the ignition and stopping the engine resulting in reduction of road mishaps.

Keywords: MQ-3 sensor, Aduino Uno, DC Motor, Ignition system, Blood alcohol content.

I. Introduction

Drinking and driving is a serious issue as a result of which endless people tend to loose their lives. According to the report published by WHO almost 50-60% of the road mishaps taking place are due to drunken condition of the driver. In countries like India every day at an average of 19-25 people die on road or in hospitals cause drunk driving accidents. Drinking for fun or leisure is not the problem, but the problem starts one tries to drive a vehicle after over-drinking this could put one's life and the life of the folks present in the vehicle at risk.

There are numerous safety systems in automobiles such as seatbelts, antilock, engine. Braking system, tractioncontrol, electronic stability control and so on. Here we tend to introduce a similar safety mechanism which would untied with the vehicle engine. A sensor will be used to measure the alcohol variable and a threshold alcohol value is set using an algorithm beyond this vehicle would stop running. The system moreover focuses on stopping the ignition of the vehicle at the initial stage itself when a contaminated driver is being encountered by the alcohol sensor. A message and an alarm is set in favour of the fellow passengers so that their life is not endangered due to the foolish behavior of the driver.

II. Literature Survey

Driving while drunk is hazardous and drivers with high Blood Alcohol Content (BAC) are at expanded danger of auto crashes, roadway wounds and vehicular passing. Anticipation measures assessed incorporate permit suspension or disavowal, appropriating or seizing vehicle plates, implementing open holder bans, expanding fine punishments, imprison, ordering instruction for youth and bringing down legitimate BAC's. Despite the fact that these much obstacles made by experts to drunken drive, it is as yet proceeding with like serial scenes. In that capacity there is no viable instrument to reduce this. Here, this process have intended to plan a Drunk driving detection, which is integrated with the directing wheel. This framework is meant for making vehicle driving more secure than previously and shields the mishaps from happening due to the liquor utilization of the driver. The individual when he is at vehicle, this is necessary to infer the driver's condition continuously and here this work proposed the detection of alcohol utilizing alcohol sensor associated with Arduino. Alcohol sensor is installed on the steering of the car, with the end goal that when the level of liquor crosses a reasonable farthest point, where the start of vehicle will kill and the motor will stop. The Arduino always uses the alcohol sensor information to check drunk driving and works a bolt on the vehicle motor to stop the engine.[1]

This work presents a system for detecting excess alcohol in drivers to reduce road traffic accidents. To do so, criteria such as alcohol concentration the environment, a facial temperature of the driver and width of the pupil are considered. To measure the corresponding variables, the data acquisition procedure uses sensors and artificial vision. Subsequently, data analysis is performed into stages for prototype selection and supervised classification algorithms. Accordingly, the acquired data can be stored and processed in a system with low-computational resources. As a remarkable result, the amount of training samples is significantly reduced, while an admissible classification performance is achieved - reaching then suitable settings regarding the given device's conditions.[2]

In the present day's alcohol-attributable accidents are increasing rapidly where the concern as alcohol is a factor in many categories of injury. Every year it is reported about 2.3 million premature deaths due to harmful consumption of alcohol. In this paper we proposed an improved alcohol detection for use in an automobile

ignition locking system using Arduino. A temperature sensor is used to measure the temperature of the breath sample to ensure that it is the same temperature as human breath. A sensor is used for a specific volume of the breath sample, which is used to determine the alcohol content. A Micro Controller is used to convert the output into a reading which represents the breath alcohol content of the breath sample. This analysis is used as part of an overall automobile ignition locking system which prohibits starting the car when the operator is intoxicating. The system also requires rolling retests to ensure that the driver is still sober.[3]

The main purpose behind this project is “Drunk and Drive detection”. Now days, many accidents are happening because of alcohol consumption of the driver. Thus drunk driving is a major reason of accidents all over the world. Alcohol Detection in Cars is designed using sensors for the safety of the people seating inside the car. This device should be fitted / installed inside the vehicle and the GPRS is connected to the micro controller where messages are sent to nearby police station if the person is drunk.[4]

III. Methodology

Specification of parts used

3.1 Alcoholic Sensor Module (MQ3.)

This module is made using alcohol gas sensor MQ3. This is a low cost semiconductor sensor which can detect the presence of alcohol gases at concentrations from 0.05mg/l. The sensitive material use in the sensor is SnO₂ whose conductivity is lower than clean air. This module can be easily interfaced with microcontroller, Arduino boards, Raspberry Pi.

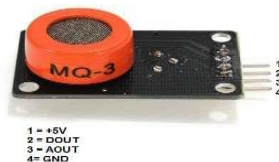


Fig 3.1 MQ-3 Sensor

3.2 Arduino Uno Microcontroller

Arduino is an open source microcontroller which can be effortlessly programmed, erased and reprogrammed at any prompt of time. It is also proficient of receiving and sending information over the web with the help of various Arduino shields. Arduino uses a hardware known as the Arduino development board and software for developing the code known as the Arduino IDE (Integrated Development Environment).



Fig 3.2 Arduino Uno Micro-controller

3.3 Buzzer

A buzzer or beeper is a sound flagging device, which might be mechanical, electromechanical, or piezoelectric. Common uses of buzzers and beepers include caution devices, timers, and affirmation of client input. The buzzer shown in the figure gives an alarm when the alcohol is detected in the vehicle.



Fig 3.3 Buzzer

3.4 DC Motor

The working principle of DC (Direct Current) motor is, when a conductor, is placed in a magnetic field, it experiences a torque and has a propensity to move. This is known as motoring action. If the path of current in the wire is inverted, the way of spin also reverses. When magnetic field and electric field interact, they produce a

mechanical force, and based on that the working principle of DC motor established. The direction of rotation of DC motor is as defined by Fleming’s left hand rule.

Fig 3.4 DC Motor

3.5 LCD Display

The figure below shows LCD display which will be fitted on the ADUINO board. The display is 20x4 (2Rows and 16 characters per row) can display 2 lines 16 characters. The built in industry standards HD44780 equivalent LCD controller which is commonly used by students projects, laser printer, fax machine, industry text machine, routers and so on. You will need 7 general I/O pins to interface the LCD screen.



Fig 3.5 LCD Display

IV. Working

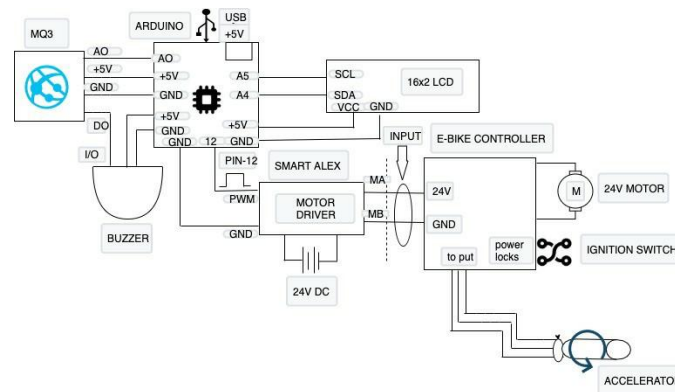


Fig 4 Schematic Diagram of Working

Here we propose a framework where the individual is identified for liquor level in his body to stay away from the accidents. The driver will be continuously monitored at regular intervals for Blood alcohol content in his body. Arduino Uno is arranged and associated with the MQ3 sensor, LCD display and the buzzer. The programming code and a threshold value will be set for the alcohol content. When the person BAC (blood alcohol content) goes above the set threshold value a message will be displayed on the LCD screen and the buzzer will start buzzing so this signal will be sent to the motor driver connected to the Arduino having an operating voltage 9V-30V. The motor driver will be connected to speed controller on receiving the signal the motor driver will instruct the speed controller to stop the motor and hence the vehicle. A 24V battery is connected to the speed controller which acts as power as a supply. If the value of BAC is less than threshold value the motor will continuously run.

V. Program for the Adruino Uno

```
##include <LiquidCrystal.h>
//LiquidCrystal lcd(7,6,5, 4, 3, 2);
#include<Wire.h>
//FORI2C
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2Clcd(0x27,2,1,0,4,5,6,7,3,POSITIVE);
//FOR 12C MODULE
int redLed = 10; int
greenLed = 12; int
buzzer = 8;
int alcoholA0 = A0
// Your threshold value
int sensorThres =550;
void setup()
{
pinMode(redLed, OUTPUT);
pinMode(buzzer, OUTPUT);
pinMode(alcoholA0, INPUT);
Serial.begin(9600); lcd.begin(16,2);
}
voidloop()
{
int analogSensor=analog
Read(alcoholA0);
Serial.print("PinA0:");
Serial.println(analogSensor);
lcd.print(" Alcohol Lev.:");
lcd.print(analogSensor-50);
// Checks if it has reached the threshold value
if (analogSensor-50 > sensorThres)
{
digitalWrite(redLed,HIGH);
lcd.setCursor(0, 2);
lcd.print("Alert!!!");
digitalWrite(12, LOW);
tone(buzzer, 1000, 200);
}
else
{
digitalWrite(redLed,LOW);
digitalWrite(12,HIGH);
lcd.setCursor(0, 2);
lcd.print(".....Normal ");
noTone(buzzer);
}
delay(1000);
lcd.clear();
}
```

VI. Advantages & Applications

Advantages

1. Helps to determine the alcohol consumed by the person/driver the ignition system will automatically shut down when the level of alcohol consumption in the driver's body is more than the specified level.
2. The buzzer in the system helps to know or alert the passenger about the conditions of the driver this is more effective in cases where the river is unknown to the passenger that is public transports.

Applications

1. This system can be used in various vehicles in detecting whether the driver has consumed alcohol or not.
2. This can also be used in various companies, organizations, mines to detect the consumption of alcohol in employees before operating the machines.
3. The buzzer fitted in the system can be used more effectively in a public transport in cases when the driver is unknown to the passengers so that they can decide upon their safety depending upon the alcoholic condition of the driver.

VII. Results

When the Blood Alcohol Content (BAC) is less than the threshold value the LCD shows that the BAC level is normal and the particular person is not drunk.



Fig 7.1 BAC level is normal

When the Blood Alcohol Content (BAC) is more than the threshold value the LCD shows that the BAC level is not regular or high and the particular person is drunk.



Fig 7.2 BAC level is high

VIII. Conclusions And Future Works

Since most of the road accidents are credited to drunk driving, thus a good methodology to forecast this to often develop associate integrated drunk and drive detection. This mechanism out to be very economic and safe and can be implemented in the future. The Aduino Uno having the sensing element as MQ-3 sensor and 2 outputs elements the LCD Display and the Buzzer. This mechanism comprises of 2 units, Unit 1 is the Aduino Microcontroller and its components and Unit 2 is the Battery and DC Motor. The intermediate unit between these two is the Motor driver which receives signal from the Aduino and sends it to the motor. The ignition is fully dependent on the drunk condition of the driver thus acts as a safety shield to the drivers and other passengers life. As Future work a GPS system can be integrated with the existing system and an alert message is directly send to the traffic authorities which will help them to locate and monitor the driver and save him/her from fatality.

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