

Engine Speed Controlling Mechanism with Alcohol Detector

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Abstract - The main purpose of this project titled “ENGINESPEEDCONTROLLINGMECHANISM WITH ALCOHOL DETECTOR” is to provide a safety feature for vehicles using Arduino. In those days many accidents are happened due to the alcohol consumption, Drunken and driving is one of the causes the vehicle to be damaged and this can be prevented easily. So to minimize this issue we have proposed this project. Arduino is the CPU of this project. In this project, potentiometer acts as accelerator which is used to control the speed of the DC motor (model for car engine) which is driven by the Relay module. An IR Sensor is used to detect the presence of an object in front of it and used to find the rpm of the DC motor connected with blade fan. The IR sensor detects every rotation of the rotors. With the help of Arduino Interrupts the IR sensor values were obtained and processed, then the speed of the motor was displayed in the LCD module.

Now the Alcohol Sensor is used to detect whether the person consumes alcohol or not. If the MQ3 Sensor senses the smell of alcohol, speed of the car gets slow down (below 30 rpm value) or not being able to go beyond 30 rpm value and warning indication was produced using buzzer and led, then the new warning message with the reduced speed is displayed on the LCD.

Keywords: Arduino Uno, Alcohol Sensor, DC motor, Relay, Potentiometer, LCD display, Buzzer, LED, IR Sensor

1. INTRODUCTION

Driving a vehicle is important for all of us because it saves our time for transportation and provides convenience. In other words it is a way of simplifying the repeated travel from one place to another. Nowadays many people forgot about the fact that driving without alcohol consumption is

a responsibility of each and every citizen of the country. A person's whose blood has alcohol content which is exceeding 30 mg/ 100 ml of blood and when it is detected then the person is said to be driving under the influence of alcohol or drunk and driving. In India under Section 185 in The Motor Vehicles Act, 1988, says that driving under the influence of alcohol or any drugs is a criminal offence and the person who has done this offense will be punished.



Figure1:DrunkandDriving

In 2019 there were 4,49,002 number of road accidents had occurred out of which 12,256 were due to drunk and driving in that around 3000 people had lost their lives and the remaining people were left injured. The National Crime Records Bureau (NCRB) data tells that around 2% of the total road accidents that happen in India are due to drunk driving. And the government also increased the penalty amount for drunk and driving act in 2019 September but still the number of accidents were increasing day by day.

Though we have some safety measures to save life from accidents like:

- Dual front airbags-Airbags are a life-saving feature in case of an accident. They act as a cushion for the driver and the passenger in case of an accident.
- ABS (anti-locking breaking system) - ABS modulates the pressure on brakes to prevent them from locking up in a panic situation so that the vehicle can be steered under hard braking
- Parking sensor-Parking sensor helps us while reversing the car by giving warning sound if there

is any obstacle at the rear side of the car.

But still there are many people who are driving under the influence of alcohol are supposed to lose their life or become a reason for other family's tears. To overcome this issue we have proposed an idea in this project titled ENGINE SPEED CONTROLLING MECHANISM WITH ALCOHOL DETECTOR. We all know that the "normal speed meets every need" if a person drunk and drives at high speed there are more chances for accidents. So in our model if a person is drunk then the vehicle will not go beyond the speed of 30rpm with an alert. Another case is the person starts the car without influenced by alcohol but later while driving if he drinks alcohol then the car automatically slows to the limit of 40km/h with an alert. Though police officers are checking drivers whether they are drunk or not while driving and if they drunk they are punished by fine and imprisoned, there are some people who were escaped from the police and doing this criminal offence and causing more accidents and putting other people's life into risk. If this

model was implemented we won't say that there will be no accidents anymore but the number of accidents will be reduced and the number of people losing their lives could be minimized.

1.1 BLOCK DIAGRAM



Figure2: BlockDiagram

1.2 PROPOSED SYSTEM AND WORKING

As with any innovation based embedded system, this model too requires explicit equipment and application that make the gadget operational. In proposed framework potentiometer acts as gas pedal which is utilized to control the speed of the DC engine (model for motor) which is driven by the Relay. An IR Sensor is a gadget which can identify the presence of an object before it and used to discover the rpm of the DC engine associated with sharp edge fan. The IR sensor distinguishes each pivot of the cutting edge fans. With the assistance of Arduino Interrupts the IR sensor Values were acquired and handled, at that point the speed of the engine was shown in the LCD module. Presently the Liquor Sensor is used to check whether the individual devours liquor or not. In the event that liquor is recognized the speed of the vehicle gets moderate down (below 40km/h) or not being ready to go past 40km/h and cautioning sign was delivered utilizing bell and drove, at that point the new admonition message with the diminished speed is shown on the LCD.

HARDWARE REQUIRED	<ul style="list-style-type: none"> ○ Arduino ○ MQ3 sensor ○ Relay ○ Led ○ Buzzer ○ DC Motor ○ IR Sensor ○ Jumper Wires ○ Soldering board ○ Potentiometer
SOFTWARE REQUIRED	<ul style="list-style-type: none"> ○ Arduino IDE ○ Tinker Cad

Table 1: Requirements and Components

2. MQ3 ALCOHOL SENSOR

MQ3 sensor is the one which is used as breath analyzer mechanism which is used to analyse the presence of alcohol content. It is less sensitive towards benzene, smoke, gasoline and vapor while that towards alcohol is very high. The sensor can be ranged maximum of 2

Meters and with the help of this sensor we can find the alcoholic level in the blood. The material which is used here is very cheap and minimal maintenance. Figure 1 shows the MQ3 sensor mounted on PCB which is printed circuit board.

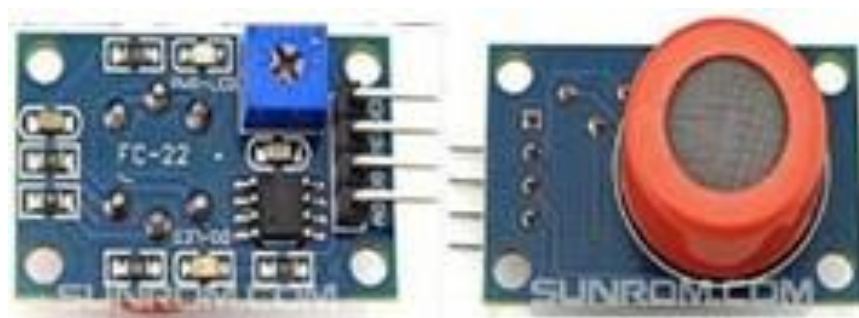


Figure3:MQ3alcoholsensor

FEATURESOFMQ3

- o 20x20 mm size
- o Power supply is 5V
- o Output pin-1 ,Gnd-2,Vcc-3
- o Analog Interference
- o Highly sensitive
- o The response time is much faster
- o Highly stable, long life
- o Cost is low

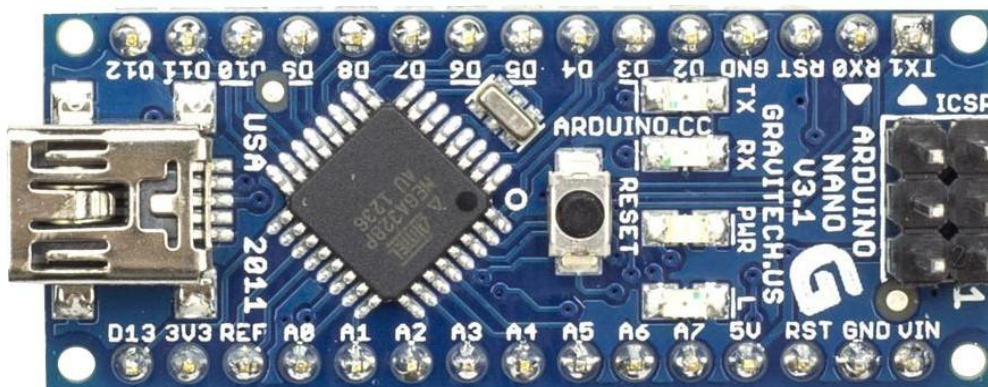


Figure 4:Arduino

FEATURES OF ARDUINO

- o Atmega 32 microcontroller
- o Power supply 5V
- o 7V-12V input voltage
- o Digital I/O are 14 Pins
- o Analog pins 6
- o DC current per I/O pin is 40 mA

- o DC current for 3.3V pin is 50 mA
- o Flash Memory 32 KB (atmega328)
- o SRAM of 2 KB (atmega328)
- o EEPROM of 1 KB (atmega328)
- o Clock Speed is 16 MHz

2.2 OPERATIONAL FLOW

The CPU of the project is Arduino.

By using this Arduino we transfer the information's obtained from sensors and potentiometer to motor and LCD module to process and display the information.

In this circuit, for controlling the speed of motor, we use a potentiometer to vary the amount of resistance in it. The potentiometer is connected to the analog input pin of the Arduino UNO and the motor is connected to the PWM pin of the Arduino. Thus the voltage is varied by the potentiometer. Here the potentiometer is used as an accelerator.

PWM is a technique by using that we can change the level of voltage or power. This means we can change the speed of the motor simply by changing the voltage values. As a result the motor speed increases with increase in voltage.

An IR Sensor is used to detect the presence of an object in front of it. We have placed a rod on the motor and placed it near the IR sensor near so that every time when the rod rotates the IR sensor can detect it and send the signal to the Arduino. By using the timers and Interrupts in Arduino we calculate the time taken for one complete rotation of the motor and the value is displayed in the LCD module.



Figure5:Locationofsensor

Now,alcoholsensorisusedtodetectwhetherthe alcoholcontentsarepresentintheairor not.Ifdetected (the driving person consumes alcohol) then an analog voltage is an output reading. Ifthere is output voltage then DC motor can only run within a particular speed only i.e., it cannotrotatebeyond that atthe same timethere were indicationsusing led andbuzzer.

Ifthealcoholcontentisnotinair(personisnotconsumingalcohol)thenthespeedofthemotor can reach to its maximum speed.

For this system the LCD module is used as a screen to display messages.

3. FLOWCHART

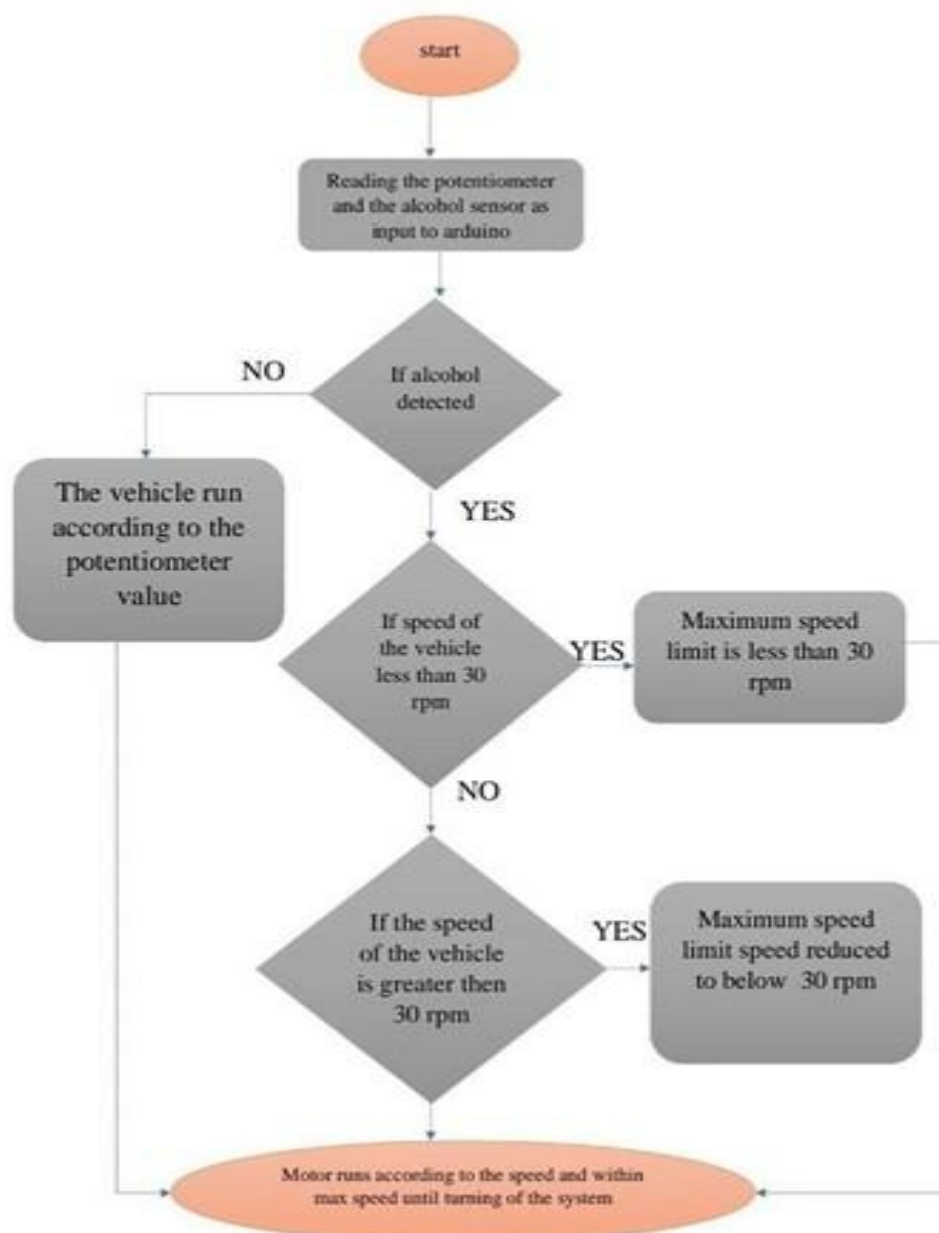


Figure6:flowchartof theworkingmodel

4. ADVANTAGES

- Drive Safe: In these days, many accidents are happened due to drink and driving, it may leads to loss the precious life of the person and family.
- Traffic Control: an individual beneath the influence of alcohol doesn't have management over his actions because it impacts synchronized coordination of brain and body, as

result, he/she violate the traffic rules which could persuade be fatal. The planned system takes action on the alcohol content.

- Compact size: the MQ-3 alcohol sensor is placed on the steering and the remaining of the components are fixed internally. The MQ3 device is a small device, this does not occur more spaces and it is more compatible.
- Reduction of Accidents: The main idea of this proposed system is to reduce the accidents because of drunken and driving.
- Apt complementing device for cops: Each and every vehicle cannot be checked manually. This is an alternate method with the setup of alert system using buzzer and led, it will be reach the nearby police station.

5.LIMITATIONS

- Every proposed system which have some limitations and errors, in this system MQ3 sensor is used to measure the alcohol content in the blood will leads to failure and system crash –
- If the drunken person wear any mask or cover his mouth, with the help of breath we cannot detect the alcohol content with appropriate measure.
- Even is the windows of the vehicle are open, then it will also be difficult to measure the alcohol content and actions cannot be taken place. Due to noise created by air the system unable to function properly.
- And if the person try to cover the alcohol detector module with any paper or clothes this may also find hard to read the input from the person, this may also failed.
- Clean the device every day because due to some dusts/dirt also the input cannot be read from the alcohol consumed person.

6. RESULT

The project “ENGINE SPEED CONTROLLING MECHANISM WITH ALCOHOL DETECTOR” has been designed and tested successfully. In this paper, the moment the system detects the presence of alcohol in car/vehicle then immediately the speed of the engine which is under the control of Arduino microcontroller gets reduced and there will be a warning by red led alert and buzzer sound. The output was shown below

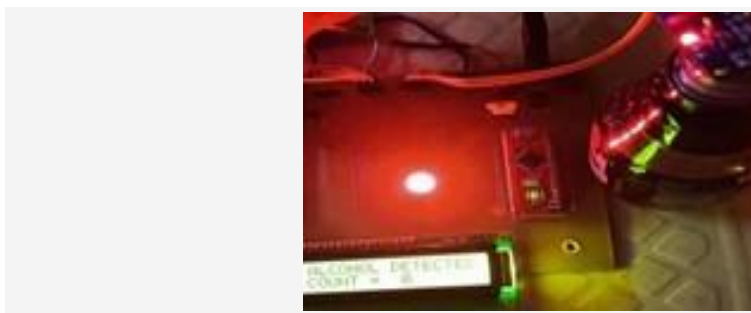


Figure7:output

7. CONCLUSION

This ENGINE SPEED CONTROLLING MECHANISM WITH ALCOHOL DETECTOR Project can check whether the person who is driving is drunk or not (it is the main reason for accidents these days), thus making minimal chances of accident happening. This proposed system protects the lives from many accidents because today drunken and driving cases are more in many places. Even though many limitations are in this proposed system which is mentioned in limitations, this may be quite useful to reduce the accidents. The proposed system of this system is more users friendly and a success one than the safety provider system. In automobile industry, it plays a vital role for safety measures. When the government makes this a mandatory one in every vehicle while approving the vehicles this will be very successful and more lives can be protected and safe. The main thing of this proposed system or it will be working properly only if the windows of the vehicles are properly closed and the alcohol detector which is MQ3 sensor should be cleaned every day. And also the device should not be covered with any clothes or sheet of paper and all, this May also very hard to read the input through breathe. This should be considered for future scope and for upgraded sensor technology. This proposed system is tested In many scenarios and the results which obtained are more effective, with the help of these results we can reduce the more number of accidents gradually. By implementing this proposed system, We can reduce the more no of accidents and by this proposed system we can protect more number of lives and we are much safer world free from drunken and driving accidental case.

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