Arduino Based Alcohol Sense Engine Lock with GPS and GSM Based Engine on System

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ABSTRACT

This project designed and implemented to avoid road accidents caused by drunk and drive. Here we use MQ-3 sensor for alcohol detection, Arduino UNO as a MCU (Master Control Unit), GSM (Global System for Mobiles) for SMS purpose, GPS (Global Positioning System) for location purpose. Initially the system senses the alcohol concentration continuously. If the concentration of alcohol is higher than the threshold value, the motor will turn off and GPS records the location coordinates and send them to integrated mobile number through GSM. The engine will on only by the integrated mobile number by sending the message as "ON" to the GSM.

I. INTRODUCTION

In present scenario automobiles plays a major role in every human life for travelling.

According to the survey conducted in 2021, 66.7 millions of automobiles are used all over the world. In India around 22.7 million units of automobiles are in use. Recently cars are demonstrated with IOT (internet of things) devices for easy handling. IOT devices are connected to MCU system and web connectivity's for import & export of data, IOT is the integration of devices like smart phones, vehicles, home appliances and industry appliances.

According to WHO (World Health Organization), around 3 million of deaths caused in every year by drunk and drive, this represents that 5.3 % of deaths and around 1.5 to 2 million of peoples are injured. So, to avoid this we designed and implemented a project entitled "ARDUINO BASED ALCOHOL SENSE ENGINE LOCK WITH GPS AND GSM BASED ENGINE ON SYSTEM".

Here we are using Arduino UNO as MCU (master control unit), which is also named as ATmega 328p, that acts as computer, GSM (Global Service for Mobile communication) for sending and receiving the messages and GPS (Global Positioning System) to record location coordinates. GPS will automatically updated for every second.

Initially the system is ready for alcohol detection. If driver was drunk, the alcohol sensor (MQ-3 sensor) sense the concentration of alcohol and compare it with the threshold value, if the concentration of alcohol is higher than threshold value the engine will automatically turn OFF and GPS records the location coordinates. These coordinates are sent as a message through GSM to integrated mobile number. Due to this we can avoid most of the drunk and drive accidents. In this project we propose a method to restart the engine through sending "ON" message from integrated mobile to GSM.

The main purpose of this project is to avoid road accidents caused by drunk and drives and makes out way to a better life.

II. EXISTING METHOD

There are many projects like alcohol sensing engine lock. In those projects MQ-3 sensor senses the concentration of alcohol of a driver. These analog values send to MCU and MCU immediately stops the engine.

III. PROPOSED METHOD

In our project we proposed a method that, the engine ignition start through a message "ON" to GSM module along with it send the GPS coordinates and live location map hyperlink to integrated mobile.

IV. BLOCK DIAGRAM

From the below diagram our project is designed on the base of Arduino UNO which acts as a receiver, because MQ-3 Sensor sense the alcohol values Continuously and sends the data to Arduino board for every second. Arduino board considers the alcohol values and compares it with threshold value. If the alcohol value is higher than threshold value, then the Arduino board recognizes that change and immediately gave an instruction to relay of 5V to stop the running of dc motor and record the coordinates of that location through GPS. The GPS sends the recorded coordinates as a message to integrated mobile number.

If the mobile number is owners number, then he checks the driver condition whether the driver was drunk or not. In case the owner wants to start the vehicle he sends the message as "ON" to the GSM. When GSM receives the message the motor immediately starts running. Otherwise, the vehicle will not move until owner sends the message to GSM.
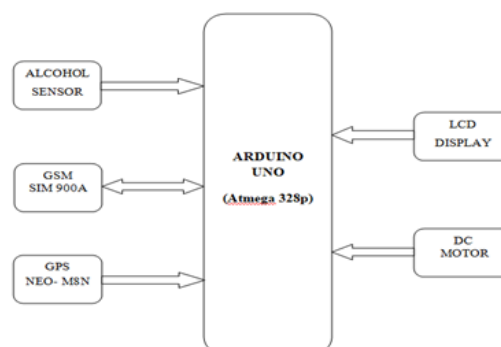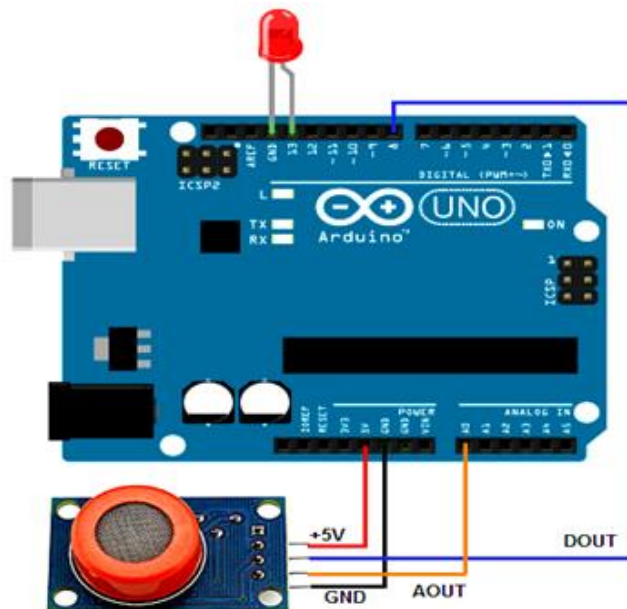
V. SENSOR

5.1 MQ-3 Alcohol sensor : -

MQ-3 is most commonly used gas sensor in MQ series. It is used to detect the concentration of alcohol. This sensor is activated in particular specifications i.e., it works in a temperature range from -10℃ to 50℃ with a power supply which is less than 150 mA to 5V. MQ-3 sensor is a Metal Oxide Semiconductor(MOS) device which is used to sense the alcohol in the range of 0.04mg/L to 4mg/L and it works on the principle of chemiresistor, because the sensor senses the different material based on its resistance values.
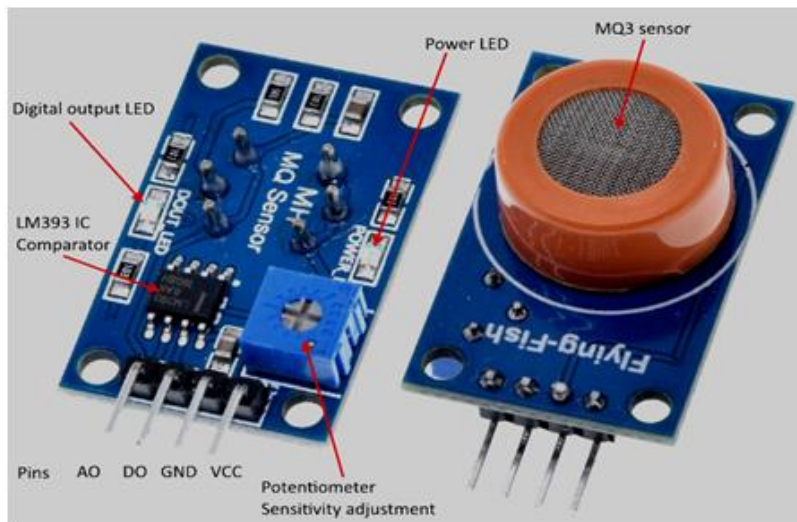
5.1.1 SCHEMATIC CIRCUIT DIAGRAM (MQ-3 Sensor):-

Below figure represents the demo circuit for MQ-3 Sensor which is connected to Arduino UNO board to light up the LED. This circuit used to check the sensor.

5.1.2   CONDITION FOR ALCOHOL DETECTION: -

```
int data =analogRead(alcohol_sensor);
Serial.prinln(data);
if(data >300)
{
Serial.println("ALCOHOL DETECTED");
digitalWrite(motor,LOW);
}
```

VI. ARDUINO UNO

The Arduino UNO is one of the Microcontroller in Microchip ATmega 328p. It is an open source for the users which is designed as a board by the arduino.cc. Arduino board can be controlled by the coding developed by Arduino IDE (Integrated Development Environment) which contains a set of digital as well as analog input & output pins. Arduino UNO works on some specifications i.e., it operates on 5V and its input voltage ranges from 7 to 20V and has 16MHZ of clock frequency.
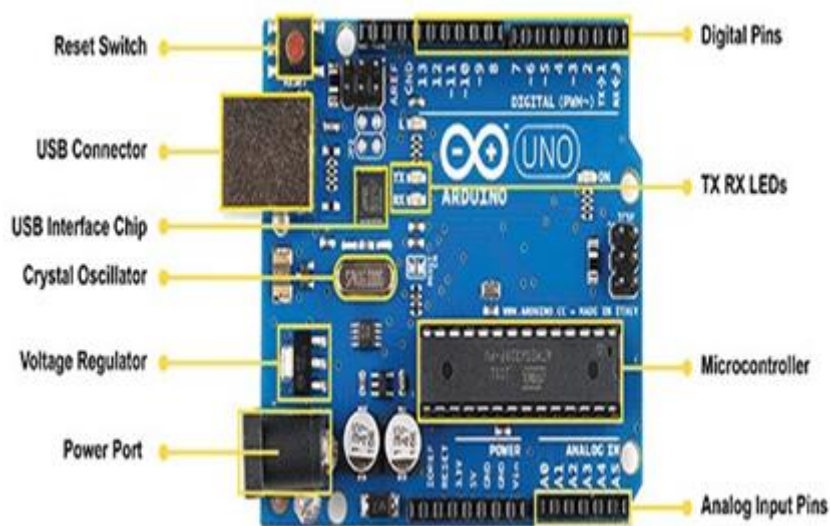
VII.   GSM (SIM 900A)

GSM (Global system for mobile communication) is a module used for communication from person to satellite. It is developed by European telecommunication standard Institute (ETSI) based on 2G Cellular network communication. 2G is the replacement of 1G analog cellular networks and is developed based on GPRS prototype network system. This GSM works on 2G, 3G and 4G networks but ETSI is not developed for 5G cellular networks. SIM 900A is advanced module in GSM SIM series.

VIII.   GPS (NEO M8-N)

GPS (Global Positioning System) is a satellite based radio navigation system owned and operated by United States government with the help of USSF (United State space force). It also provides GEO navigation, location and time information. NEO M8-N is a GPS module used for tracking purpose, it is mainly used in flying drones for location purpose.

IX. DC MOTOR

DC motor is an electronic device which converts the electrical energy into mechanical energy. The working principle of dc motor is, when a conductor is kept in magnetic field, current carrying conductor gains the torque and the motor has a tendency to spin also dc motors operates in different voltages.
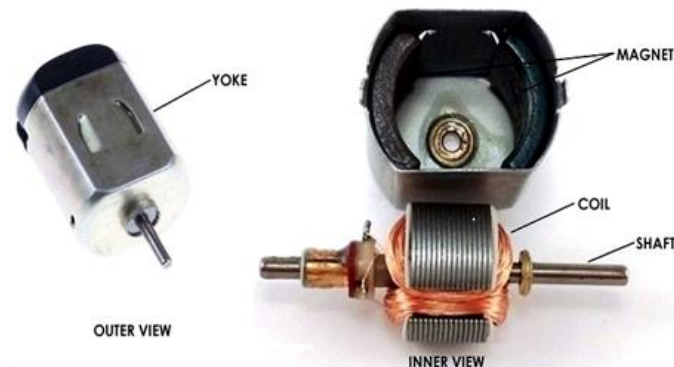
X. RESULT

Initially the system is activated and LCD displays as "SYSTEM IS READY" as shown as below.

If the sensor senss alcohol concentration, then LCD displays as "ALCOHOL DETECTED "

Then the motor immediately truns off and record the location coordinates, these coordinates will be send to integrated mobile number and displays on LCD.

The message is sent to the integrated mobile number as shown as below.

After sending the message to integrated mobile number the LCD displays as "message sent".it indicates that owner will be "TURNING ON THE VEHCLE".So.that another person can drive the vehicle apart from alcohol consumed person.

XI. CONCLUSION

Many of the project developers designed and implemented alcohol sense engine lock system. In this system alcohol sensor will sense the alcohol concentration of the driver and sends its value to the MCU. If measured alcohol value is greater than threshold value, engine stops immediately. But some others includes the GSM for the accident purposes. If the driver was drunk and motor was immediately stopped and send a message to integrated mobile number.

But in our project we added GPS for the live location, GPS record the location coordinates and send these coordinates as a message through GSM to integrated mobile. The vehicle is in off condition until the GSM receives a message as "ON" from the integrated mobile number. This project is the solution for road accidents caused by drunk and drive, reduces the accident rate and improves the safety features of the vehicle.

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