AUTOMATIC BREATHALYZER

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Abstract— Our projects aim to detect the alcohol presence by using breathalyzer which is already present in the car, this will stop the functioning of car as soon as it detects the alcohol contents and it will send the notification to your loved ones with a message. This all will happens when keys are used to unlock car. The project is using MQ-3 alcohol sensor along with Arduinomicrocontroller which will send message to the local authorities or to the loved ones once it crosses the threshold level using GSM module.

Keywords— Arduino Atmega328P, MQ-3 alcohol sensor, GSM module

INTRODUCTION

Alcohol breathalyzers are commonly used by the police in our country , it is used to check and catch the people who are drunk driving. Usually these types of cases are on major festivals and in metro cities where accident chances are more. These people not only risk their own life but also the people who are out on streets. This device helps our police to stay alert and catch hold of these people. The project is used to build a device which will detect the alcohol consumed by the suspect and sends a message via GSM module to the local authority. The main component used in the project is MQ-3 alcohol sensor which is used to detect the level of alcohol present in a person's breath, the sensor is prone to smoke or gasoline and only reacts with alcohol.

The sensor is both analog and digital which sends analog voltage proportional to alcohol present in the breath. The project also uses a devices called Arduino UNO which takes the reading from MQ-3 sensor, digitizes it and then compares it with the threshold level and then displays the reading and operate on GSM module. The code is written on Arduino IDE and then burnt to Arduino UNO using the same.

LITERATURE STUDY

In this paper author describes how we can utilise different sensors and modules to make an Alcohol detector circuit out of it to prevent drunk driving cases. [1]

In this paper author explains how the MQ-3 alcohol sensor is used to detect the BAC.[2]

In this paper the author implements safer vehicle driving than before using Arduino. This paper uses real time calculations involved in the project.[3]

The project is developed by combining alcohol sensor with Arduino board. The processor of Arduino which is Atmega328 handles more functions than any other microcontroller. The sensor used is MQ-3 alcohol sensor used to detect the amount of alcohol present in breath.[4]

In this paper the author describes, when the level of alcohol present crosses a threshold limit, the ignition system of the vehicle will turn off. The GPS module will take the present location of the vehicle and the GSM module will send a distress message to the police or family members.[3]

A. *Problem statement*

Driving drunk is one of the main reason in road accidents. It contributes around 30% accidents in all road related accidents.[1]

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OBJECTIVE

Our projects aim to detect the alcohol presence by using breathalyzer which is already present in the car, this will stop the functioning of car as soon as it detects the alcohol contents and it will send the notification to your loved ones with a message.

II. METHODOLOGY

The methodology used for this projects is that we will connect the breathalyzer with Arduino to block the controls of car .The Arduino is also interfaced with the GSM module so that if the alcohols contents are higher it will inform the loved ones. The breathalyzer will continuously monitors the alcohols particles and it blocks down the controls for few hours after few hours the controls will gets reset to its default position as they were before the alcohol detection.
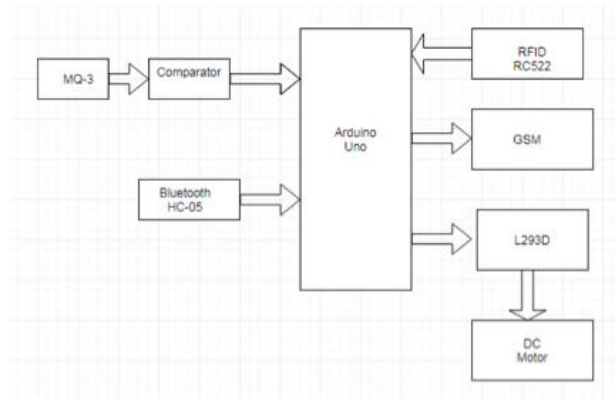

Fig 1. Block Diagram

A. *Reaction*

When an Sno2 film is exposed to air, the oxygen molecules present in it receives electrons from the conduction band and reacts to become O or O2. These molecules then form a depletion layer below these Sno2 particles.[2]

COMPONENTS USED

B. *Arduino Uno*

Arduino is a microcontroller board which uses different bit microcontroller. We are using UNO variant which uses atmega328p microcontroller which consists of different components such as crystal oscillator, cation, and voltage regulator, to support the controller. It has 14 digital output out of which 6 are PWM pins, 6 analog pins, a parallel jack, a USB connection, an in circuit serial programming header.[5]
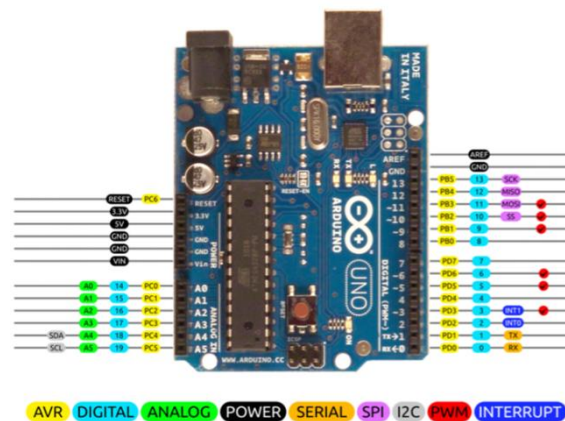

Fig 2 Arduino Uno

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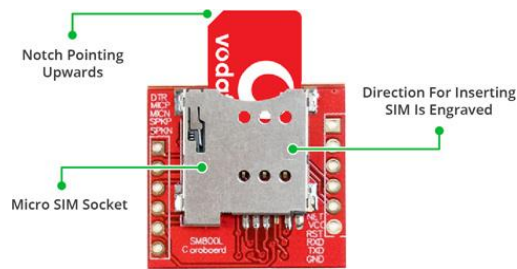C. *Subscriber Iidentity Module (sim)*

Fig 3. Sim Module 800L

Sim 800l module is a small gsm modem. We can use this module to achieve anything a mobile phone can like phone calls, SMS, connecting to internet and more. In the centre of the module is a cellular chip which is from simcom. The operating voltage is of 3.4 to 4.4V. The pins required for communication with a microcontroller over UART are broken out to a 0.1" pitch headers. This also supports a baud rate of 1200 to 115200 bps with auto baud detection. It needs an external antenna to connect to a network. It comes with a helical antenna , a sim socket at the back of the module and an activated 2G sim would fit perfectly.[6]

D. *Bluetooth module*

The Bluetooth module HC-05 works on UART serial communication protocols. It is connected with the serial communication pins Tx and Rx of Arduino UNO the microcontroller unit which helps to establish connection between HC-05 module and the microcontroller unit. The module operates on two modes, one is data mode and other is AT command mode. The data mode is used to send and receive data whereas the AT command mode is used to configure the HC-05 module.

The module establishes connection via sending Handshaking signals to the microcontroller. the serial library in the arduino uses 2 commands to check whether the data is sent or received via Serial.available() function and Serial.read() function, these are functions are also called as Serial Port protocol. [7]

E. *MQ3 Sensor*

The MQ-3 sensor has three terminals known as A,B and H each has 2 pins. The basic working involves a heat core which is connected to 5V supply along with any of the 2 pins A and B. Suppose A is connected to 5V then the B pin will be regarded as output pin.

The heat coil is having thin layer of reacting element of corresponding element, which on interaction changes the EMF in the sensor, these are mutually inducted coil which results in change of the output voltage. This output voltage is fed into the inverting terminal of op-amp (comparator) an non inverting is fed with Vref. When the sensor voltage is greater than the Vref voltage it will give high output signal. [8]
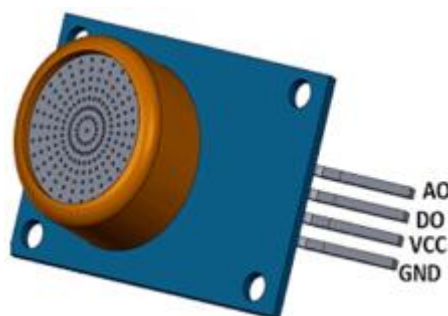

Fig 4. MQ-3 Alcohol Sensor

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F. *L293D Driver Module*

It is an IC which allows the motor to rotate in any direction. A 16 pin IC that controls two DC motor and the concept is based on H-bridge. For being able to rotate the voltage needs to change it's direction in clock and anti-clockwise direction. In a single chip there are two H-bridge circuits which can rotate two DC motors.Two enable pins are present in this, pin 9 and pin 1 which are used to drive the motor and they need to be logic high .[9]
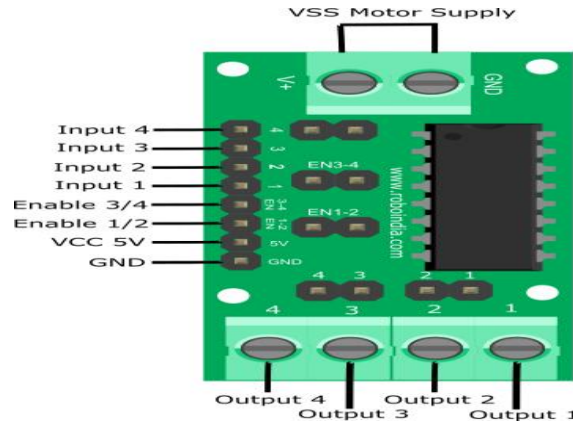

Fig 5. L293D Driver Module

G. *BO DC motors*

Dual shaft DC motor with gear box which gives good torque and rpm at lower voltages. This motor can run at approximately 200rpm when driven by a Dual Li-Ion cell battery at 6 V and approximately at 300 rpm when driven by a 9V Li-Ion cell.[10]


Fig 6. BO DC motors

1) *Advantages*

- It will reduce the accidents in areas where people drink too much alcohol and yet drive in traffic.
- It will warn the parents if their kids ever try to do that.
- It will blocks the controls of car if it detects the desired amount of alcohol particles in air detected by breathalyzer.
- An efficient way to test the presence of alcohol in our body which shows quick and accurate results.

FUTURE SCOPE AND APPLICATIONS

- Automatic Breathalyzer can be used in the various vehicles for detecting whether the driver has consumed alcohol or not.
- It can also be used in various organization for safety check as well.
- Eye blink Sensor can be used along with alcohol detection sensor which can check the eye movement if alcohol detector fails to check BAC contents.

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CONCLUSIONS

This project aims to help the society to minimise the road accident and to take extra precautions when the person is unconscious. Projects like this can be further developed and connected to automobiles and helmets as an inbuilt feature to smart cars and smart helmets, it can also be implemented with IoT applications.
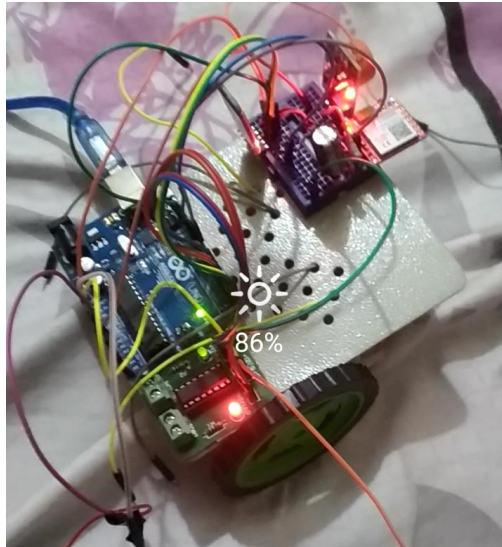
We have completed our project along with hardware and software development.

Fig 7.Hardware Model

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