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Alcohol Detection System in Vehicle for Human Safety

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ABSTRACT

In this paper the objective is to design a system that detects the state of the driver before he takes the control of the vehicle. Where the system takes driver breath as the input to the MQ3 sensor. With the combination of the Arduino UNO and GPS& GSM Module for the communication purpose to send the alert message and location of the vehicle to the near ones and LCD display to show the present state of the driver and by using ESP 8266 Wi-Fi module to check and communicate the data through web page

KEYWORDS: *MQ3 sensor, Arduino UNO, GPS& GSM Module, LCD Display, ESP 8266 Wi-Fi Module*

INTRODUCTION

According to latest data compiled by National Crime Records Bureau (NCRB) 12,256 road accidents occurred in 2019 related to drunk and driving, 12,000 such cases reported in 2018. NCRB says that 2% of road accidents are happen in india are due to drunk and driving.

In this project we have developed a smart system that detects the state of driverwith the sensor and after the alcohol sensor senses the drivers breathe in that air the alcohol percentage is taken as input and the concentration or percentage will be calculated and given as output. It will be displayed on the LCD display and give an alarm sound with the help of the buzzer whenever the amount exceeds the peak amount and sends an alert message to their people and warns him about the current situation and it shows the amount of concentration of alcohol percentage which was taken by the driver. This is our system is used for human safety whenever driver was drunk and driving the car.

This is one of the basic ides and technique which used to prevent accidents caused by drunk and driving.

LITERATURE REVIEW

In this paper author describes the alcohol detection system using sensor [1].

In this papers author discuss about the detection process for various modules and kinds of detection methodologies in a particular attribute [4, 6, 8].

In this paper author introduces an emerging technology like blockchain for the future scope of a project [10] and security concern in any module [2].

EMBEDDED SYSTEM

An Embedded system is the combination of both Hardware and Software.

It has three components:

- Hardware
- Software
- RTOS (Real Time Operating System)

Generally, an Embedded system is microcontroller or microprocessor-based system which is designed to perform a particular task.

The embedded systems can be programmable with fixed functionality. They are varied in complexity which affect the type of software, hardware and firmware which they are using in the system.

Some of the applications are:

- Industrial
- Telecommunication
- Home appliances
- Automotive
- Medical

BLOCK DIAGRAM

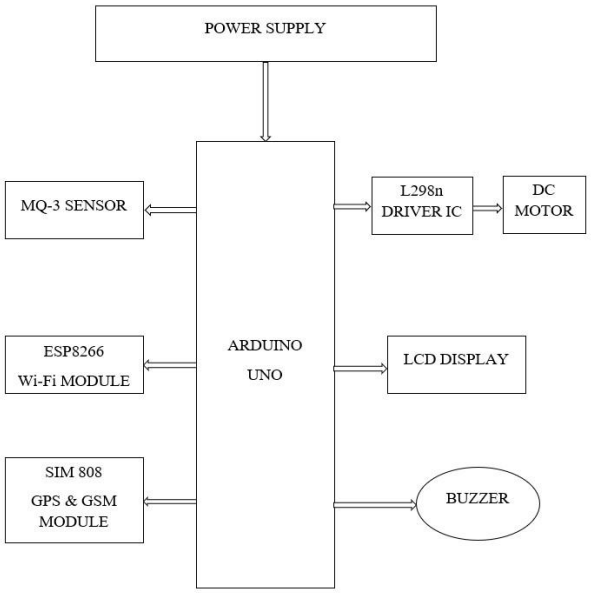

Fig: Block Diagram

In this Block Diagram all the components are attached to Arduino UNO where it is the Heart of the system and all the components are controlled and integrated by Arduino UNO.

ARDUINO UNO

Arduino uno is developed by Hernando Barragan in 2003. It is an open source electronics platform based on easy to use hardware and software. Arduino UNO is a microcontroller which is based on ATmega328P. It contains 14 digital input/output pins, 6 analog inputs.

Arduino is one of the basic boards to get started with electronics and coding.

Arduino UNO is programmable with Arduino IDE (Integrated Development Environment) by using type B USB cable.

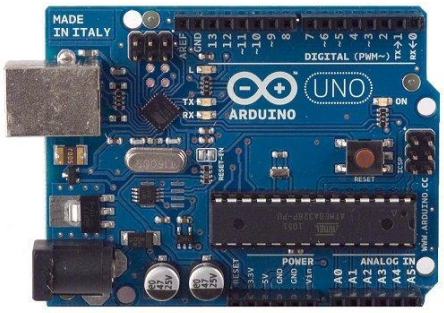

Fig: Arduino Uno

We can connect it simply to the computer with a USB or AC to DC power adapter or simply a battery for starting it.

The operating voltage is about 5V an input voltage is 7V to 20V and also having 16MHz clock speed. Where Arduino UNO is similar to nano and Leonardo

MQ3 ALCOHOL SENSOR

It is a gas sensor which basically used to detect some of the gases like alcohol, Benzene, Hexane, Carbon Monoxide (CO).

Where this sensor has high sensitivity to alcohol

Fig: MQ3 Alcohol Sensor

The sensor detects the alcohol concentration from 0.05mg/L to 10mg/L. This sensor has high sensitivity and fast response time. Which will provide analog resistive output based on the Alcohol concentration give as input.

MQ3 sensor can be easily interfaced with Arduino boards, Microcontrollers, Raspberry Pi etc.

ESP 8266 Wi-Fi Module

It is low-cost open source IoT platform(Internet of Things). It initially integrated with SoC(System on Chip). It having memory of 32KiB instructionRAM, 80KiB user data RAM, 32KiB instruction cache

RAM, 16 KiB ETS system data RAM.

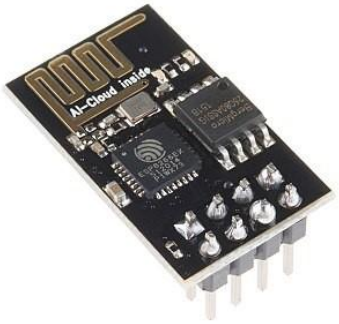

Fig: ESP 8266 Wi-Fi Module

It is a 32-bitmicrocontroller. This module is developed by Espressif Systems.

It provides access to the GPIO Pins (General Purpose Input Output) and having 16 GPIO pins and power supply of 3.3V DC.

SIM 808 GPS&GSM Module

It is a two-in-one function module. This module is used mainly for communication purpose. It is a complete quad band(850/900/1800/1900MHz)based GSM/GPRS module and which combines GPS for location tracking. This module offers cellular GSM(Global System for Mobile Communication) and GPRS(General Packet Radio Service) data with GPS(Global Positioning System) technology for satellite navigation.

Fig: SIM 808 GPS&GSM Module

It consumes low power in sleep mode and integrated with charging circuit fir Li-Ion batteries. This module has high GPS receive sensitivity 22 tracking and 66 acquisition channels. It supports real time clock. Module having power supply of 12V DC supply.

L298N DRIVER IC

It is a high-power motor driving module which idused for stepper motors and DC motors. This module can control up to 4 DC motors or 2 DC motors with direction and speed control.

Fig: L298N DRIVER IC

LCD DISPLAY

It is a flat panel display which uses liquid crystal in primary form. LCD (Liquid Crystal Display) consume less power compared toLED(Light Emitting Diode). Where an LED emits light, butwhereas LCD creates light using backlight.

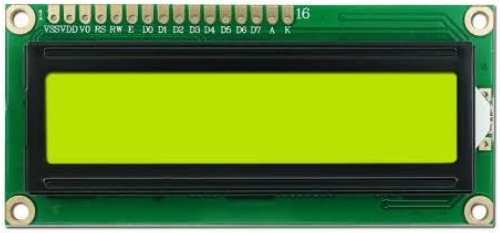

Fig: LCD DISPLAY

LCD contains million numbers of pixels. In this we are using 16*2 LCD display. LCD display was operated at 4.7V to 5.3V. It can display both alphabets and numbers. Consisting of two rows where each row can enter up to 16 characters. LCD display can work on both 4-bit mode and 8-bit mode. It contains 16 pins.

BUZZER

Buzzer is a electro-acoustic, electromechanical, magnetic, electromagnetic, mechanical, audio signaling device. It is one of type of electronic device which is used to produce an alarm, tone, sound. Low in cost and less weight.

Fig: BUZZER

Buzzer produce sound in the range of 2 to 4KHz. In this Red lead is connected to the input and where as the black one is connected to the ground. The operating voltage is from 4 to 8V DC. It has continuous beep sound.

RESULTS

The input which we given to the sensor and when the sensor detects the alcohol percentage and the sensor detects the amount of alcohol percentage and displayed in the webpage

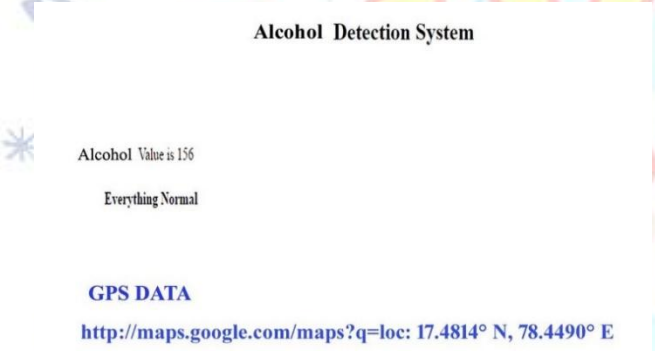

Fig: Result 1 of Alcohol Detection System

Where the amount of alcohol percentage exceeds the displayed reading will alert and shows the exceeded value and sends the location to the near ones.

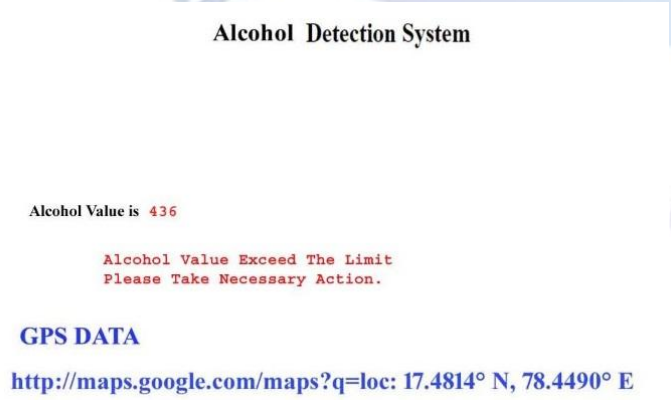

Fig: Result 2 of Alcohol Detection System

FURURE SCOPE

We can integrate a breath analyzer, heart rate sensor and pulse sensor to identify the exact position of the driver behavior.

CONCLUSION

Providingan effective way to develop a smart system for vehicles using blockchain[10] for the alcohol detection with range of about 2 meters and due to its compact size, it can be hidden anywhere. Now a day'svehicle safety is more important and this

System will improve the human safety from accidents.

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