

ALCOHOL SENSING ALERT - ENGINE LOCKING SYSTEM BY USING INTERNET OF THINGS (IoT) TECHNOLOGY

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ABSTRACT:

The microcontroller on encountering high alcohol signal from the alcohol sensor displays alcohol detection note on LCD screen and also stops the dc motor to demonstrate as engine locking. The system needs a push button to start the engine. If alcohol is detected at the time of starting the engine the engine does not start at all. If alcohol is detected after engine starting, the system locks the engine at that time. This Project presents an innovative way of protecting automobiles from drunken drivers for safeguarding them by using IOT (INTERNET OF THINGS). The system permits an alert to the owner on his mobile phone or mail as a short message (SMS) at his request.

1. INTRODUCTION

Now a day's every system is automated in order to face new challenges. In the present days Automated systems have less manual operations, flexibility, reliability and accurate. Due to this demand every field prefers automated control systems. Especially in the field of electronics automated systems are giving good performance.

We usually come across drink and driving cases where drunk drivers crash their cars under the influence of alcohol causing damage to property and life. So here we propose an innovative system to eliminate such cases. Our proposed system would be constantly monitoring the driver breath by placing it on the driver wheel or somewhere the driver's breath can be constantly monitored by it. So if a driver is drunk and tries to drive the system detects alcohol presence in his/her breathe and locks the engine so that the vehicle fails to start.

In another case if the driver is not drunk while he starts the vehicle and engine is started but he/she drinks while driving the sensor still detects alcohol in his breath and stops the engine so that the car would not accelerate any further and driver can steer it to roadside. In this system we use an AVR family microcontroller interfaced with an alcohol sensor along with an LCD screen and a dc motor to demonstrate the concept. So here the alcohol sensor is used to monitor uses breath and constantly sends signals to the microcontroller.

What is internet of things?

Internet of Things (IoT) is a eco community of associated physical items that are available through the web. The 'thing' in IoT could be a man with a heart screen or a vehicle with worked in-sensors, i.e. objects that have been appointed an IP address and can gather and exchange information over a system without manual help or mediation. The installed innovation in the items encourages them to connect with inward states or the outer condition, which thus influences the choices taken.

Why IoT?

An article by Ashton published in the RFID Journal in 1999 stated, "On the off chance that we had PCs that knew everything there was to think about things - utilizing information they accumulated with no assistance from us - we would have the capacity to track and check everything, and incredibly lessen waste, misfortune and cost. We would know when things required supplanting, repairing or reviewing, and whether they were new or past their best. We have to engage PCs with their own particular methods for social occasion data, so they can see, hear and notice the world for themselves, in all its arbitrary eminence." This is definitely what IoT stages improves the situation us. It empowers gadgets/items to watch, recognize and comprehend a circumstance or the surroundings without being reliant on human offer assistance.

How can IOT help?

IoT stages can enable associations to decrease cost through enhanced process proficiency, resource usage and efficiency. With enhanced following of gadgets/objects utilizing sensors and network, they can profit by ongoing bits of knowledge and investigation, which would enable them to settle on more brilliant choices. The development and joining of information, procedures and things on the web would make such associations more significant and vital, making more open doors for individuals, organizations and enterprises.

What is scope of IOT?

Inter of Things can interface gadgets implanted in different frameworks to the web. Whenever gadgets/items can speak to themselves carefully, they can be controlled from anyplace. The network at that point causes us catch more information from more places, guaranteeing more methods for expanding productivity and enhancing wellbeing and IoT security.

IoT is a transformational compel that can enable organizations to enhance execution through IoT investigation and IoT Security to convey better outcomes. Organizations in the utilities, oil and gas, protection, fabricating, transportation, foundation and retail divisions can receive the rewards of IoT by settling on more educated choices, helped by the downpour of interactional and value-based information available to them.

2. LITERATURE REVIEW

In past there were some technologies which protects the automobile from drunken driver. Those technologies are works on the concept of **GSM** and **GPS**. In this system, the microcontroller was interconnected with the car alarm system and alerts the owner on his mobile phone. The tracking system is composed of a GPS receiver, PIC micro controller processes this information and this processed information is sent to the user/owner using GSM modem by Abhishek guptha^[1].

In [2], they used PIC 16876A micro controller, alcohol sensor, alarm, LCD display. Ignition system will be off when alcohol detected.

In [3], GSM, GPS system were used to find the location and alert message to the owner. Location would be in longitude and latitude which was difficult to locate. Ignition system turns off when the sensor senses the alcohol.

In [4], IR LED894 was used , it was produces high intensity IR rays which absorbs high content of alcohol from air , so this system will work only when driver drunk high concentration alcohol.

In [5], IR SENSOR was used to detect obstacle that comes in front of sensor, then the vehicle stops. It also senses the toxic gases like LPG, CO₂, and alcohol from inside of the automobile. If there is high content of gasses then SMS has been sent to owner to notify him.

In [6], it proclaims a real time prototype. It has used remotely located charge-coupled-device cameras which are equipped with infrared illuminators to get images of the driver. This gives clues of gaze movement, eye lid movement, and facial expressions. It tells eye blink frequency is beyond the normal state, and then ignition system offs immediately.

In our present project we replaced GPS/GSM system by the technology of IOT (INTERNET OF THINGS)

3. HARDWARE COMPONENTS TO BE USED

I. ESP 8266 WIFI MODULE



Fig.1 ESP 8266 WIFI MODULE

ESP8266 (presently ESP8266EX) is a chip with which manufacturers are making wirelessly networkable micro-controller modules. More specifically, ESP8266 is a system-on-a-chip (SoC) with capabilities for 2.4 GHz Wi-Fi (802.11 b/g/n, supporting WPA/WPA2), general-purpose input/output (16 GPIO), Inter-Integrated Circuit (I²C), analog-to-digital conversion (10-bit ADC), Serial Peripheral Interface (SPI), I²S interfaces with DMA (sharing pins with GPIO), UART (on dedicated pins, plus a transmit-only UART can be enabled on GPIO2), and pulse-width modulation (PWM). The processor core, called "L106" by Expressive, is based on ten silica's Diamond Standard 106Micro 32-bit processor controller core and runs at 80 MHz (or over clocked to 160 MHz). It has a 64 KB boot ROM, 64 KB instruction RAM and 96 KB data RAM. External flash memory can be accessed through SPI.

II. LED DISPLAY

These displays are small, only about 1" LENGTH, but very readable due to the high contrast of an OLED display.

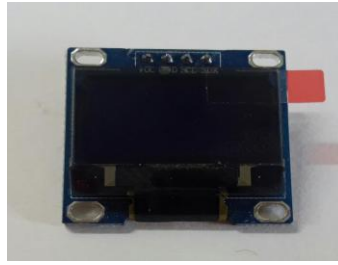


Fig.2 LED display

This display is made of 128x64 individual white OLED pixels, each one is turned on or off by the controller chip. Because the display makes its own light, no backlight is required. This reduces the power required to run the LED and is why the display has such high contrast. We really like this miniature display for its crispness.

This breakout can be used with either an SPI or I2C interface - selectable by soldering two jumpers on the back. The design is completely 5V-ready, with an onboard regulator and built in boost converter. It's easier than ever to connect directly to your 3V or 5V microcontroller without needing any kind of level shifter.

Table 1 Specifications of LED display

Technical details:-	
PCB	38mm x 29mm (1.5" x 1")
Screen	25mm x 14 mm
Thickness	4 mm
Weight	8.5 grams

III. Regulator

A voltage regulator is used to produce a constant linear output voltage. It's generally used with AC to DC power supply. And also it can be used as well as a DC to DC voltage convertor.

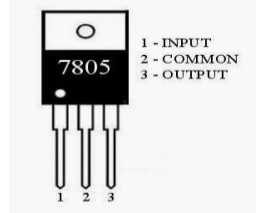
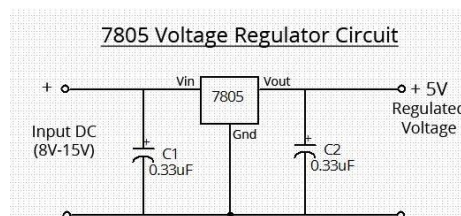


Fig. 3 Regulator



To regulating low voltage, most used device is one single IC. 7805, 7812, 7905 etc. 78xx series are design for positive and 79xx series are for Negative voltage regulator. **7805** is a three terminal +5v voltage regulator IC from 78XX chips family. See 7805 pin out below. LM78XX series are from National Semiconductor. They are linear positive voltage regulator IC; used to produce a fixed linear stable output voltage.

IV. RELAY DRIVER



Fig. 4 Relay driver

A Relay driver IC is an electro-magnetic switch that will be utilized at whatever point we need to utilize a low voltage circuit to switch a light ON and OFF which is associated with 220V mains supply. The expected current to run the transfer loop is more than can be provided by different coordinated circuits like Op-Amp, etc. Relays have exceptional properties and are supplanted with strong state switches that are solid than strong state gadgets. High present limits, ability to stand ESD and drive circuit detachment are the one of kind properties of Relays. There are different approaches to drive relays.

V. DC MOTOR



Fig. 5 MOTOR

DC or direct current motor works on the principal, when a current carrying conductor is placed in a magnetic field; it experiences a torque and has a tendency to move. This is known as motoring action. If the direction of current in the wire is reversed, the direction of rotation also reverses. When magnetic field and electric field interact they produce a mechanical force, and based on that the working principle of DC motor is established. In our project DC motor is using as engine starter which would be connected to crank of the engine.

VI. BUZZER/ALARM



Fig. 6 Buzzer / Alarm

Buzzer is the convenient sound generator utilized as a part of electronic circuits to give sound sign. It is broadly utilized as caution generator in electronic gadgets. It is accessible in different sorts and size to suit the prerequisites. A Piezo bell has a Piezo circle and an oscillator inside. At the point when the ringer is controlled, the oscillator creates a recurrence around 2-4 kHz and the Piezo component vibrates as needs be to deliver the sound. A conventional Piezo bell works between 3 – 12 volts DC.

VII. MQ-03 ALCOHOL SENSOR

This alcohol sensor is appropriate for distinguishing liquor fixation on your breath, much the same as your normal breathalyzer.



Fig. 7 Alcohol sensor

It has a high affectability and quick reaction time. Sensor gives a simple resistive yield in view of liquor fixation. The drive circuit is extremely straightforward; all it needs is one resistor. A basic interface could be a 0-3.3V ADC.

4. BLOCK DIAGRAM

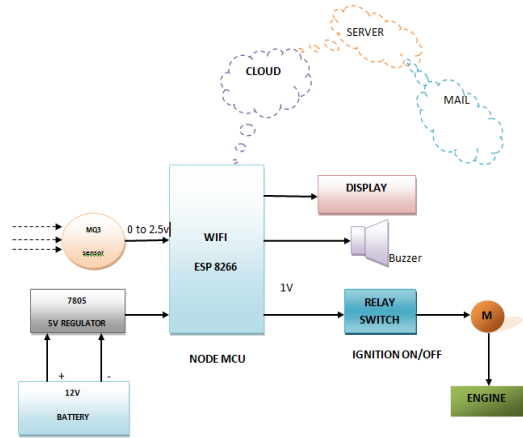


Fig. 8 Block diagram of alcohol sensing system

5. CIRCUIT DIAGRAM

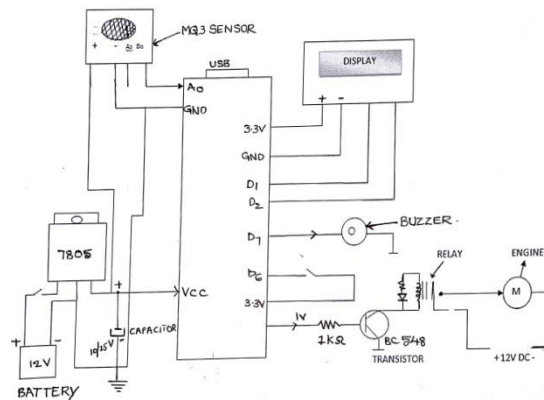


Fig. 9 Circuit diagram of Alcohol sensing system

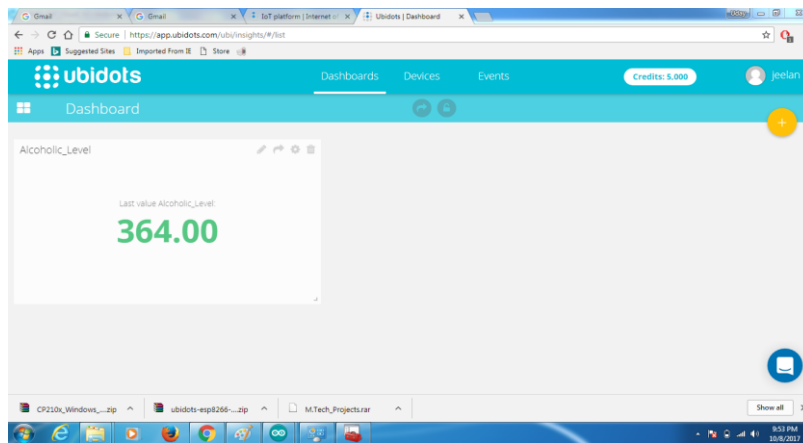
6. WORKING

An alcohol sensor recognizes the mindfulness of liquor gas noticeable all around and analog voltage is an output reading. The sensor can actuate at temperatures going from - 10 to 50° C with a power supply is under 150 mamp to 5V. The detecting range is from 0.04 mg/L to 4 mg/L, which is appropriate for breathalyzers.

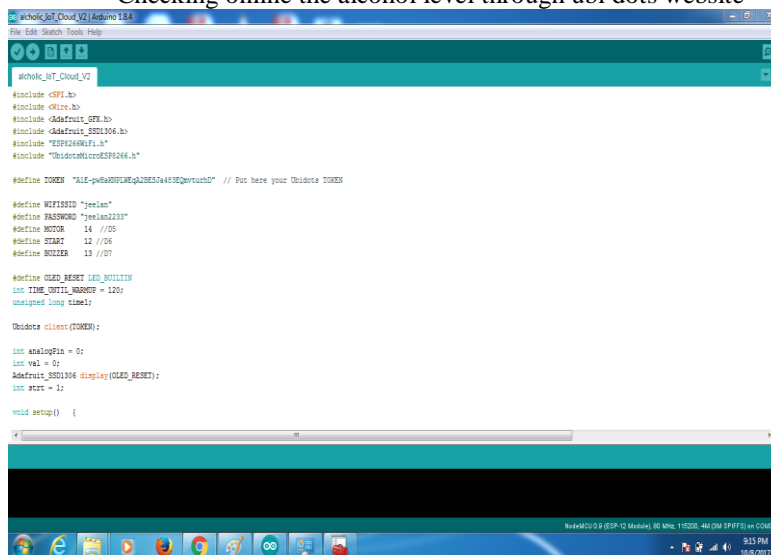
The MQ-3 alcohol gas sensor comprises of aggregate 6-pins including A, H, B and the other three pins are A, H, B out of the aggregate 6-pins we utilize just 4 pins. The two pins A, H are utilized for the warming reason and the other two pins are utilized for the ground and power. There is a warming system inside the sensor, which is comprised of aluminium oxide, tin dioxide. It has warm curls to create warmth, and along these lines it is utilized as a heating sensor. The beneath outline demonstrates the stick chart and the setup of the MQ-3 alcohol sensor.

The MQ-03 alcohol sensor comprises of a tin dioxide (SnO₂), a point of view layer inside aluminium oxide smaller scale tubes (measuring cathodes) and a warming component inside a tubular packaging. The end face of the sensor is encased by a stainless steel net and the posterior holds the association terminals. Ethyl liquor introduce in the breath is oxidized into acidic corrosive going through the warmth component. With the ethyl liquor course on the tin dioxide detecting layer, the protection diminishes. By utilizing the outer load protection the protection variety is changed over into an appropriate voltage variety.

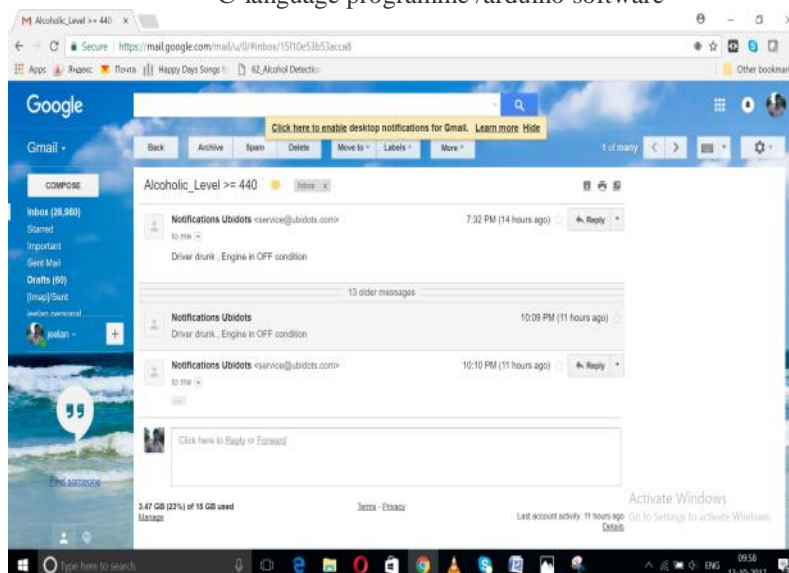
When alcohol detected by the sensor, the micro controller ESP 8266 sends required voltage to the buzzer, so that it sounds continuously and percentage of alcohol would be monitored through the display. Ignition on and off condition monitored by the micro controller through relay switch. According to the programme, the normal default limit fixed at 440 points. Buzzer, relay switch activates and performs their respective job. In addition to that, the micro controller is connected to the server (UBIDOTS), through wifi. So that it sends an alert message / mail to the vehicle owner. Here a programme in C Language has designed in such way that, whenever the limit of alcohol content exceeds 440, mail through the cloud and server would be sent to the owner's mail. So that further action can be taken.



Checking online the alcohol level through ubi dots website



C-language programme /arduino software



Mail alert from Ubidots website

7. RESULT:

The “Ignition Interlock by Alcohol Breath Analyser using IOT Technology” was designed such that the driver alcohol content is transmitted to the owner on his mobile phone as a short message (SMS) at his request. The microcontroller gets the information regarding the alcohol through the alcohol sensor and alerts about the condition being sensed using Buzzer and also automatically the motors of the vehicle turns OFF using relay switch.

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