Project report submitted in partial fulfillment for the Degree of B. Tech in Applied Electronics & Instrumentation Engineering under Maulana Abul Kalam Azad University of Technology

SMART HELMET: AUTOMATIC ENGINE LOCKING THROUGH ALCOHOL DETECTION

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CERTIFICATE OF APPROVAL

The project report titled "**SMART HELMET: AUTOMATIC ENGINE LOCKING THROUGH ALCOHOL DETECTION**" prepared by **Anzar Ashraf Khan**, AEIE2015/041, **Joyeeta Das**, AEIE2015/001, **Pankaj Kumar Yadav**, AEIE2015/005, **Richa Kumari**, AEIE2015/052 and **Sourabh Singh**, AEIE2015/030 is hereby approved and certified as a creditable study in technological subjects performed in a way sufficient for its acceptance for partial fulfilment of the degree for which it is submitted.

It is to be understood that by this approval, the undersigned do not, necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein, but approve the project only for the purpose for which it is submitted.

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RECOMMENDATION

I hereby recommend that the project report titled "**SMART HELMET: AUTOMATIC ENGINE LOCKING THROUGH ALCOHOL DETECTION**" prepared by **Anzar Ashraf Khan**, AEIE2015/041, **Joyeeta Das**, AEIE2015/001, **Pankaj Kumar Yadav**, AEIE2015/005, **Richa Kumari**, AEIE2015/052 and **Sourabh Singh**, AEIE2015/030 be accepted in partial fulfillment of the requirement for the Degree of Bachelor of Technology in Applied Electronics & Instrumentation Engineering, RCC Institute of Information Technology.

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ABSTRACT

A Smart Helmet is a special idea which makes motorcycle driving safe than before. It is a way to stop starting of vehicles without wearing helmet or even if the Driver has boozed. In addition, it has a great feature of detecting accidents and informs specific people via SMS with Location and speed of the bike before the accident occurs with the help of GPS and GSM based tracking system, thus aiding the ambulance to reach the correct location in case of some mishappening.

The Nodemcu ESP8266 on encountering high alcohol signal from the alcohol sensor MQ3 stops the dc motor and the Buzzer Alarm gets on 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 and hence sends the GPS location of the bike to the registered mobile number.

This Project presents an innovative way of protecting automobiles from drunken drivers for safeguarding them. The system permits an alert to the owner on his mobile phone or mail as a short message (SMS) along with the GPS location of the bike at his request.

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Table 1.3a Platform used for coding part

SL NO	NAME
1	ARDUINO IDE

Hardware used:

Table 2.3b Specifications of Hardware part used

SL NO	NAME	SPECIFICATION
1	GSM	SIM 800
2	GPS	NEO 6M 0001
3	MOTOR DRIVER	L293D
4	ALCOHOL SENSOR	MQ-3
5	ESP8266 NODEMCU	-------
6	LCD DISPLAY	16x2
7	BUZZER ALARM	HT12D
8	VOLTAGE REGULATOR	LM7805
9	DIODES	BS170
10	LIMIT SWITCH	------

CONTENT

CHAPTER I: 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 vehicle would not accelerate any further. In this system we use a 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.

CHAPTER II: 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

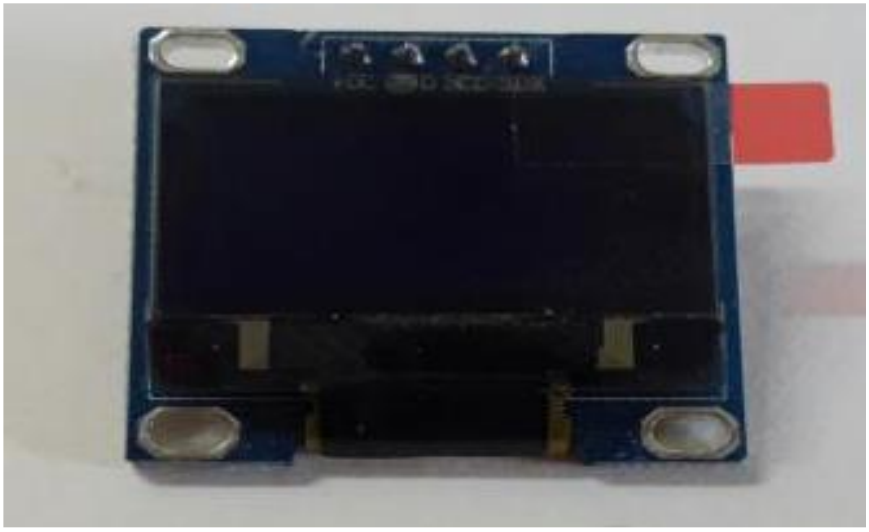


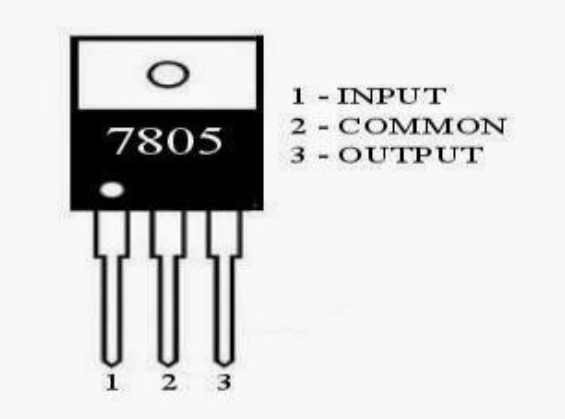
Fig.2 LED display

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

III. VOLTAGE REGULATOR(7805)

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.



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. L293D Module

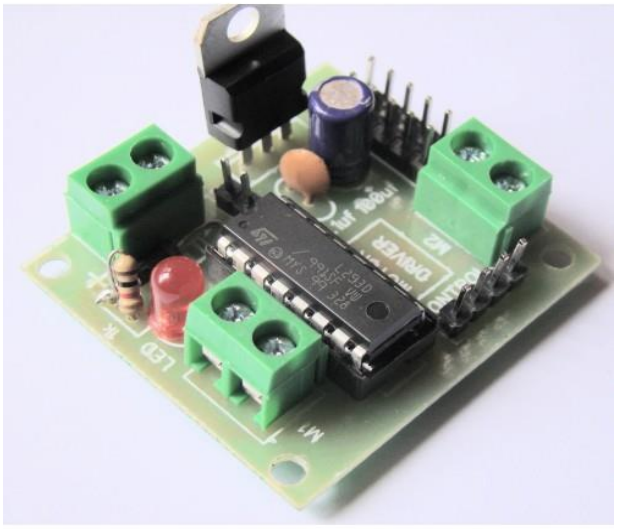


Fig. 4 L293 Module

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC.

The L293d can drive small and quiet big motors as well. It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to be flown in either direction. As you know voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction, Hence H-bridge IC are ideal for driving a DC motor.

In a single L293D chip there are two h-Bridge circuit inside the IC which can rotate two dc motor independently. Due its size it is very much used in robotic application for controlling DC motors. Given below is the pin diagram of a L293D motor controller.

There are two Enable pins on l293d. Pin 1 and pin 9, for being able to drive the motor, the pin 1 and 9 need to be high. For driving the motor with left H-bridge you need to enable pin 1 to high. And for right H-Bridge you need to make the pin 9 to high. If anyone of the either pin1 or pin9 goes low then the motor in the corresponding section will suspend working. It's like a switch.

V. DC MOTOR

Fig. 5 DC 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**

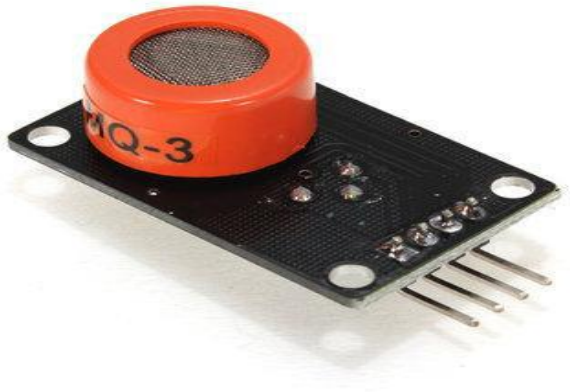


Fig. 7 Alcohol sensor

This module is made using Alcohol Gas Sensor MQ3. It is a low cost semiconductor sensor which can detect the presence of alcohol gases at concentrations from 0.05 mg/L to 10 mg/L. The sensitive material used for this sensor is SnO2, whose conductivity is lower in clean air. It's conductivity increases as the concentration of alcohol gases increases. It has high sensitivity to alcohol and has a good resistance to disturbances due to smoke, vapor and gasoline. This module provides both digital and analog outputs. MQ3 alcohol sensor module can be easily interfaced with Microcontrollers, Arduino Boards, Raspberry Pi etc.

This alcohol sensor is suitable for detecting alcohol concentration on your breath, just like your common breathalyzer. It has a high sensitivity and fast response time. Sensor provides an analog resistive output based on alcohol concentration. The drive circuit is very simple, all it needs is one resistor. A simple interface could be a 0-3.3V ADC.

VIII. GSM AND GPS MODULE

Fig. 8 GPS and GSM Module

GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services. Here we are using it only for transmitting and receiving the messages. GSM wireless data module is used for remote wireless applications, machine to machine or user to machine and remote data communications in many applications. Microcontroller sends AT commands to GSM modem and accordingly it operates.

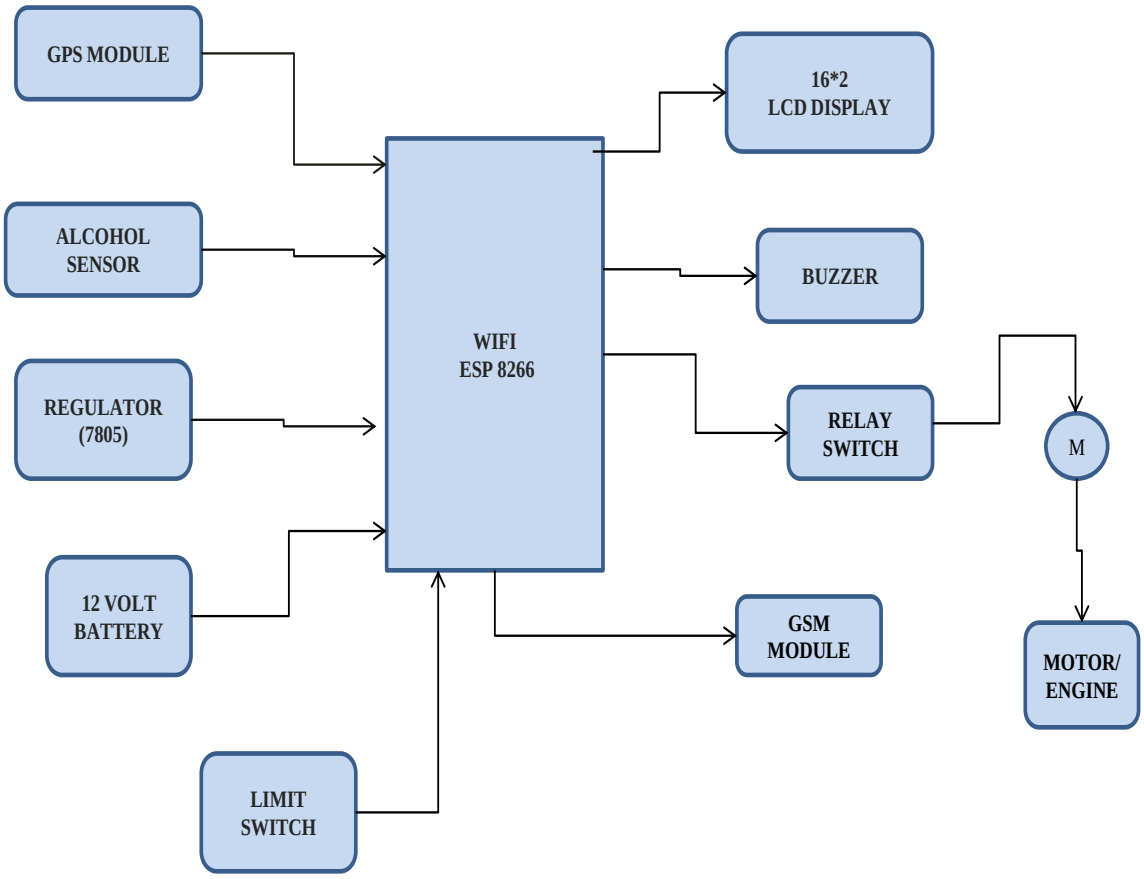
The GPS concept is based on time and the known position of specialized satellites. The satellites carry very stable atomic clocks that are synchronized with one another and to ground clocks. Any drift from true time maintained on the ground is corrected daily. Likewise, the satellite locations are known with great precision.

IX. LIMIT SWITCH

The limit switch is placed inside the helmet which gets pressed when the rider wears helmet and actuates the system. It checks the presence of Helmet

Fig. 9 Limit Switch

CHAPTER III: BLOCK DIAGRAM



CHAPTER IV: 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.

CHAPTER V: RESULT

The “Smart helmet: Automatic Engine Locking through Alcohol Detection” 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.

FLOWCHART OF EVENTS:

Fig. Ignition of bike

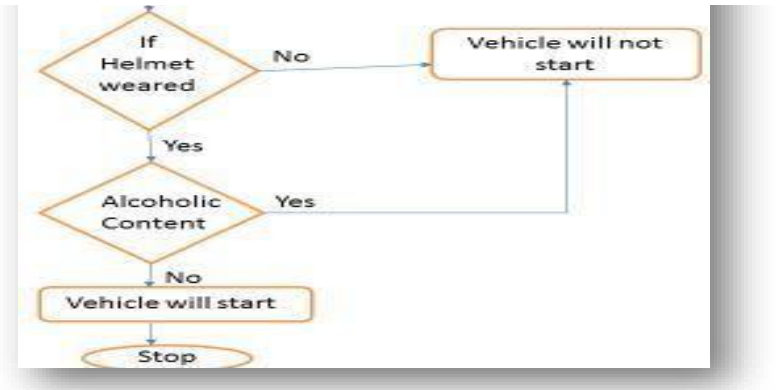


Fig. When accident takes place

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APPENDIX

CODING PART(SOFTWARE)

```
const int leftForward = 5;
const int leftBackward = 4;
const int rightForward = 0;
const int rightBackward = 2;
void setup()
{
   Serial.begin(9600);
  pinMode(leftForward,OUTPUT);
  pinMode(leftBackward,OUTPUT);
  pinMode(rightForward,OUTPUT);
  pinMode(rightBackward,OUTPUT);
}
 void loop()
{
  float sensorVoltage;
  float sensorValue;

  sensorValue = analogRead(A0);
  sensorVoltage = sensorValue/1024*5.0;

  Serial.print("sensor voltage = ");
  Serial.print(sensorVoltage);
  Serial.println(" V");
  delay(1000);
```

```
if(sensorVoltage<3.97){

  digitalWrite(leftForward,HIGH);
  digitalWrite(leftBackward,LOW);
  digitalWrite(rightForward,LOW);
  digitalWrite(rightBackward,LOW);
  }

  if(sensorVoltage>3.97){

  digitalWrite(leftForward,LOW);
  digitalWrite(leftBackward,LOW);
  digitalWrite(rightForward,HIGH);
  digitalWrite(rightBackward,LOW);
  }
  }
```