IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, October 2022
Impact Factor: 6.252

Experimental Analysis of Alcohol Detection in Open and Closed Vehicle

Mahesh Buradkar[1], Amit Sanjay Girpunje[2], Saurabh Arun Jambhule[3], Abhilash Vijay Chahare[4], Piyush Premdas Borkar[5]
Assistant Professor, Department of Mechanical Engineering[1]
U.G. Students, Department of Mechanical Engineering[2,3,4,5]
Rajiv Gandhi College of Engineering Research and Technology, Chandrapur, Maharashtra, India

Abstract: *The current scenario shows that the most of the road accidents are occurring due to drunk-driving. The drivers who drink alcohol are not in a stable condition and so, rash driving occurs on highway which can be risky to the lives of the people on road, the driver inclusive. This paper presenting an Experimental Analysis of Alcohol detection in open and closed vehicle. (Here we used Royal Stage and Royal Challenge whisky). Here we set the alcohol limit 180 ml to the sensor and reading is taken on 60,120 and 180 ml. After testing, it is observed that when the alcohol quantity is 120ml, we can allow the driver to drive but when the quantity more than 180ml, the buzzer sound and the reading observed above the set limit. The performance testing found by us is satisfactory in both open and closed car .There are so many technics of alcohol detection available but here we are giving practical approach. It will definitely be effective and beneficiary to the society.*

Keywords: Alcohol quantity, Vehicle, Experimental, Temperature, Testing

I. INTRODUCTION

One major reason of deaths on Indian roads is accidents due to drunken driving. This happens because of drunk people being able to take control of vehicle even after being drunk. This problem can be solved by proving experimental analysis. Whenever alcohol of certain quantity is detected in the driver's breath, sensor shall sense his condition and turn on the buzzerand a message "driver is drunk" is flashed on the LCD screen which can be installed in the system, so that nearby people can interpret gravity of the situation and inform the concerned authorities to avoid any kind of incident. [1] For that more analysis is required to perform the system effectively when the driver is drunk. Various experiment is required to find out the performance and effectiveness of the system to implement. But we have present experimental analysis with theMQ3 sensors.

II. LITERATURE REVIEW

1. Alcohol detection and vehicle ignition locking system - This paper shows an improved alcohol detection for use in an automobile ignition locking system using Arduino. A temperature sensor is used to measure the normal temperature as human breath. A sensor reads a specific volume of the breath sample, andmeasure the alcohol content. The result of this paper is used as part of an overall automobile ignition locking system which prohibits starting the car when the operator is intoxicating.
2. Vehicle Engine Lock System for Theft and Alcohol Detection -This system is used to detect the alcohol percentage level of the driver. The alcohol percentage of the driver is detected by using the MQ3 sensors embedded in the steering of the vehicle. The breath of the driver is sensed through this sensor and the alcohol content is the blood is analyzed. If the alcohol content is above the predefined value, the car does not start. This system is work to sense only the person sitting in the driver's seat not for passenger. It is also used to track the theft of the vehicle if there using the figure print recognition technique. This is done by measures of the sensors connected to the NodeMCU Arduino micro controller where it is programmed to give a buzzer sound when the driver is drunk or theft to the vehicle.
3. Alcohol Detection and Ignition Interlock System - This system analyses the blood alcohol consumption of the driver and acts according to the results which reduces road accidents. Aa device which is placed on the

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, October 2022
Impact Factor: 6.252

dashboard of the vehicle on either sides of the steering, detects Blood Alcohol Consumption of the driver when he/she blows in it to start the vehicle which is followed by ignition interlocking if it finds the driver is intoxicated.

4. Health Monitoring with Alcohol Detection and Ignition Control System using IoT–This system monitor the level of alcohol consumption and heart beat rate. If the driver is identified with drunken drive, then the vehicle ignition system will stop which makes the drunken driver unable to move the vehicle resulting in accident prevention. And also, If the heart is not working as normal heart beat rate, then the current status of the driver is send to their friendsusing IoT.
5. Alcohol Detection System in Vehicle Using Arduino - developed by integrating alcohol sensor with Arduino board. Arduino processor ATmega328. This sensor has fine sensitivity range around 2 meters, it can suit to any vehicle and can easily be hidden from the suspects.
6. Intelligent alcohol detection system for car drivers–In this paper the Alcohol Gas Sensor is used to sense the consumption of alcohol by the driver and this data is also given to ADC(Analog-to-Digital Converter).If the driver is tired and feeling sleepy, the eye blink sensor shall sense his condition and turn on the buzzer. The tilt sensor is also used to detect whether the vehicle is going in a normal condition or not. GSM (Global System for Mobile communication) and the GPS module is used to detect vehicle location.

III. AIM, NEED AND OBJECTIVE

3.1 Aim

The main Aim of this project is to reduce the accidents caused by drunk and drive.

3.2 Need

The main purpose behind this project is “Drunk driving detection”. Now a days, many accidents are happening because of the alcohol consumption of the driver or the person who is driving the vehicle. Thus, drunk driving is a major reason of accidents in almost all countries all over the world.

It has been known that alcohol use impairs driving skills and increases accident risk. It has been found that while driving under the influence of alcohol, the risk of having an accident-causing injury or death increases exponentially. The estimates produced by the European Commission convey that every year at least 10,000 people in the European Union die in road accidents caused by alcohol [2]. Alcohol-impaired driving accidents contribute to approximately 31% of all traffic fatalities in the USA [3].In China, Li et al. revealed that about 34.1% of road accidents were alcohol related [4].

3.3 Objective

The target of this project is to give an idea and experimental method for avoiding drunken driving of a car. We need to plan a sort of framework which can recognize the alcohol content in the open and closed cars to prevent the conduct of alcoholic driving. The project is to set up intelligent innovations for Go-cart and Chevrolet Sail UVA vehicles to produce alert as the notice and message will be shown in LCD display as drunken driver. Another objective is to utilize alcohol sensor as the primary sensor to sense the presence of alcohol gas noticeable all around.

IV. PROBLEM STATEMENT

There are very few research has been done on this topic but no one has given practical approach. By reading above literature it is seen that some work has done in closed car. So there is a gap to do the experimental work in open car. By identifying this problem we will use open and closed car both for the detection of alcohol percentage when the driver is drunk.

V. WORKING PRICIPAL OF ALCOHOL DETECTION SYSTEM

The Alcohol Detection system works on a simple principle. Here we attached sensor on the centre of the steering. If a driver has been drinking, the alcohol breath analyzer sensor will detect the level of alcohol in the driver's breath and if it crosses a set threshold, an alert will come. This Project is based on the Principle of Alcohol Detection by the Alcohol

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, October 2022
Impact Factor: 6.252

Sensor (MQ3)sensor which detects ethanol in the air. When a drunk person breathes near the alcohol sensor it detects the ethanol in his breathe and provides an output based on alcohol concentration. If there is more alcohol concentration more LEDs would lit. A limit of alcohol is being set on the sensor which means it will only allow till the set limit drunken driver to drive the vehicle. As soon as the value will reach beyond the set value, the buzzer will start to give indication in the LEC screen that attached to the steering. Here we used open card vehicle.

Fig. 5.1 Actual model of alcohol detection system with open cart

VI. PERFORMANCE TESTING

We carried out testing in various ways. Firstly, we tested the performance of our project without mounting the sensor kit on the vehicle. When the results of the performance testing of the vehicle were satisfactory observed, then we mounted the sensor kit on the vehicle and carried out the testing.

Figure 6.1: Testing of the alcohol detection system

6.1 Testing on the Cart

We brought a man and let him consume the alcohol in quantity as per our requirement and let him to sit on the project vehicle and after that we noted the readings at regular interval of 15 minutes and we observed the following readings.

- Alcohol Sensor set limit – 1.20%
- Alcohol brand – Royal Stage
- Time interval – 15 min during 1 peg
- Test person age – 24 years
- Test person weight – 70 kg
- Test person height – 163 cm

Table 6.1: Observation table of various quantity of alcohol and distance from steering from the test person and reading obtained in percentage.

Sr. No	Quantity (In mm)	Distance from the steering (In cm)	Readings obtained (In %)
1	60	43	0.90
		30	0.94
		15	0.97
2	120	43	1.01
		30	1.13

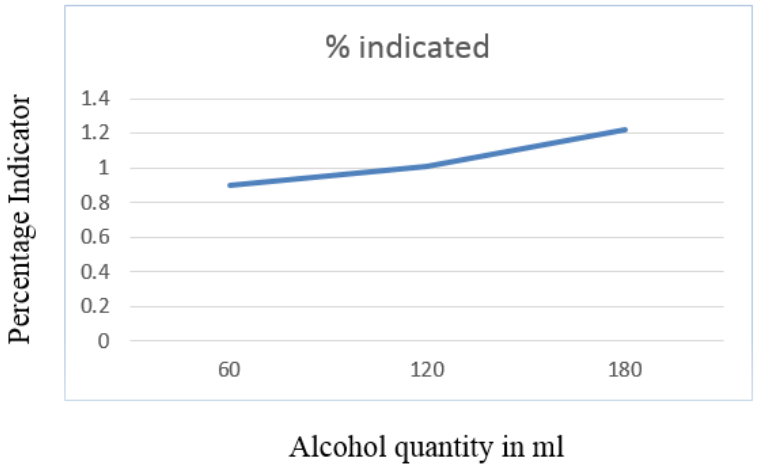
IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, October 2022
Impact Factor: 6.252

		15	1.18
3	180	43	1.22
		30	1.32
		15	1.48

6.2 Chart on various quantities of alcohol with same steering distance.

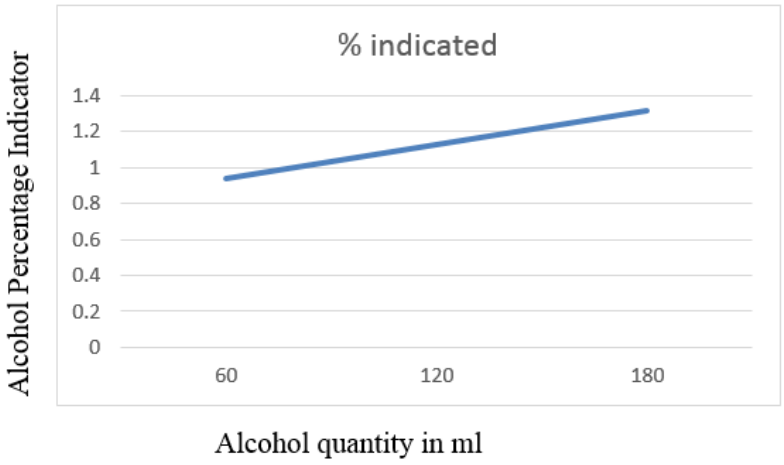
Distance from steering is 43 cm

Alcohol Quantity (in ml)	Steering distance (cm)	% indicated
60	43	0.9
120	43	1.01
180	43	1.22



Distance from steering is 30 cm

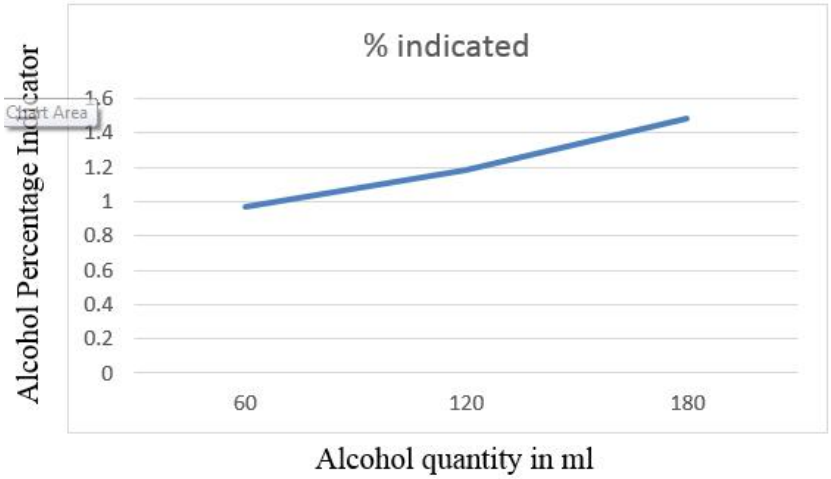
Quantity(In ml)	Steering distance (cm)	% indicated
60	30	0.94
120	30	1.13
180	30	1.32



IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, October 2022
Impact Factor: 6.252

Distance from steering is 15 cm

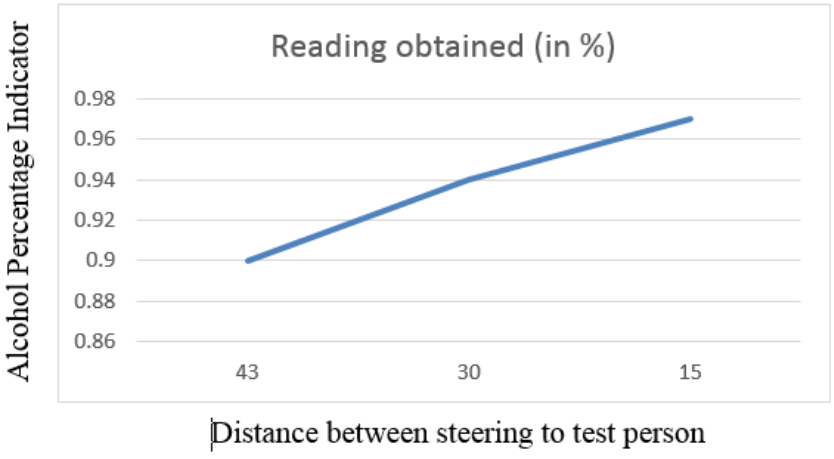
Quantity(In ml)	Steering distance (cm)	% indicated
60	15	0.97
120	15	1.18
180	15	1.48



6.3 Chart of distance from the steering to test person on the various quantity of alcohol.

Alcohol quantity is 60 ml

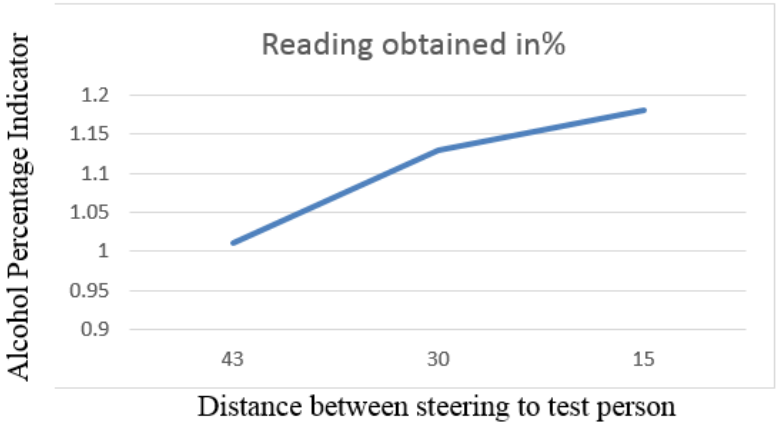
Distance from the steering (In cm)	Readings obtained (in %)
43	0.9
30	0.94
15	0.97



Alcohol quantity is 120 ml

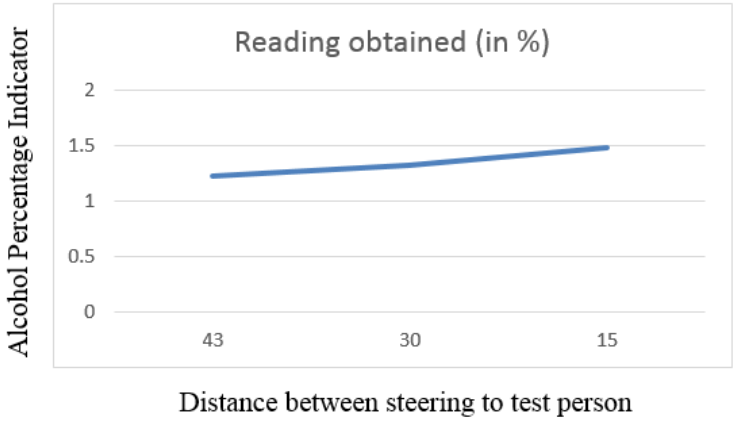
Distance from the steering (In cm)	Readings obtained (in %)
43	1.01
30	1.13
15	1.18

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, October 2022
Impact Factor: 6.252



Alcohol quantity is 180 ml

Distance from the steering (In cm)	Readings obtained (in %)
43	1.22
30	1.32
15	1.48



6.4 Result

It is found that when alcohol quantity is taken as 60 ml, there is no indication of the buzzer found. Then we increased the alcohol quantity by 60 ml. After 120 ml again no indication of the buzzer found but the reading increases that means when we increase the quantity of the alcohol then the % of the alcohol reading obtained also increases. Then again, we increase the alcohol by 60 ml. That means when 180 ml of alcohol is consumed by the test person then the first reading obtained is gone beyond the set limit and the buzzer starts indicating at all the varying distances i.e., 43 cm, 30 cm, 15 cm from the steering, again it is seen that as the person sits as closer to the steering, the sensor reads fastly as shown in the readings.

As it is found the when the alcohol quantity is set on 180 ml, the reading obtained et the varying distances are all crossing the set alcohol limit. Hence, the Ignition of the vehicle is automatically locked and the vehicle is turned off. When the sensor will detect no alcohol then only the vehicle will start and move forward. Hence there is no chance of accident.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, October 2022
Impact Factor: 6.252

Fig. 6.4.1 Initial reading of the sensor

6.5 Testing on Chevrolet Sail UVA Car

- Alcohol limit –1.20%
- Alcohol brand –Royal Challenger (RC)
- Distance from the steering is kept constant – 35cm
- Time interval – 15 min during 1 peg
- Test person age – 45 years
- Test person weight – 110 kg
- Test person height – 165 cm

Fig. 6.5.1 Mechanism of the testing

Fig. 6.5.2 Test person in the vehicle

Table 6.2: Observation table of Sell UVA vehicle

Sr. No	Alcohol quantity in ml	Alcohol percentage obtained	
		Normal reading of sensor	Without AC
1	60	0.71	0.96
2	120	0.71	1.12
3	180	0.71	1.25

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, October 2022
Impact Factor: 6.252

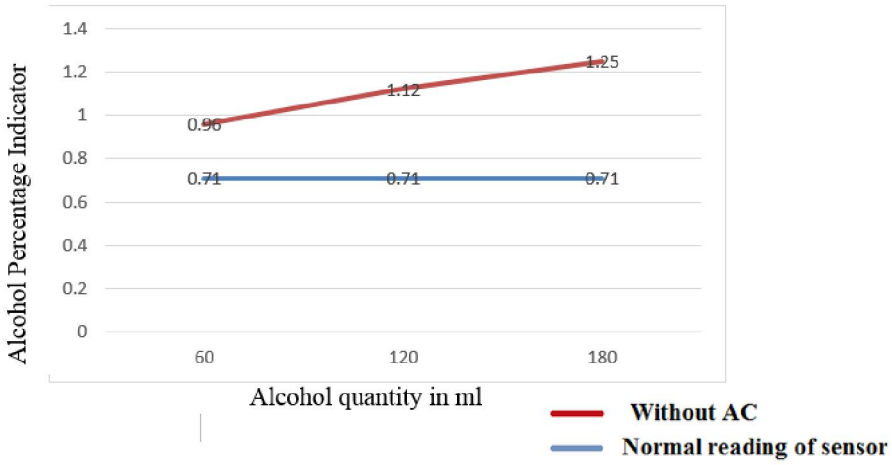


Fig. 6.5.3 Result of the testing

6.6 Result

For the experiment we have used closed vehicle ie., Sell UVA from Chevrolet, It is found that as compared with our open cart, the reading in the closed vehicle is more precise as no external factor other than temperature is affecting the testing. We have noted both temperatures, the temperature inside the car and the atmospheric temperature and it is found that the atmospheric temperature is less than the temperature inside the car because half an hour before the testing there was heavy rainfall. That is why surrounding temperature was less and we carried out testing without starting the car on road it was in stable condition. After the testing it had been observed that that when the alcohol quantity is 120 ml, the reading we got was just closer to the set limit hence, we can allow the driver to drive but when the quantity is reached at 180 ml, the reading we got are above the set limit and hence the ignition is automatically locked and the vehicle is turned off.

VII. CONCLUSION AND FUTURE SCOPE

When the alcohol quantity s set on 180ml, the reading obtained at all the distance are crossing the set alcohol limit and the ignition of the vehicle is automatically locked and the vehicle is turned off. When the sensor will detect no alcohol then only the vehicle will start and will move forward. Hence, there is no chance of accident. The performance testing of our project was successfully done, but as our vehicle is open cart, many errors occurred during the testing such as temperature error, moisture, atmospheric gases etc. and many other. To overcome these errors and to make our project more efficient, we also tested our sensor kit separately in a closed vehicle. It is found that as compared with our open cart, the reading in the closed vehicle is more precise as no external factor other than temperature is affecting the testing. We have noted both temperatures, the temperature inside the car and the atmospheric temperature and it is

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, October 2022
Impact Factor: 6.252

found that the atmospheric temperature is less than the temperature inside the car because half an hour before the testing there was heavy rainfall. That is why surrounding temperature was less and we carried out testing without starting the car on road it was in stable condition. After the testing it had been observed that that when the alcohol quantity is 120ml, the reading we got was just closer to the set limit hence, we can allow the driver to drive but when the quantity is reached at 180ml, the reading we got are above the set limit and hence the ignition is automatically locked and the vehicle is turned off.

It is concluded that the performance testing carried by us is successful at both the stages in open cart and closed car but we are not satisfied with this. Hence, in future it can be tested in other ways and can be modified as per the requirement. In future scope we can implement GSM technology with an alcohol detector. So Alcohol detection & vehicle controlling through text SMS will inform the relatives or owners of the vehicle about the alcohol consumption. We can implement GPS technology so that once alcohol detection is done, the system will find out the location of the vehicle. We can implement this on heavy vehicles as many of the major accidents mainly happens with the heavy vehicle. This system used only 2 brand of alcohol, we can used various brand of alcohol and in different atmospheric condition. This system in future can be test in many other ways and can be implemented in various other source by modifying it as per the requirement needed.

REFERENCES

[1]. P. Ranjana, Rajeswari Mukesh, Achhint Kumar, N.N.S.S.Sujith, C.H.Sathyasai, Vehicle Engine Lock System for Theft and Alcohol Detection, International Journal of Recent Technology and Engineering (IJRTE)February 2019.

[2]. European Commission, "Saving 20000 lives on our roads," Tech. Rep. COM 2003/311, European Road Safety Action Programme, Luxembourg, 2003.

[3]. NHTSA, "Assessing the feasibility of vehicle-based sensors to detect alcohol impairment," Tech. Rep. DOT HS, 811 358, National Highway Traffic Safety Administration, US Department of Transportation, Washington, DC, USA, 2010.

[4]. Y. Li, D. Xie, G. Nie, and J. Zhang, "The drink driving situation in China," Traffic Injury Prevention, vol. 13, no. 2, pp. 101–108, 2012.(2002) The IEEE website.

[5]. Vasundhara Ramireddy, G. Varsha, A. Sharath Kumar, Alcohol Detection and Vehicle Ignition Locking System, International Journal of Mechanical Engineering and Technology (IJMET), Available online at http://iaeme.com/Home/issue/IJMET?Volume=9&Issue=9 ISSN Print: 0976-6340 and ISSN

[6]. Sadhana B, Yashwanth Nanduru, L Vihari, Ravi Kumar T, Venkata Naresh Mandhala, Alcohol Detection and Ignition Interlock System, International Journal of Engineering and Advanced Technology (IJEAT), ISSN: 2249 – 8958, Volume-8 Issue-4, April 2019.

[7]. G.Arun Francis, M.Wilson Wilfred, R.Sekar, Health Monitoring with Alcohol Detection and Ignition Control System using IoT, International Journal of Innovative Technology and Exploring Engineering (IJITEE), ISSN: 2278-3075, Volume-8 Issue-6S, April 2019