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IOT BASED SMART VEHICLE MONITORING SYSTEM

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Abstract **:** With the advancements in technology, several smart innovations are being introduced by automobile manufacturers across the world to enhance their product portfolio. Vehicle monitoring and tracking systems are implemented using iot platform acting as a medium for data transfer and visualization. The system is developed to monitor various driver help parameters like eye blinking, and vehicle speed parameters, the distance between the vehicles and tracking of the live location of the Vehicle. The Ultrasonic sensor is placed in the front part of the vehicle, if any two vehicles draw near to one another then an alert message is sent to the iot through. Accident detection and anti-theft systems are introduced in smart vehicles by using sensors connected to Arduino GPS and ESP modules are used to find vehicle location and send it to the owner phone through IoT system. The main objective of this system for vehicles is to anti-theft and establish a connection between vehicle and its user.

1. INTRODUCTION

Internet of Things (IoT) is nothing but the devices (things) communicating with each other by using the internet. IoT is a trend-setting innovation in which all the data from sensors is stored in the cloud where it can be easily accessed from the cloud. Sensors and actuators for gathering the data and sending across the internet are also included in this advancement. Das et al[1] proposed a vehicle accident and location monitoring system. This system provides a mechanism to reduce disasters by monitoring eye blinking of the driver, which indicates drowsiness, obstacles located in the road and the drunken state of the driver. Accident and the location of the vehicle are detected. By this system primary care is received as the accident information is available Anusha et al[2] implemented a system using LPC2148 and the system has features like storing in the database. The work includes GPS, GSM modules. The framework also detects Alcohol consumption and Engine Temperature, All the values can be seen on the Web page.so safety is provided to the travelers in the vehicle. Imteaj et al[3] developed an Android-based application that detects an accidental situation and sends an alert message to the nearest police station and medical care center. This application is organized with an external pressure sensor to extract the outward force of the vehicle body. Hence, the application plays an important role in Post-accident services and could lessen the effect due to an accident Mayuresh et al[4] described a system that uses an open source platform and intended to monitor and trace the location of a vehicle, the framework also checks fuel consumption, engine temperature and vehicle speed, GPS/GPRS/GSM modules are used for communication.

2. IOT BASED SMART VEHICLE MONITORING SYSTEM

2.1 BASIC BLOCK DIAGRAM

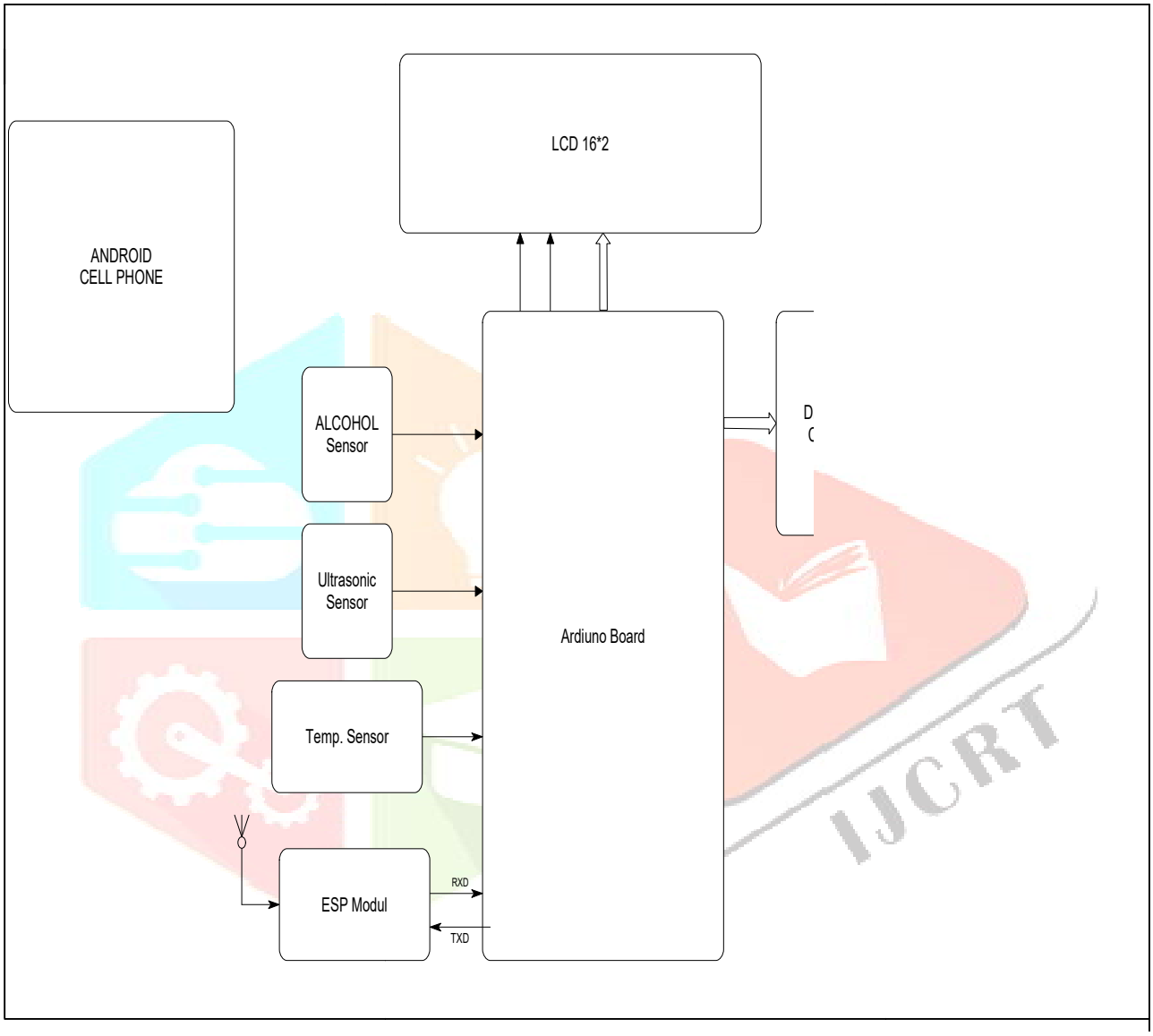

Fig. 1. Block Diagram

This project is mainly divided in 3 subsystems:
1. Arduino
2. Input Devices (Sensors, ESP Module)
3.Output Devices (LCD display, Buzzer)

3. SYSTEM REQUIREMENT

The microcontroller is the key component of the extend because it will control the sensors and transducers that monitor the vehicle. It'll moreover require a way to associate to the web and store sensor readings and plant settings. Beginning investigate into the conceivable gadgets required for this extend appeared that the microcontroller would need around 2 simple pins and 6 computerized pins. This required to be taken under consideration when selecting the board. However, these values were likely to alter as the venture advanced so the board required to be able to manage with that.

Selected controller is
1.Arduinouno

3.1 ARDUINO UNO

Arduino Uno is a microcontroller board which depends on the ATmega328P. Arduino UNO basically contains two microcontrollers first is ATmega 328 microcontroller IC and other is ATmega16U2 microcontroller IC/USB controller in this former is heart of this board and without other microcontroller you are not able to connect laptop or system with this Arduino UNO.It's frequency is 16Mhz and unlike 8051 it doesn't have a unique frequency level. ATmega 328 has an inbuilt RC phase shift oscillator which can generate itself 2Mhz to 8Mhz frequency. ATmega 328 is 8 bit microcontroller here 8 bit represents it can process 8 data lines or bits in single clock pulse and has inbuilt 32 kbits of memory. It has voltage regulator and is a RISC(Reduced Instruction Set Computer) base microcontroller is used in various devices as it is quite power efficient and also uses high optimal set of instructions. It has fourteen information pins of which 6 can be utilized as PWM outputs, I2C connectors, SPI ports, power jack, ICSP header and a reset pin.

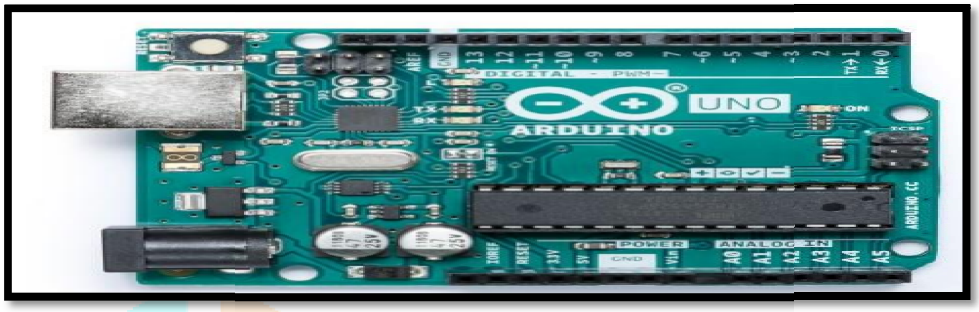

Fig. 2.Arduino NANO

3.2 GPS DEVICE

The Global Positioning System (GPS) is a space global navigation satellite (GNSS) that provides reliable location and time formation in all weather and times anywhere on the globe. The GPS satellites act as a reference point which receives on the ground detect.

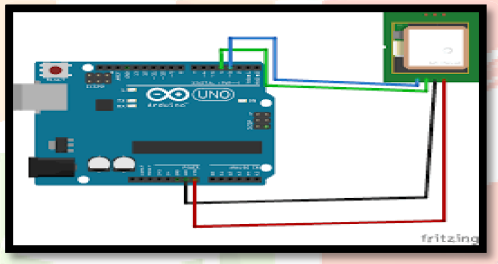

Fig. 3. GPS Interfacing with Arduino

3.3 HC-SR05 ULTRASONIC SENSOR

An ultrasonic sensor is an electronic device that measures the diatance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faaster than the speed of audible sound (i.e. the sound that humans can hear).

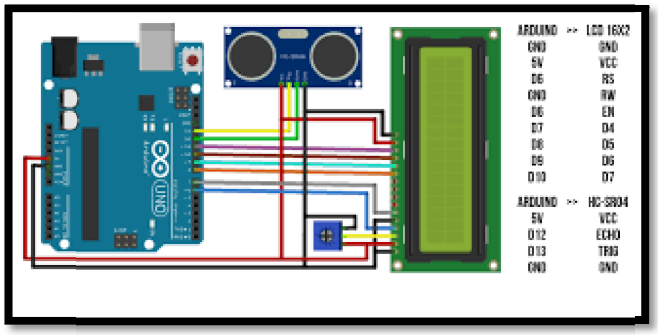

Fig. 4 Ultrasonic Sensor Interfacing with Arduino

3.4 MQ3 ALCOHOL SENSOR

MQ3 is one of the most commonly used sensors in the MQ sensor series. It is a metal Oxise Semiconductor (MOS) type of sensor. MOS sensors are also known as Chemiresistors, because sensing is based on the change of resistance of the sensing material when exposed to alcohol. So by placing it in a simple voltage divider network, alcohol concentrations can be detected.

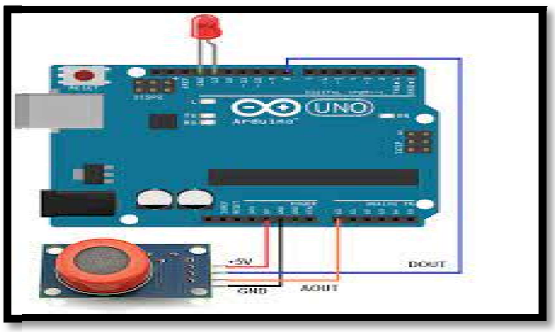

Fig. 5. MQ3 Interfacing with Arduino

3.5 ESP8266 Wi-Fi MODULE

It is a SOC (System On-chip) integrated with a TCP/IP protocol stack, which can provide microcontroller qccess to any type of Wi-Fi network.The maximum working voltage of the module is 3.3v so you cant supply 5v as it will fry the module.

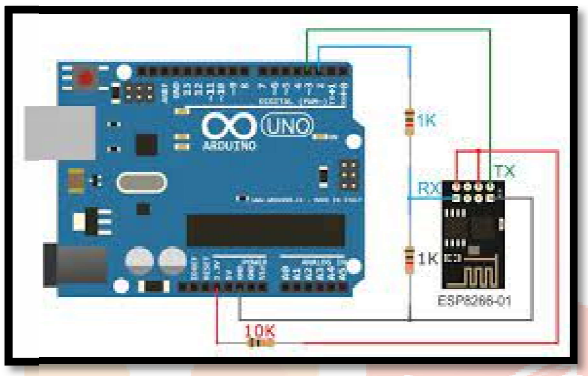

Fig. 6.ESP Module Interfacing with Arduino

4. CIRCUIT DIAGRAM

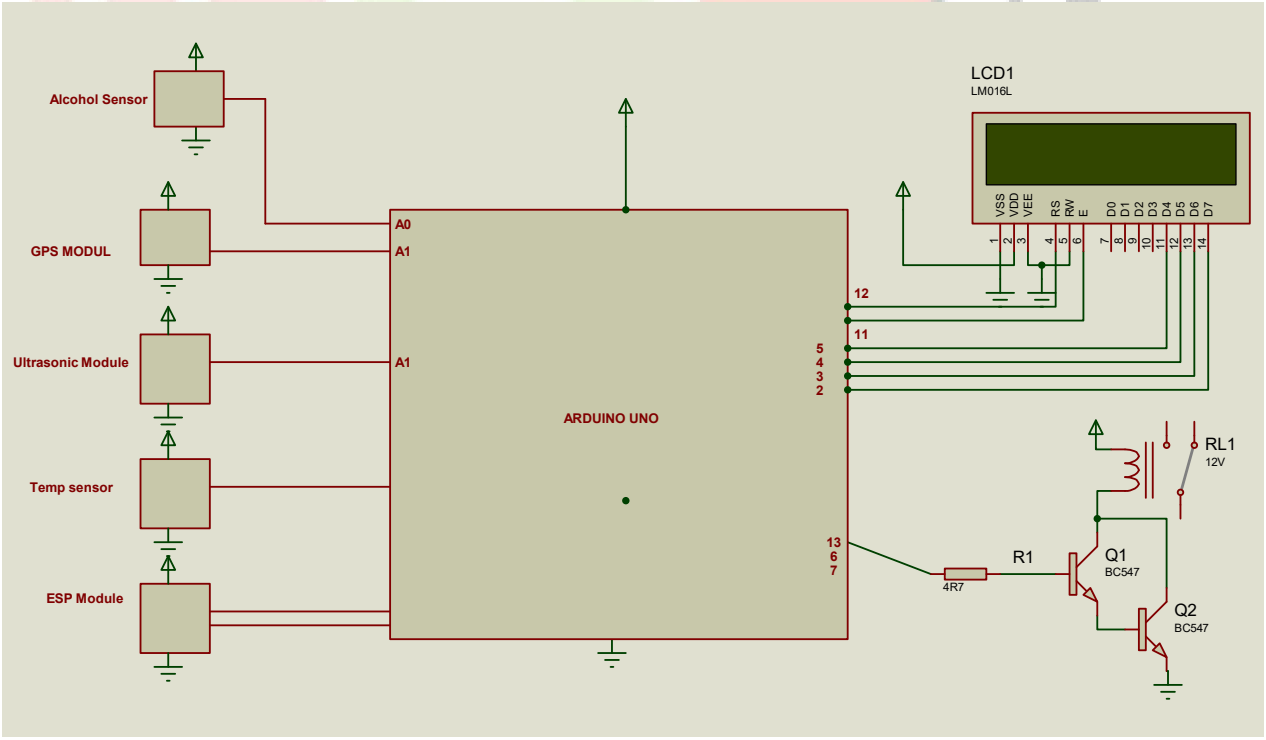

Fig. 7. Circuit Diagram

4.1 WORKING

An ultrasonic sensor is placed in the front part of the vehicle, if any vehicle draws near then alert message is sent to the mail via Blynk application. To avoid the sparks in the vehicle temperature sensor is utilized and it is placed in the engine part of the vehicle if the temperature inside the car increases then Notification is sent to mail through Blynk. If alcohol consumption is in high range then caution will be sent. If the person feels drowsiness then it is detected by IR sensor and alarm will be in on state and an alert is sent to mail saying the driver is in the drowsy state. The values of all the sensors are collected by ESP8266 as it has inbuilt Wi-Fi module all the data is transferred to the cloud through Wi-Fi and analysis is done in Blynk app and notifications are sent according to the conditions.

5. ALGORITHM :

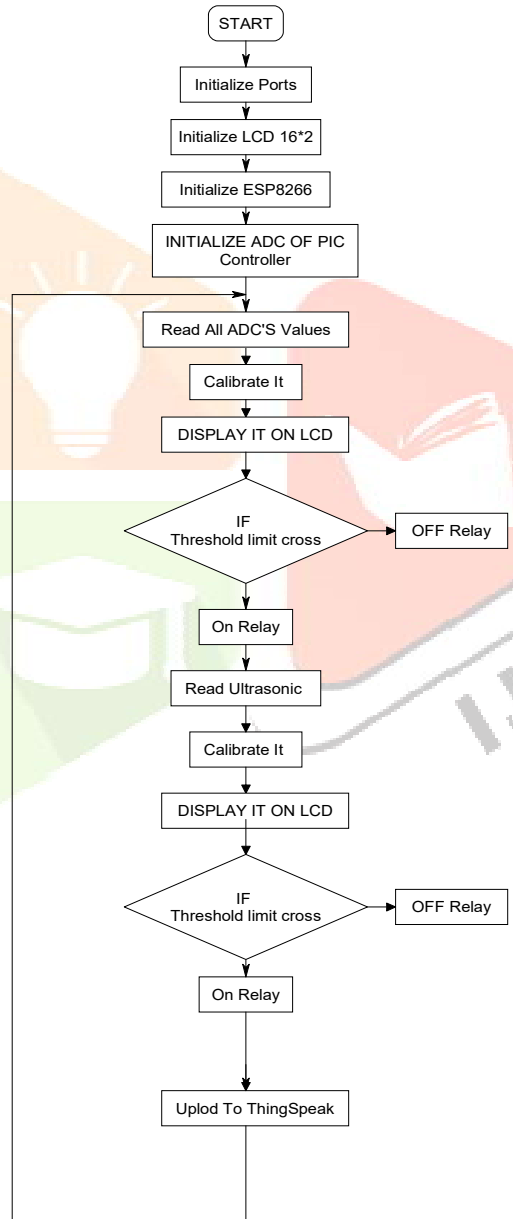

Fig. 8. Algorithm

5.1 .ALGORITHM EXPLANATION

1. Arduino Uno sets the variables declaration and ports input output that will be used in the program.
2. dAI, realValue, and multiply.
4. Declaration of LCD 16*2 in the program
5. Declaration of ESP8266 wifi module in the program
6. Declaration of ADC for reading sensors
7. Read adc value for temp and alcohol sensors in variable
8. Calibrate according temp and alcohol values
9. Display it on lcd
10. If alcohol values greeter than threshold values
11. On port pin Of relay
12. Otherwise Off relay
13. Read ultrasonic module dist.
14. Display it on lcd
15. If ultrasonic dist. values greeter than threshold values
16. On port pin Of relay
17. Otherwise Off relay
18. Upload all data on thigspeak id
19. Return to main

5.2 CONCLUSION :

Execution of Vehicle Checking and Following framework will be actualized utilizing Ultrasonic sensor, liquor sensor, IR sensor, Temperature sensor, esp8266 Module to extend the security of the driver and to dodge mischances, By utilizing this framework consistent checking of the driver conjointly the conditions of the car will be checked

6. OUTPUT

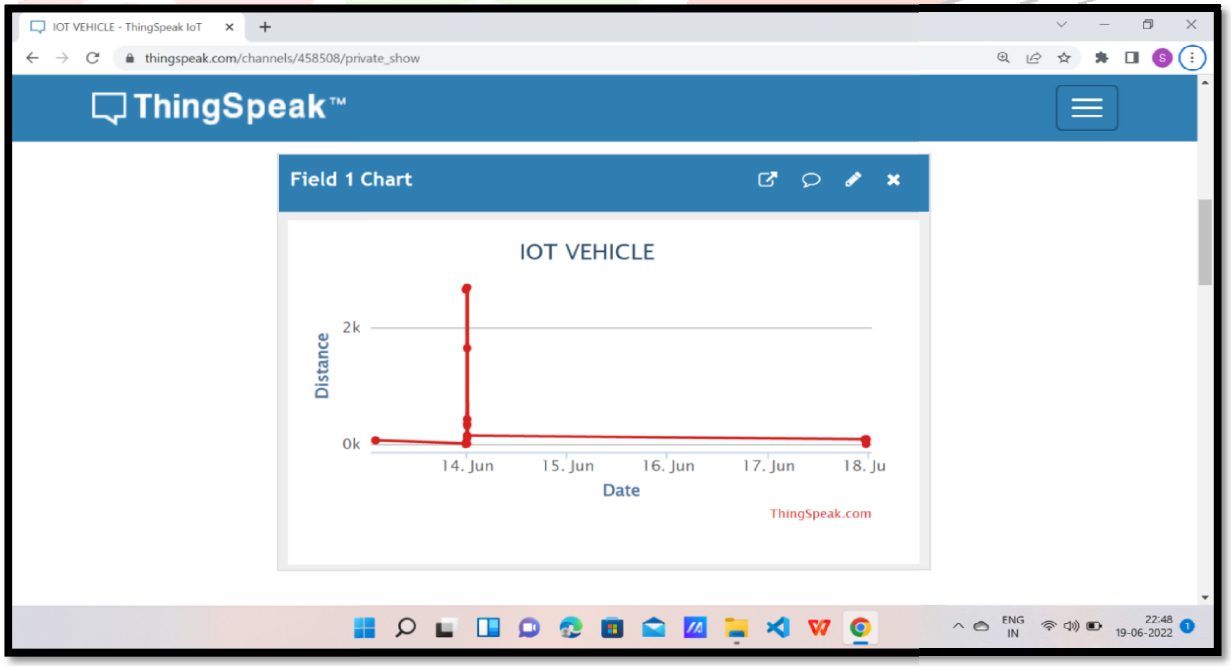

Fig.9. Output graph of distance sensor

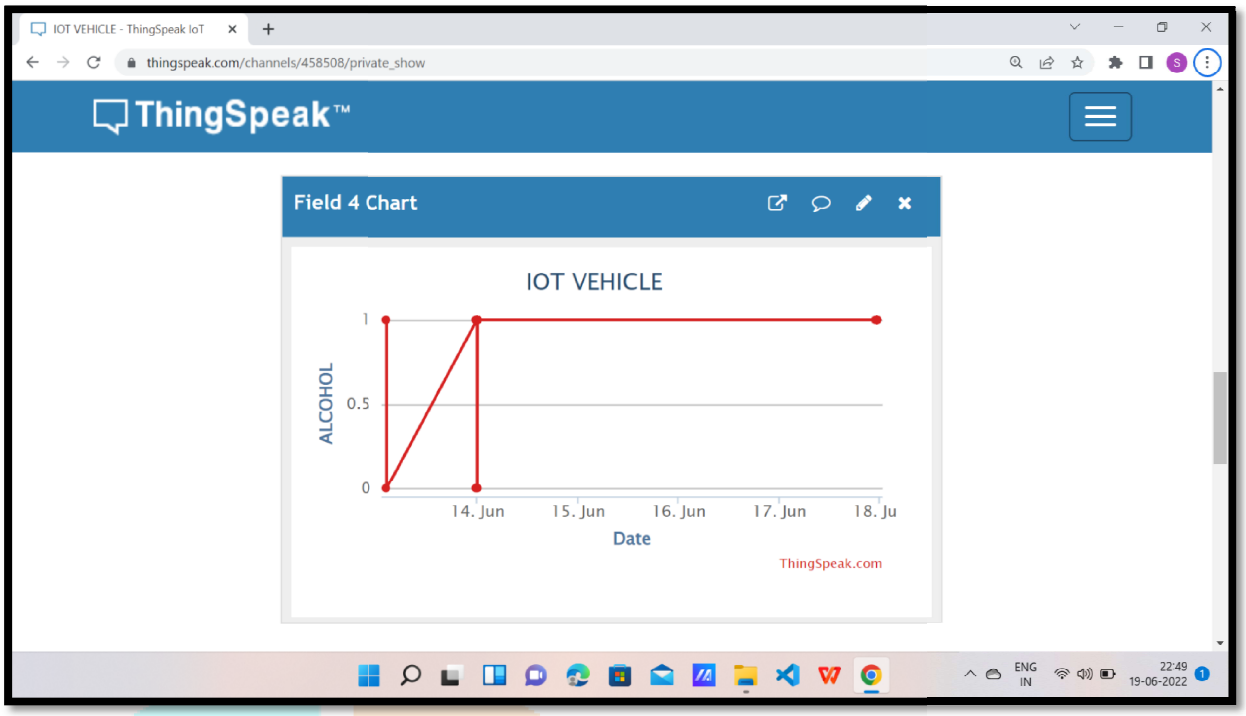

Fig. 10. Output graph of alcohol sensor

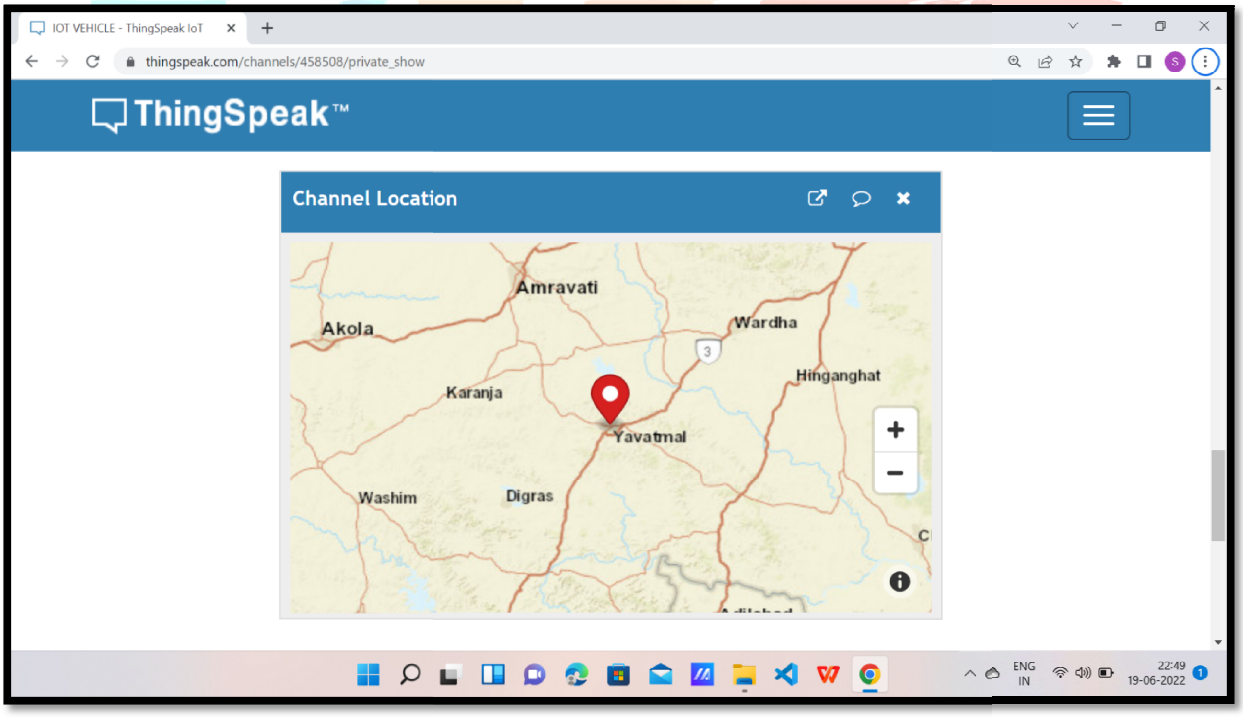

Fig. 11 . Output graph of GPS(location)

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