

# IOT



## Smart Iot Jar

-IOT PROJECT

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## OBJECTIVE

This **smart Jar** allows us to keep track of the stocks, and it is easily accessible from using the internet.

- Making the smart jar using the Iot(Internet Of Things)
- Applications of this Smart Jar.
- Using of Iot in this project.
- Components description and Usage.

## DESCRIPTION

The Jar includes an ultrasonic sensor at the top of it and uses the ultra-sonic reflected waves to figure out at what extent the Jar is filled and how much space is left inside the jar.



Whenever the amount of content changes in the jar, it is sensed by the NodeMCU, and the same is updated on the webserver. This can be helpful to track supplies and plan for restocking from anywhere in the world.

## Then Why is IoT?

The IoT brings the power of the internet, data processing and analytics to the real world of physical objects.

- ❖ Appliances can take instructions from that network with minimal human intervention.
- ❖ The basic elements of the IoT are devices that gather data. Broadly speaking, they are internet-connected devices, so they each have an **IP address**.
- ❖ Collecting the data is done by transmitting it from the devices to a gathering point. Moving the data can be done wirelessly using a range of technologies or on wired networks.
- ❖ The data can be sent over the internet to a data center or a cloud that has storage and compute power or the transfer can be staged

# COMPONENTS REQUIRED

- NodeMCU ESP8266
- Ultrasonic Sensor HC-05
- Breadboard
- Jumper Wires

Description of components:

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## NodeMCU ESP8266

ESP8266 is the name of the microcontroller, has the ability to perform WIFI related activities hence **it is widely used as a WIFI module**

Many equipment's around us cannot be connected to internet on its own. So, this chip enables these equipment to connect with internet and make them IoT devices.



NodeMCU is a Firmware on ESP8266.

## Ultrasonic Sensor HC-05

It has two circular eyes like projections and four pins coming out of it.

The two eye like projections are the Ultrasonic wave Transmitter and receiver.

The transmitter emits an US wave at a frequency of 40Hz, this wave travels through the air and gets reflected back when it senses an object. The returning waves are observed by the receiver.

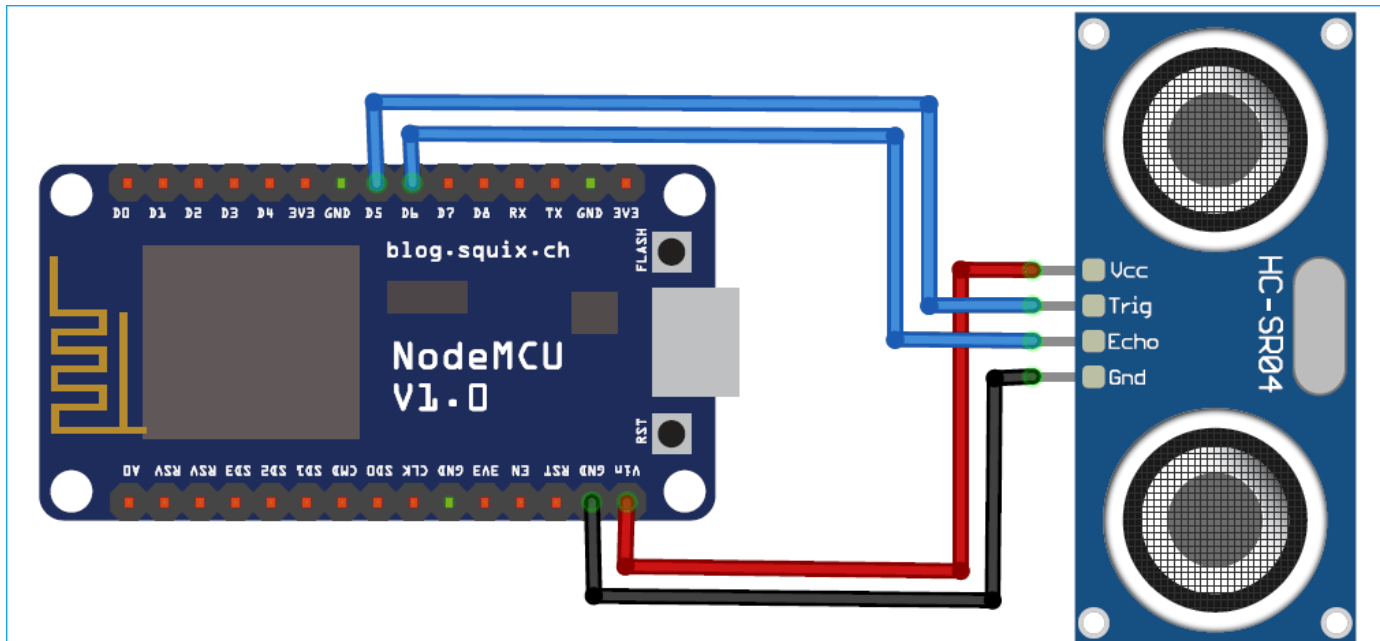


These **four pins are Vcc, Trigger, Echo and Ground** respectively. The module works on +5V and hence the Vcc and ground pin is used to power the module.

The other two pins are the I/O pins using which we communicate to our MCU.

The **trigger pin should be declared as an output pin**

## CIRCUIT DIAGRAM



We are only using the ultrasonic sensor and NodeMCU. [HC-SR04 ultrasonic sensor](#) works on 5V, so if you connect it to 3.3V, it won't work.

V<sub>CC</sub> pin of the ultrasonic sensor is connected to the V<sub>IN</sub> pin of NodeMCU.

Trig and Echo pins are connected to D5 and D6 pin of NodeMCU while the GND pin of the sensor is connected to the GND pin of NodeMCU.

A 5V power supply powers NodeMCU.

# EXPERIMENTAL SETUP

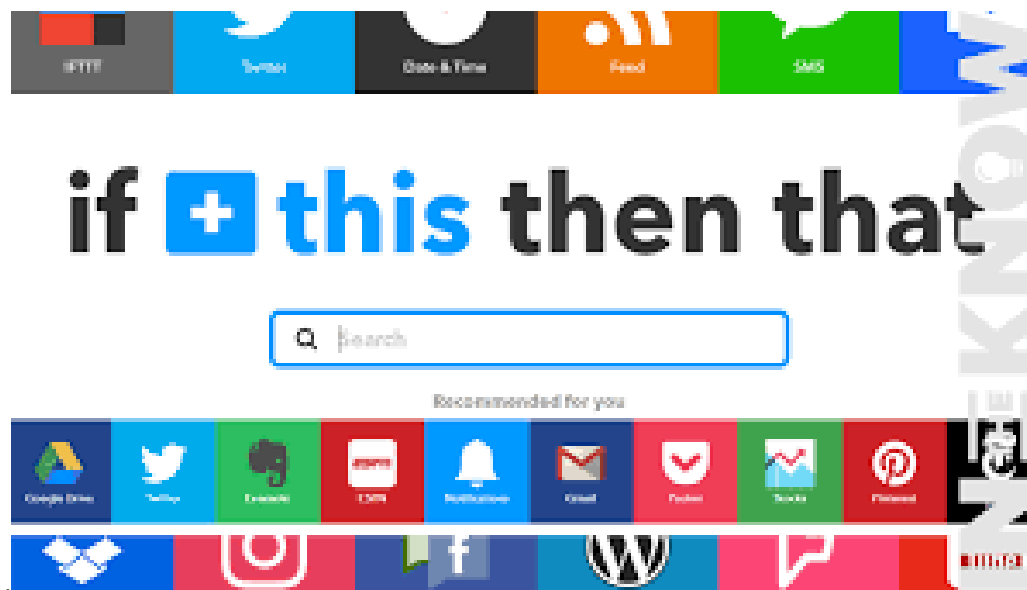
The main theme of the project is to make the notice of **levels** of the contents in the jar.

To go with the levels of jar we need to warn of the nil level of the jar.

So to warn us I made a setup to send me the mail making the issue as “Please refill your jar”.

So these all mails to be done through some web based service. So here comes our web based service **IFTTT (If This Then That)**.

IFTTT (If This Then That) is a web-based service using which we can create chains of conditional statements, called **applets**. Using these applets, we can send Emails, Twitter, Facebook notifications. Here we are using IFTTT to send **Email notifications** when the Jar is almost empty



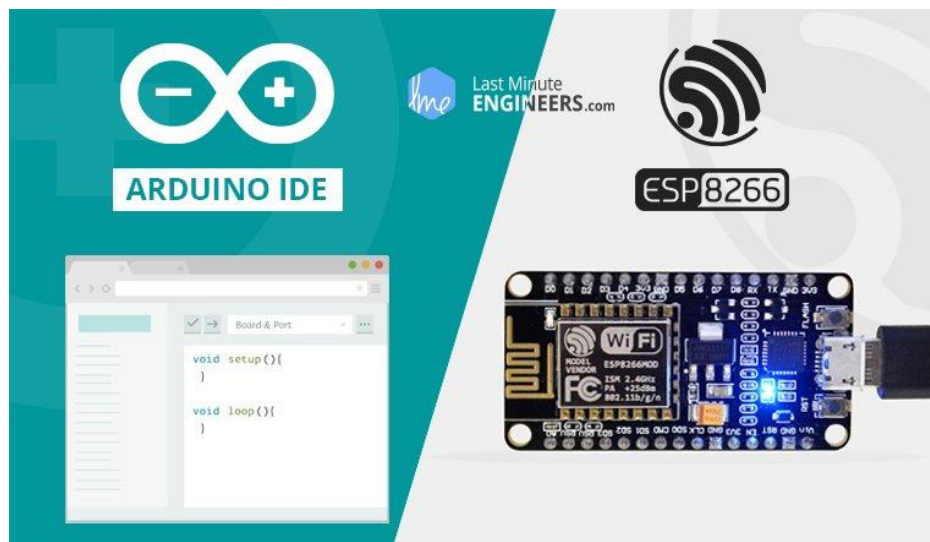
After finishing the process of signing up and creating account and linking our mail to this IFTTT service, we complete our applet setup.

The applet notifies the level warnings to our mail of smart jar.

## To program NODEMCU

For programming our NODEMCU ESP866 we use arduino ide.

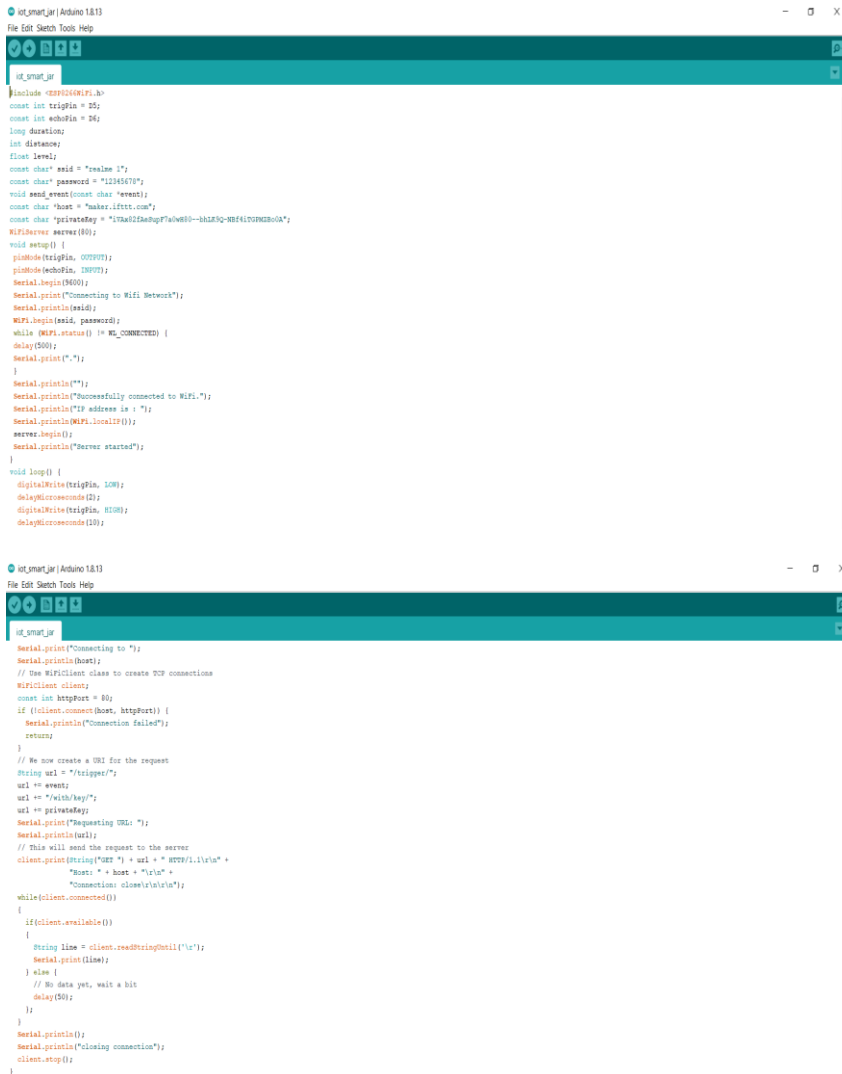
We don't need any programmer to program our board. We just need a USB cable.



By using Arduino ide latest version we program our esp8266.



## The coding :



So starting our code by including all the required library files. The ultrasonic sensor doesn't require a library file, so we only need ESP8266WiFi.h library file.

```
#include <ESP8266WiFi.h>
```

After that, define the pins where you connected the Trig and Echo pins and also define two variables for calculating distance and duration.

```
const int trigPin = D5;

const int echoPin = D6;

long duration;

int distance;
```

After that, make instances for our Wi-Fi name, Wi-Fi password, IFTTT hostname, and private key.

[Note: we should give our Wi-Fi details that is connected to our pc and the private key is the documented key of ifttt web service which connects to that server using this private key]

```
const char* ssid = " realme 1";

const char* password = " 12345678";

const char *host = "maker.ifttt.com";

const char *privateKey = " iVAX82fAeSupF7a0wH80--bhLK9Q-NBf4iTGPMZBo0A";
```

Now to access the WiFiServer, we declared an object **WifiServer** library. 80 is the default port for HTTP.

```
WiFiServer server(80);
```

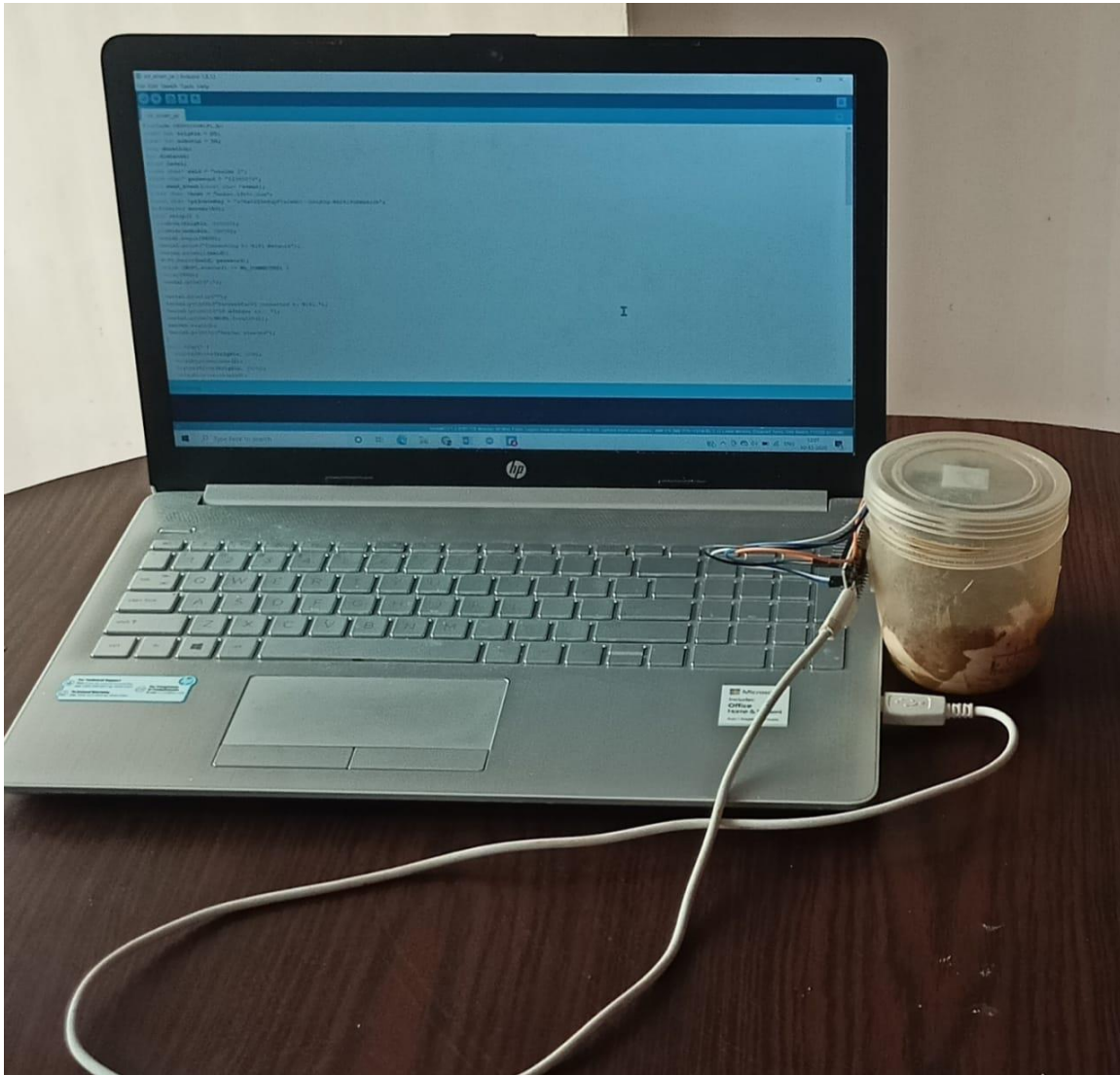
We make distance and our measurements and fill the code.

Now making our code and hardware ready we go for execution.

MY HARDWARE:

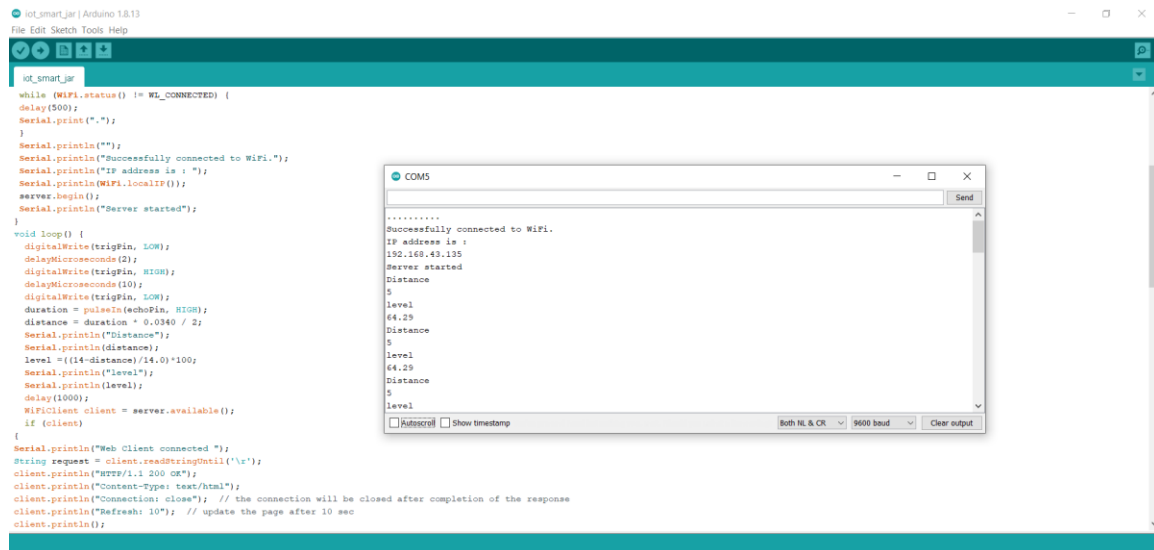


After setting my experimental setup iam going to connect my us cable and run the code in aurdino.

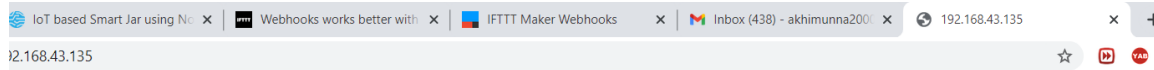


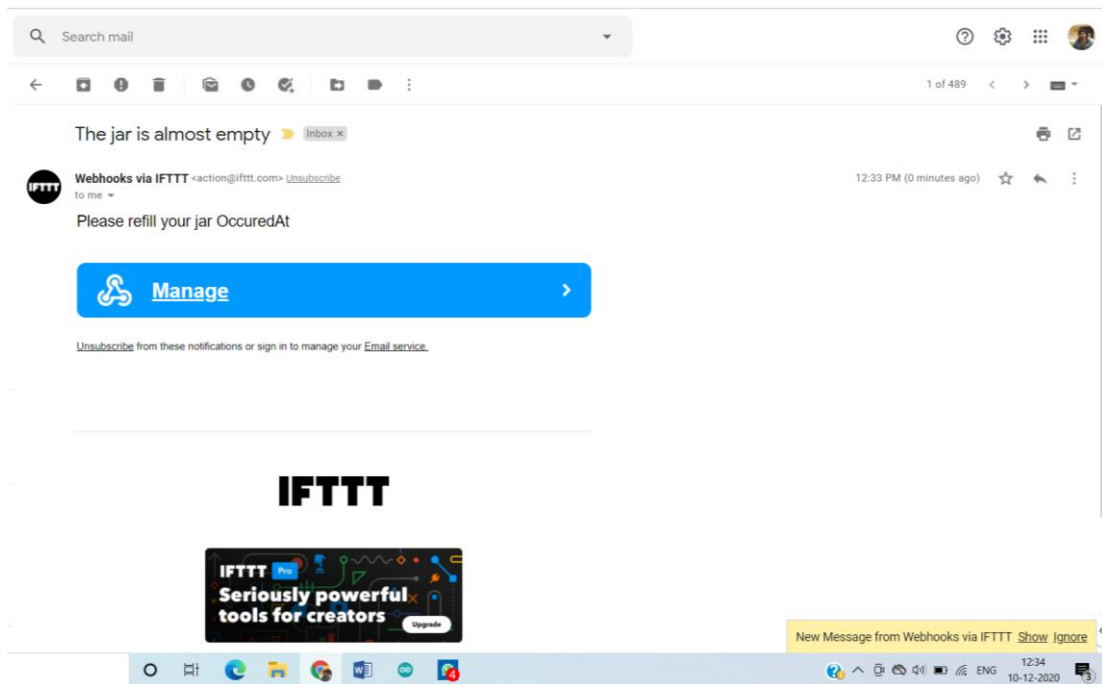
# RESULT

AFTER EXECUTING THE CODE WE GET IP ADDRESS ON SERIAL MONITOR OF ARDUINO AND BY GOING TO THAT ADDRESS WE GET THE LEVEL OF JAR



IP ADDRESS IS : <http://192.168.43.135/>





We get a warning “Please refill your Jar when the level crosses below 10%.

## CONCLUSION

- EASY TO USE
- The smart jar enables us to keep track of the medicines stocks with the help of an android app easily accessible anywhere with a simple internet connection.
- This helps us in monitoring the stocks and prepare for restocking from anywhere, additionally it also provides

important data such as the expiry date and the manufactured data of the content in the jar.

- Can be used to track nutrition and dietary values of stored content.
- In environmental usage as to calculate the level of pollution and rain levels.
- The contents stored can be fresh for more time than usual as of closed lids and modulated signal when send may keep the food warm and fresh.

## References:

1. Through research papers.
2. IOT related websites(circuit digest, electronics hub, reaserchgate)

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Thank you