SMARTBRIDGE:PROJECT

IoT Based

River Water Quality Monitoring System

Using IBM Watson

TEAM MEMBERS:

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ABSTRACT:

The established method of testing water quality is to gather samples of water manually and send to the lab to test and analyze. This method is time consuming, wastage of man power, and not economical. The water quality measuring system that we have implemented checks the quality of water in real time through various sensors (one for each parameter: pH, conductivity, temperature, turbidity,oxidation_reduction_potential) to measure the quality of water. As a variation in the value of this parameter points towards the presence of pollutants.This system can keep a strict check on the pollution of the water resources and be able to provide an environment for safe drinking water.

INTRODUCTION:

OVERVIEW:

Internet of Things (IoT) technologies provide a solution to this as it can monitor the water

quality always and bring about data which can be used for analysis purposes in real time on the cloud. This system can provide an early warning system for which if a contamination were to occur.

OBJECTIVE:

We have to measure the values of temperature,pH values,conductivity,oxidation reduction potential,turbidity.People face many health-related issues because of using contaminated water. An efficient water quality monitoring system using IBM Watson is potential constraint for determining quality of water .

LITERATURE SURVEY:

EXISTING PROBLEM:

The existing Water Quality monitoring system employ human towards sampling the water Quality, Testing and perform the analysis. Currently some amount of technological innovation has been applied in water quality monitoring by using robotic fish, Digital camera and laser beam. Also research been done by employing wireless sensor also in water quality monitoring.

In addition to monitoring the water quality, very limited work carried out in employing machine learning technique in analyzing the quality of water based on collected water parameter for analysis rather than false alarm notification.

PROPOSED SOLUTION:

The challenge with the existing system is that there is no fully automated water Quality monitoring system using IBM Watson employing Sensors. Also system possess no intelligence as such which allows for analyzing the data for prediction. These systems so developed communicate within a small geographical area.

THEORETICAL ANALYSIS:

BLOCK DIAGRAM:

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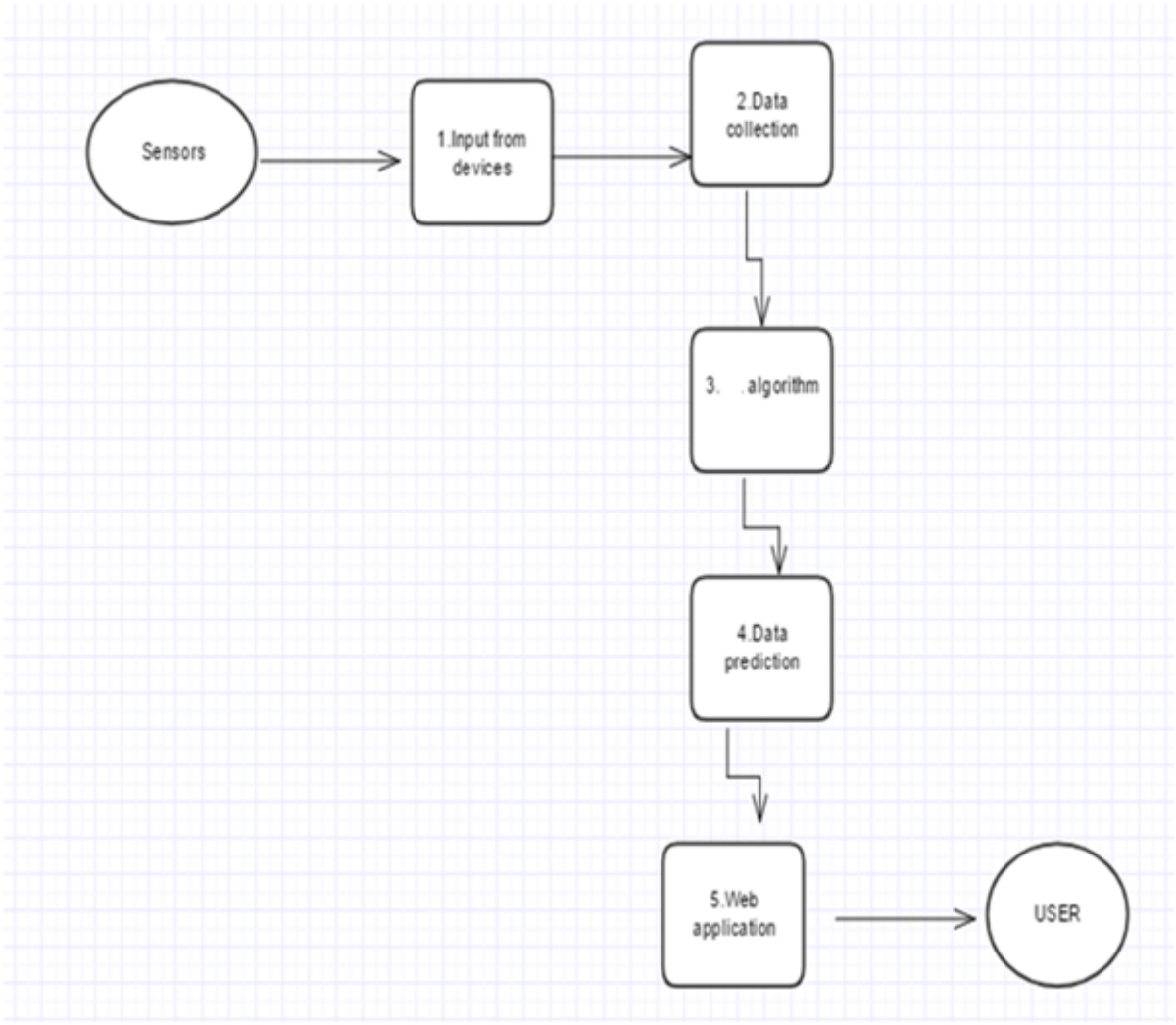


SOFTWARE REQUIRED:

Python

IOT Cloud Platform

IBM Cloud

Node- RED

IBM IoT Platform

MIT App Inventor

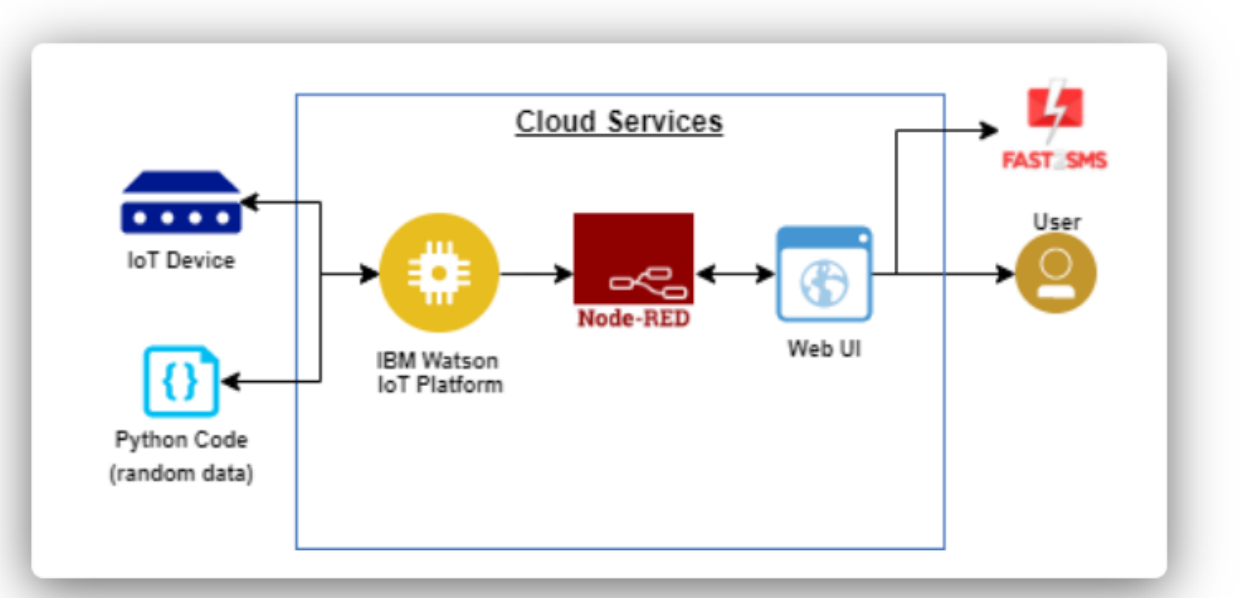
Fast2sms

EXPERIMENTAL INVESTIGATION:

The main purpose of developing an IoT technique to check water quality using ibm watson protocol is to develop a system which give the end user a useful data securely and fast. In traditional technique, the water samples are gathered from different places, and then tested by the scientist at their laboratory using different techniques to determine the water quality. That way was a time consuming but now the 'Internet of Things (IoT)` has the potential to modernize the water testing, as more and more of its technology is connected to the internet. So instead of checking the water quality using old ways, this method is used which is way better, fast, cost friendly and easy to use.

In order to meet with the requirements for developing the system, some work has been done in the past to achieve the desired results. The system formed in past used sensors to gather the data concerning the water constraints. Later that the data gathers were directed to IBM cloud platform, through which it was showed to the computer or any other devices. Next examination of the data gained, the communication part was approved out by the help of GSM technology. This structure was supportive but had numerous limitations as well such as expensive, no actual time data could be produced, the system was transferring data in sequence so there was probabilities of data damage and security issues

FLOWCHART:



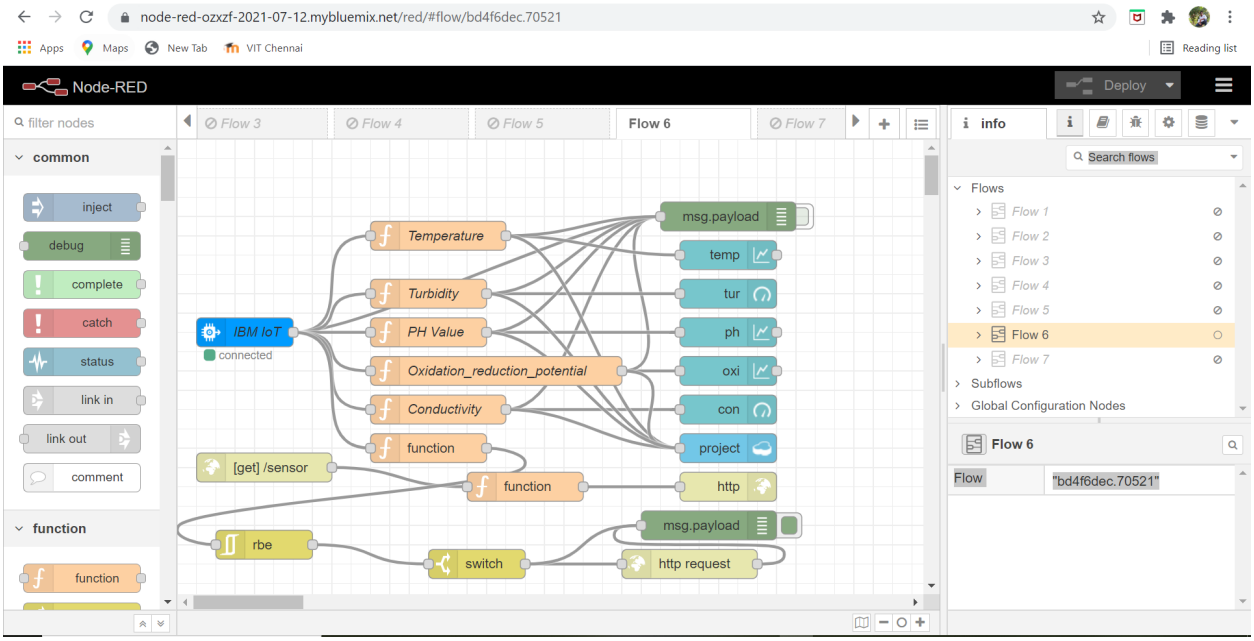
PROCEDURE:

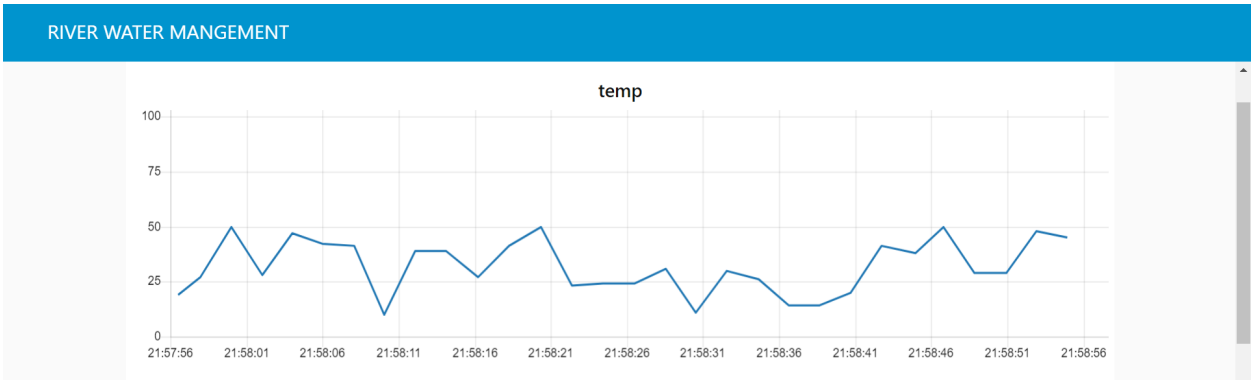
Develop the code

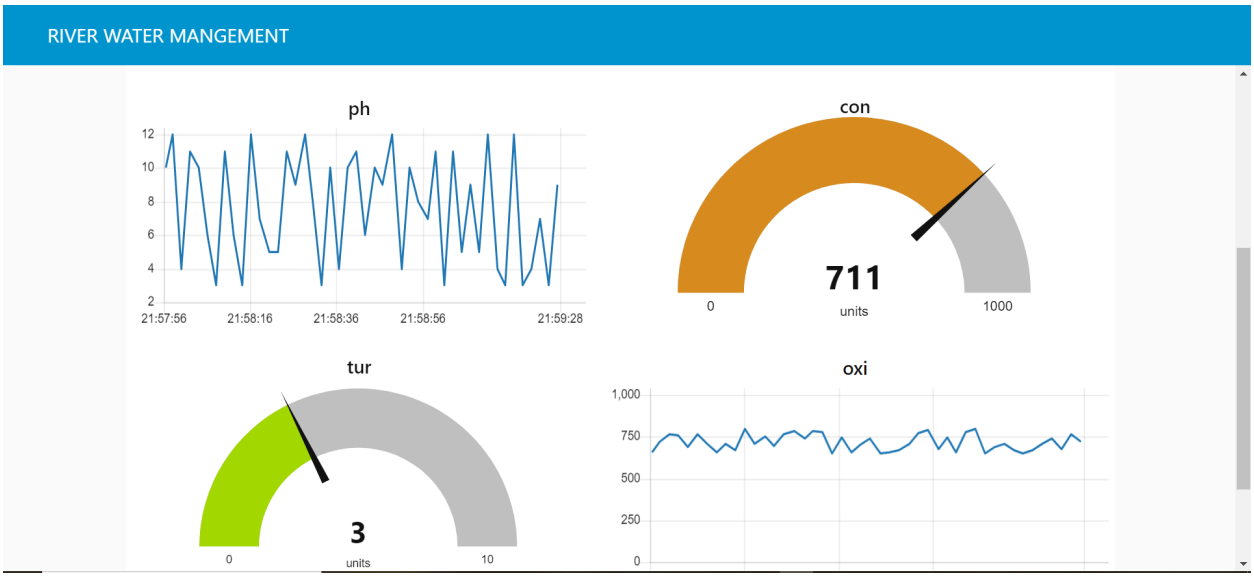
```
project.py - C:\Users\BOREDDY CHAITANYA\Desktop\cv_python_test\project.py (3.9.6)
File  Edit  Format  Run  Options  Window  Help
import wiotp.sdk.device
import time
import random
import requests
myConfig = {
    "identity": {
        "orgId": "lbjhlu",
        "typeId": "VITDEVICE",
        "deviceId":"63021"
    },
    "auth": {
        "token": "9876543210"
    }
}
def myCommandCallback(cmd):
    print("Message received from IBM IoT Platform: %s" % cmd.data['command'])
    print()
client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()
while True:
    temp=random.randint(10,50)
    ph=random.randint(3,12)
    con=random.randint(400,1000)
    oxi=random.randint(650,800)
    tur=random.randint(0,5)
    if((6<=ph<=9)and(20<temp<40)and(500<con<1000) and(650<oxi<800)and(0<tur<5)):
        sms=1
        print("drink that water")
    else:
        sms=0
        print("not to drink that water")
    myData={'Temperature':temp,'PH_Value':ph,'Conductivity':con,'Oxidation_Reduction_Potential':oxi,'Turbidity':tur,'sms':sms}
    client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)
    print("Published data Successfully: %s", myData)
    client.commandCallback = myCommandCallback
    time.sleep(2)
client.disconnect()
r = requests.get('https://www.fast2sms.com/dev/bulkV2?authorization=NegxEnouG4SH0iXbVzDyBQIWFpa7m86RlKAqZ52Udtsvc1YCOkkuhIfbGpKrMyVgxo3svneHa0Wz587E&route=q&message=%20pref
print(r.text)
Ln: 32  Col: 36
```

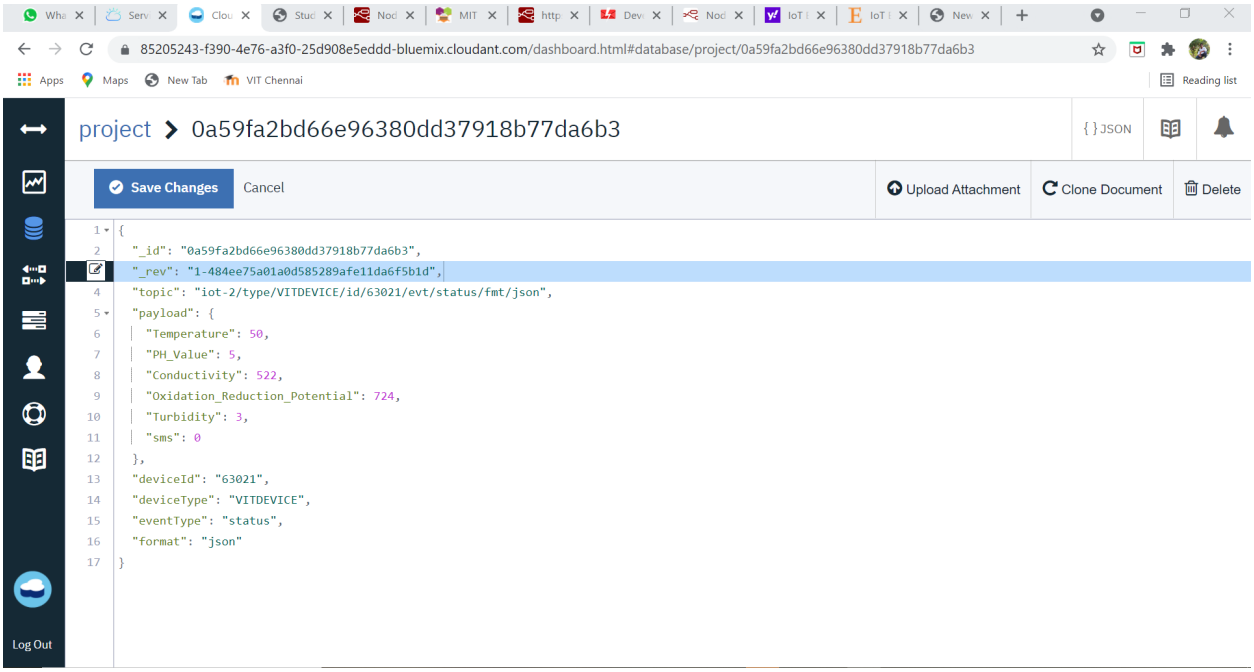
To develop a Node-red application we need to get an "JSON" file to run after getting that json file into node-red ,just fill he required details which are needed.After setting IBM out enter the api key and token .

Before deploying the schematic we need to run the python code and after that deploy the schematic we need to view(user interface) the web view of the application.





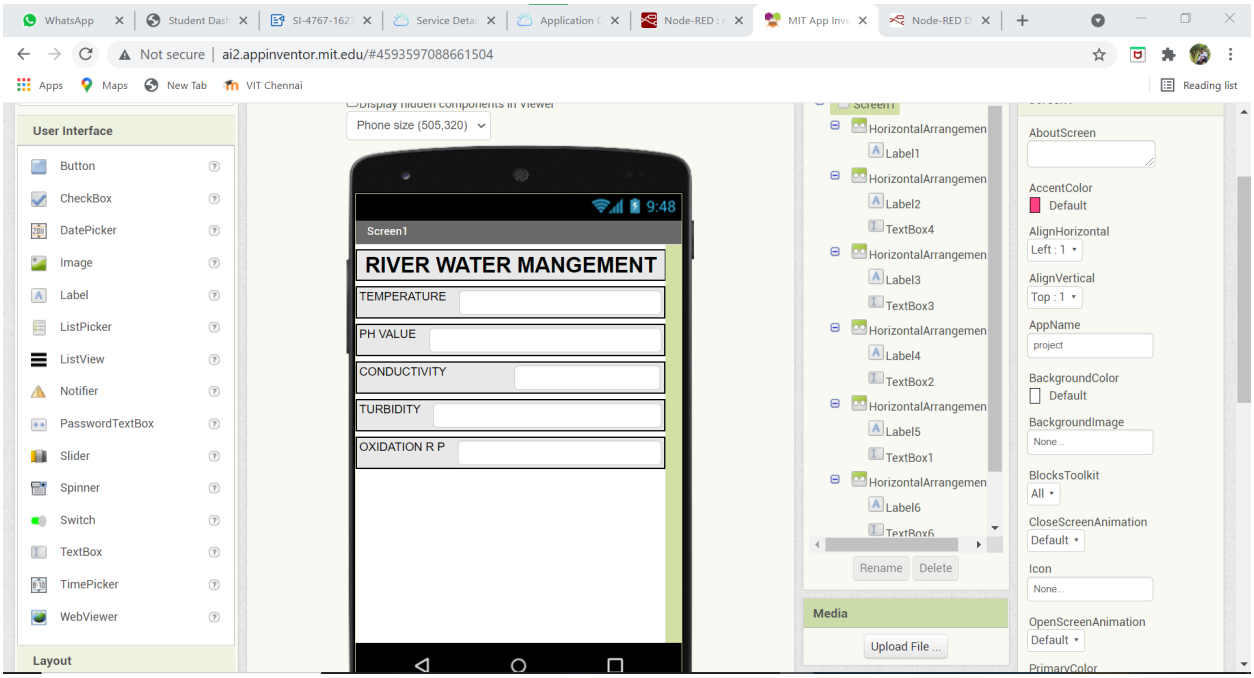


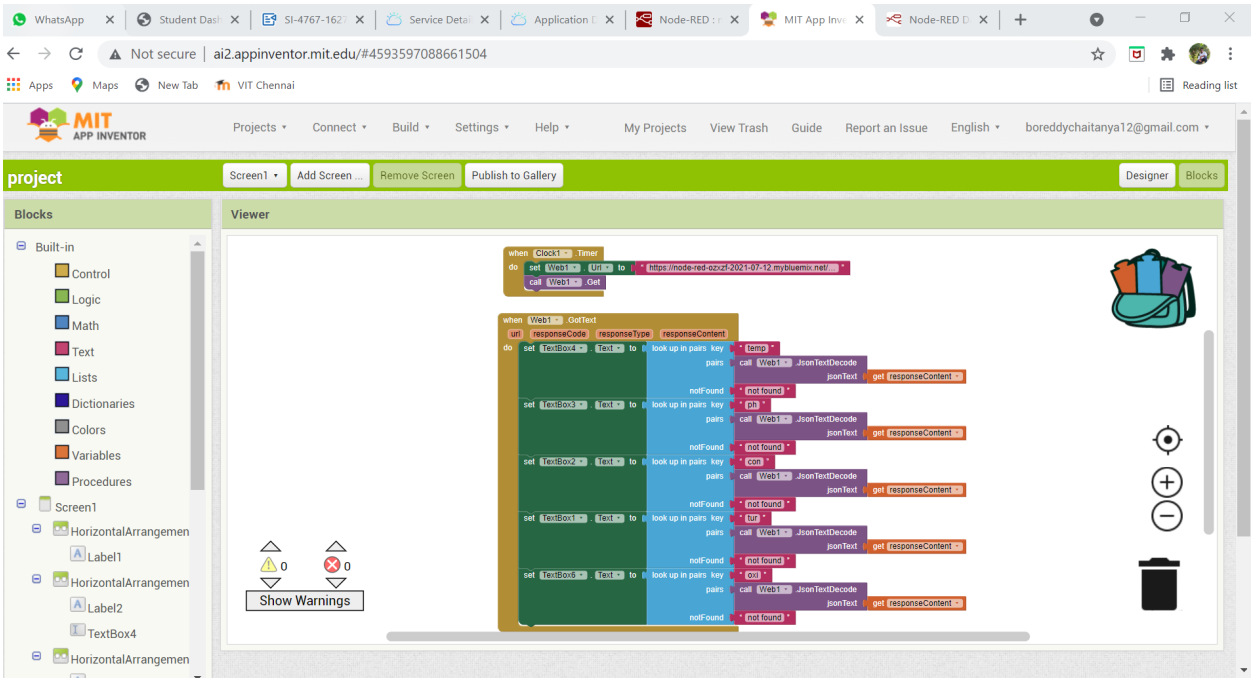


Getting Started with MIT App Inventor. App Inventor is a cloud-based tool, which means you can build apps right in your web browser. This website offers all the support you'll need to learn how to build your own apps. Visit it at ai2.app inventor.mit.edu. You can get there by clicking the orange "Create Apps".

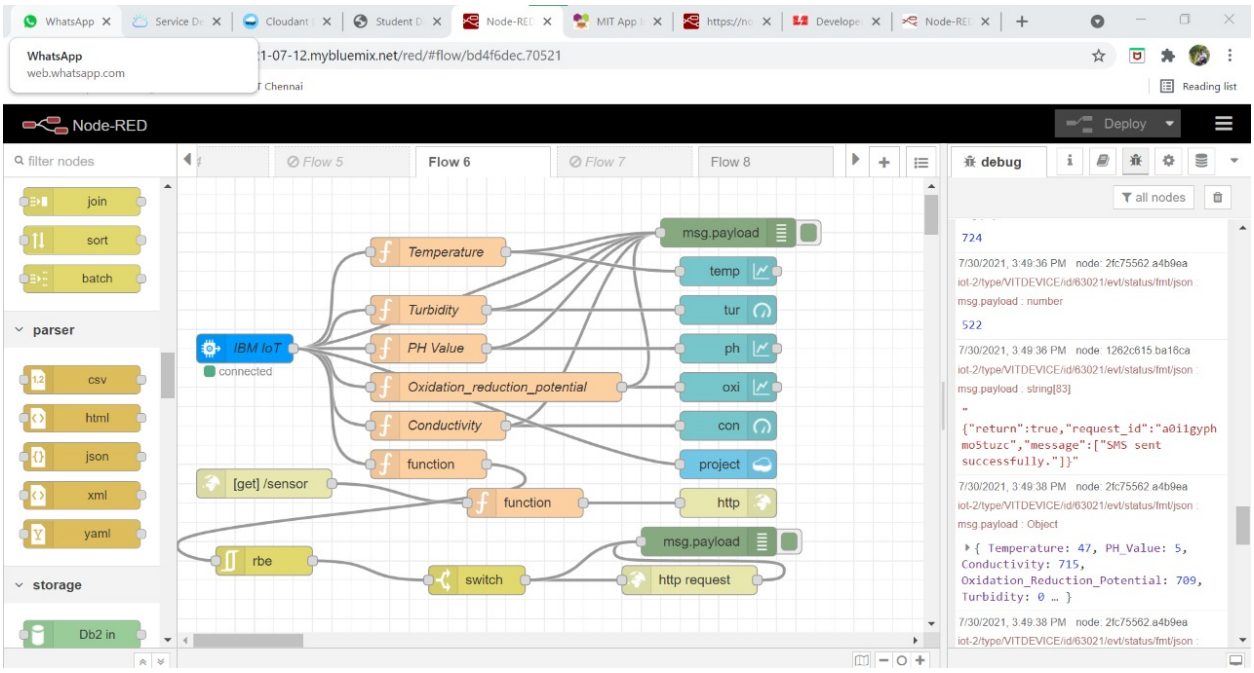
After setting this we need to develop for the app view for that we need get some connections with in same "http/in" & "http/response" node with including some

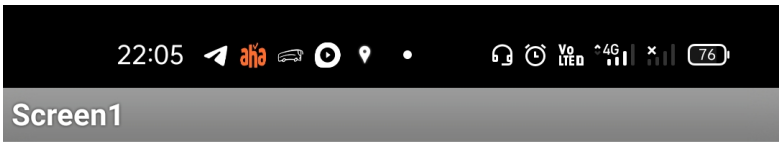
.functions and to develop an app we are using the help of MIT APP INVERTER





After creating the interface and back-end of the app we need to scan and view the app in the phone.


WhatsApp
web.whatsapp.com
Node-RED
Deploy
filter nodes
Flow 5
Flow 6
Flow 7
Flow 8
join
sort
batch
parser
csv
html
json
xml
yaml
storage
Db2 in
IBM IoT
connected
Temperature
Turbidity
PH Value
Oxidation_reduction_potential
Conductivity
function
[get] /sensor
function
rbe
switch
msg.payload
temp
tur
ph
oxi
con
project
http
msg.payload
http request
debug
all nodes
724
7/30/2021, 3:49:36 PM node: 2fc75562.a4b9ea
iot-2/type/VITDEVICE/id/63021/evt/status/fmt/json :
msg.payload : number
522
7/30/2021, 3:49:36 PM node: 1262c615.ba16ca
iot-2/type/VITDEVICE/id/63021/evt/status/fmt/json :
msg.payload : string[83]
"{"return":true,"request_id":"a0i1gyphmo5tuzc","message":["SMS sent successfully."]}"
7/30/2021, 3:49:38 PM node: 2fc75562.a4b9ea
iot-2/type/VITDEVICE/id/63021/evt/status/fmt/json :
msg.payload : Object
{ Temperature: 47, PH_Value: 5, Conductivity: 715, Oxidation_Reduction_Potential: 709, Turbidity: 0 … }
7/30/2021, 3:49:38 PM node: 2fc75562.a4b9ea
iot-2/type/VITDEVICE/id/63021/evt/status/fmt/json :



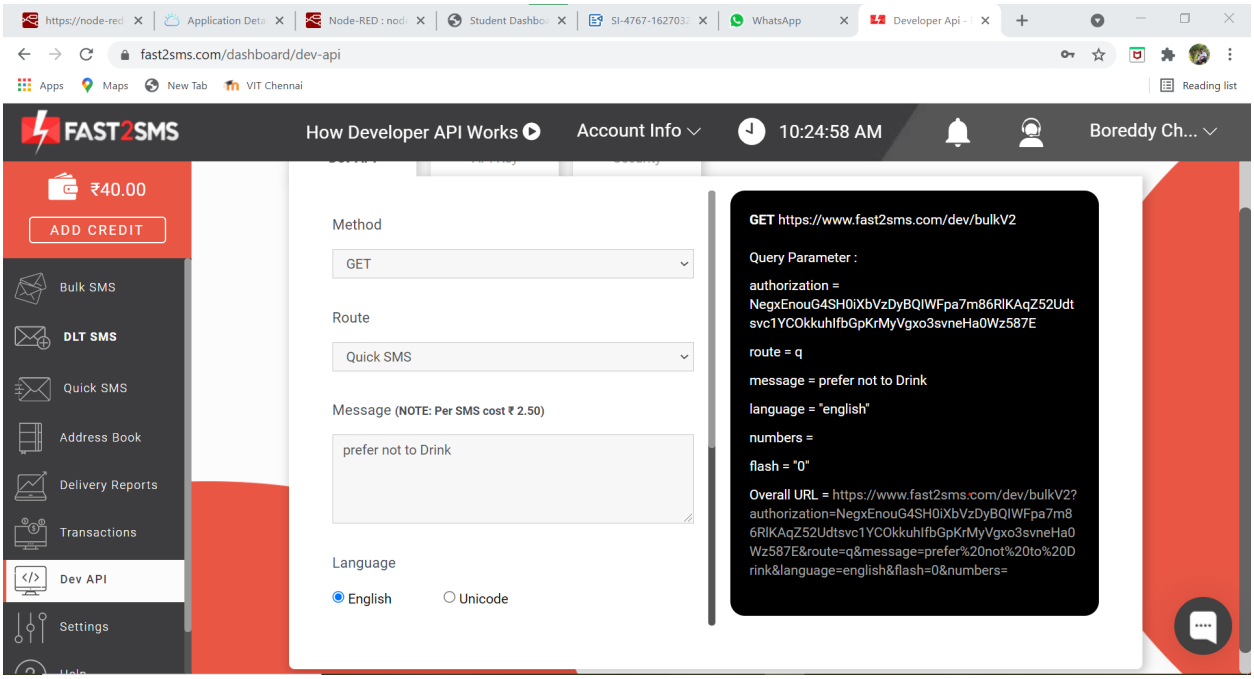
RIVER WATER MANGEMENT

TEMPERATURE	19
PH VALUE	6
CONDUCTIVITY	852
TURBIDITY	2
OXIDATION R P	756

Login to **Fast2SMS**.

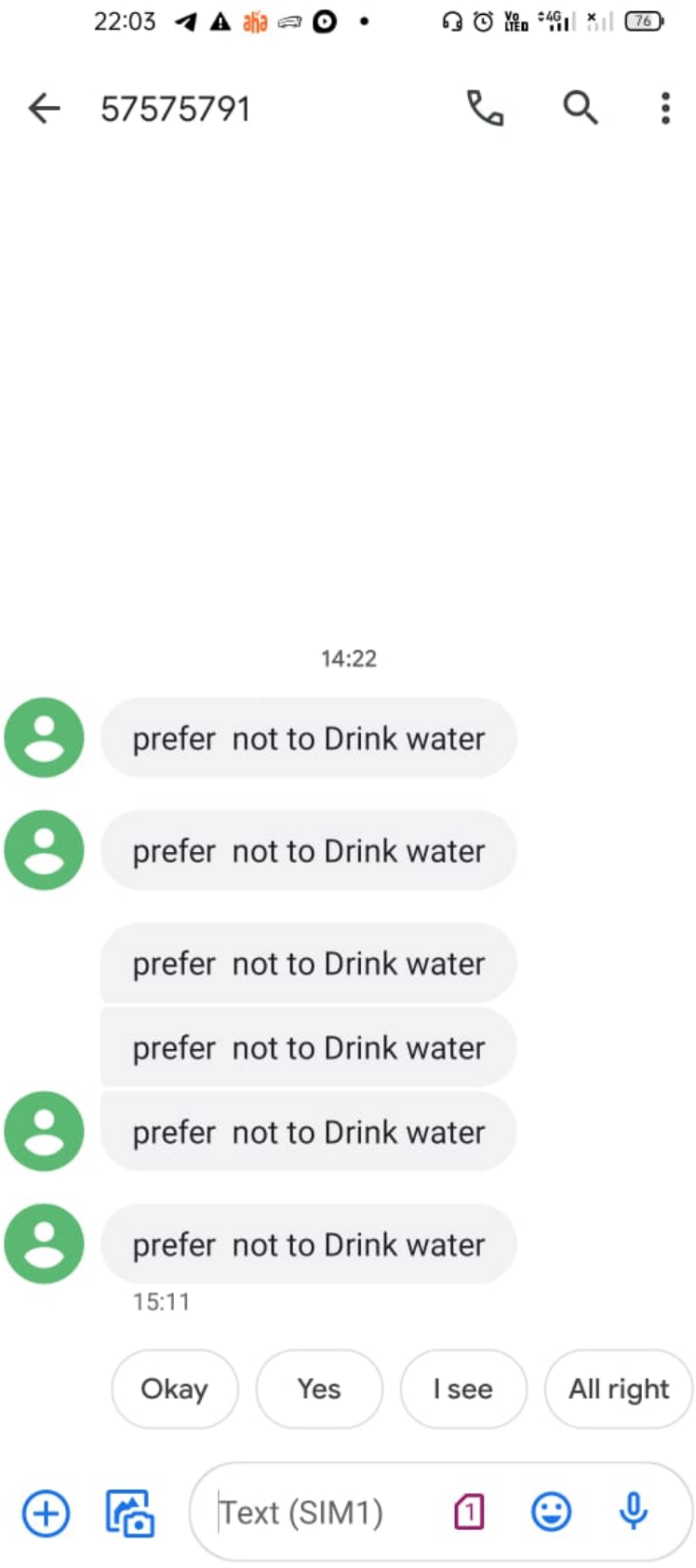
Select Dev API from the left side and copy the authorization key.

copy the url and paste it in the python code and run the program .the sms sent to the registered mobile.



sms is sent.

Result:


22:03
57575791
14:22
prefer not to Drink water
prefer not to Drink water
prefer not to Drink water
prefer not to Drink water
prefer not to Drink water
prefer not to Drink water
15:11
Okay
Yes
I see
All right
Text (SIM1)

APPLICATIONS:

System development is also considered as a process backed by engineering approach. We have tried to incorporate & develop new particles for our education particles have been followed not during the but coding but also during the analysis, design phases & in documentation.

IoT Based River Water Quality Monitoring System Using IBM Watson project is considered as an expansion of business relations. It contributes a lot by providing quick & fast services of sending documents letters (formal & informal both) to business as it enables any business to flourish

Following modification or upgrades can be done in system.

1) More than one company can be integrated through this software.

2) Web services can be used to know exact delivery status of packets.

3) Client can check the repacked delivery status online.

4) Distributed database approach in place of centralized approach

ADVANTAGES :

The boat is mobile in nature and hence many samples are easily

collected from different locations less time.

It is effortless to maintain the IoT based water quality monitoring system as all the electronic boards .

The system is very cheap as software does not cost much made it very easy to plot the data collected in various formats for proper analysis.

Cloud storage platforms such as IBM cloud helps in storing the sensor data immediately and wireless to the robust servers.

DIS -ADVANTAGES:

The system is less effective as sensors are installed profound inside the water and their positions are fixed.

The sensors are costly. Moreover their maintenance cost is also enormous. This leads to higher cost on the regulatory body.
The sensors which work on power source may often required to be replaced in case of malfunctioning.

Mounted Sensors may get damage during natural disasters and often by aquatic animals.

CONCLUSION:

The low cost, efficient, real-time water quality monitoring system using IBM Watson has been implemented and tested. Through this system, the officials can keep track of the levels of pollution s occurring in the water bodies and send immediate warnings to the public. This can help in preventing diseases caused due to polluted water and presence of metals.

The system can be easily installed, with the base station kept close to the target area, and the task of monitoring can be done by less-trained individuals. Internet of Things (IoT) and its services are becoming part of our everyday life, ways of working, and business. There is a great deal of research on developing crucial building blocks and models for the next generation Internet services supported by a plethora of connected things.

FUTURE SCOPE :

- In future we use IOT concept in this project
- Detecting the more parameters for most secure purpose
- Increase the parameters by addition of multiple sensors
- By interfacing relay we controls the supply of water.

BIBLIOGRAPHY:

Smart bridge lecture videos

IBM platform videos

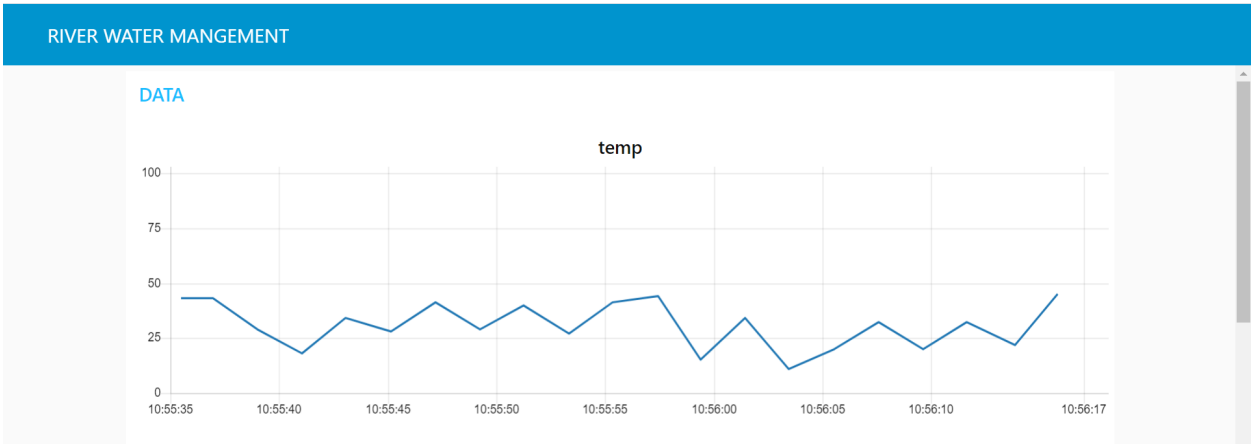
https://drive.google.com/file/d/1oL_KpIKNeSuwVNnsJhQ6rgY3MlRogHvS/view?usp=sharing

APPENDIX:

SOURCE CODE:

https://github.com/gnaneshwarbandari/IOT/blob/main/ibm_code.py

UI OUT PUT SCREENSHOTS:



RIVER WATER MANGEMENT