

APPENDIX 1

**IOT BASED RIVER WATER QUALITY
MONITORING SYSTEM USING IBM WATSON**

AN INDUSTRIAL INTERNSHIP REPORT

submitted by

BOREDDY CHAITANYA KUMAR REDDY

(19BEE1001)

in partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

in

ELECTRICAL AND ELECTRONICS ENGINEERING



VIT[®]
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

AUGUST 2022

Appendix 2

DECLARATION BY THE CANDIDATE

I hereby declare that the in-plant training report entitled “**IOT BASED RIVER WATER QUALITY MONITORING SYSTEM USING IBM WATSON**” submitted by me to VIT University - Chennai Campus, in partial fulfillment of the requirement for the award of the degree of **BACHELOR OF TECHNOLOGY in ELECTRICAL AND ELECTRONICS ENGINEERING** is a record of bonafide industrial training undertaken by me under the supervision of **Gnaneshwar bandari**. I further declare that the work reported in this report has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

Signature of the Candidate

Place: Chennai

Date: 27-07-2022

Appendix 3



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(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF ELECTRICAL ENGINEERING

BONAFIDE CERTIFICATE

This is to certify that the in-plant training report entitled “**IOT BASED RIVER WATER QUALITY MONITORING SYSTEM USING IBM WATSON**” submitted by **BOREDDY CHAITANYA KUMAR REDDY (19BEE1001)** to VIT University - Chennai Campus, in partial fulfillment of the requirement for the award of the degree of **BACHELOR OF TECHNOLOGY** in **ELECTRICAL AND ELECTRONICS ENGINEERING** is a record of bonafide in-plant training undertaken by him/her under my supervision. The training fulfills the requirements as per the regulations of this Institute and in my opinion meets the necessary standards for submission. The contents of this report have not been submitted and will not be submitted either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

Head of the Department (**B.Tech EEE**)

Date: _____

Examiner (s) Signature

1.

2.

Appendix 4

Date:

CERTIFICATE BY THE TRAINING OFFICER

This is to certify that the project report entitled “**IOT BASED RIVER WATER QUALITY MONITORING SYSTEM USING IBM WATSON**” submitted by **BOREDDY CHAITANYA KUMAR REDDY (19BEE1001)** to VIT University - Chennai Campus, in partial fulfillment of the requirement for the award of the degree of **BACHELOR OF TECHNOLOGY in ELECTRICAL AND ELECTRONICS ENGINEERING** is a record of bonafide in-plant training undertaken by him under my supervision. The training fulfills the requirements as per the regulations of this Institute and in my opinion meets the necessary standards for submission. The contents of this report have not been submitted and will not be submitted either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

TRAINING OFFICER

Appendix 5

ACKNOWLEDGEMENT

We wish to express our sincere thanks and deep sense of gratitude to our project guide, **GNANESHWAR** from Smartinternz for his consistent encouragement and valuable guidance offered to us throughout the course of the project work.

We are extremely grateful to **Dr. SENTHIL KUMAR, Dean**, School Electrical and Electronic Engineering (SELECT), Vellore Institute of Technology, Chennai, for extending the facilities of the school towards our project and for his unstinting support.

We express our thanks to our **Head of the Department** for his support throughout the course of this project. We also take this opportunity to thank all the faculty of the school for their support and their wisdom imparted to us throughout the courses.

We thank our parents, family, and friends for bearing with us throughout the course of our project and for the opportunity they provided us in undergoing this course in such a prestigious institution.

Place : Chennai

(Name of the Student)

Date : 27/07/2022

Appendix 6

TABLE OF CONTENTS

CHAPTER NO.	TITLE	PAGE NO.
	ABSTRACT	7
1.	INTRODUCTION	8
	Overview	8
	Objective	8
	Software required	8
2.	BLOCK DIAGRAM	9
3.	EXPERIMENTAL INVESTIGATION	10
4.	FLOWCHART	11
5.	PROCEDURE	12
	Setup environment	12
	Setup Hardware and Develop The Code	14
	Building web app	15
6.	RESULT	18
7.	CONCLUSION	21
8.	APPENDICES	22

ABSTRACT

Industrial training is an important phase of a student life. A well planned, properly executed and evaluated industrial training helps a lot in developing a professional attitude. It develop an awareness of industrial approach to problem solving, based on a broad understanding of process and mode of operation of organization. During a period of 30 days training at Smartinternz, I was assigned to develop an IoT based river water quality monitoring system in order to keep a strict check on the pollution of the water resources and be able to provide an environment for safe drinking water. Throughout this industrial training, I have been learned node-red, IBM Watson platform that required for the system. And also learned about MIT app inventor and fast2sms.

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.

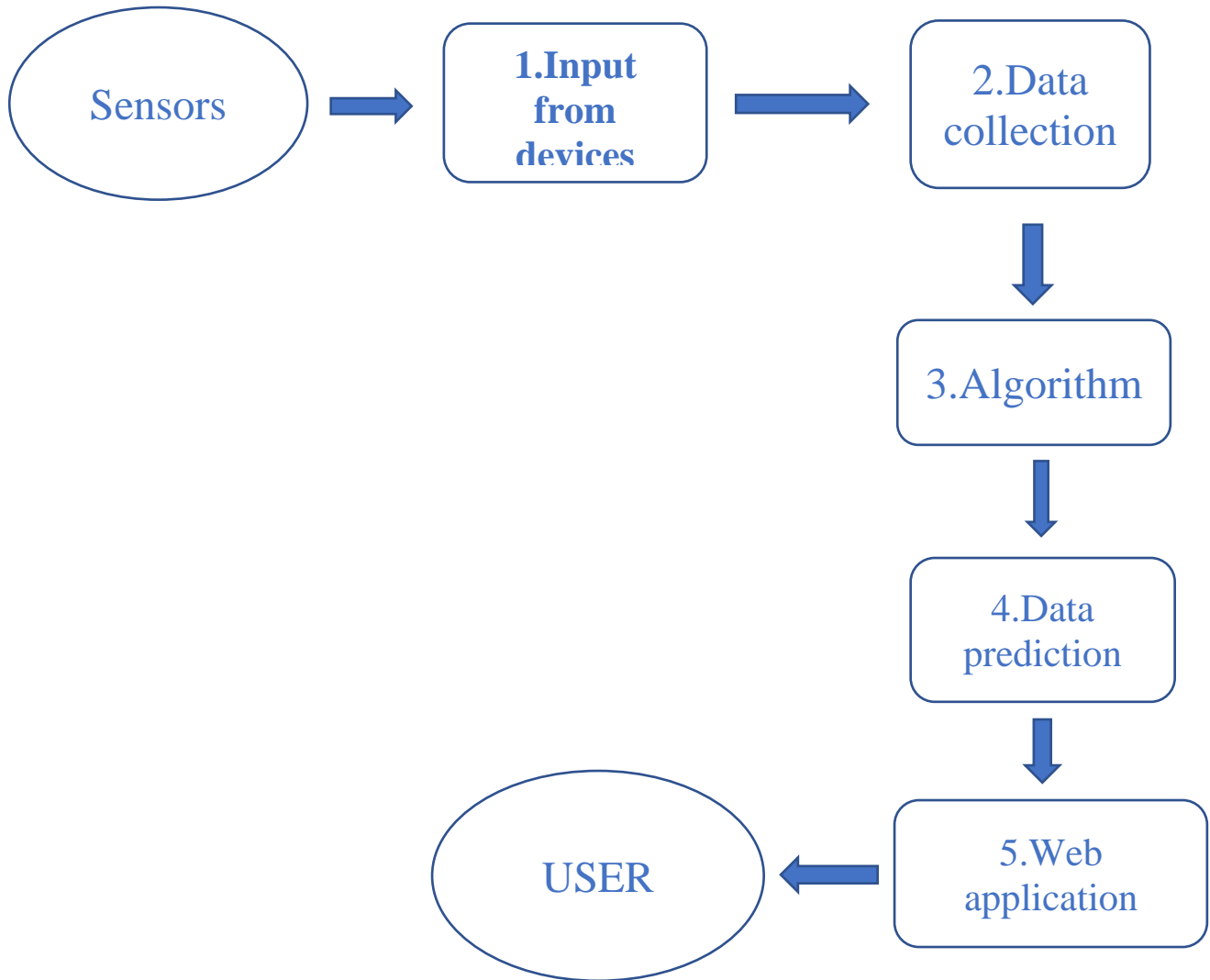
OBJECTIVE:

The objective is 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 .

SOFTWARE REQUIRED:

1. Python
2. IOT Cloud Platform
3. IBM Cloud
4. Node- RED
5. IBM IoT Platform
6. MIT App Inventor
7. Fast2sms

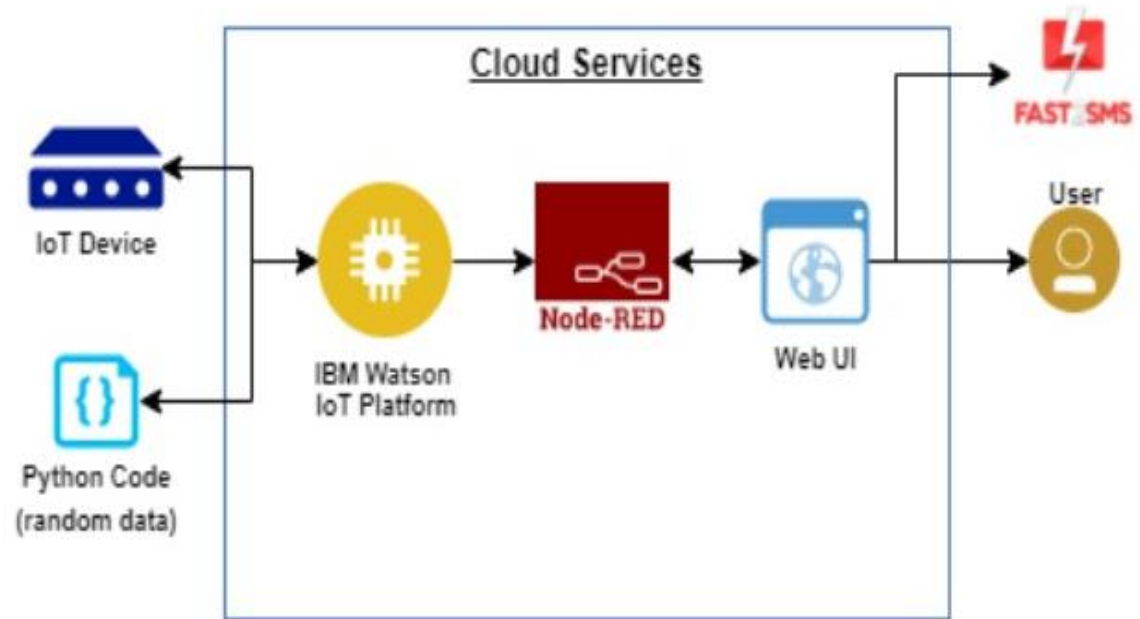
BLOCK DIAGRAM



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. Intraditional 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

Setup environment:

1. Install Python Idle

Install Python IDLE from official website.

2. Create IBM Account

If you are new to IBM Cloud, create an account here in Cloud, or else you can ignore this step.

3. Create Node-Red Application

Node-Red application is to be created in IBM Cloud where some of the applications and services would be created automatically to it.

4. Create IBM Watson IoT Platform

IBM Watson IoT Platform enables you to create the device and integrate that device with your IoT device or Python program.

5. Create The MIT App Inventor Account To Build The Mobile App.

You can log in or create an account in MIT App Inventor using your existing google account.

6. Create Fast2SMS Account

Create a Fast2SMS account by using your basic details i.e., mobile number and email id and verify your mail ID.

fast2sms.com/dashboard/dev-api

FAST2SMS How Developer API Works Account Info 10:24:58 AM Boreddy Ch...

₹40.00 ADD CREDIT

Bulk SMS
DLT SMS
Quick SMS
Address Book
Delivery Reports
Transactions
Dev API
Settings

Method: GET

Route: Quick SMS

Message (NOTE: Per SMS cost ₹ 2.50): prefer not to Drink

Language: ☒ English ☐ Unicode

GET https://www.fast2sms.com/dev/bulkV2

Query Parameter :

authorization = NegxEnouG4SH0IXbVzDyBQIWFpa7m86RIKAqZ52Udt
svc1YC0kkuhlfGpKrMyVgxo3svneHa0Wz587E

route = q

message = prefer not to Drink

language = "english"

numbers =

flash = "0"

Overall URL = https://www.fast2sms.com/dev/bulkV2?
authorization=NegxEnouG4SH0IXbVzDyBQIWFpa7m8
6RIKAqZ52Udt
svc1YC0kkuhlfGpKrMyVgxo3svneHa0
Wz587E&route=q&message=prefer%20not%20to%20
rink&language=english&flash=0&numbers=

Setup Hardware and Develop The Code:

In this milestone, we set up all the interfaces required for our project and develop the code in python to send random sensor data to the cloud.

1. Creating A Code Snippet

Create a code snippet using python to send

Random Temperature and Humidity values (which represents the DHT11 sensor)

2. Publish Data To The IBM Cloud

Python code is used to send random sensor data to the cloud and also to receive commands from the cloud.

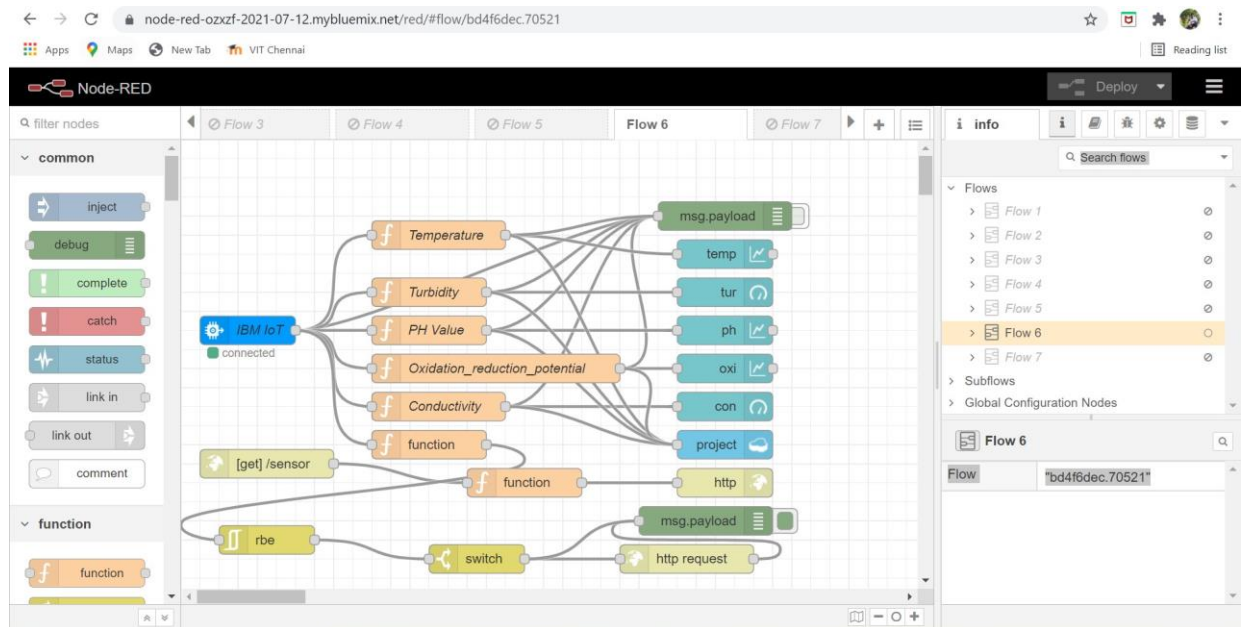
```
project.py - C:\Users\BOREDDY CHAITANYA\Desktop\cv_python_test\project.py (3.9.6)
File Edit Format Run Options Window Help
import wiotp.sdk.device
import time
import random
import requests
myConfig = {
    "identity": {
        "orgId": "ibjhlw",
        "typeId": "VITDEVICE",
        "deviceId": "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=%20pre!')
print(r.text)
```

Building web app:

1. Create Node Red Flow To Get Data From Device

Configure the Node-RED flow to receive data from the IBM IoT platform.

And also use Cloudant DB nodes to store the received sensor data in the cloudant DB

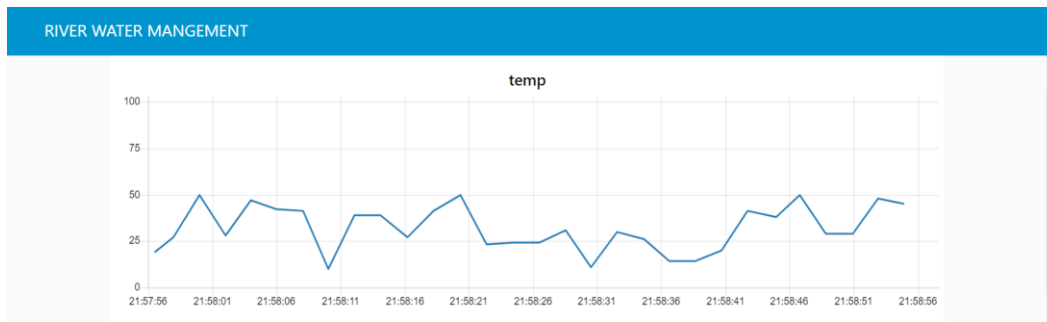


2. Use Dashboard Nodes For Creating UI(Web App)

Build a web dashboard to visualize the water quality parameters.

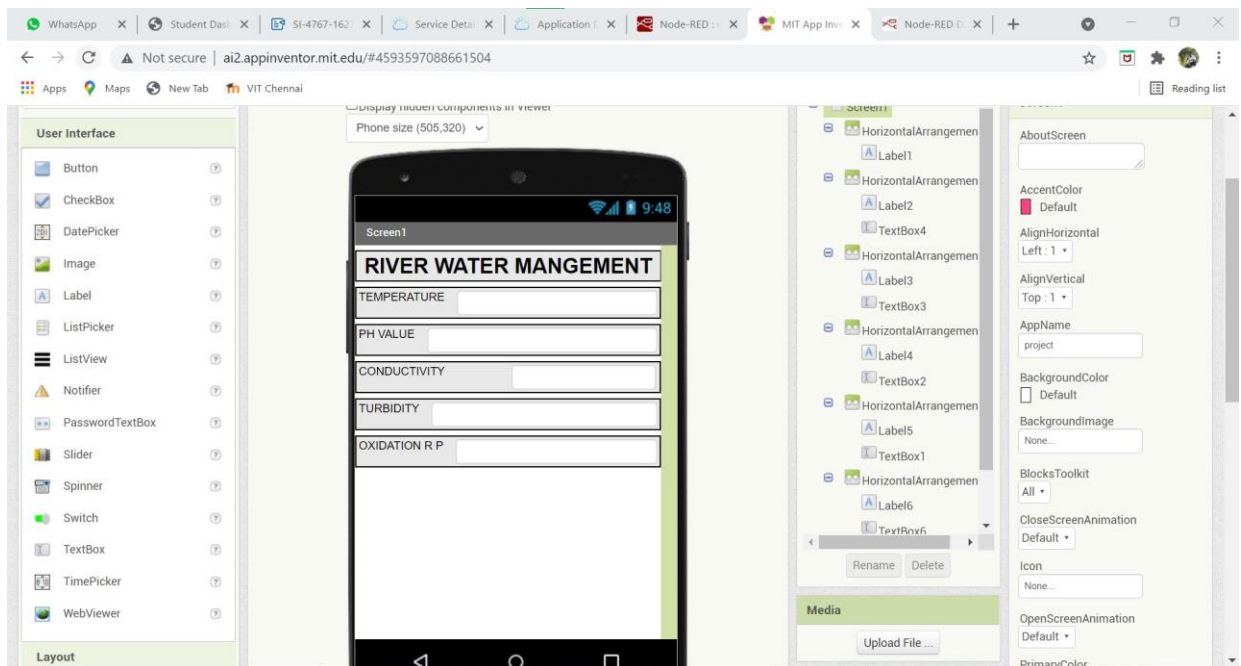
configure the nodes to send message notification if water quality is not good.



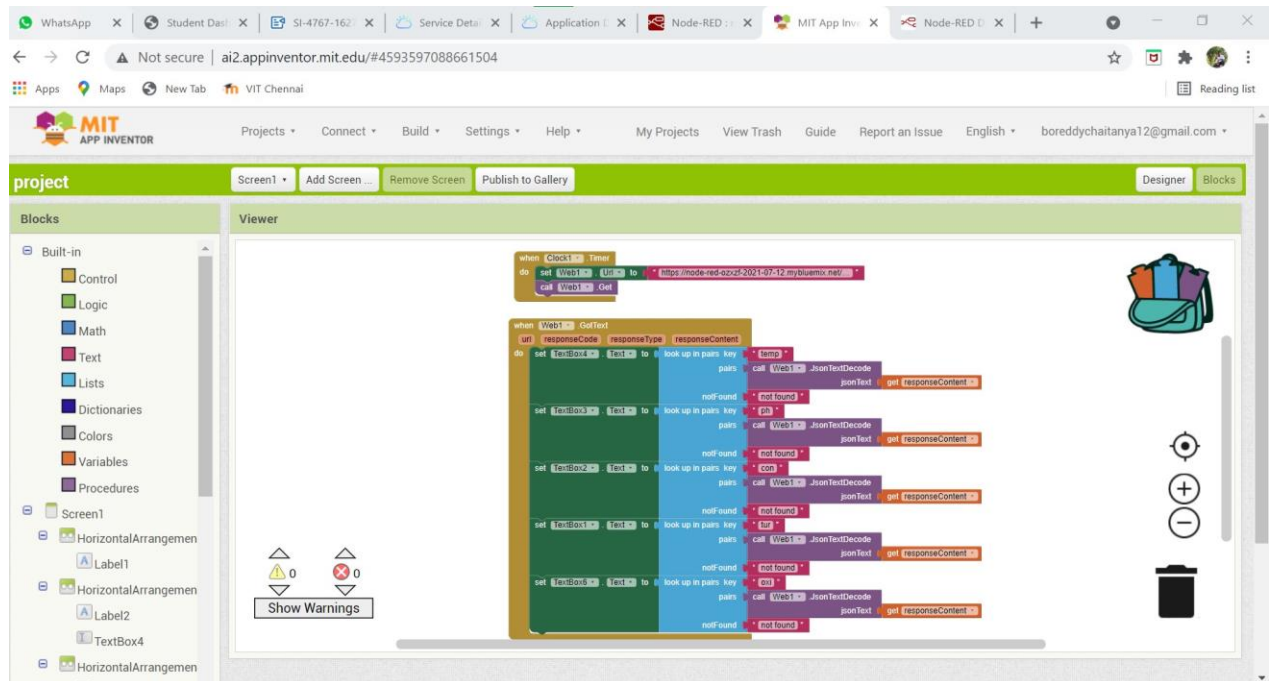


3. Create Http Requests To Communicate With Mobile App
Create HTTP API's for communicating with Mobile Application.

Frontend:

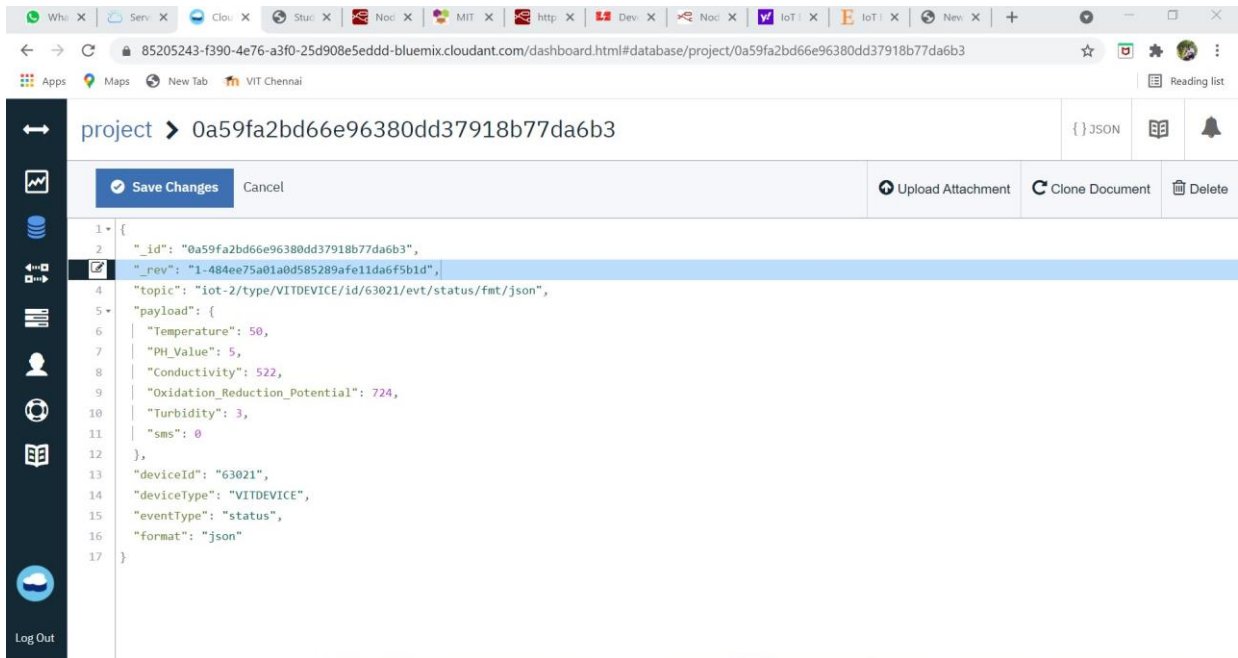


Backend:

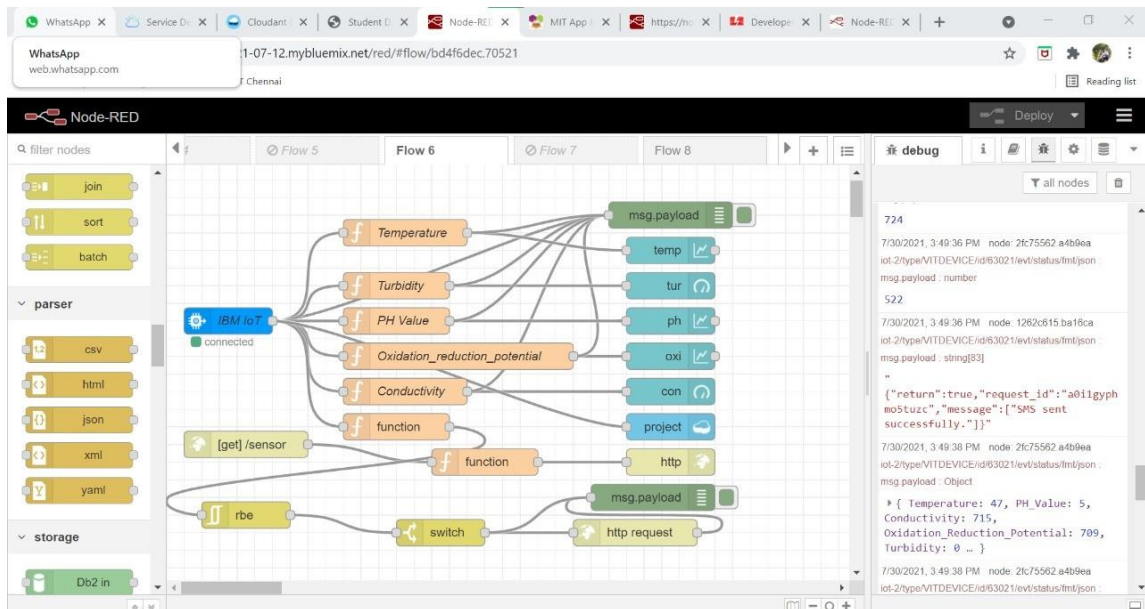


RESULT

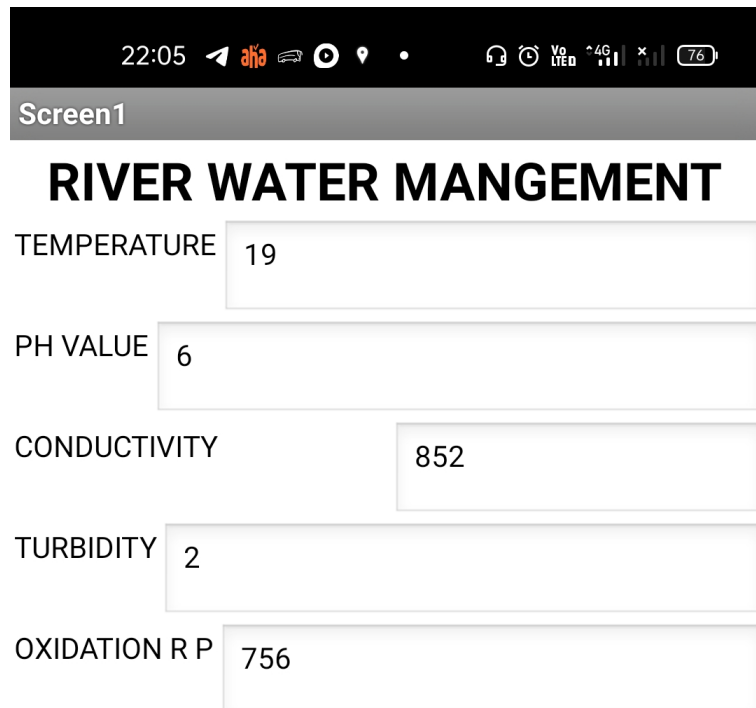
Cloudant:



Debug window:



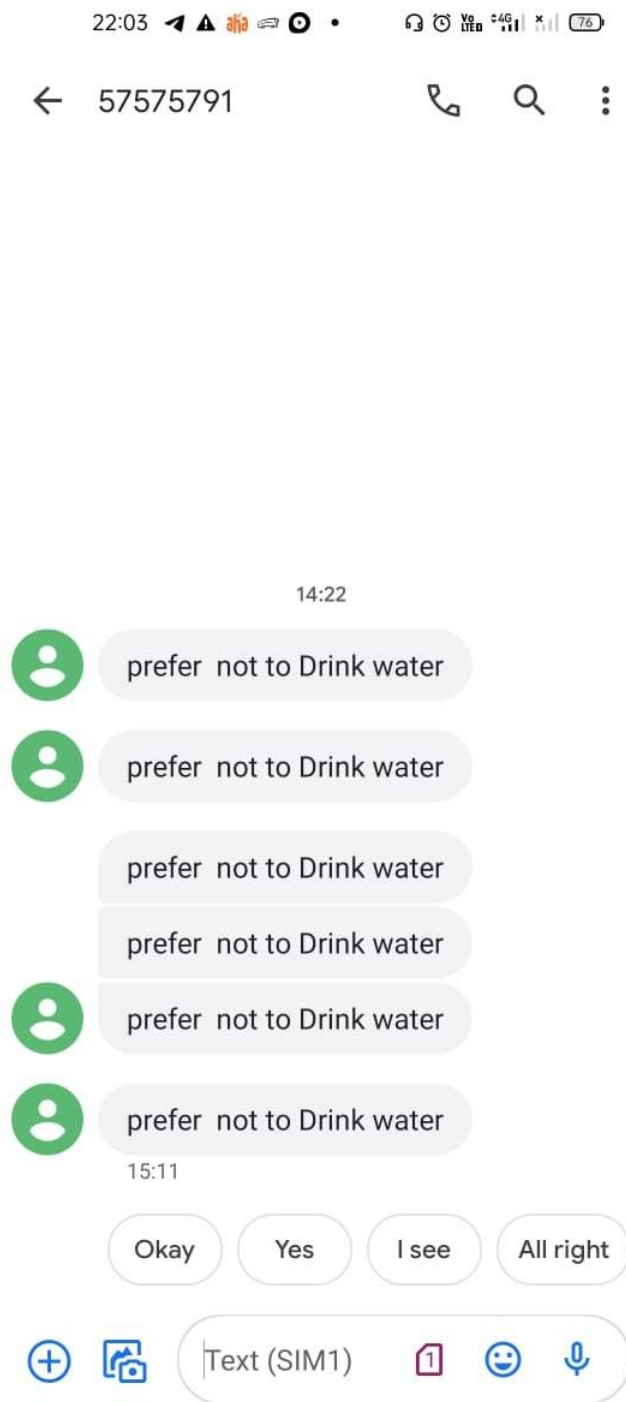
MIT app:



The screenshot shows a mobile application interface titled "RIVER WATER MANGEMENT". It features five input fields for water quality parameters. The status bar at the top indicates the time is 22:05, and the battery level is 76%. The app title "Screen1" is visible below the status bar.

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

SMS:



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.

APPENDICES

IBM platform videos

https://drive.google.com/file/d/1oL_KpIKNeSuwVNnsJhQ6rgY3MiRogHvS/view?usp=sharing

Source code

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

<https://machinelearningmastery.com/how-to-generate-random-numbers-in-python/>

<https://docs.fast2sms.com/?python#get-method6>

<https://ibm-watson-iot.github.io/iot-python/>

<https://ibm-watson-iot.github.io/iot-python/application/config/>