TAGORE ENGINEERING COLLEGE CHENNAI

PROJECT REPORT

REAL-TIME RIVER WATER QUALITY MONITORING AND CONTROL SYSTEM

TEAM ID: PNT2022TMID38365

Team Members

UKASH KUMAR G
SUBASH E
SURYA E
BARANIVASAN P

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INTRODUCTION

1.1 Project Overview:

River Water quality monitoring System

Water is one of the major compounds that profoundly influence ecosystem. But nowadays it is been exploited heavily due to rapid industrialization, human waste and randomuse of pesticides and chemical fertilizers in agriculture, which leads to water contamination. Thus, a water monitoring system is necessary to observe the water quality in a large area such as lake, river, and aquaculture. As per the current world situation, Internet of Things (IoT) and remote sensing techniques are used in heterogeneous areas of research for supervising, congregate and analyzing data from the remote locations. In this paper, the suggested system is a minimal price real time water quality monitoring system in IoT environment.This system comprises of numerous sensors for assessing the physical and chemical parameter. The factors of water that can be assessed using these sensors are pH, turbidity, conductivity, dissolved oxygen. Using this system, the real time quality of water bodies can bedetermined and the data uploaded over the Internet are analyzed.

1.2 Purpose:

Water quality refers to chemical, physical biological and radio logical characteristics ofwater. It is a measure of the condition of water relative to the necessities of one or more bio-ticspecies and or to any human need or purposes. Water quality monitoring is defined as a sampling and analysis of the water in lake, stream, ocean and river and conditions of the waterbody. Smart water quality monitoring is a process of real-time monitoring and the analysis of water to identify changes in parameters based on the physical, chemical and biological characteristics. Monitoring water quality is clearly important: in our seas, our rivers, on the surface and in our ports, for both companies and the public. It enables us to assess how they are changing, analyze trends and to inform plans and strategies that improve water quality and ensures that water meets its designated use. There are several indicators determining water quality. These include dissolved oxygen, turbidity, bio indicators, nitrates, pH scale and water temperature. Monitoring water quality helps to identify specific pollutants, a certain chemical,and the source of the pollution. There are many sources of water pollution: wastewater from sewage seeping into the water supply; agricultural practices (e.g., the use of pesticides and fertilizer); oil pollution, river and marine dumping, port, shipping and industrial activity. Monitoring water quality and a water quality assessment regularly provides a source of data identify immediate issues – and their source.

- Identifying trends, short and long-term, in water quality.

- Data collected over a period of time will show trends, for example identifying increasing concentrations of nitrogen pollution in a river or an inland waterway. Thetotal data will then help to identify key water quality parameters.
- Environmental planning methods: water pollution prevention and management.
- Collecting, interpreting and using data is essential for the development of a sound andeffective water quality strategy. The absence of real-time data will however hamper thedevelopment of strategies and limit the impact on pollution control. Using digital systems and programs for data collection and management is a solution to this challenge.
- Monitoring water quality is a global issue and concern: on land and at sea. Within the European Union, the European Green Deal sets out goals for restoring biological biodiversity and reducing water pollution, as well as publishing various directives to ensure standards of water quality. Individual nation states, for example France, have also clear regulatory frameworks requiring the effective monitoring of water quality. Inthe United States, the Environmental Protection Agency (EPA) enforces regulations toaddress water pollution in each state. Across the world, countries increasingly understand the importance of effective water quality monitoring parameters and methods.

2.LITERATURE SURVEY

2.1 Existing Problem:

Due to population growth, urbanization, and climatic change, competition for water resources is expected to increase, with a particular impact on agriculture, river water. Water will be suitableness to potable water monitoring compound spillage identification done rivers,remote estimation for swimming pools. It holds self-sufficient hubs that unite with the cloud toongoing water control. The River water needed to be treated before it is used in agriculture fields, hence the parameters affecting the quality of river-water need to be analyzed and to be used for water treatment purpose.

Book/journal	Author's name	Inference
Detection on water pollution and water management using smart sensors IOT	J. Navarajan	This research paper focuses on Detection on water pollution and water management using smart sensors IOT. To ensure the safe supply of drinking water the quality should be monitored in real time for that purpose new approach IOT (Internet of Things) based water quality monitoring has been proposed. This system consists some sensors. Which measure the water quality parameter such as pH, turbidity, conductivity, dissolved oxygen, temperature. The measured values from the sensors are processed by microcontroller and these processed values are transmitted remotely to the core controller that is raspberry pi using Zigbee protocol. Based on a study of existing water quality monitoring system and scenario of water we can say that proposed system is more suitable to monitor water quality parameters in real time. Based on a study of existing water quality monitoring system and scenario of water we can say that proposed system is more suitable to monitor water quality parameters in real time.
Sensor Web for River Water Pollution Monitoring	Natasa Markovic	This research paper focuses on Sensor Web for River Water Pollution Monitoring and Alert System Sensor Web has provided infrastructure for collecting and processing data from distributed and heterogeneous sensors. This set of technologies has found various implementations,

		especially in the area of environmental monitoring. The Sensor Web architecture for crisis management, described in this paper, provides active monitoring of measuring parameters and timely responses in cases of environmental disasters. The River Water Management and Alert System built on this architecture enable access, control and management of river water pollution.
Wireless Sensor Network for River Water Quality Monitoring	K. A. Unnikrishna Menon	This research paper focuses on Wireless Sensor Network for River Water Quality Monitoring in India This paper introduces a river water quality monitoring system based on wireless sensor network which helps in continuous and remote monitoring of the water quality data in India. The wireless sensor node in the system is designed for monitoring the pH of water, which is one of the main parameters that affect the quality of water. Wireless sensor Network which aids in River Water Quality Monitoring. This paper also proposes a novel technique for the design of a water quality sensor node which can be used for monitoring the pH of water.
IoT Based Real-time River Water Quality Monitoring System	Brinda Das, P.C. Jain	The conventional 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) to measure the quality of water. The ZigBee module in the system transfers data collected by the sensors to the microcontroller wirelessly, and a GSM module transfers wirelessly the data further from the microcontroller to the smart phone/PC.
Wireless Sensor Network Real-Time Water Quality Monitoring System	Mohammad Salah Uddin, Bin Emranb, Subhasish Ghosha,	Current water quality monitoring system is a manual system with a monotonous process and is very time-consuming. This paper proposes a sensor-based water quality monitoring system. The main components of Wireless Sensor Network (WSN) include a microcontroller for processing the system, communication system for inter and intra node communication and several

		sensors. Real-time data access can be done by using remote monitoring and Internet of Things (IoT) technology. Data collected at the apart site can be displayed in a visual format on a server PC with the help of Spark streaming analysis through Spark ML-lib, Deep learning neural network models, Belief Rule Based (BRB) system and is also compared with standard values.

2.2 Problem Statement:

Mr. Arjun is a 65 years old man. He was living in the village he only use that river water for drinking, bathing, agriculture and for all purposes. Few days later polluted sewage water mixed with that river water so he cannot use the water. So he Faced a lot of problems of using the river water. Not only he the total village facing this issue.

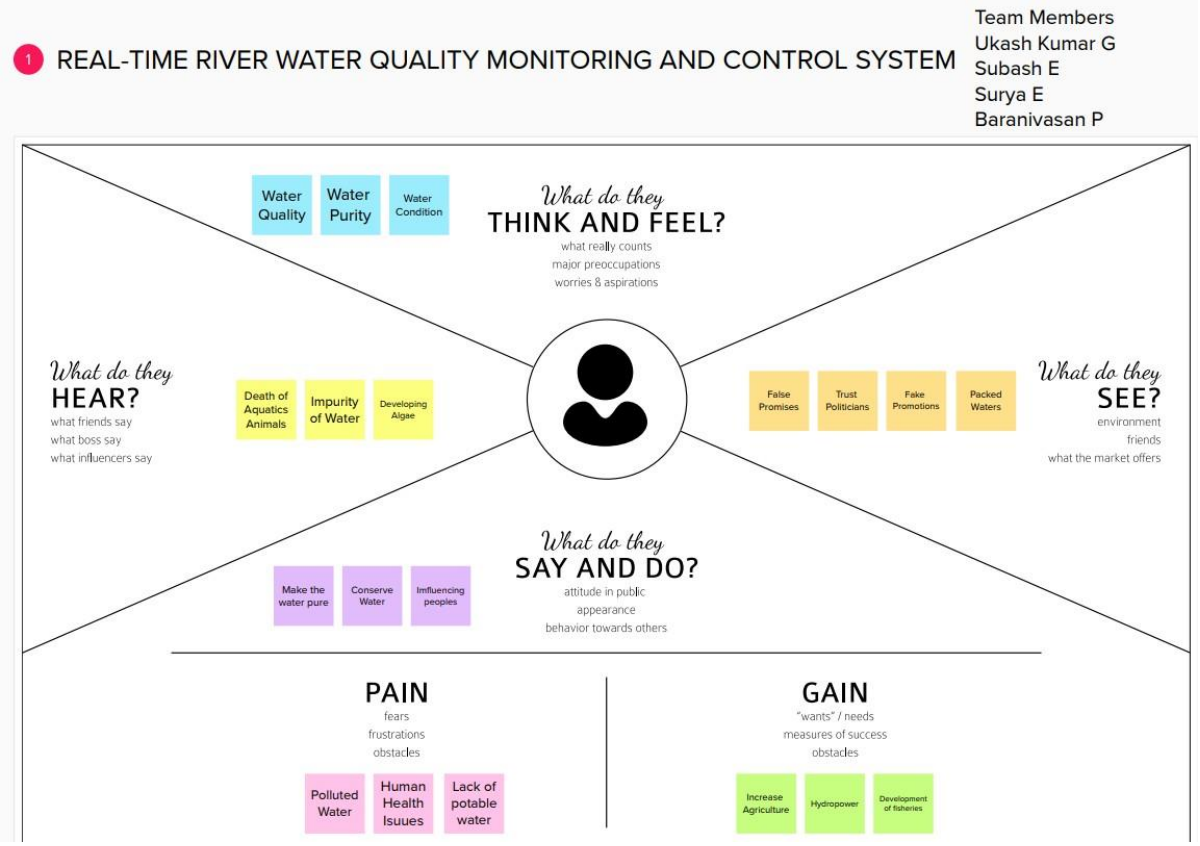
- Arjun and that village peoples wants the better solution for River water quality monitoring and the control system by the web application.
- They wants to alerting the authorities if the river water quality is not pure so that they can announce the localities not to drink that water.
- Mr. Arjun and village peoples needs to know the result immediately.

Who does the problem affect?	Human beings, Plants, Aquatic animals, Animals.
What are the boundaries of theproblem?	People who are around the river are facing lot of the health issues.
What is the issue?	In river water aspects, the polluted water could causes. Water Born Diseases like Cholera, Typhoid, Diarrhea, etc. Death of Aquatic animals like Fishes, Shrimp, lobsters, and so on. Agriculture: It affects agriculture so on.
When does the issue occur?	During the dispatch and public use of river water will be affected by various diseases.

IDEATION & PROPOSED SOLUTION

3:1 Empathy Map Canvas:

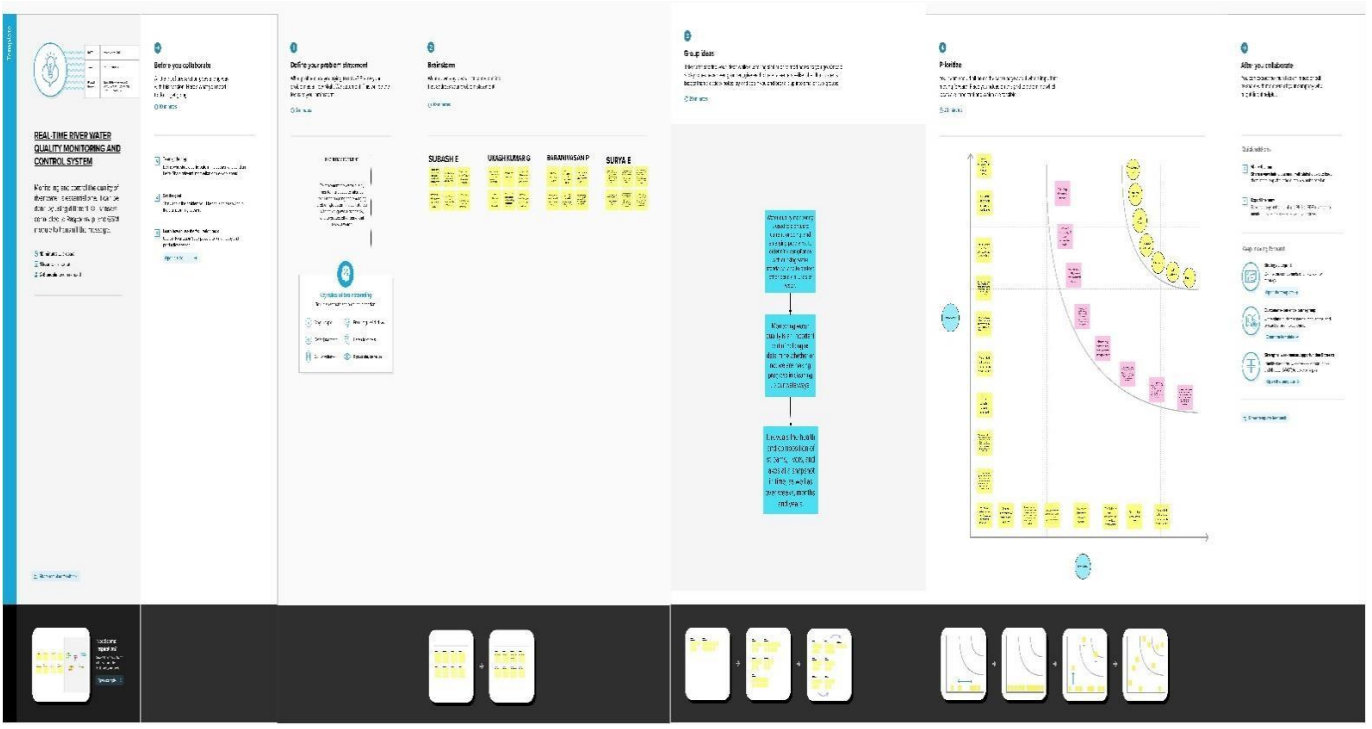
An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes. It is a useful tool to helps teams better understand their users.Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.



3.1 Ideation & Brainstorming:

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.



3.2 Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	River water is the major source of water in villages or cities. But most the river water is get polluted due to the lot of reasons like industrial wastages, sewage water, etc. The usage of this water is not possible. Even though if we use this kind of water it cause many health issues. We need to find the solution for it.
2.	Idea / Solution description	To avoid this kind of vulnerabilities we want to measure various physical and chemical water parameters which are temperature, pH level and turbidity can be measured by this proposed system. Sensors' circuits are connected to the microprocessor and the probes of the turbidity, pH, and temperature sensors placed inside the water.
3.	Novelty / Uniqueness	* If any imperfection found in the water for the above threshold value, automated warning SMS will be sent to the authorities. * The uniqueness of our proposed paper is to obtain the water monitoring system with high frequency, high mobility and low powered.
4.	Social Impact / Customer Satisfaction	* Everyday peoples and animals will drink only the pure water. * The risk of water-borne diseases can be reduced. * Good environment surrounding the river. * The good quality river water is mainly used for farmers.
5.	Business Model (Revenue Model)	By using this system we can find the quality of water because river water is the basic raw material for food and beverage industries.
6.	Scalability of the Solution	* Water quality data with a high spatial and temporal resolution for thousands of lakes at a time. * It supports the evaluation of environmental problems and potential health risks through the analysis of changes in water quality and the detection of harmful algal blooms.

3.3 PROBLEM SOLUTION:

Define CS, fit into CC

1. CUSTOMER SEGMENT(S) CS

Government officials like PWD - Public Works Department and the

Peoples using the river water as their source of water.

6. CUSTOMER CONSTRAINTS CC

Taking the water samples from the river and it make tested in the lab. It takes more time. We have reduce the time of testing.

5. AVAILABLE SOLUTIONS AS

The IOT sensors like pH sensor, turbidity sensor, temperature sensor are connected into the series and make communicated to the local authorities by using GSM module and buzzer is used to alert local peoples.

Explore AS, differenti

Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS J&P

River water quality is controlled and monitored by using this system the various parameters like temperature, ph, turbidity are measured by using this system.

9. PROBLEM ROOT CAUSE RC

River water monitoring system is very poor.

River water maintenance is also very poor.

There is proper disposal of sewage water.

7. BEHAVIOUR BE

Instal the proper maintaining and control system to monitor the river water quality by using the IOT sensors.

Focus on J&P, tap into BE, understand RC

Identify strong TR & EM

3. TRIGGERS TR

In many countries river water quality is calculated by using the different technologies.

And also our country and state peoples affected by many health issues while using these river water.

10. YOUR SOLUTION SL

Based on the problem, the different IOT sensors are connected into the series and it is connected to the mini computer called raspberry pi that works on the python code, and it transmit the signal to the user by the GSM module and LED display is used to the live value measures if the water. Buzzer is used to alert the local peoples using the river water.

8.CHANNELS of BEHAVIOUR CH

8.1 ONLINE

Raspberry pi transmit the signal to GSM module.

GSM module do the online work that transmit the message to the user.

8.2 OFFLINE

Maintaining the IOT sensors is important.

At regular interval of time we want check the system functionality and efficiency.

Identify strong TR & EM

4. EMOTIONS: BEFORE / AFTER EM

Before our project the peoples have suffered to use the river water and even though they using the river water they have a fear of using the river water.

After our project the peoples will definitely appreciate this initiative.

They will encourage our system, technologies and methodologies uses in it.

Now the peoples will not have any fear use the river water.

4 REQUIREMENT ANALYSIS

4.1 Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Email Registration through product mobile UI
FR-2	User Confirmation	Confirmation via Email,Confirmation via OTP Confirmation via Message
FR-3	Ph level detection	To monitor the water quality Ph sensor is used and the signals are send to Ardino.
FR-4	Turbidity detection	Turbidity sensor measures the clarity of element or muddiness utter in the water and the signals are send to Arduino.
FR-5	Ultrasonic generator	At regular interval times the waves are generated to clear algae 25%,50%,75%,100%

4.2 Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

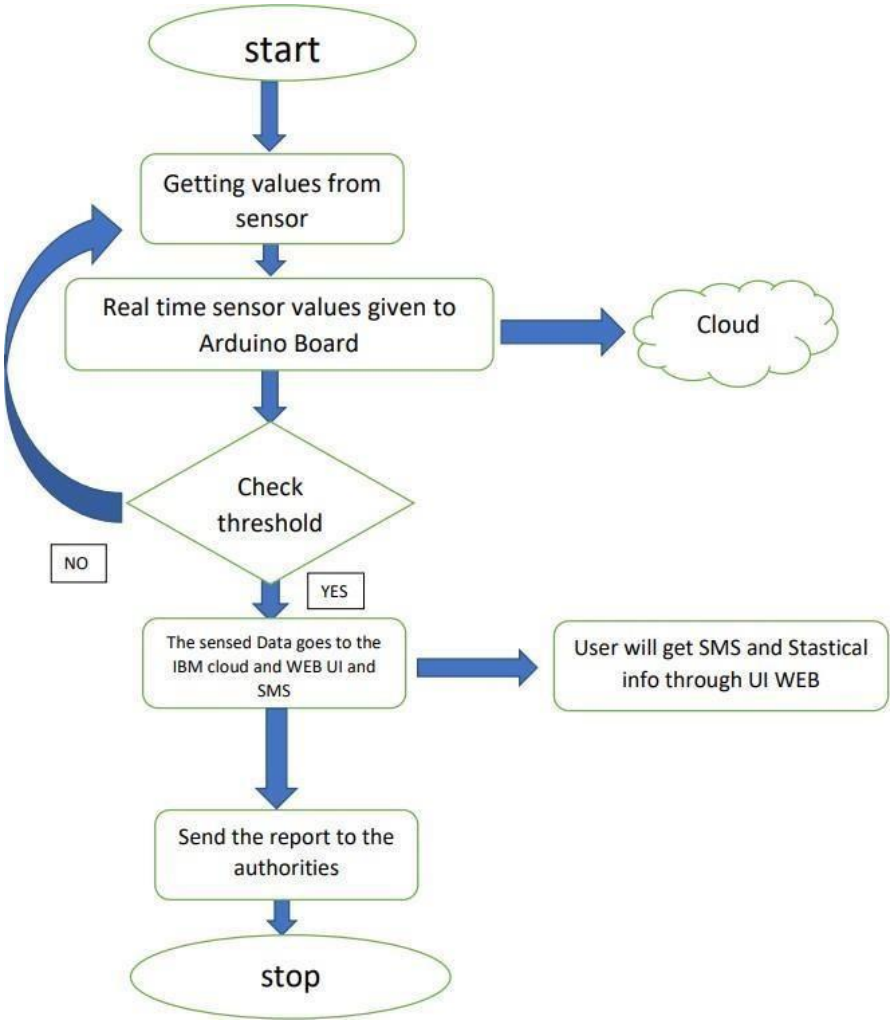
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	It has simple monitoring system and efficient to use.
NFR-2	**Security**	Mobile application is secured with firewall protection.
NFR-3	**Reliability**	Real time sensor output values with future predicted data storage. 98% efficient monitoring output. It also gives assurance for aquaculture safety.
NFR-4	**Performance**	It has greater performance and environmentally safe model.
NFR-5	**Availability**	In the form of mobile UI 24 x 7 monitoring system.

NFR-6	**Scalability**	Highly Scalable. It is capable to produce a best final output.
NFR-7	**Stability**	The stability is very high
NFR-8	**Efficiency**	It is highly efficient, high mobility and low powered.

5 PROJECTDESIGN

5.1 Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



5.2 SOLUTION AND TECHNICAL ARCHITECTURE

Summary

This code pattern explains how to build an IOT based river water monitoring and controlling system with some predefined values.

Flow

- Feed the data received from the Sensor unit which are placed in the river sides.
- The collected data will be displayed in the Web page to the user.
- Then the collected data is sent to the data base, where the collected data and the predefined data are checked and monitored.
- If any data exceed the predefined data then the control signal will send to the Admin.
- The collected data will be stored in the IBM cloud storage. Later the data will be controlled by the admin via UI.

Components & Technologies:

S.No	Component	Description	Technology
1.	Sensor Data	The data is collected form the various sensor placed in the river sides.	ESP32Wifi module Raspberry Pie.
2.	Database for Storage	The data/info need to be stored for accessing it in future	MySQL-Oracle

3.	File Storage	File storage requirements	IBM Block Storage or Other Storage Service or Local Filesystem
4.	Cloud Database	Database Service on Cloud	IBM cloud
5.	Data Storage	File storage requirements	IBM Block Storage

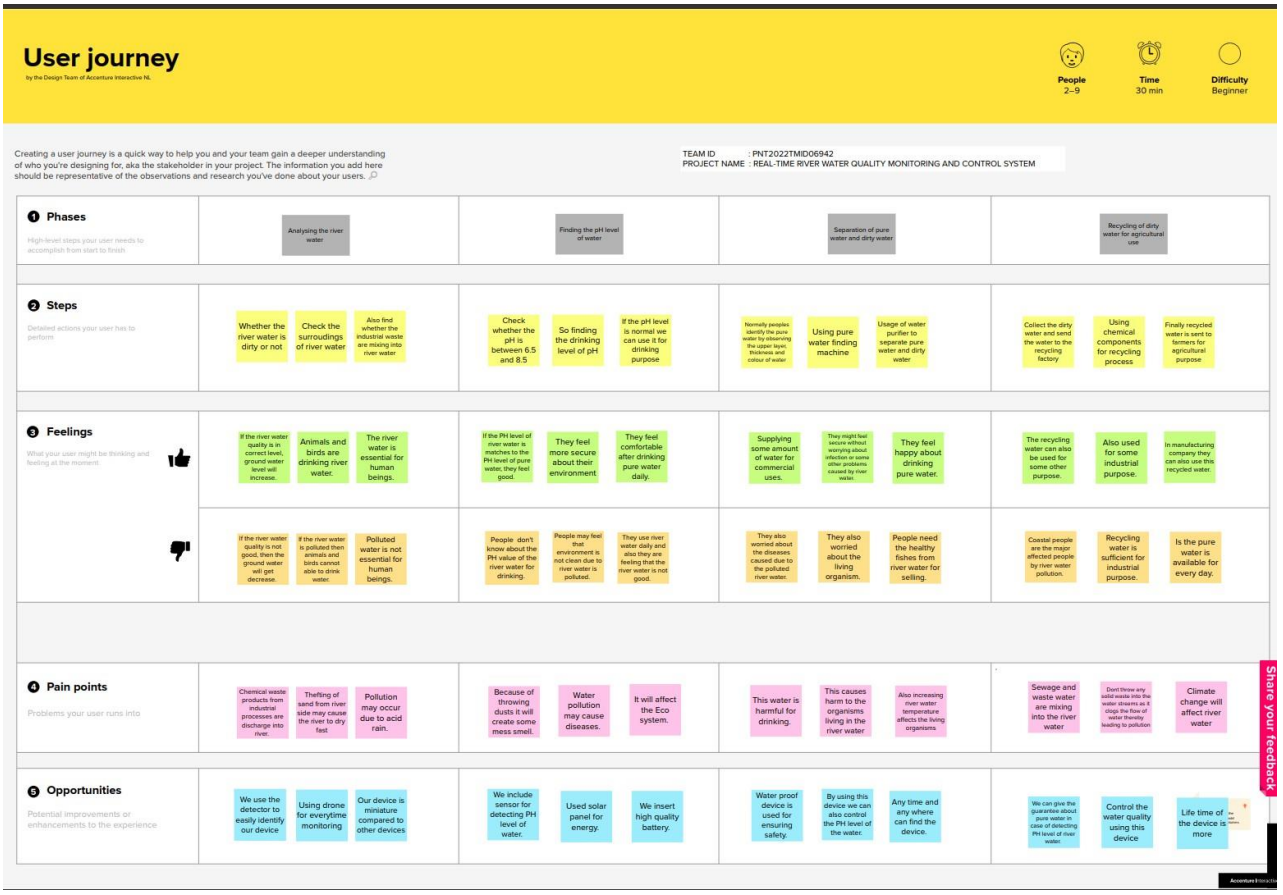
Application Characteristics:

S.No	Characteristics	Description	Technology
1.	PH level Monitoring	The PH level of river water can be monitored via placing sensors in rivers.	PH-sensor
2.	Air Quality Monitoring	The clarity and purity of river water can be monitored	Surface Mount Sensor
3.	Temperature Monitoring	The temperature of river water can be monitored	Temperature sensor
4.	Water Treatment	can be used as both a safety device in the water purification process as carbon dioxide, methane, and carbon monoxide are some of the key gases produced during the treatment process	NDIR gas sensors

4.	Soil Condition Monitoring	Soil condition monitoring sensors allow farmers to collect data about rainfall, temperature, and other metrics over time to track trends and predict irrigation needs.	Acoustic sensor

5.3 User Stories

Use the below template to list all the user stories for the product.



6.PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING AND SCHEDULING

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Login	USN-1	As a Administrator, need to give user id and passcode for ever workers over there in PWD	10	High	Subash E
Sprint-1	Login	USN-2	As a Co-Admin, they will manage the login database	10	High	Ukash Kumar G
Sprint-2	Dashboard	USN-3	In that filed it snows the real time water quality parameters.	20	Low	Baranivasan P
Sprint-1	Dashboard	USN-4	We can store the water quality parameters in the cloud.	20	Medium	Surya E
Sprint-1	Dashboard	USN-5	The stored data can be make analysis for the future use also and make report.	20	High	Subash E

6.1 SPRINT DELIVERY SCHEDULE

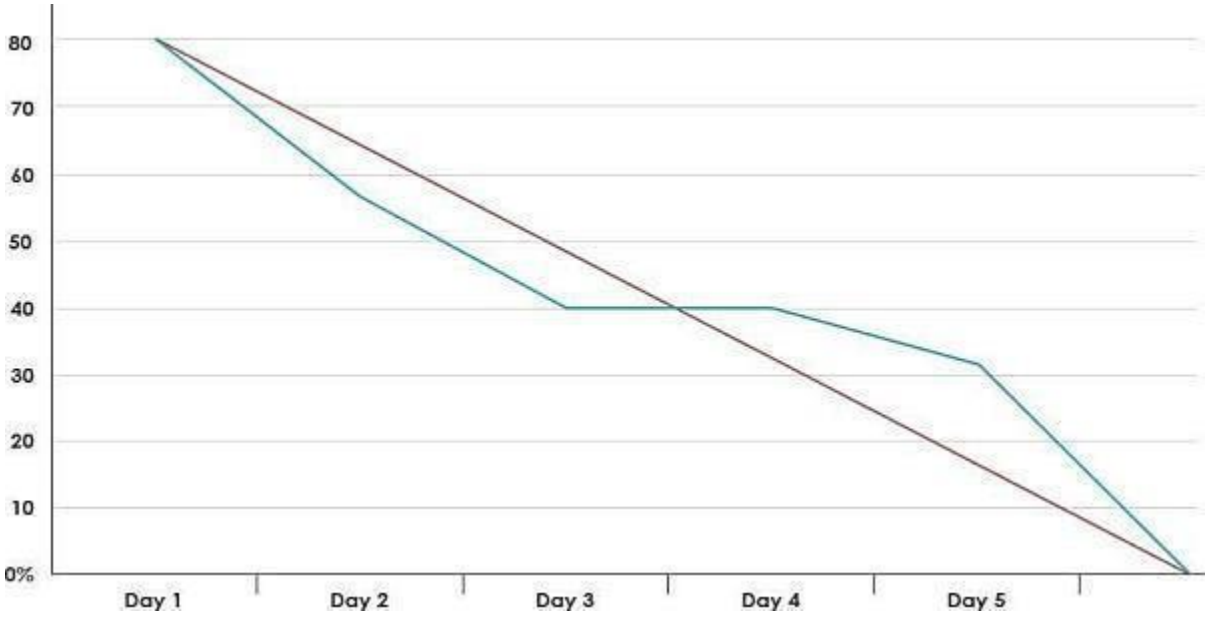
Product Backlog, Sprint Schedule, and Estimate

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Velocity:

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

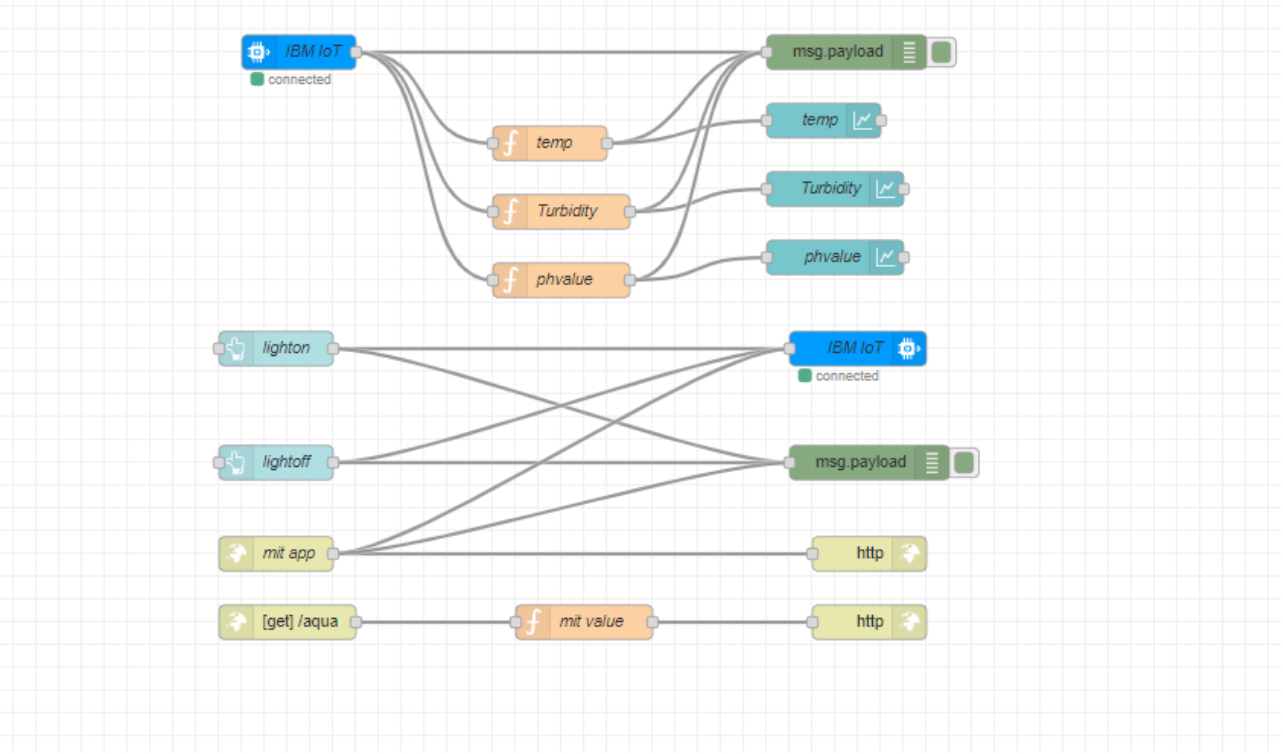
Burndown Chart:



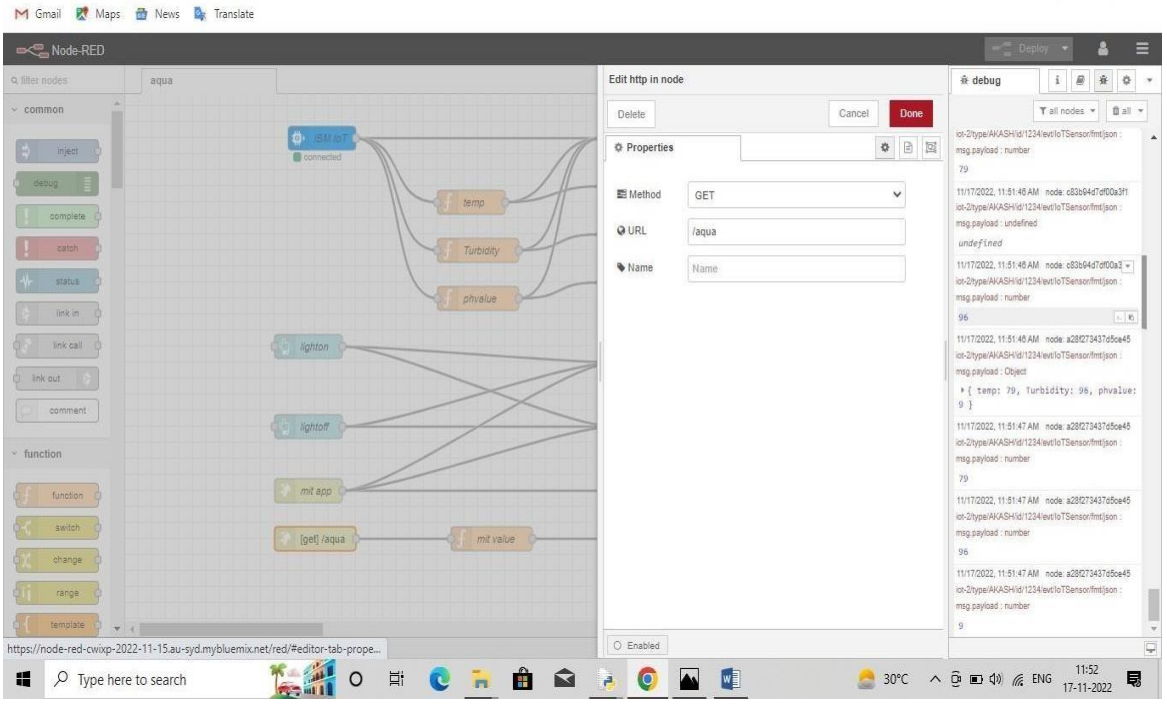
6.2 REPORT FROM JIRA

7 CODING AND SOLUTIONING

7.1 NODE RED SERVICE ASSOCIATED WITH IBM CLOUD:



Node red Outputs:



8 TESTING

8.1 Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	15	0	0	15
Client Application	45	0	0	45
Security	1	0	0	1
Outsource Shipping	2	0	0	2
Exception Reporting	10	0	0	10
Final Report Output	4	0	0	4
Version Control	3	0	0	3

8.2 USER ACCEPTANCE TESTING

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the REAL TIME RIVER WATER QUALITY MONITORING AND CONTROL SYSTEMS project at the time of the release to User Acceptance Testing (UAT).

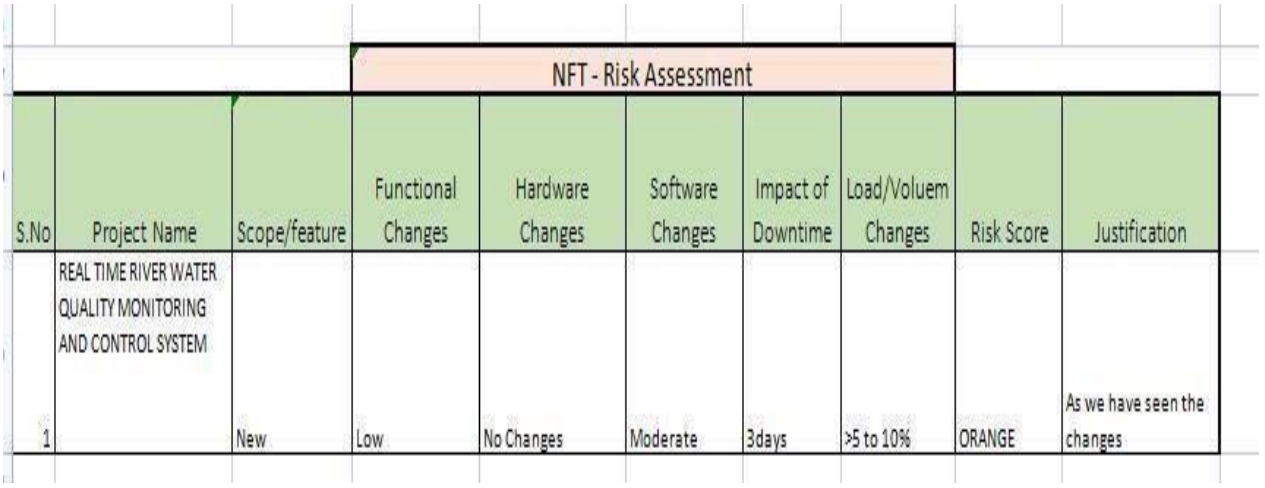
2. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Test case id	Feature	Component	Test Scenario	Steps to Execute	Test Data	Actual Result	Status
Login page	Functional	Home page	Verify user is able to see the Given app	1.Download the given APK File 2.Click on download button 3.Verify login popup displayed or not"	APK File	Working as expected	Pass
Login page	Functional	Home page	Verify user is able to see the Login/Signup popup when user open the Aqua Meter	1. Download the given APK File 2.Click on download button 3.Verify login popup displayed or not"	APK File	Working as expected	Pass
Login page	Functional	Home page	Verify the UI elements in Login/Signup popup	1. Download the given APK File 2.Click on download button 3.Verify login popup with below UI elements: A .Username text box A .password text box B .Submit button	APK File	Working as Expected	Pass
Login Page	Functional	Home page	Verify user is able to log into application with Valid credentials	"1 Download the given APK File 2.Click on download button 3.Enter Valid “Given “ username in Username text box 4.Enter valid password in password text box 5.Click on Submit button"	Username: Username Password: Password	Working as Expected	Pass
Login Page	Functional	Home page	Verify user is able to see the output	1.output displayed	APKFile	Working as Expected	Pass

9 RESULT

9.1 PERFROMANCE METRICS:



			NFT - Risk Assessment						
S.No	Project Name	Scope/feature	Functional Changes	Hardware Changes	Software Changes	Impact of Downtime	Load/Voluem Changes	Risk Score	Justification
1	REAL TIME RIVER WATER QUALITY MONITORING AND CONTROL SYSTEM	New	Low	No Changes	Moderate	3days	>5 to 10%	ORANGE	As we have seen the changes

PERFORMANCE TABLE

PARAMETER	PERFORMANCE	DESCRIPTION
ADMIN TESTING	95%-100%	THE TESTING DONE BEFORE IT IS DEPLOYED AS AN APP
CUSTOMER SATISFACTION	75-85%	THE CUSTOMER NEED TO BE SATISFIED WITH THE MOBILE APPLICATION
USER INTERFACE	65-85%	THE APP CAN USED BY ANYONE.(EASE OF ACCESS)

SEVER RESPONSE	50-75%	url - response
DATA VALIDATION WITH NO. OF TEST CASE	60-80% (15-30 TESTCASE)	VALID DATA FROM THE APP
ERROR	3-5%	REAL-TIME DELAY MAY OCCUR

10 ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

- The prototype developed for water quality maintenance is very beneficial for safeguarding public health and also adds to the clean environment.
- The automation of this water monitoring, cleaning and control process removes the need of manual labor and thus saves time and money.
- The automation of the system makes the control and monitoring process more efficient and effective. Real time monitoring on mobile phone which is possible through the interface of plc with Arduino and Bluetooth module allows remote controlling of the system.

DISADVANTAGES:

- It is difficult to collect the water samples from all the area of the water body.
- The cost of analysis is very high.
- The lab testing and analysis takes some time and hence the lab results does not reflect real time water quality measurement due to delay in measurement.
- The process is time consuming due to slow process of manual data collection from different locations of the water body.

11.CONCLUSION

Thus our project is used to Monitoring of Turbidity, PH & Temperature of Water makes use of water detection sensor with unique advantage and existing GSM network. The system can monitor water quality automatically, and it is low in cost and does not require people on duty. So the water quality testing is likely to be more economical, convenient and fast. The system has good flexibility. Only by replacing the corresponding sensors and changing the relevant software programs, this system can be used to monitor other water quality parameters.

The operation is simple. The system can be expanded to monitor hydrologic, air pollution, industrial and agricultural production and so on. It has widespread application and extension value. By keeping the embedded devices in the environment for monitoring enables self protection (i.e., smart environment) to the environment. To implement this need to deploy the sensor devices in the environment for collecting the data and analysis. By deploying sensor devices in the environment, we can bring the environment into real life i.e. it can interact with other objects through the network.

Then the collected data and analysis results will be available to the end user through the Wi-Fi.

12.FUTURE SCOPE

We use water detection sensor has unique advantage. It consumes less time to monitor than a manual method for checking polluted levels, and notifies immediately to reduce affected rate of pollution in water. People who are living in rural areas near to the river will be very

satisfied with our idea. It will be useful to monitor water pollution in specific area. So this system prevent people from water pollution. It will be used for farming purpose to check quality water temperature and PH level. Our Impact of this project is also create a social satisfaction for farmers too. The scalabilty of this project gives the addition of more different type of sensors. By interfacing the relay we can control the supply of water. We can also implement as a revenue model. This system could also be implemented in various industrial processes. The system can be modified according to the needs of the user and can be implemented along with lab view to monitor data on computers.

13.APPENDIX

13.1 SOURCE CODE:

PYTHON CODE TO PUBLISH DATA

```
import time
import sys
import ibmiotf.application
import ibmiotf.device
import random


#Provide your IBM Watson Device
Credentials
organization = "uo60re"

deviceType = "AKASH"
deviceId = "1234"
authMethod = "token"
authToken = "12345678"

# Initialize GPIO


def myCommandCallback(cmd):
    print("Command received: %s" %
cmd.data['command'])
    status=cmd.data['command']
    if status=="lighton":
        print ("led is on")
    else:
        print ("led is off")
    #print(cmd)
```

```
    deviceType = "AKASH"
    deviceId = "1234"
    authMethod = "token"
    authToken = "12345678"

    # Initialize GPIO


    def myCommandCallback(cmd):
        print("Command received: %s" %
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        status=cmd.data['command']
        if status=="lighton":
            print ("led is on")
        else:
            print ("led is off")
        #print(cmd)



    try:
            deviceOptions = {"org":
organization, "type": deviceType, "id":
deviceId, "auth-method": authMethod,
"auth-token": authToken}
            deviceCli =
ibmiotf.device.Client(deviceOptions)
            #.....................................

    except Exception as e:
            print("Caught exception
connecting device: %s" % str(e))
            sys.exit()
```
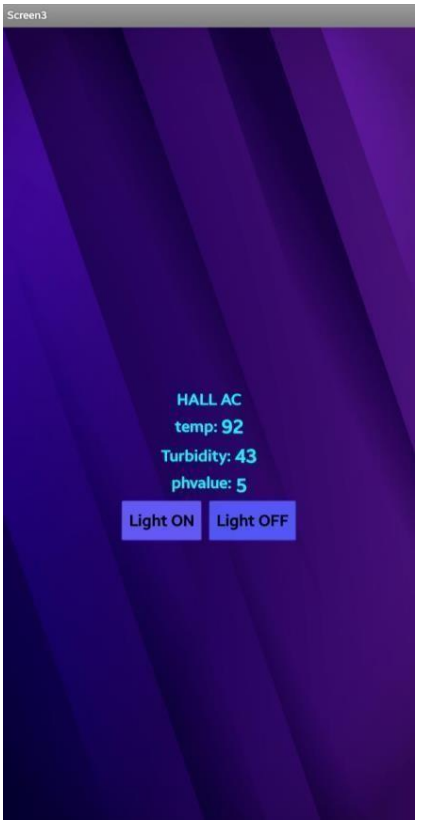

```
    # Connect and send a datapoint
"hello" with value "world" into the cloud
as an event of type "greeting" 10 times
    deviceCli.connect()

    while True:
        #Get Sensor Data from DHT11

        temp=random.randint(60,100)

Turbidity=random.randint(0,100)
        phvalue=random.randint(2,14)

        data = { 'temp' : temp,
'Turbidity': Turbidity,'phvalue': phvalue}
        #print data
        def myOnPublishCallback():
            print ("Published temp = %s
'C" % temp, "Turbidity = %s %%" %
Turbidity,"phvalue = %s %%" % phvalue,
"to IBM Watson")

        success =
deviceCli.publishEvent("IoTSensor",
"json", data, qos=0,
on_publish=myOnPublishCallback)
        if not success:
            print("Not connected to
IoTF")
        time.sleep(10)

        deviceCli.commandCallback =
myCommandCallback
```

```
    # Disconnect the device and
application from the cloud
    deviceCli.disconnect()
```

OUTPUT

MOBILE APP:



Git Hub Link: https://github.com/IBM-EPBL/IBM-Project-41136-1660639628

DEMONSTRATION REPORT LINK:
https://drive.google.com/file/d/1Is6-Aj2FeUXMJFnX3xKW4zshdKXUrviD/view?usp=drivesdk