REAL – TIME RIVER WATER QUALITY MONITORING AND CONTROL SYSTEM

NALAIYATHIRAN PROJECT BASED LEARNING ON

PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTERPRENEURSHIP

A PROJECT REPORT

Submitted by

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BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

UNIVERSITY COLLEGE OF ENGINEERING, RAMANATHAPURAM

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BONAFIDE CERTIFICATE

Certified that this project report titled "**Real-Time River Water Quality Monitoring and Control System by NALAIYATHIRAN PROJECT BASED LEARNING Program"**, is the bonafide work of **RAMESH M(913019106009), KARTHIK KISHORE M (913019106005), ROOPAN KUMAR R(913019106010),SANJAY M (913019106012), AJITHKANNAN P(913019106003)** who carried out the work under faculty mentor and industry mentor supervision, for the partial fulfillment of the requirements for the award of the degree of **BACHELOR OF ENGINEERING IN ELECTRONICS AND COMMUNICATION ENGINEERING.**

Certified further that to the best of my knowledge and belief, the work reported here in does not form part of any other thesis or dissertation on the basis of which a degree or an award was conferred on a nearlier occasion.

DECLARATION

I, hereby declare that the Project work entitled "**Real-Time River Water Quality Monitoring and Control System by NALAIYATHIRAN PROJECT BASED LEARNING PROGRAM**" submitted to the IBM November 2022 in partial fulfillment for the award of the degree of **BACHELOR OF ENGINEERING IN ELECTRONICS AND COMMUNICATION ENGINEERING,** is the report of the original project work done by us under the guidance of Mr. (Faculty Mentor),Department of **ELECTRONICS AND COMMUNICATION ENGINEERING**, University College of Engineering, Ramanathapuram.

NAME

RAMESH M
(Team Leader)

I certify that the declaration made by the above candidate is true.

SIGNATURE FACULTY MENTOR
Department of Electronics and Communication Engineering
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TABLE OF CONTENTS

1. INTRODUCTION

1.1 PROJECT OVERVIEW:

These days drinking water is the most valuableand significant for every single individual and potable water usage faces new difficulties in constant operation. Monitoring various aspectsof the River Water Quality leads to a clear understanding of the aspects that should be considered for a healthy life and to avoid unsanitary waterusing Internet of Things (IOT) should allow for the integration of real time monitoring and controlling of water quality. The suggested system utilizes Internet of Things (IOT) through using sensors such as (PH, temperature and turbidity). Using a web application to immediately alert the people to check the status of water. The **IOT based Real-time river water quality monitoring and control system** being proposed via this report with micro controller mixed with different sensors and a Wi-Fi module producing live data is sent to cloud o that people or authorities can get the data easily. Using IBM Cloud services to store and using various types of codes to execute the system process. Real-time river water quality monitoring and control system is used to monitor and control the quality of water pH level, Temperature to get the proper qualityof good water.

1.2 PURPOSE:

The main aim of our project is to monitor and control the quality of water in river water quality monitoring is used to alert us to current ongoing and emerging problems; To determine compliance with drinking water standards and to protects other beneficial uses of water and also helpful for people to drink good water.

2. LITERATURE SURVEY

2.1 EXISTING PROPLEM:

1. Mixing of water like drainage, chemical wastage.

2. Death of animals in river water.

3. When people throw plastics and in the river, it causes river water pollution.

4. Oilspilled, fertilizers, human wastes are the existing problems in the river water.

2.2 REFERENCES:

1. **TITLE:** IOT Based real time river water quality monitoring system

   AUTHOR DETAILS : Mohammad salahuddinchowdury, Talha bin emran, Subhasish, Abhjitpathak, Karalandersson, Mohd.manjuralam, Nurulabsar, Mohammadshahadathossain

   YEAR 2019

2. **TITLE:** Smart water quality monitoring system with cost effective using IOT

   AUTHOR DETAILS : Sathishpasika, Saitejagandha

   YEAR 2020

3. **TITLE :** Smart water quality monitoring system for Real time applications

   AUTHOR DETAILS : Tha.Sugapriya, S.Rakshya, K.Ramyadevi, M.Ramya,

YEAR 2018

4. **TITLE** **:** Real time monitoring of water quality

AUTHOR DETAILS: Mohanabarathy.R, Sindhuparvathi.M, Priyanka.K,

YEAR 2019

5. **TITLE** **:** Real time water quality monitoring system

AUTHOR DETAILS: Yashwanthgowda K.N, Vaishali.c, sumalatha S.T and spoorth G.B

YEAR 2020

6. **TITLE** **:** Smart water quality and monitoring of motor in bore well by IOT

AUTHOR **:** Nandhinimurugaiyan, Elakkiyasakthivel, Madhumithalavakumar,

YEAR 2020

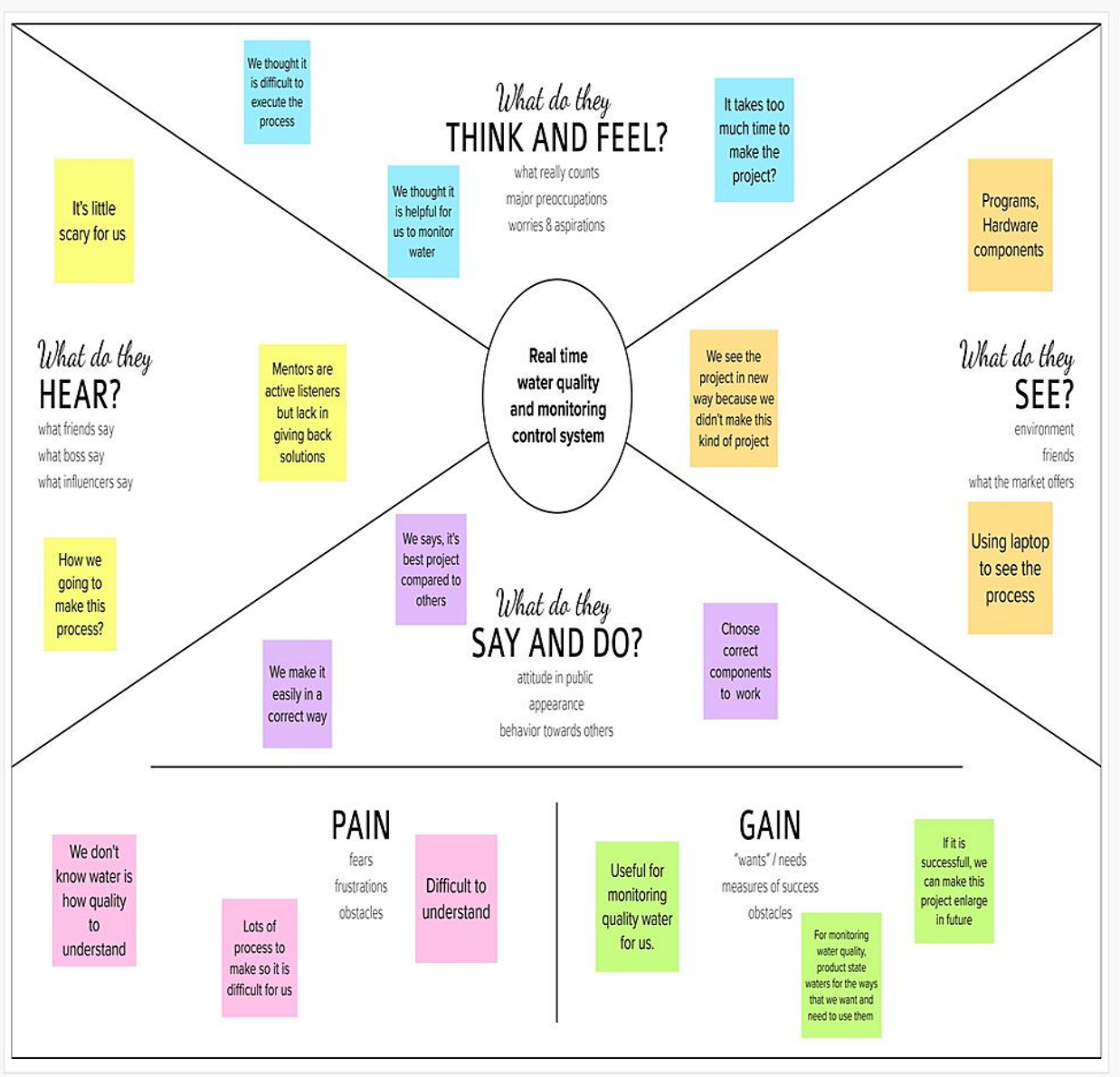
2.3 PROBLEM STATEMENT DEFINITION:

REAL-TIME RIVER WATER QUALITY MONITORING AND CONTROL SYSTEM

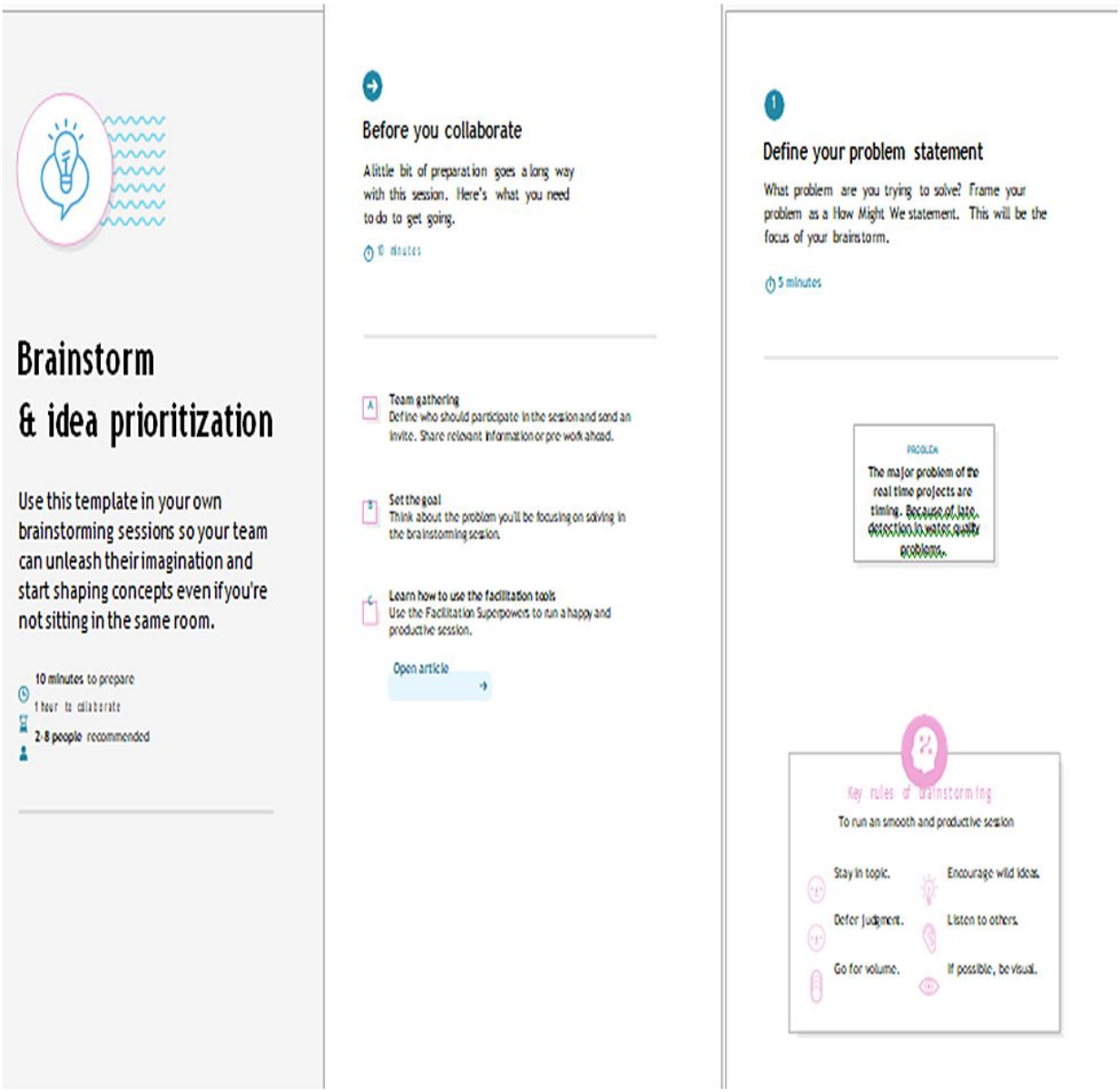
01.	**I AM**	Manufacturer
02.	**I'm trying to**	Detect the water quality monitoring and control system in river
03.	**But**	Using different types of sensor is a major problem in this system
04..	**Because**	If any one of the sensor are damaged or not working doesn't detect the system properly.
05.	**Which makes me feel**	This leads people to drink and use unsanitary water

3. IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS:



3.2 IDEATION & BRAINSTORMING:



2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

TIP

You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

RAMESH

KARTHIK KISHORE

ROOBAN KUMAR

SANJAY

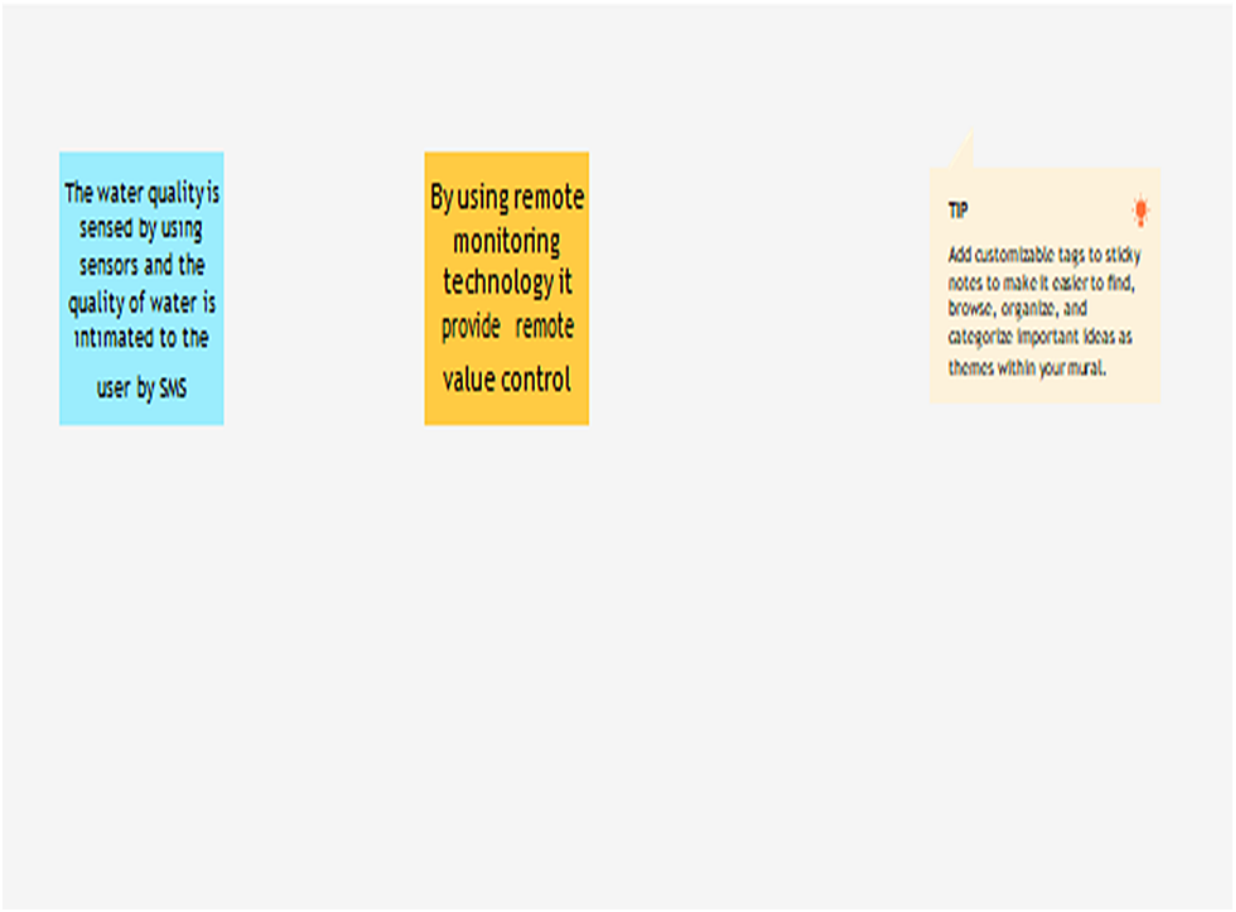
AJITH KANNAN

3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes



Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

Share the mural
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.

Export the mural
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

Strategy blueprint
Define the components of a new idea or strategy.
Open the template

Customer experience journey map
Understand customer needs, motivations, and obstacles for an experience.
Open the template

Strengths, weaknesses, opportunities & threats
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
Open the template

Share template feedback

3.3 PROPOSED SOLUTION:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
01.	Problem Statement (Problem to be solved)	The major problem of the real time projects are timing. Because of late detection of water quality problems .
02.	Idea / Solution description	To setting up internet connection in rural areas for quick detection of water quality through mobile application or SMS alert.
03.	Novelty / Uniqueness	Timely detection of water quality can keep the water in good condition.
04.	Social Impact / Customer Satisfaction	People can drink clean water and use it effectively.
05.	Business Model (Revenue Model)	It benefits for mergers to sell in medium cost to buffers and also helpful in the society.
06	Scalability of the Solution	Need more type of sensors and others components high cost is required.

3.4 PROBLEM SOLUTION FIT:

1.CUSTOMER SEGMENT (S): People and Industrial companies are our customers. We take this ideas to customers.	**6. CUSTOMER CONSTRAINTS:** The customer constraints are network connection, No cash and available devices to built the system	**5. AVAILABLE SOLUTOINS** The solution of water quality monitoring and quality systems using robot to detect the problem and using sensors to identify the problem to the user by SMS.
2.JOBS – TO – BE DONE / PROBLEM: Timing and Internet issues are the major problem in the system. Because me detect the water quality problems l**ate.**	**9. PROBLEM ROOT CAUSE:** Timing and Internet connection is the real reason that problem exists.	**7. BEHAVIOUR** Our customer address the problem, Sometimes they drink and use unsanitary water. This leads to health Problems.
3. TRIGGERS: Water problem triggers the customers to act in various ways.	**10. YOUR SOLUTION:** Using different types of sensors like PH sensor, turbidity sensor, temperature sensor to monitoring the water and display the conditions in	**8. CHANNELS OF BEHAVIOUR:** **8.1 ONLINE:** They can't interact with the physical components. They complaint the problem through online easily.
4. EMOTIONS: BEFORE/AFTER: The emotions are frustrated, anger, fear and neglected	LCD sensor	**8.2 OFFLINE:** They take the decision immediately in offline and solved it quickly.

4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT:

Following are the functional requirements of the proposed solution.

FR NO:	Functional requirements	Sub Requirement (Story / Sub - task)
FR – 1	User identification	The user has to identify whether the water conditions are good or bad then take the sample water to identify the water quality.
FR – 2	User detection	The user has to detect the quality of the river water using different types of sensors and measure the PH value.

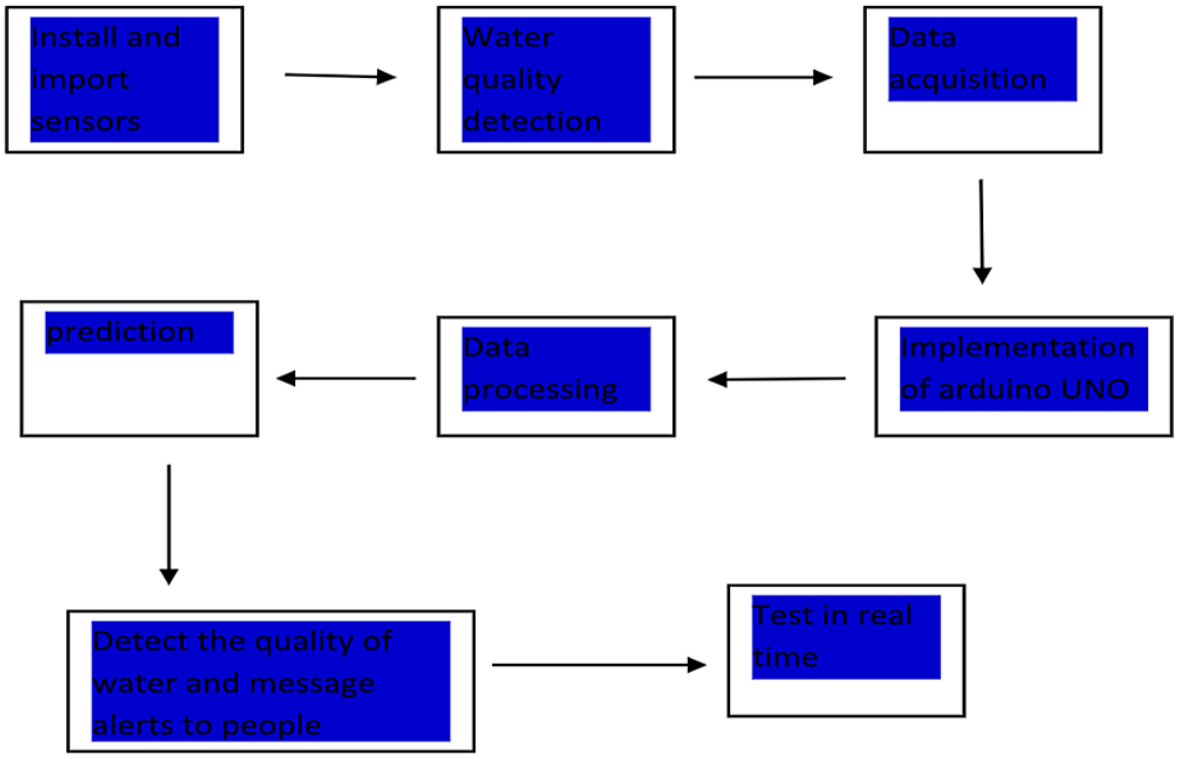
4.2 Non - Functional Requirements:

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

FR NO	Non – Functional Requirement	Description
NFR – 1	Usability	The sensors are used to monitor the quality of water for people and to drink the water in good condition.
NFR – 2	Security	Using a web application to immediately alert the user not to drink the water keeps them safe from health problems.
NFR – 3	Reliability	The system is more reliable. It is simple to detect the quality of various types of water and is helpful for people to drink good water.

5. PROJECTDESIGN

5.1 DATA FLOW DIAGRAM:



Flow:

a. We start collecting data from cloud services and collect a bunch of data from sensors.

b. Save data in the form of numpy arrays.

c. We then implement arduino UNO without.

d. The number of sensor for the models determined by us, if we increase the number of sensors, the accuracy increases.

e. But it requires much more time for implementing more sensors.

f. Once detection is done, we can use this model for real time water quality detection and simultaneously used to detect PH value of water and temperature of the water.

5.2 Solution & Technical Architecture:

1. Customer Segment:

People and Industrial Companies are our customers. We take these ideas from industrial companies to people. They need this system to detect the water quality and monitoring.

2. Jobs to be done / problems:

Timing is the major problem in this system. Because of late detection cause severe water problems. They didn't use the water after detect the water problems late.

3. Triggers:

Water problems triggers the customers to act in various ways like, they complaint about water problems to government and protest take place.

4. Emotions:

The emotions are very frustrated, anger, fear and neglected. It makes the people so depressed

5. Available Solutions:

The solution of water quality monitoring and control systems using SMS to detect the problem quick in manner. Using different types of sensors to detect the water quality problems.

6. Customer constraints:

The customer constraints are network connections to make the system difficult and to build this system we need sensor to handle good.

7. Behavior:

Our customer addresses the problem, sometime the drink and use unsanitary water. This leads to health problems and it affects their children in future.

8. Channels of Behavior:

Online:

They can't interact with the physical components and complaint the problems through online easily.

Offline:

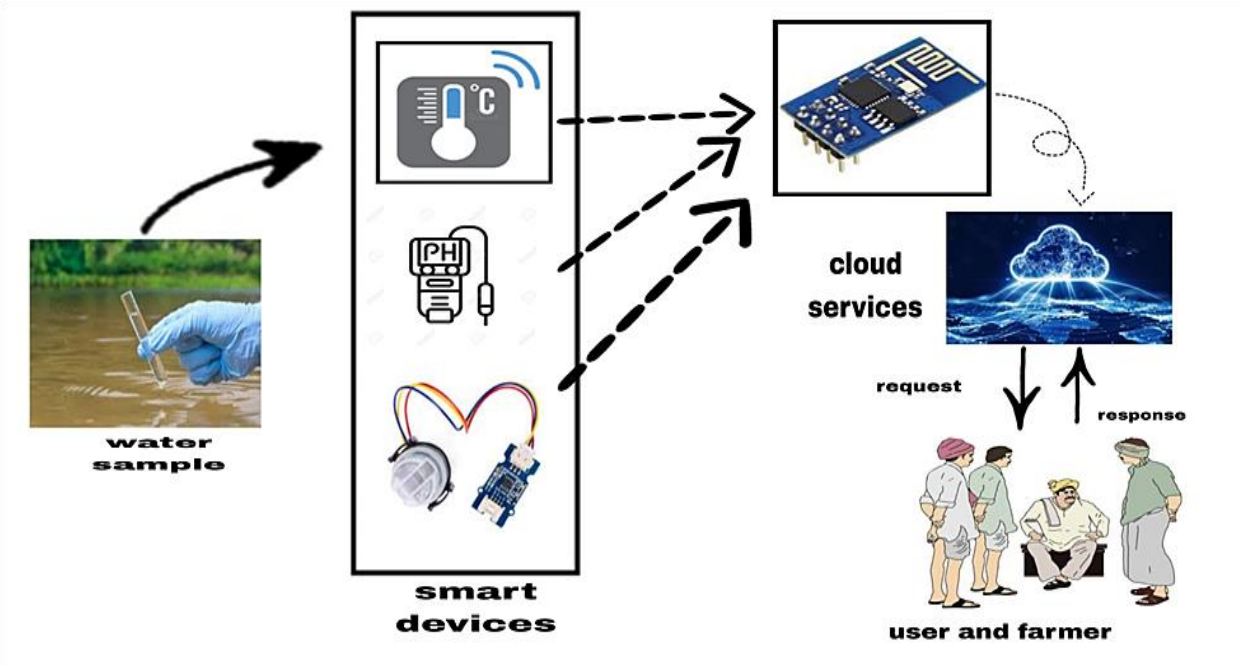
They take the decision immediately offline and solved it quickly. After detecting the problem, they find their way to executing the system.

9. Problem root cause:

Timing is the real reason that this problem exists.

10. Your solution:

Using different types of sensors like PH sensor, turbidity sensor to monitoring the water and display the conditions in LCD. Additionally, SMS alerts for water conditions are good or bad.



Technical architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table 1 & table 2.

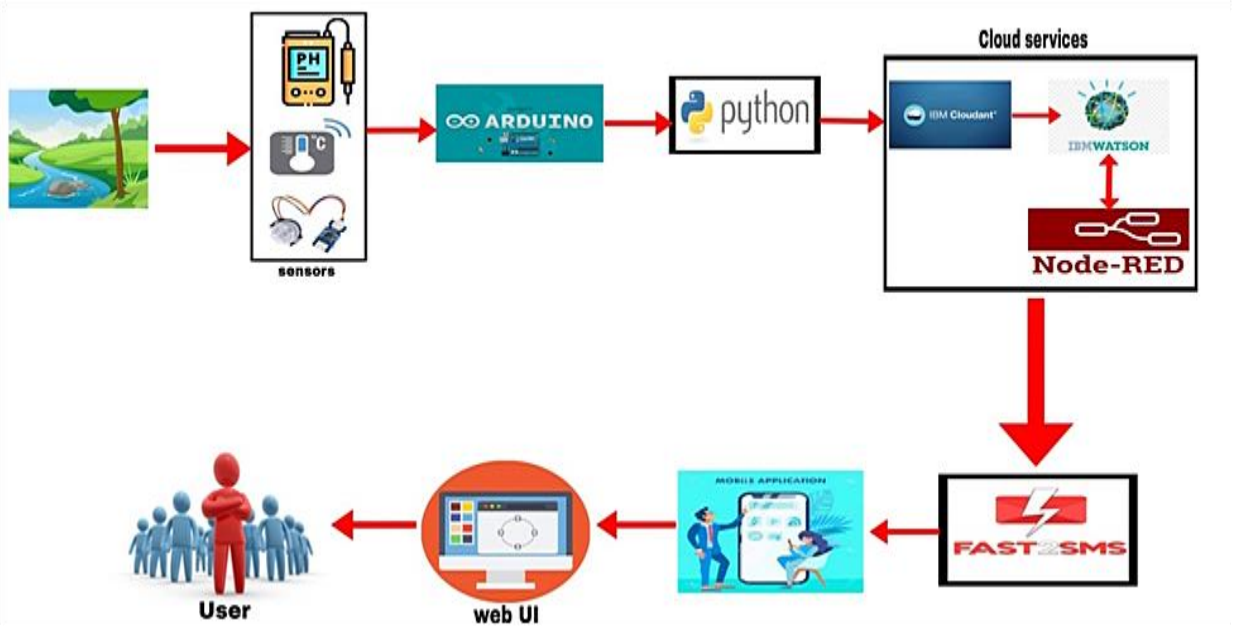


Table-1: Components & Technologies:

s.no	Component	Description	Technology
01.	User interface	Web UI, Mobile App.	HTML, CSS, Python Script.
02.	Application Logic-1	Available water resource to detect and to search location.	Python Script.
03.	Application Logic-2	Statistical random values and graphical analysis.	IBM Watson STT service.
04.	Application Logic-3	Alert message to the user.	IBM Watson Assistant.
05.	Database	Random values of PH level turbidity and temperature in river water.	MySQL, NoSQL.
06.	Cloud Database	Database service on cloud by the administrator.	IBM Cloudant.
07.	File Storage	Storing the random values to compare with threshold value.	IBM Block storage.
08.	External API -1	Effective data generation.	IBM Watson API.
09.	External API -2	Google sign-in.	Google API.
10.	Machine Learning Model	To recognize file pattern (here graphical mode of statistical data is generated).	Object recognition model (IBM Watson and node-RED).
11.	Infrastructure (Server/Cloud)	Software library workspace.	Cloud foundry (IBM Cloudant) ,adding.

Table-2: Application Characteristics:

S.no	Characteristics	Description	Technology
01.	Open-source frameworks	The open-source tools we utilised to create our project.	Node-RED, IBM Cloudant, IBM Watson IoT Platform.
02.	Security implementations	Use of a login page with a user's unique user name and password on a web interface optimized for mobile devices and computers with adjustable screen sizes.	Password protection in MIT app.
03.	Scalable architecture	Optimised for mobile devices and computers with adjustable screen sizes.	Node-RED (Web UI).
04.	Availability	Accessible to user's through both a web UI and a mobile app.	Node-RED (Web UI), MIT app (Mobile app).
05.	Performance	Give precise results and a prompt warning in the event of water contamination.	Node-RED (Web UI) , MIT app (Mobile app).

User stories:

User type	**Functional requirement**	**User story number**	**User story/ task**	**Accepture criteria**	**Priority**	**Release**
Developer	System building	USN-1	Collect data set	I can collect data set	High	Sprint-1
		USN-2	Collecting data from sensor	I can collect from sensor	High	Sprint-2
		USN-3	Implementing arduino UNO from data collection	I can implement arduino UNO from data collection	High	Sprint-3
		USN-4	Message alert to people	I can receive message	High	Sprint-4

		USN-5	People identity the problem and resolve it by using mobile application	I can identify the problem and I try to resolve it	Medium	Sprint-5
Customer	Adoption	USN-1	Adopting new technology for boosting production	I can adopt new technology	Low	Sprint-1
	Detection	USN-2	Detect the quality of river water and PH value	I can detect the quality of water monitoring	High	Sprint-2

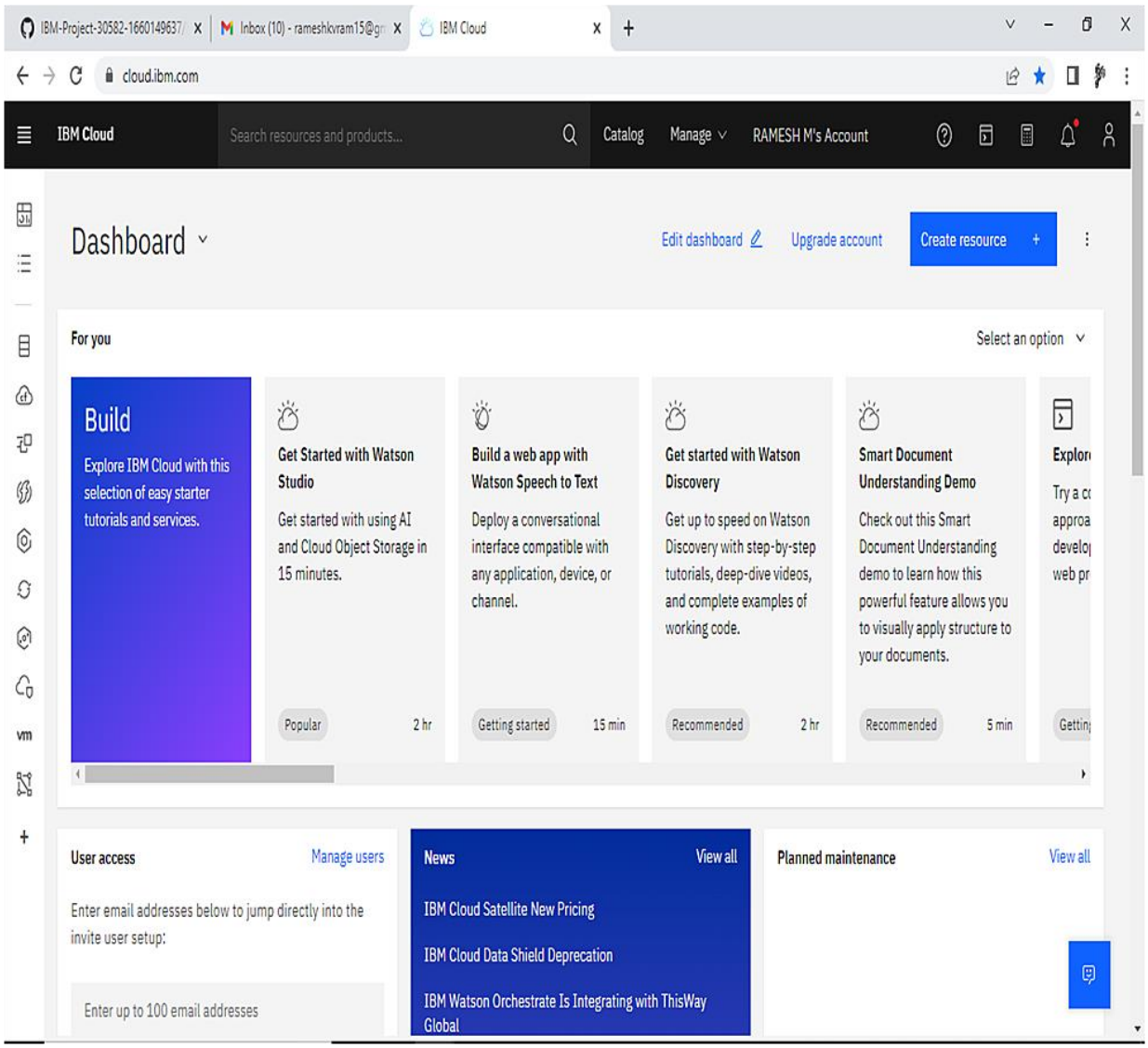
6 PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning and Estimation

Sprint 1

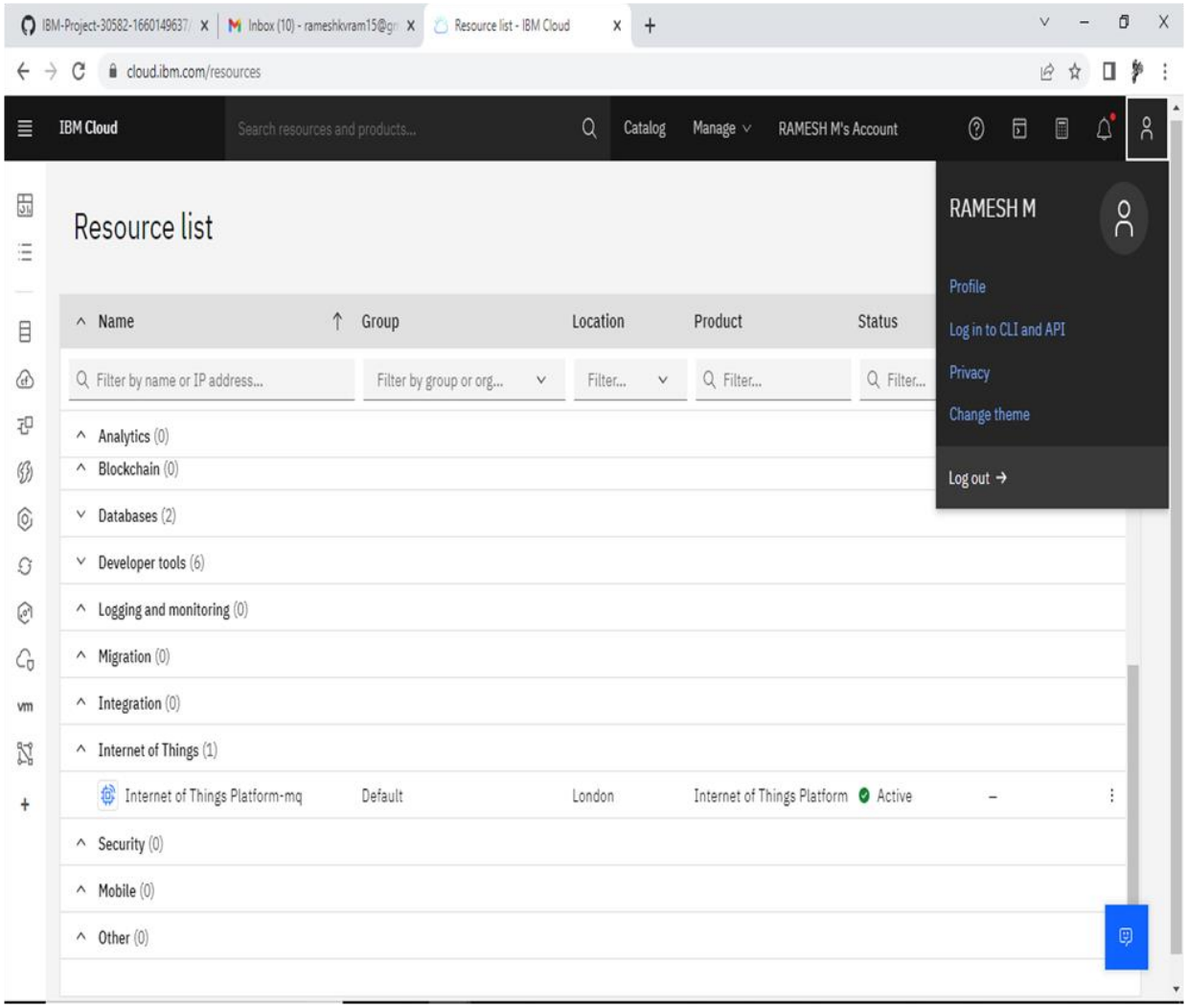
USN-1

As a user, I will register in ICTA academyand create IBM cloud account.



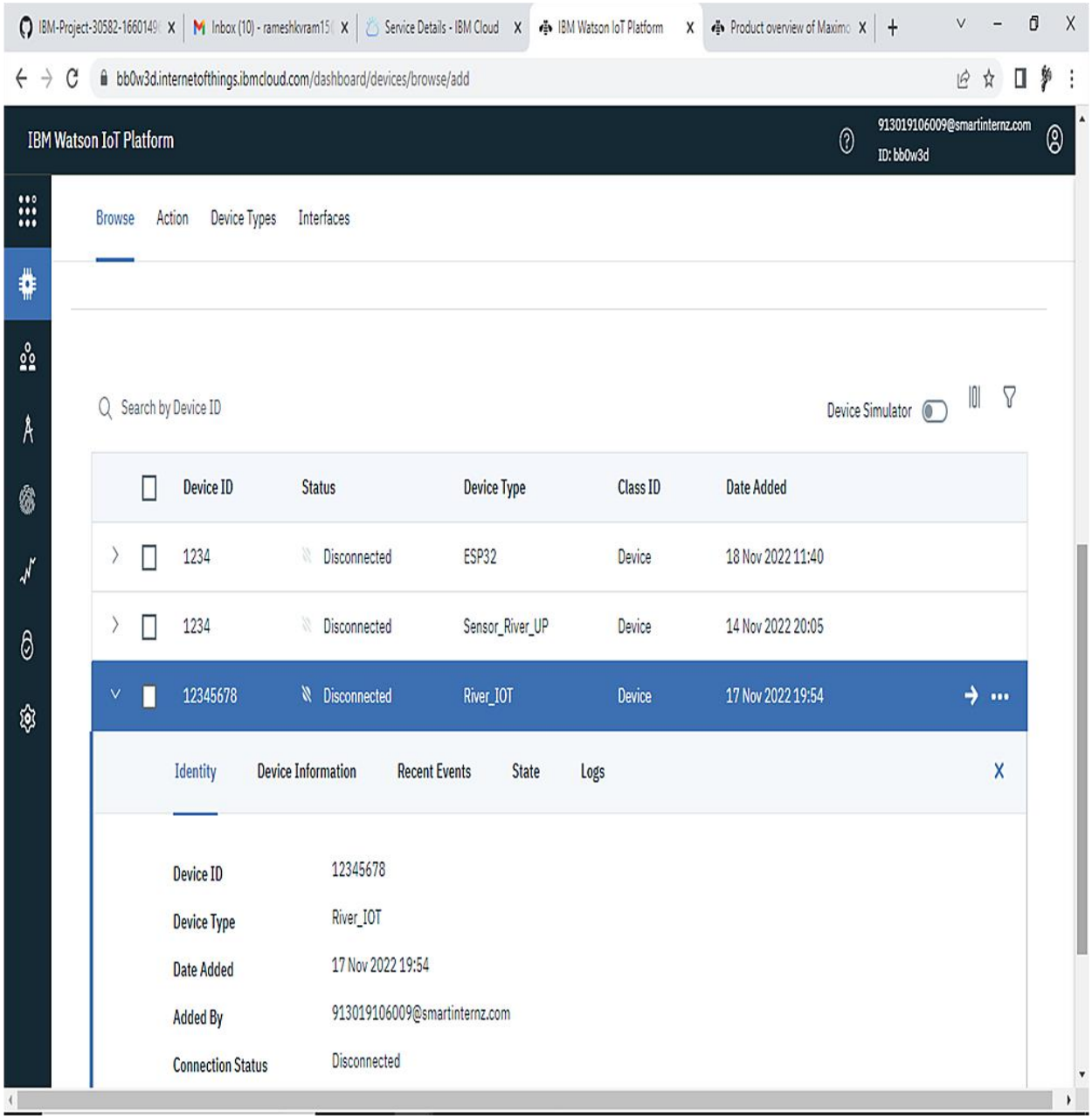
USN-2

As a user, I will access IBM cloud and launch the IBM Watson IOT platform



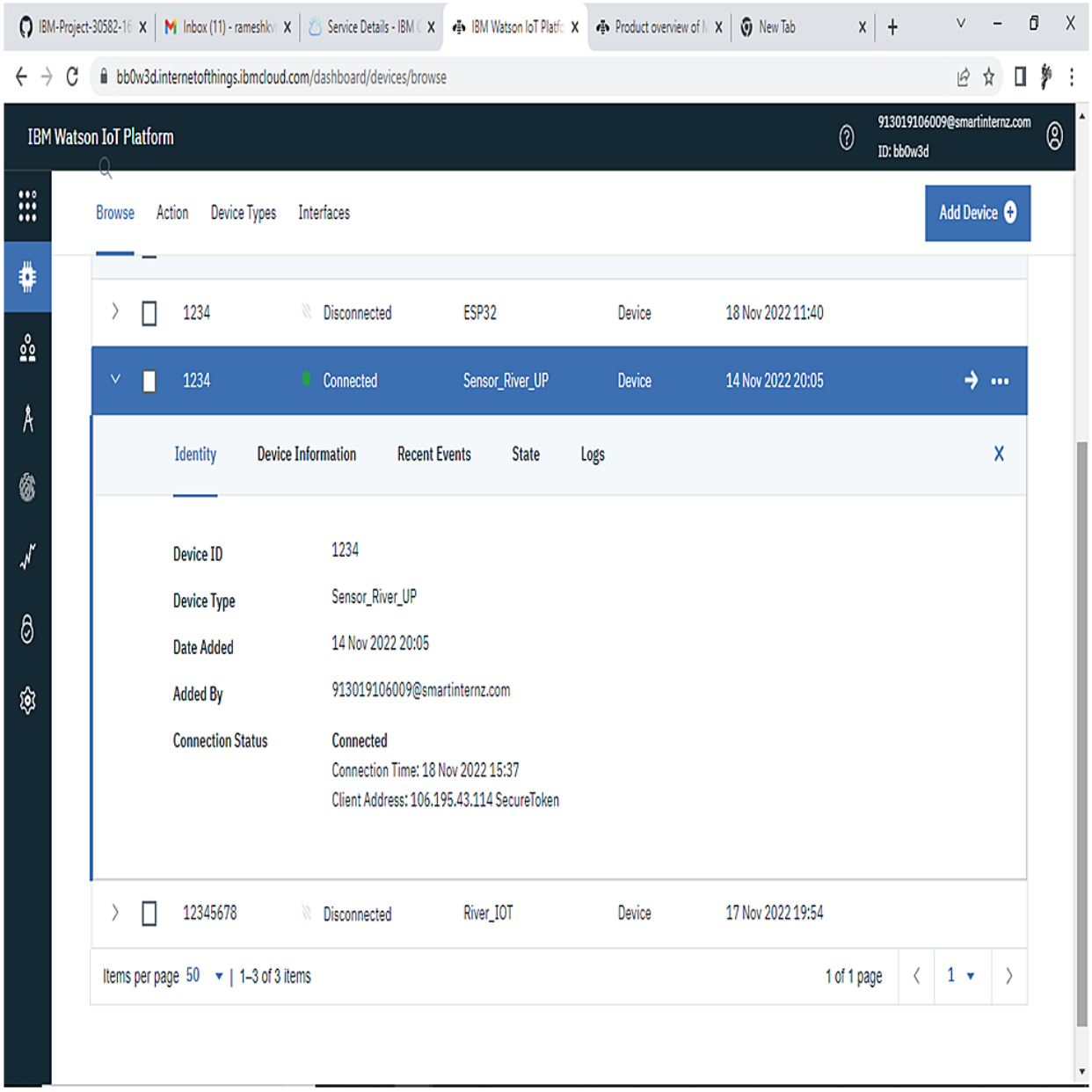
USN-3

As a user, I can create a device in the IOT IBM Watson platform for simulation



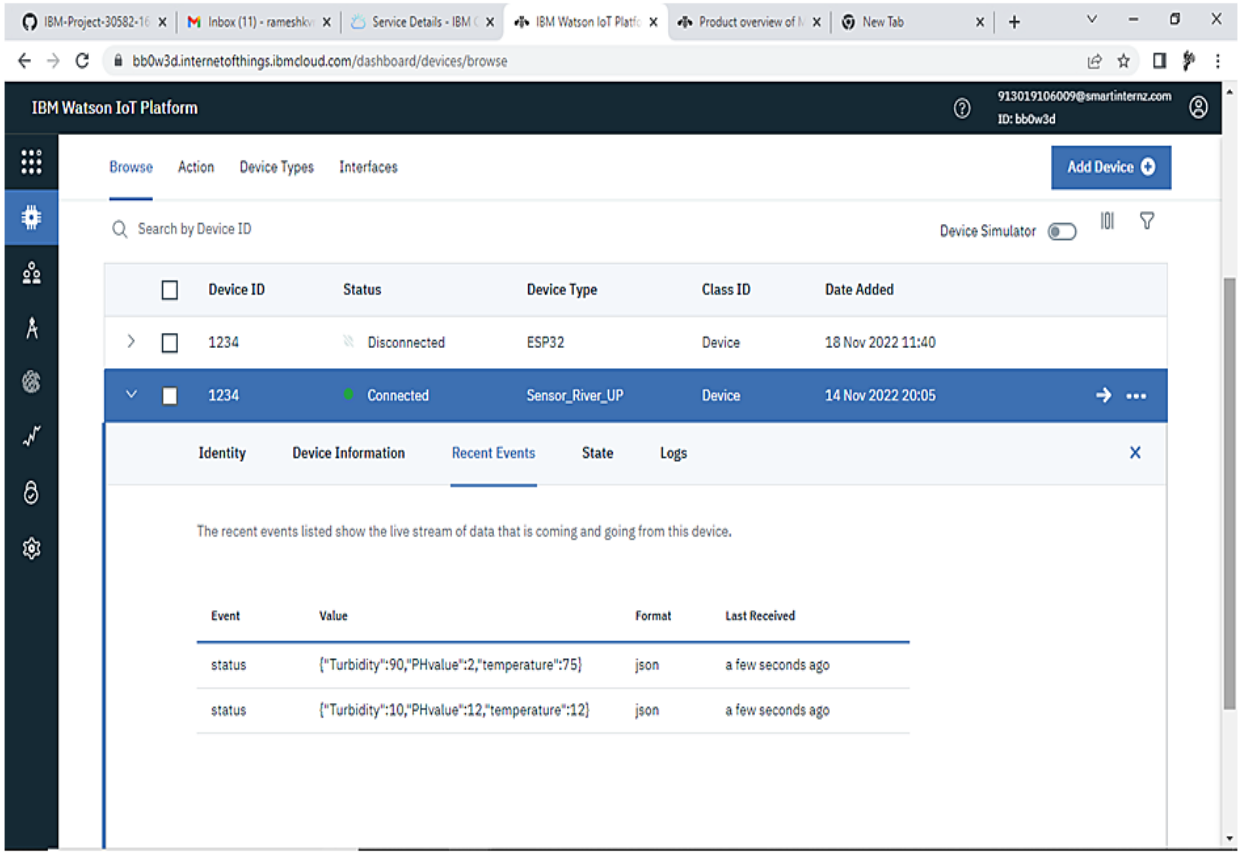
USN-4

As a user, I can simulate the device created



USN-5

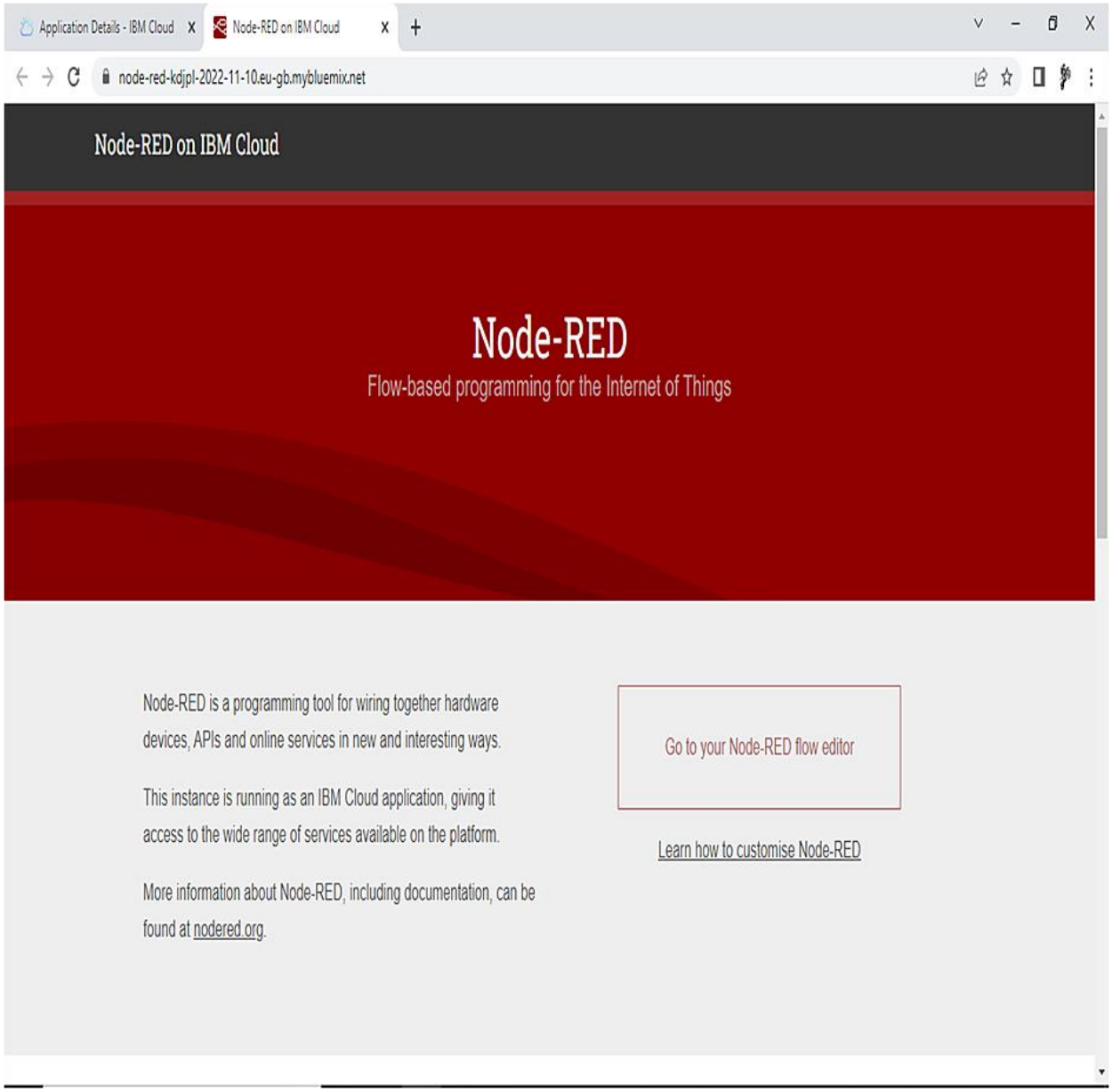
As a user, I can get the values of temperature, PH and Turbidity, I can create a line chart with my output data



Sprint 2

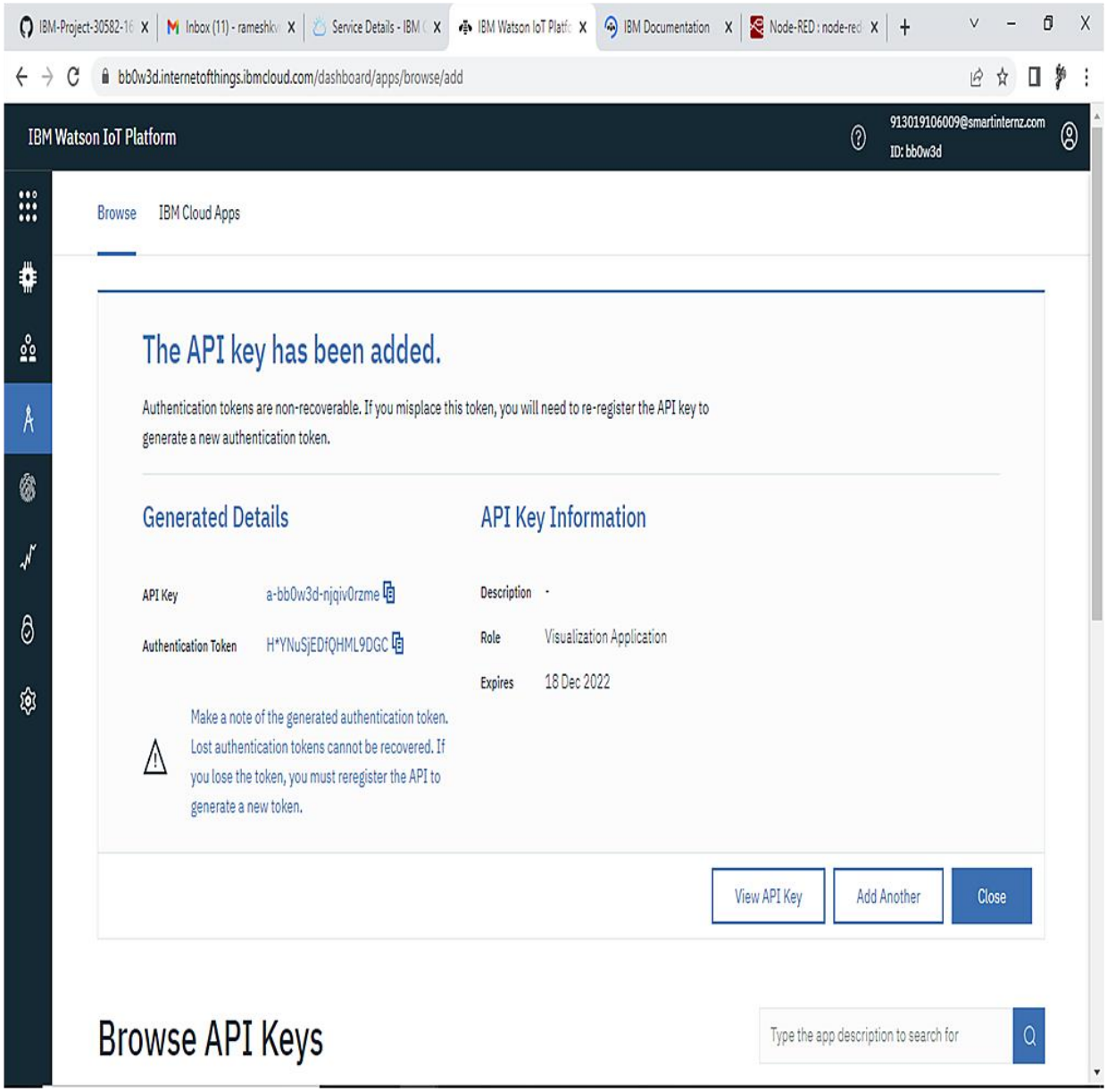
USN-6

As a user, I can create NODE RED by app deployment



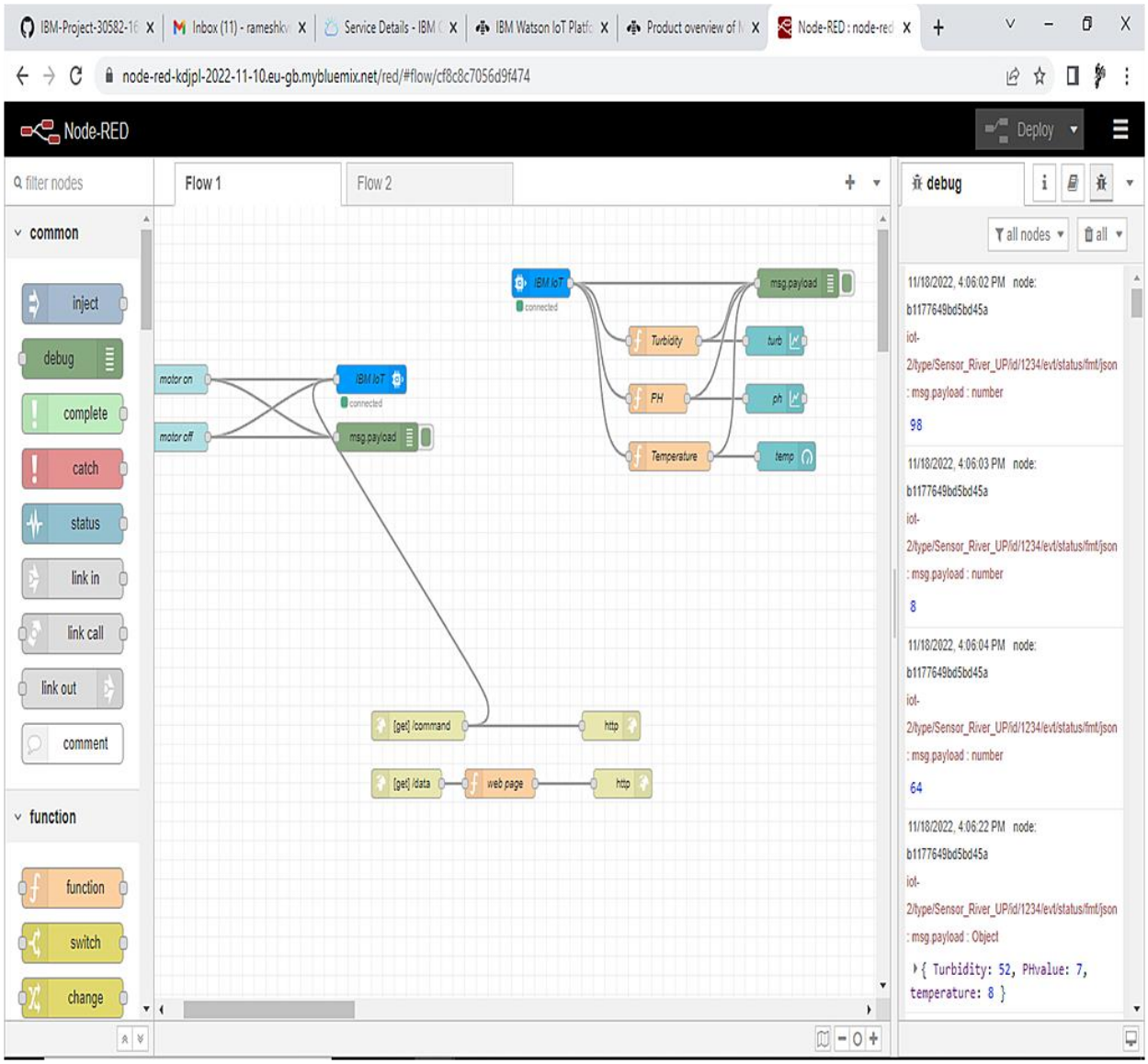
USN-7

As a user, I can get the API key through IBM Watson platform



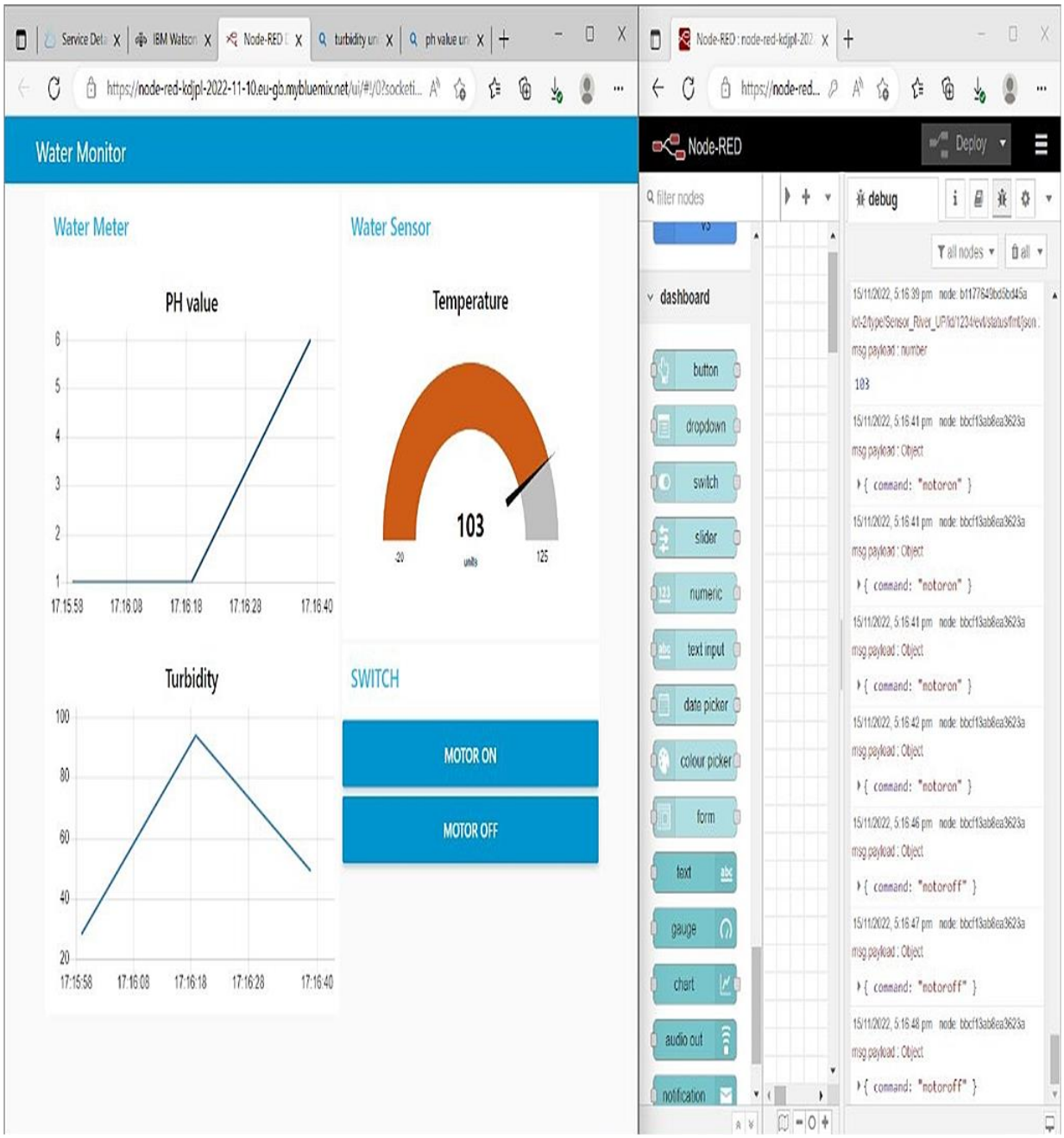
USN-8

As a user, I can design the flow in NODE RED



USN-9

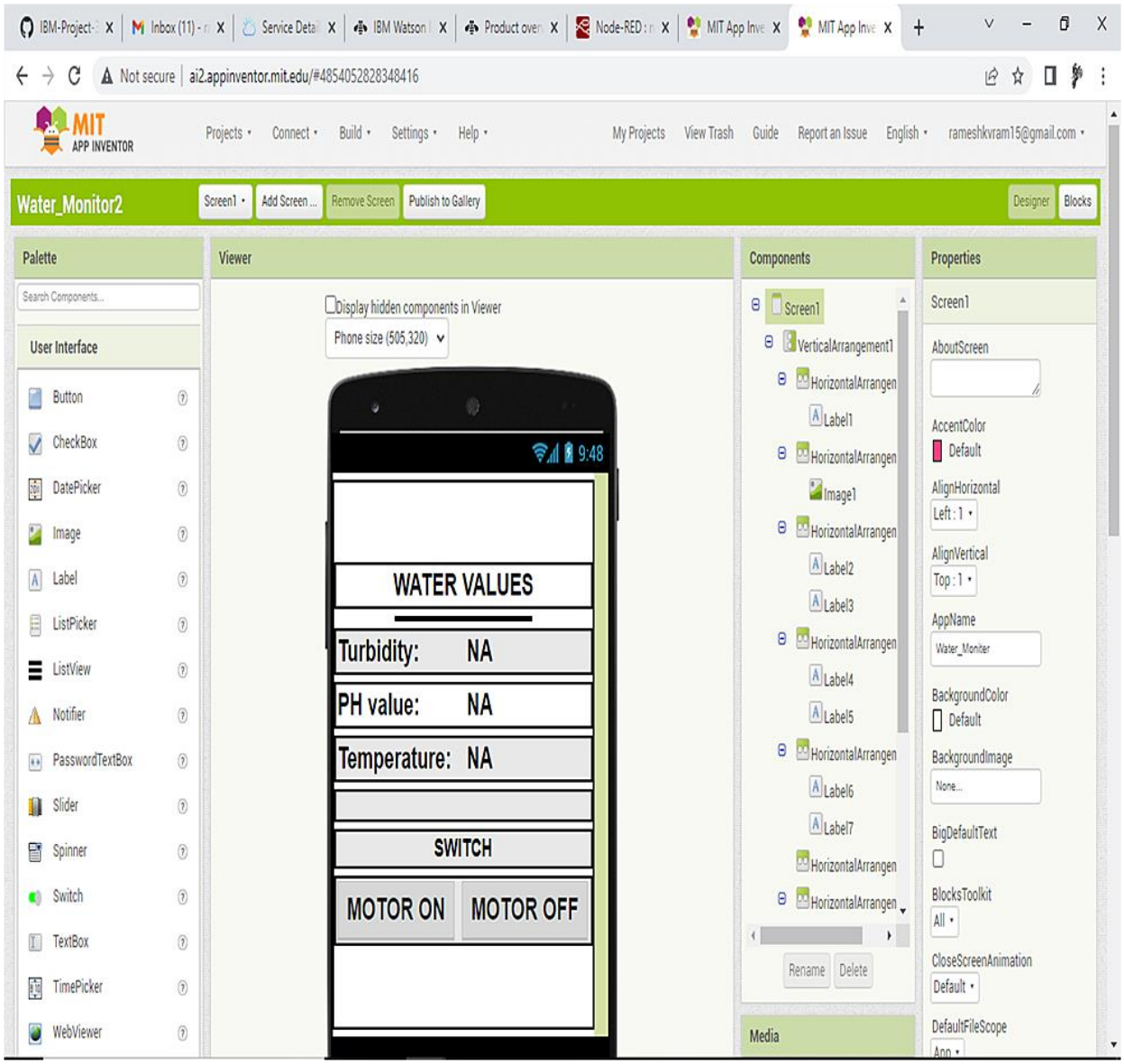
As a user, I can check for the gauge output



Sprint 3

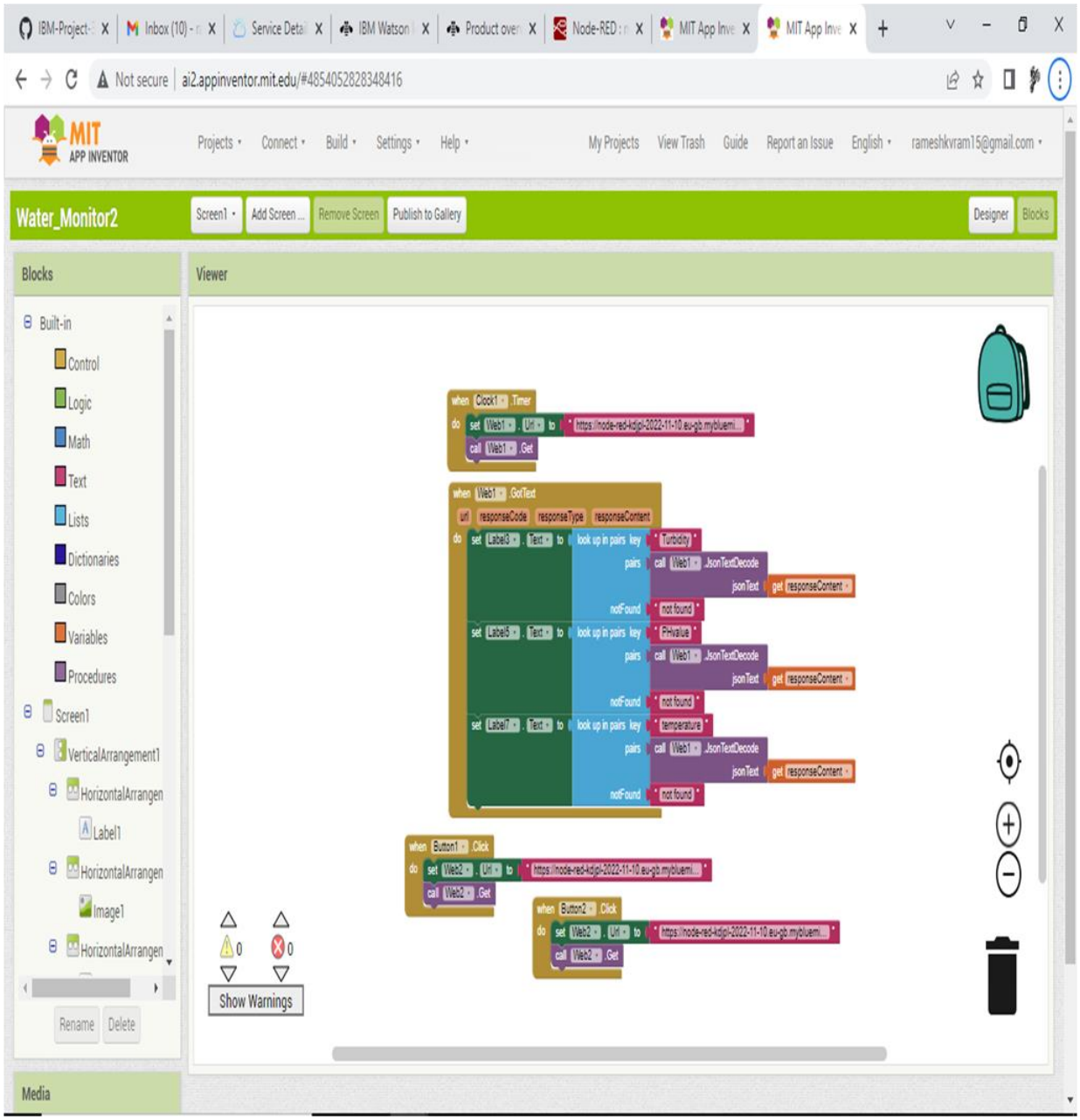
USN-10

As a user, I can design the front end in MIT app inventor



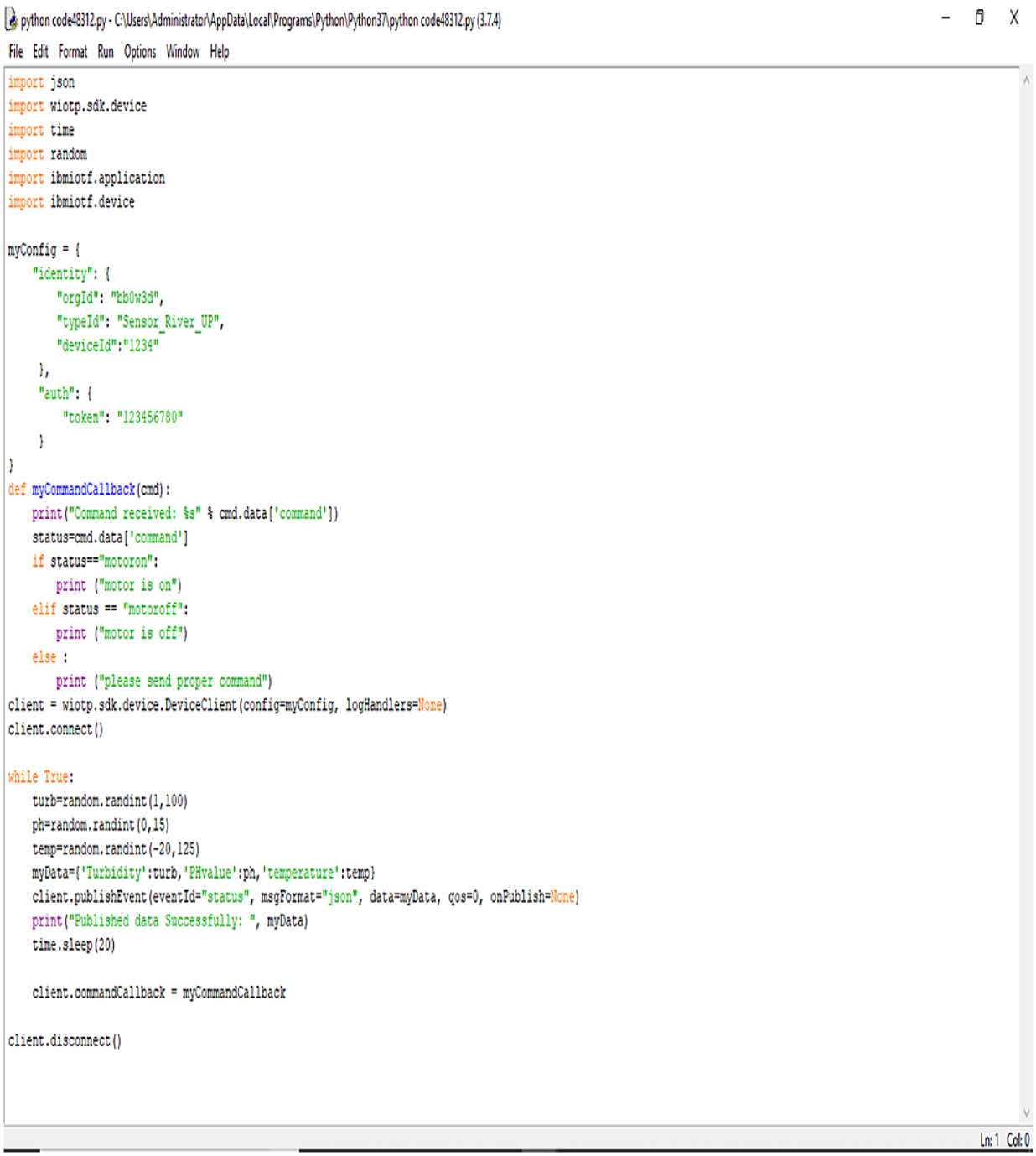
USN-11

As a user, I can design the back end (blocks) in MIT app inventor



USN-12

As a user, I can develop the python script

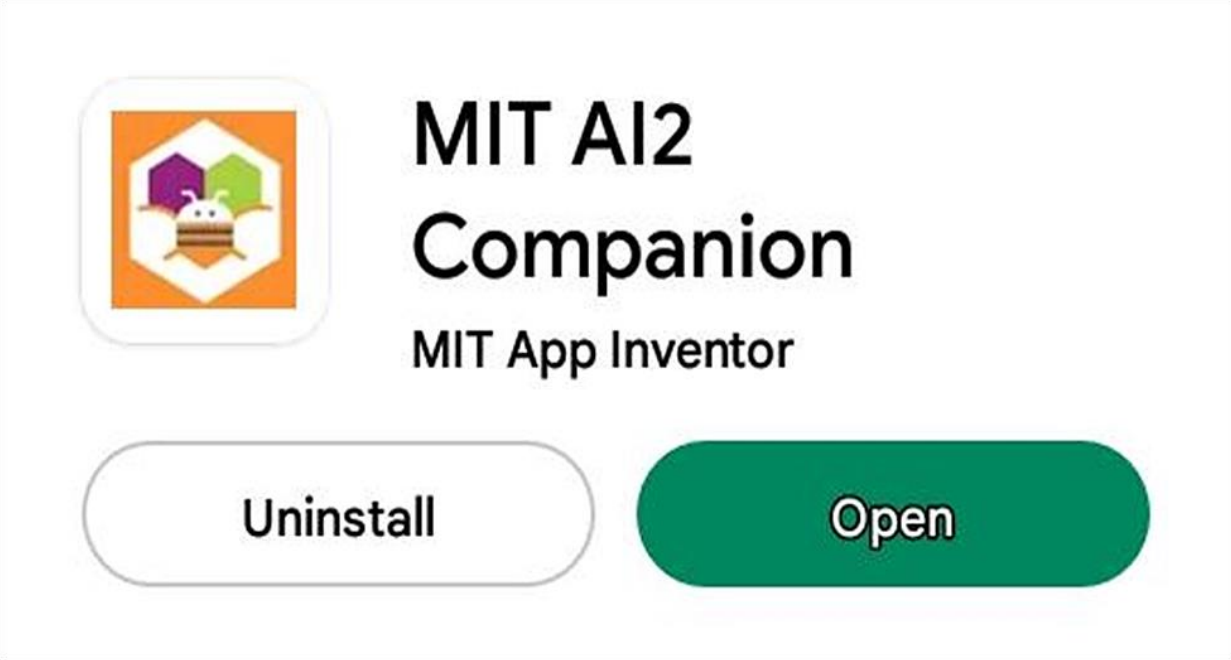


USN-13

As a user, I can get the output of the program with the parameters

USN-14

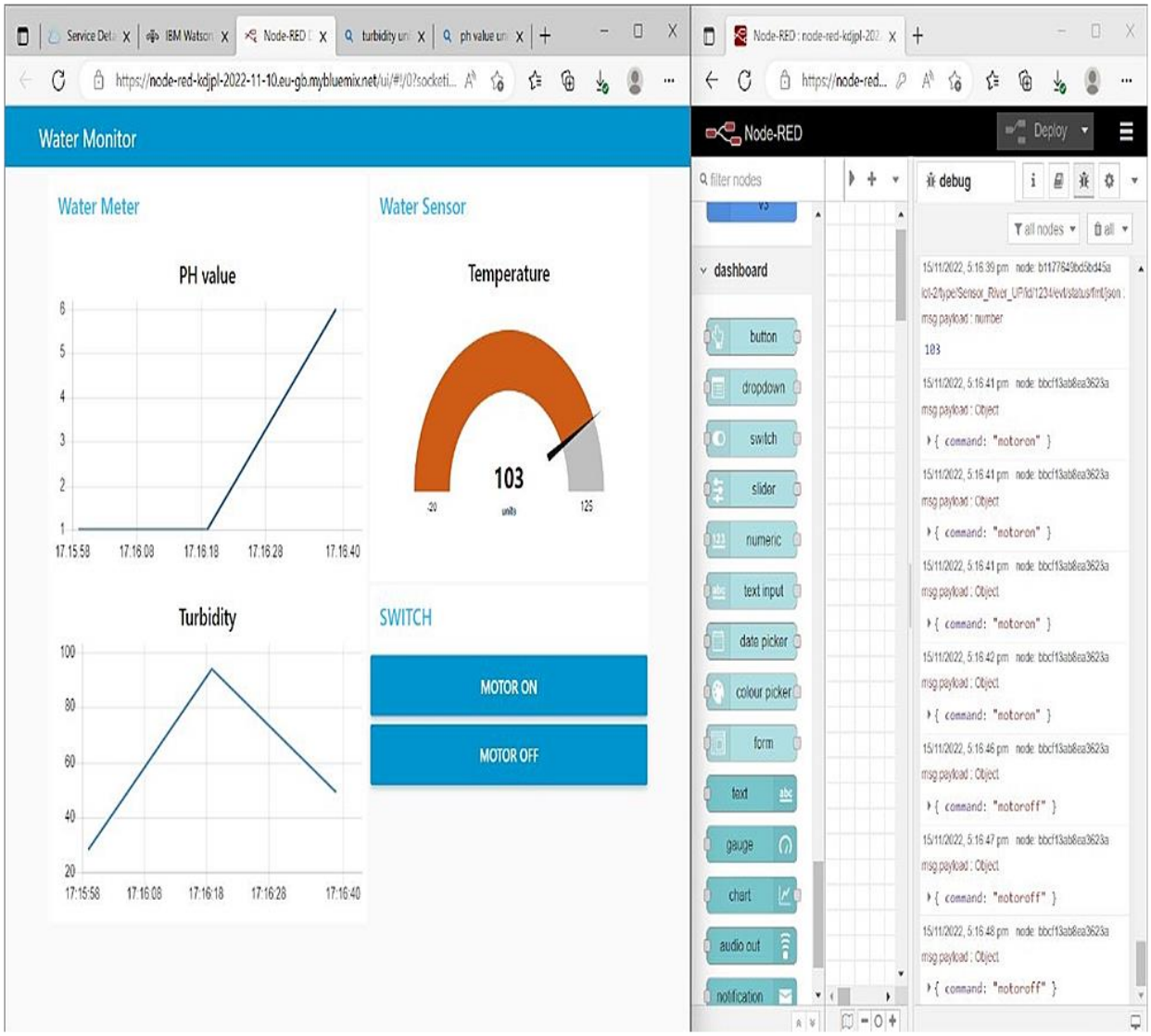
As a user, I can download MIT AI2 companion app in my mobile



Sprint 4

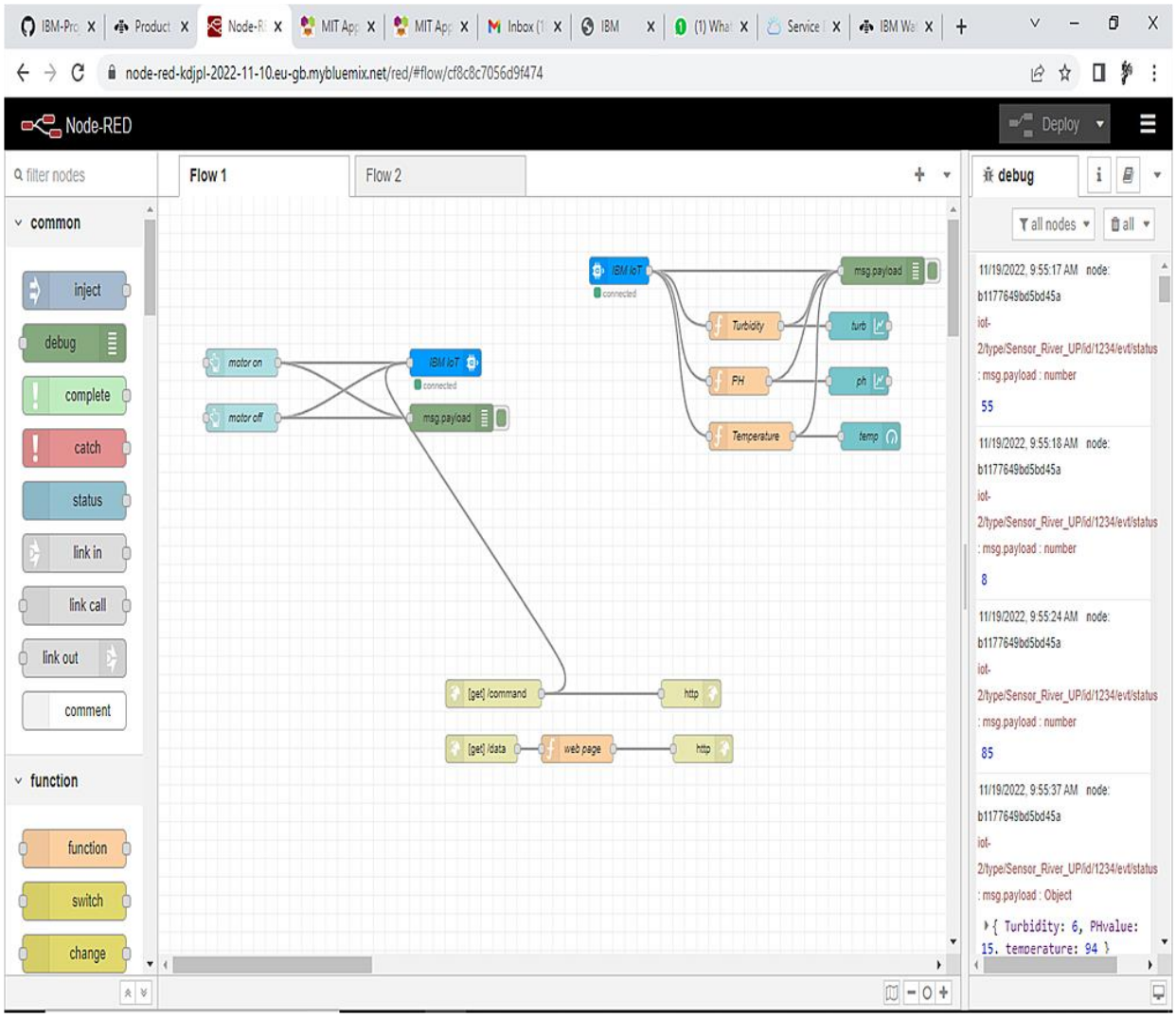
USN-15

As a user, I can create a Web UL



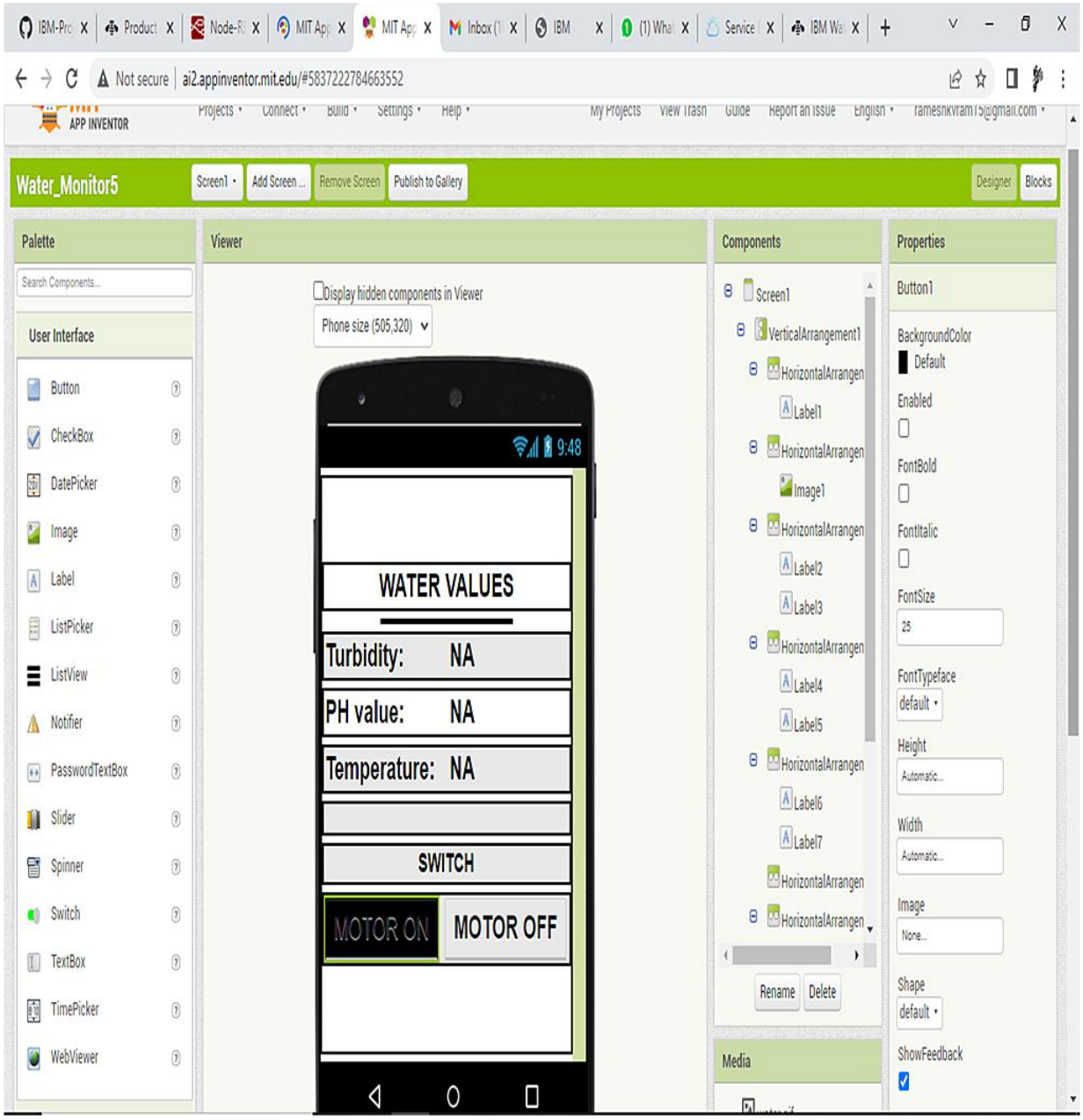
USN-16

As a user, I can check whether I can get the values of the parameters



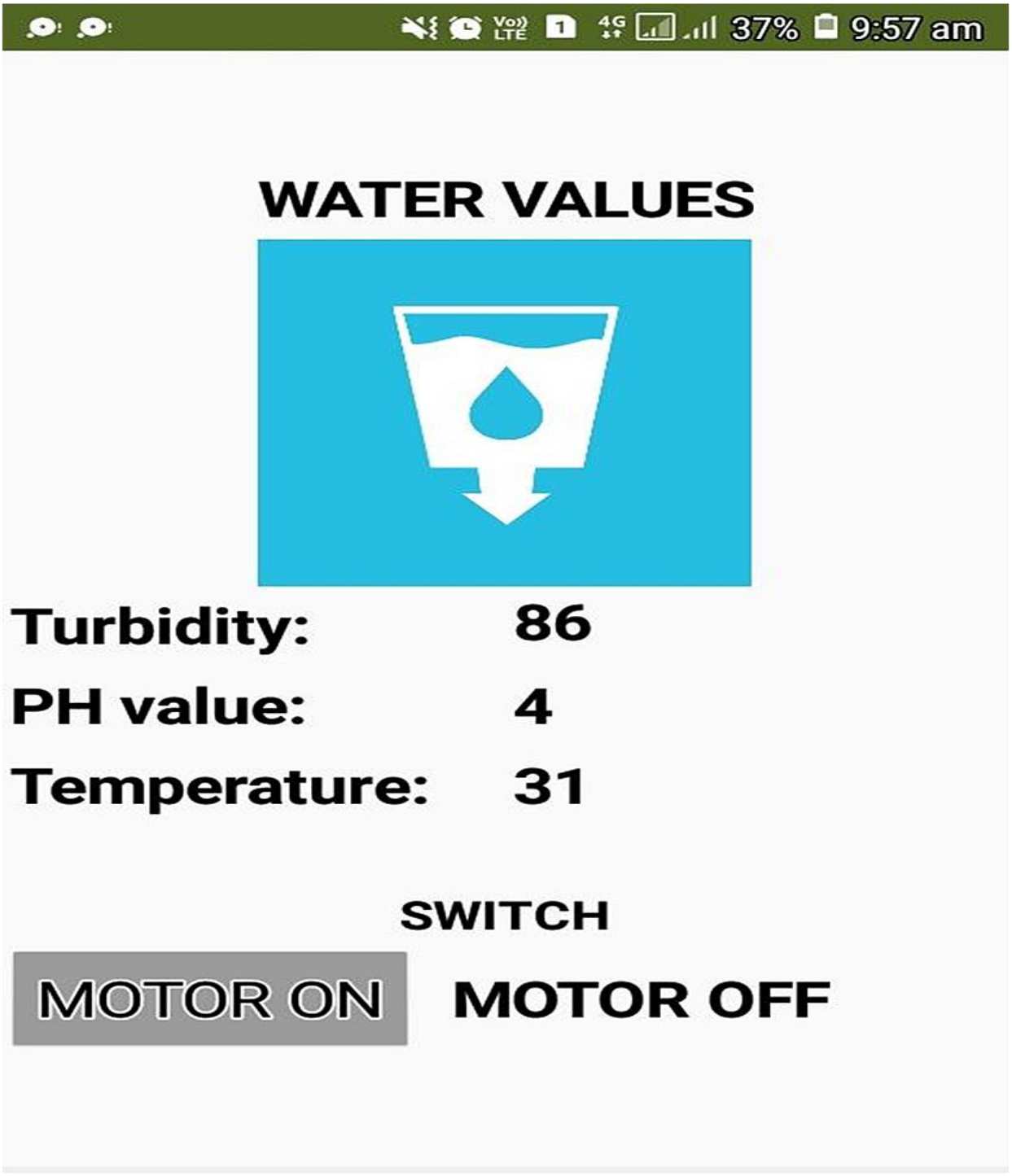
USN-17

As a user, I can connect the Web UI with the mobile application through QR code.



USN-18

As a user, I can get values of the parameters in my mobile application



6.2 Sprint Delivery schedule

Product Backlog, SprintSchedule, and Estimation

Sprint	Functional Requirement (Epic)	User StoryNumber	User Story /Task	Story Points	Priority	Team Members
Sprint-1		US-1	Creating IBM Cloud and using its services.	4	High	Ramesh M Karthik kishore M Roopan kumar R Sanjay M Ajithkannan P
Sprint-1		US-2	Configure the IBM cloudservice and creatingIoT platform.	3	High	Ramesh M Karthik kishore M Roopan kumar R Sanjay M Ajithkannan P
Sprint-1		US-3	IBM Watson IoT platform acts as the mediator toconnect the web application to IoT devices, hence Launching IBM Watson IoT platform.	3	Low	Ramesh M Karthik kishore M Roopan kumar R Sanjay M Ajithkannan P
Sprint-1		US-4	In order to connect the IoT device to the IBM Cloud, createa device in theIBM Watson IoTPlatform and get the devicecredentials.	3	Medium	Ramesh M Karthik kishore M Roopan kumar R Sanjay M Ajithkannan P

Sprint-2		US-1	Configure theconnection security andcreate API keys that are used in the NODE-RED service for accessing theIBM IoT Platform.		High	Ramesh M Karthik kishore M Roopan kumar R Sanjay M Ajithkannan P
Sprint-2		US-2	Create a Node-RED service.		High	Ramesh M Karthik kishore M Roopan kumar R Sanjay M Ajithkannan P
Sprint-3		US-1	Develop a python script to publish random sensor datasuch as temperature, turbidity andpH to the IBM IoT Platform.	4	High	Ramesh M Karthik kishore M Roopan kumar R Sanjay M Ajithkannan P
Sprint-3		US-2	After developing python itcode,commands arereceived just print the statements which represent the control of thedevices.	3	Medium	Ramesh M Karthik kishore M Roopan kumar R Sanjay M Ajithkannan P
Sprint-3		US-3	Publish datato the IBM Cloud.	4	High	Ramesh M Karthik kishore M Roopan kumar R Sanjay M Ajithkannan P
Sprint-4		US-1	Create Web UI in Node-RED.		High	Ramesh M Karthik kishore M Roopan kumar R Sanjay M Ajithkannan P
Sprint-4		US-2	Configure the Node-RED flow to receive data from the IBM IoT Platform and alsouse Cloudant DB nodes to store the received sensordata in Cloudant DB.		High	Ramesh M Karthik kishore M Roopan kumar R Sanjay M Ajithkannan P

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (ason Planned End Date)	Sprint ReleaseDate (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

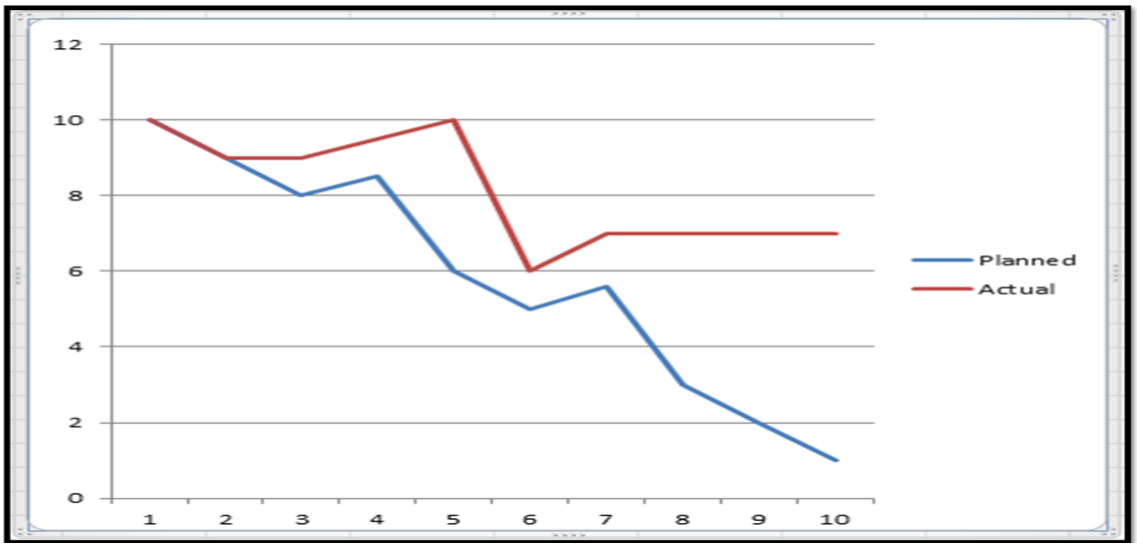
Velocity:

Imagine we have a 10-daysprint duration, and the velocityof the team is 20 (points per sprint). Let's calculate the team's averagevelocity(AV) per iteration unit (story pointsper day)

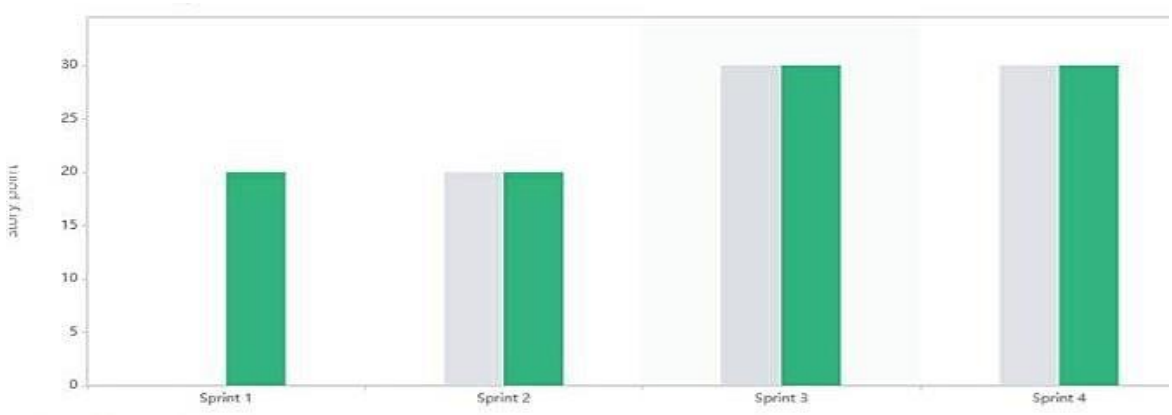
$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

Burndown Chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologiessuchasScrum. However, burn down charts can be applied to any projectcontaining measurable progressover time.



6.3 Reports from JIRA



7. CODING AND SOLUTIONING

7.1 Feature 1

PH, Temperature:

pH sensor: The pH of a solution is the measure of the acidity or alkalinity of that solution. The pH scale is a logarithmic scale whose range is from 0-14 with a neutral point being 7. Values above 7 indicate a basic or alkaline solution and values below 7 would indicate an acidic solution. It operates on 5v power supply and it is easy to interface with arduino. The normal range of pHis 6 to 8.5.

water temperature: Indicates how water is hot or cold. Therange of DS18B20 temperature sensor is digital type which gives accurate reading.

7.2 Feature 2

Turbidity:

Turbidity sensor: Turbidity is a measure of the cloudiness of water. Turbidity has indicated the degree at which the watr loses its transparency. It is considered as a good measure of the quality of water. Turbidity blocks out the light needed by submerged aquatic vegetation. It also can raise surface water temperature above normal because suspended particles near the surface facilitate the absorption of heat from sunlight. The measurement of turbidity is a key test of waterquality. Turbidity, as identified with a turbidity meter or sensor, is the measurement of water clarity.

7.3 Feature 3

To display the sensor values of PH, temperature and turbidity infront of the river. It shows the current status of the river to people and they didn't do anything .

8. TESTING

8.1 Test Cases

A test case is a document which has a set of test data, preconditions, expected resultsand postconditions, developed for a particular test scenario in order to verify compliance against a specific requirement.

8.2 User Acceptance Testing

Defect analysis

resultion	Severity1	Severity2	Severity3	Severity4	Severity5
By Design	10	4	3	3	20
Duplicate	3	0	4	0	7
External	2	0	0	2	4
Fixed	7	3	5	7	22
Not Reproduced	0	0	2	0	2
Skipped	0	0	3	1	4
Won't Fix	0	7	3	1	11
total	22	14	20	14	70

Test case analysis

section	**total**	**cases**	**Not tested**	**Fail pass**
Designing the circuit	3	0	1	2
Create a program suitable for the circuit and also compile and execute the program	4	0	0	4

Connect the output values to the cloud services by using NODE RED Make the data's store in IBM watson	3 4	0 0	1 1	2 3
Connects the cloud data with the authorities communication device	4	0	2	2
Find report output	3	0	0	3

9. RESULTS

9.1 Performance Metrics

NFT - Risk Assessment									
S.No	Project Name	Scope/feature	Functional Changes	Hardware Changes	Software Changes	Impact of Downtime	Load/Volume Changes	Risk Score	Justification
1	Real Time River Water Quality monitoring and control system	New	Low	Low	Low	Downtime does not affect the performance much.The errors can be resolved within a short duration of time.	>5 to 10%	ORANGE	As the sensors senses the parameters continuosly ,there will not be any delay.As the sensors are well protected ,there is a low probability of physical damage.

NFT - Detailed Test Plan				
S.No	Project Overview	NFT Test approach	ssumptions/Dependencies/Risk	Approvals/SignOff
1	Real Time River Water Quality monitoring and control system	LOAD TEST ENDURANCE TEST	The project is capable of dealing with large amount of data (i.e) load. Congestion can be controlled and the system can operate efficiently.	Approved

End Of Test Report								
S.No	Project Overview	NFT Test approach	NFR - Met	Test Outcome	GO/NO-GO decision	Recommendations	Identified Defects (Detected/Closed/Open)	Approvals/SignOff
1	Real Time River Water Quality monitoring and control system	LOAD TEST ENDURANCE TEST	YES	The parameter values of Temperature, pH,& Turbidity can be obtained continously and the alert messages whenever the water is not fit to use is sent to the authorities without any delay.	GO	The rechargable sensors can be used during the manufacturing of this system.	Closed	Approved

10. ADVANTAGES :

a. The system is very cheap as the hardware and software dose not cost much.

b. User friendly and efficient.

c. It is helpful for people to drink good water.

DISADVANTAGES

a. Drawback is high cost for smart sensors.

b. It is working under internet, if it losses the net connection, it cannot be generate value for IBM service

11. CONCLUTION

a. This Real time river water quality monitorning and control system monitors PH turbidity & temperature of water.

b. The system can monitor river water quality automatically and it is low in cost and does not require people on duty.

c. So the river water quality using IOT testing is likely to be more economical, connenient and fast. The system has good flexibility.

12. FUTURE SCOPE

The future scope of this project is monitoring environmental condition, drinking water quality, treatment and disinfection of waste water ect... this system could be implemented in various industial processes. The system can be modify into different needs of the user and its beneficial for user to view the conditions of water in mobile apps or sms. The standardization of the data format for the process will alsoprovide improved device consisteney and execution time.

13. APPENDIX

SOURCE CODE:

```
import json
import wiotp.sdk.device
import time
import random
import ibmiotf.application
import ibmiotf.device

myConfig = {
    "identity": {
        "orgId": "bb0w3d",
        "typeId": "Sensor_River_UP",
        "deviceId":"1234"
     },
     "auth": {
         "token": "123456780"
     }
}
defmyCommandCallback(cmd):
    print("Command received: %s" % cmd.data['command'])
    status=cmd.data['command']
```

```
    if status=="motoron":
        print ("motor is on")
    elif status == "motoroff":
        print ("motor is off")
    else :
        print ("please send proper command")
client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()

while True:
    turb=random.randint(1,100)
    ph=random.randint(0,15)
    temp=random.randint(-20,125)
    myData={'Turbidity':turb,'PHvalue':ph,'temperature':temp}
    client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0,
onPublish=None)
    print("Published data Successfully: ", myData)
    time.sleep(20)

    client.commandCallback = myCommandCallback

client.disconnect()
```

GITHUB: https://github.com/IBM-EPBL/IBM-Project-18702-1659688705

PROJECT DEMO: https://www.youtube.com/embed/AUqEUMIfT3E