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DEPARTMENT OF ELECTRONICS AND COMMUNICATION

SUB CODE: HX8001

**SUB NAME: Professional Readiness For Innovation, Employability and
Entrepreneurship**

Project Report

**IoT ENABLED – REAL TIME WATER QUALITY MONITORING AND
CONTROL SYSTEM**

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INTRODUCTION:

1. ROJECT OVERVIEW:

Water pollution is one among the most important fears for the green globalization. In order to ensure the safe supply of the drinking water the quality needs to be monitor in real time. In this paper we present a design and development of a coffee cost system for real time monitoring of the water quality in IOT (internet of things). The system contains several sensors is employed to measuring physical and chemical parameters of the water. The parameters like temperature, pH, turbidity, flow sensor of the water are often measured. The measured values from the sensors are often processed by the core controller. The Arduino model is core controller. Finally, the sensor data are often viewed on internet using WI-FI system. Index Terms—IOT, Sensors, Arduino.

2.PURPOSE:

There are numerous advances in the twenty-first century, but at the same time, pollutions, heating, and other forms of pollution are forming, and as a result, there is no safe beverage for the world's pollution. Water quality monitoring in real time is becoming more difficult as a result of increasing water scarcity, population growth, and other factors. As a result, better approaches for monitoring water quality metrics in real time are required [1]. The parameters of water quality the concentration of hydrogen ions is measured by pH. It indicates whether or not the water is acidic or alkaline. Pure water has a pH of 7, although it is acidic rather than alkaline. pH ranges from 0 to 14. It should be between 6.5 and 8.5 pH for drinking. Turbidity is a measurement of the unseen suspended particles in water. The greater the turbidity, the greater the risk of diarrhoea, cholera. If the turbidity is low, the water is safe to drink. The temperature sensor detects how hot or cold the

water is. Flow sensor is a device that measures the flow of water. The traditional method of water quality monitoring entails manually collecting water samples from various sites. The use of wireless communication technologies is becoming more common to help people with their personal and daily duties. Many building control, automation, and data collecting applications have been created in recent years. There are numerous advantages, such as minimal cost, ease of installation, and maintenance. The remote device network can be used for a variety of tasks, including agriculture and traffic control, remote health care, forest management, security, and surveillance.

2, LITERATURE SURVEY:

1.EXISTING PROBLEMS AND REFERENCES:

TITLE	AUTHOR	DATE	PUBLICATION	PROS/CONS
Real Time Water Quality Monitorn g System	MithilaBarab de ,ShrutiDanve	6, June 2015	https://www.researchgate.net	1. To obtain the water monitoring system with high frequency, high mobility, and low powered. 2. Another important fact of this system is the easy installation of the system that is the base

				<p>station can be placed at the local residence close to the target area and the monitoring task can be done by any person with very less training at the beginning of the system installation. 3. Water pollution can be easily detected by this system, which will help in controlling it.</p>
Internet of things enabled real time water quality monitoring system	C S. Geetha and S.Gouthami	27, July 2017	https://link.springer.com	<p>1. power efficient, simpler solution for in-pipe water quality monitoring based on Internet of Things technology is presented. 2. system also provides an alert to a remote user, when</p>

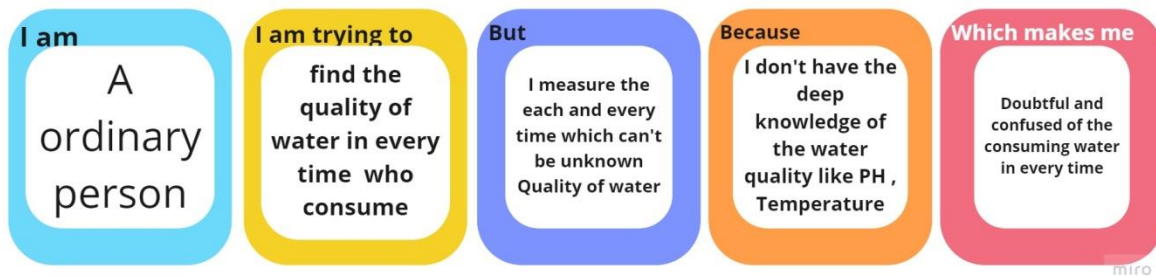
				<p>there is a deviation of water quality parameters from the pre-defined set of standard values. 3. Turbidity is a measure of cloudiness in the water. But only the Opto electronic devices such as LDR and LED are used to measure the turbidity.</p>
<p>EIoT Based Water Management Systems: Survey and Future Research Direction</p>	<p>Sherenismai , Diana W. Dawoud, Nadhem Ismaïl, Ronald Marsh and Alis. Alshami</p>	<p>31, March 2022</p>	<p>https://ieeexplore.ieee.org.</p>	<p>1. Infrastructure and equipment conditions monitoring to predict any upcoming failures, leakage, tampering, or maintenance needs. 2. This technology can be beneficial in obtaining information, valuable for making business</p>

				<p>decisions, while a realtime history record can assist in monitoring changes in key physical reservoir parameters 3. This work aims to serve as a motivation for further research concerning IoT-based water management systems designated for oilfield applications</p>
Real Time Quality Monitoring System for Water in IoT Environment	DeepthiN1 , Rahul R A1 , Kiran M1 , Aishwarya S1 , PoornaPrajna K M1	4, July 2020	http://www.ijprse.com/	<p>1. Water quality should be monitored properly to certify whether the quality is good or not.</p> <p>2. In the paper they used the method called data acquisition process for monitoring the quality water.</p>

				3. Here in this system , have used Raspberri Pi as the micro controller.
IoT Based Realtime River Water Quality Monitoring System	Mohammad Salah Uddin Chowdurya, Talha Bin Emranb ,SubhasishGh osha , AbhijitPatha ka , Mohd. ManjurAlam a ,NurulAbsara , Karl Anderssonc , Mohammad ShahadatHos saind	August 19- 21, 2019	https://www.researchgate.net/ publication/33 3642226	1. 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. 2. Due to the limitation of the budget, we only focus on measuring the quality of river water parameters. 3. But, This project can be extended into an

				efficient water management system of a local area.
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2.PROBLEM DEFINE STATEMENT:

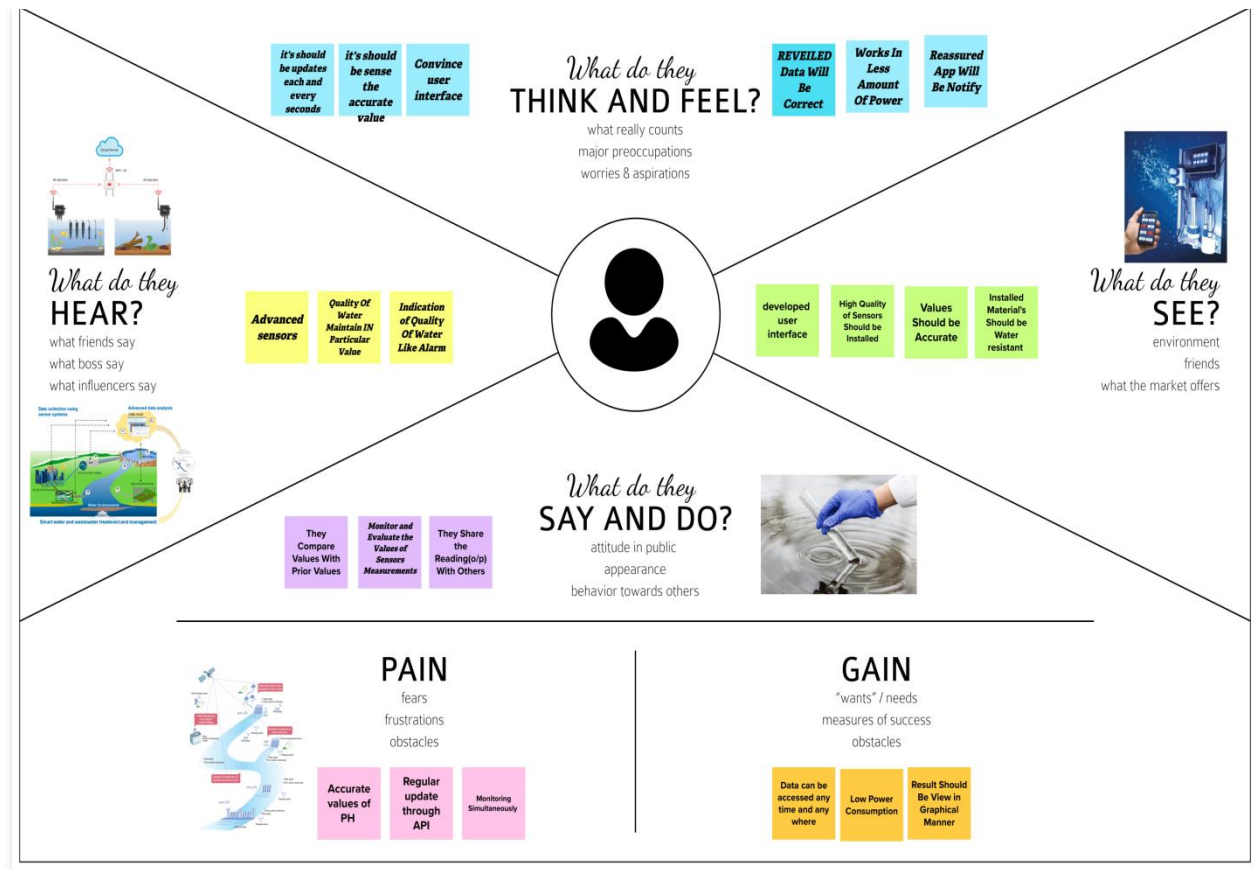


I am	Common people living a normal life on Earth	Common people living on Earth who consume water in their day-to-day life for different purpose
I'm trying to	Monitor the standard quality of the water	Wants to monitor the water consumed everyday whether the water is contaminated or pure, pH, temperature, salinity in it
But	Don't know to monitor the quality of water	Time consuming a lot for process of manual testing
Because	Lack of required knowledge	Common people lack knowledge of this type of testing, sensors etc.

Which makes me feel	Doubted and fearful of the consumed water	Lack of pure water by changes in environment and also causing various diseases by bacteria and virus are present in water
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3. IDEATION & PROPOSED SOLUTION

EMPATHY MAP:



BRAINSTORMING AND IDEATION:

Step-1: Team Gathering, Collaboration and Select the Problem Statement

Template



Real-Time River Water Quality Monitoring and Control System

water quality monitoring system is a manual system with a continuous process and is very time-consuming. This project is 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 later 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 spot site can be displayed in a visual format on a server PC. Deep learning neural network models, Artificial Neural Network (ANN) system and is also compared with standard values. If the acquired value is above the threshold value automated warning SMS alert will be sent to the agent. The outcomes of our proposed system will be to monitor the water quality in real-time, high accuracy, and low powered. Therefore, our proposed system will help to protect the water quality and to become conscious against contaminated water as well as to stop polluting the water.

🕒 10 minutes to prepare
🕒 1 hour to collaborate
👤 2-8 people recommended

[Share template feedback](#)



Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

🕒 10 minutes

A Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.

C Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#) →



Need some inspiration?
See a finished version of this template to kickstart your work.

[Open example](#) →

1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

 5 minutes

PROBLEM

**Due to climate changes
the devices like sensors
may not be work
properly**

**Key rules of brainstorming**

To run an smooth and productive session



Stay in topic.



Encourage wild ideas.



Defer judgment.



Listen to others.



Go for volume.



If possible, be visual.

Step-2: Brainstorm, Idea Listing and Group2

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!

JAYASHREE

TESTING THE QUALITY OF WATER FROM REMOTE LOCATION	INTERFACED MONITORING OF AUTOMATED IMPLEMENTATION	WATER QUALITY MONITORING DONT IN EFFICIENCY
THE COLLECTED DATA ARE READY TO USE		IT ALSO CONSUME THE LOW POWER
USE TOWER FOR MONITOR FLUCTUATION	TRANSLATE ANALOG SIGNAL INTO DIGITAL SIGNALS	USE SOLAR PANEL TO CHARGE THE DEVICE IN DAY TIME

KANNAN J S

MONITORING WATER QUALITY FROM REMOTE LOCATION	DATA AND EVERY REQUIREMENT PROTECTS THE USER	REMEDIATION ALWAYS BE WATER RESISTANT
MONITORING OF REMOTE LOCATION		DEVELOPED USER INTERFACE
ADVANCED MONITORING ARE IMPLEMENTED	ADVANCED MONITORING ARE USED TO MONITORING THE ACCURATE VALUE	WATER QUALITY MONITORING AND REMEDIATION OF REMOTE LOCATION

GANESH PRABHU

ALARM ALERT CAN BE MADE IN CASE OF HIGH VALUES	PARTICULAR LEVEL OF PH VALUE SHOULD BE MAINTAINED	SHOWING THE SAFETY OF WATER REMEDIATION CAN BE CONSIDERING
ALARM CAN BE SHOWNED WHEN THE WATER LEVEL REACHES THE LIMITS		QUALITY OF WATER MONITORING AND REMEDIATION OF REMOTE LOCATION
KEEP THE IoT DEVICE IN SECURED PLACE	WARNING SHOULD BE SHOWN TO THE USER IN MONITORING DEVICE	THEY ARE PREDICTIVE THE SITUATION

PAVASINGH

THE STATE OF WATER IS RESOLVED THE REMEDIATION ACTIVITIES	MONITORING WATER QUALITY FROM REMOTE LOCATION	LOW POWER AND REMEDIATION PROTECTS THE USER
REGULAR UPDATES ARE SENT TO THE REMOTE USER		ADVANCED DATA ANALYSIS ARE USED TO MONITORING THE REMEDIATION
REAL TIME DATA BASE USED LIKE CLOUD SERVER	MULTIPLE REMOTE USER INTERFACE ARE ABLE TO ACCESS	ADVANCED DATA ANALYSIS ARE USED TO MONITORING THE REMEDIATION

GAYATHRI

REMOTE MONITORING AND REMEDIATION OF REMOTE LOCATION	MONITORING THE WATER QUALITY TESTING IN TIME EFFICIENT	QUALITY OF WATER WILL HELP US TO BUILD STRONG SOCIETY
WAY OF THE QUALITY OF WATER MONITORING AND REMEDIATION OF REMOTE LOCATION		RELATIONSHIP OF WATER QUALITY AND REMEDIATION OF REMOTE LOCATION
IT WILL HELP TO MONITOR THE WATER QUALITY MONITORING	MAKE PROPER MONITORING AND REMEDIATION	MAKE THE SERVER IS MORE SECURE

MATHAVAN

MONITORING THE WATER QUALITY FROM REMOTE LOCATION	CREATE A LINK BETWEEN USER AND DEVICE	REAL TIME DATABASE MAINTAINED
CLOUD DATA CAN BE USED AND REMEDIATION CAN BE DONE		ALWAYS STORE THE DATA IN SECURED WAY
USE DONE REMEDIATION WHEN LOW INTERNET CONNECTION	ALWAYS PAYMENT FROM INTERNET TO MONITORING THE DEVICE	WE CAN USE THE REMEDIATION AND DEVICE REMEDIATION

→

ing

STEP 3: GROUP IDEA

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

CLUSTER 1

Keep a additional back-up battery to the device.

We Can Seperately Use The Device And

Also Make Use Device Closed

use tripper for power fluctuation.

Use solar panel to energize the device in day time.

CLUSTER 2

Use gsm module when there is slow

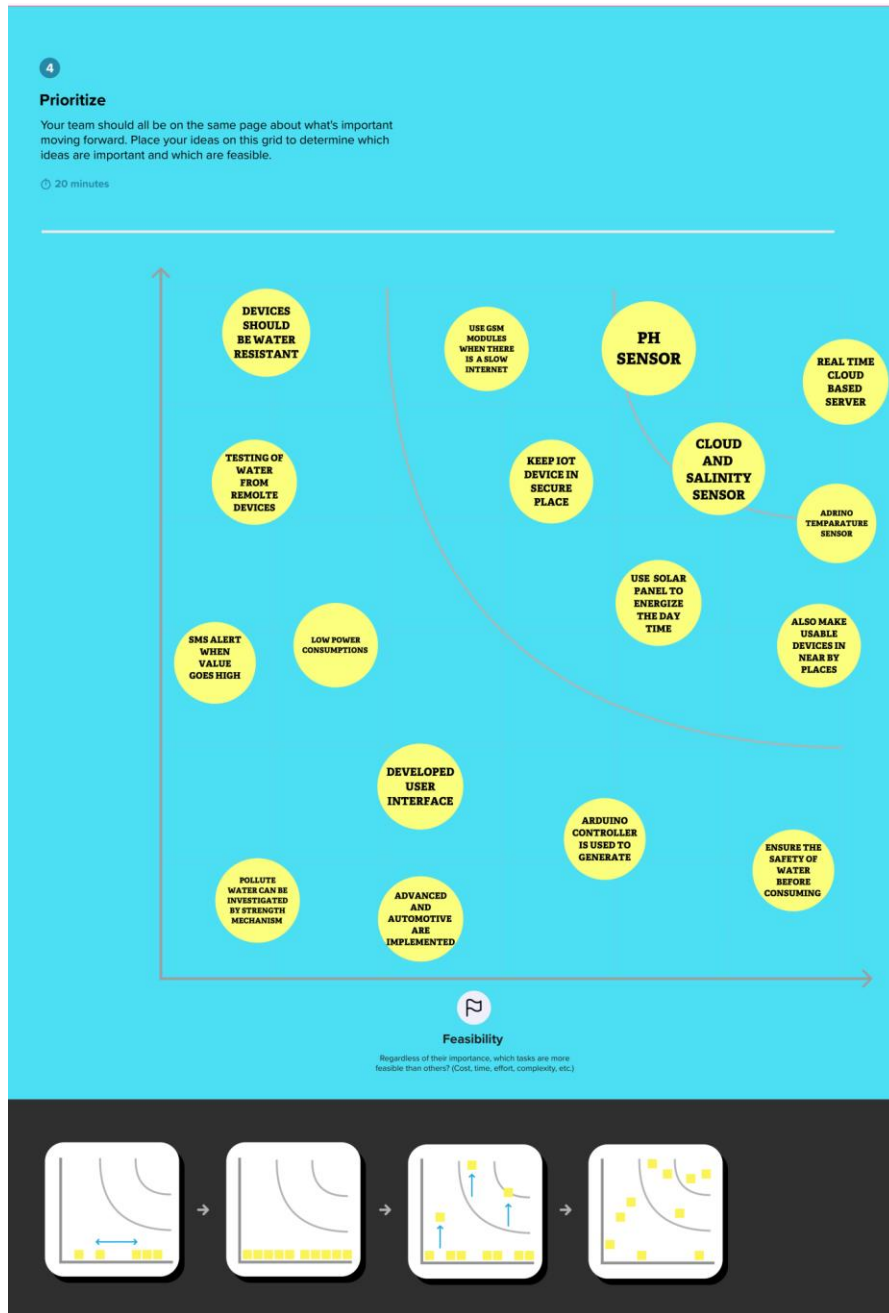
We Can Make Sensors Protector

Keep the IOT device in secured

MAKE THE SERVER MORE SECURE

USE an alarm system to alert the user.

STEP 4:PRIORITIZE



AFTER YOU COLLABPRATE:



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. Proposed Solution:

S. No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	IOT Based Real Time River Water Quality Monitoring and Control System
2.	Idea / Solution description	<p>1. To monitor the quality of water using sensors like Temperature, Potentiometer(pH), Turbidity, Salinity and so on.</p> <p>2. Collecting those data and storing it in cloud and perform analyse to check if the water is contaminated or not for drinking.</p> <p>3. If the water is contaminated an alert is made to the user/ local authority through SMS or can be viewed through web application anytime.</p>
3.	Novelty / Uniqueness	<p>1. Based on the collected data prediction is made whether the water can be used for cultivation of specific crops and suitable for the aquatic animals.</p>

4.	Social Impact / Customer Satisfaction	Algal growth, fertilizers, pesticides cause river pollution which can impact all living beings. Better monitoring and control measures can impact health and vegetation massively.
5.	Business Model (Revenue Model)	Service based product is developed to serve the local people to know the quality of water before consuming it or using it for any purpose. This prevents health issues or at most loss of living being.
6.	Scalability of the Solution	Developing the product as both web and mobile application it is portable, and data can be accessed from anywhere anytime. provide a real-time monitoring and a feasible solution for remote or distant places where water quality laboratory is not present.

SOLUTION FIT:

RealTimeWaterQualityManagementandControlSystem

ProjectDesignPhase-I-SolutionFitTemplate

TeamID:PNT2022TMID47600

Defines film/OC	1. CUSTOMER SEGMENT(S) CS Normal people and industrialist are our customer because all the have the basic knowledge in water quality and also they need a pure water. We are targeting the people who are have the basic knowledge and who need to know the quality of water. As well as who are having water based industries.	6. CUSTOMER CONSTRAINTS CC Network availability and available device are the biggest issue face by the customers and they need to spend a time to get daily update, it may high budget for some people. The resources in terms of financial as well as manpower are inadequate.	5. AVAILABLE SOLUTIONS <ul style="list-style-type: none"> The temperature of water can be monitored. The PH level of water is monitored and identified. Amount of oxygen dissolved in water. Any kind of chemical substances should be presence in water. 	Explores, differentiate
Focuses on the problem	2. JOBS-TO-BE-DONE/PROBLEM J&P All the people and industrialist are suffers to know the quality of water and also monitor the PH, Humidity, presence of chemical substances, amount of dissolved oxygen. They are only need the quality of water because impure water should because the various diseases.	9. PROBLEM ROOT CAUSE RC The reason for available of this project to monitor the quality of water as well as the various substances are presence in water. We took this project to break the myth of utilizing the technology and also reduce the manpower	7. BEHAVIOUR BE Directly related: Find better network availability, calculate the quality and quantity of water and also monitor simultaneously the quality and quantity of water. Indirectly related: We should make the awareness to all other industries as well as people	Focuses on the solution
Identify strong TR & EM	3. TRIGGERS TR <ul style="list-style-type: none"> By installing this project, we can trigger people by seeing their neighbor make the utilization of technology more useful and reading about a more efficient solution in the news. In case of without using mobile app, one should always be there to maintain the parameters and the maintenance cost should be paid. 	10. YOUR SOLUTION SI <ul style="list-style-type: none"> We provide a good source to the public and we work based on public review. The PH level of water is identified. Turbidity of water is identified. Conductivity of water is identified and also monitor the presence of chemical substances in water 	8. CHANNEL OF BEHAVIOUR CH ONLINE: <ul style="list-style-type: none"> People and industrialist may provide review and rating for the system. The software used should be properly studied by everyone to operate it. The software and hardware connections should be given properly. 	Find strong TR & EM
			n properly.	
	4. EMOTIONS: BEFORE/ AFTER EM BEFORE: <ul style="list-style-type: none"> Before implementing this project people feel it difficult to enjoy boating fishing and provision of safe drinking. They also face major problems in the development of industrial, hydroelectric and agricultural water requirements. AFTER: <ul style="list-style-type: none"> After implementing this project people can be able to face all these above mentioned problems easily 	<ul style="list-style-type: none"> Temperature of water is always monitored. Amount of oxygen dissolved in the water. TDS are used to describe the salinity level of water. Monthly report of maintaining the water will be displayed. 	OFFLINE: <ul style="list-style-type: none"> Public and industrialist supply funds to develop the system and make the system to take next move. The hardware setup should be installed properly. All the kind of hardware should be water resistant. 	

REQUIREMENT ANALYSIS:

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 registered credentials register confirmation e-mails
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP/SMS
FR-3	Log in to the System	Enter the OTP Check the Credentials Check the Access/Server
FR-4	Manage the Modules	Manage the system Admins of user Manage and Monitor Details of System UserManage the User Roles Manage the User Accessibility and User PermissionManage User Details Privacy

FR-5	Check Process Details	Temperature DetailsPH Details Turbidity Details dissolved oxygen level in water presence of chemical substances in water
FR-6	Log out	Save the existing measurements Exit

Non-functional Requirements:

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

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Make Easier to Use, More Efficiency to Use, Reduction of Errors While Using this Techniques
NFR-2	Security	end by end encrypted protocol in Data Authentication, Sensitive data protected personally identifiable information (PII) other informationdetails of users and networks

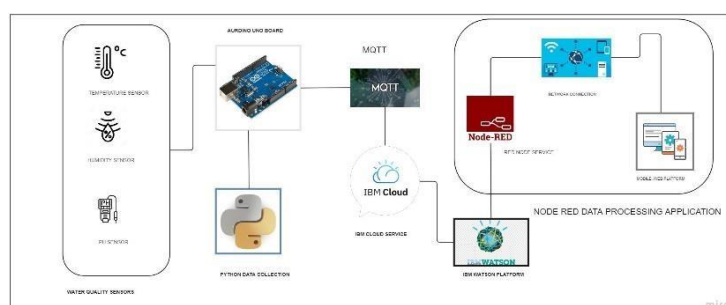
NFR-3	Reliability	<p>Provides the objective evidence necessary to make decisions on managing water quality today and in future also.</p> <p>This techniques make good communication between the user and the networks and it also achieves a better trade-off between costs and reliability</p>
NFR-4	Performance	<p>Implementing Monitoring River Water, by using sensing sensor to monitor the river water parameters making more useful for various environmental Usage.</p>
NFR-5	Availability	<p>PH Monitoring, Conductivity Analysis, CDOM (Dissolved Organic Matter), Measure of Carbonate and bicarbonate levels in water, this techniques made possible by linking information in water</p>
NFR-6	Scalability	<p>Automatic Water Sampler, PH testing, Recording the water temperature, chlorophyll, fluorescence analysis measuring the dissolved oxygen levels.</p>

5. PROJECT DESIGN

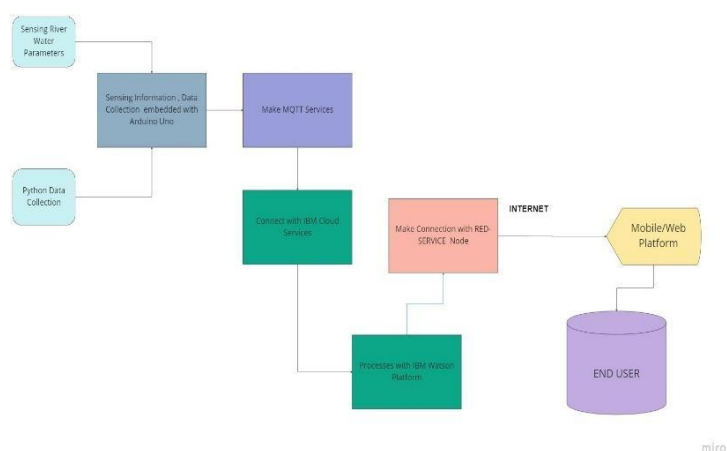
5.1. Data Flow Diagrams:

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.

DATA FLOW:



DATA FLOW DIAGRAM:



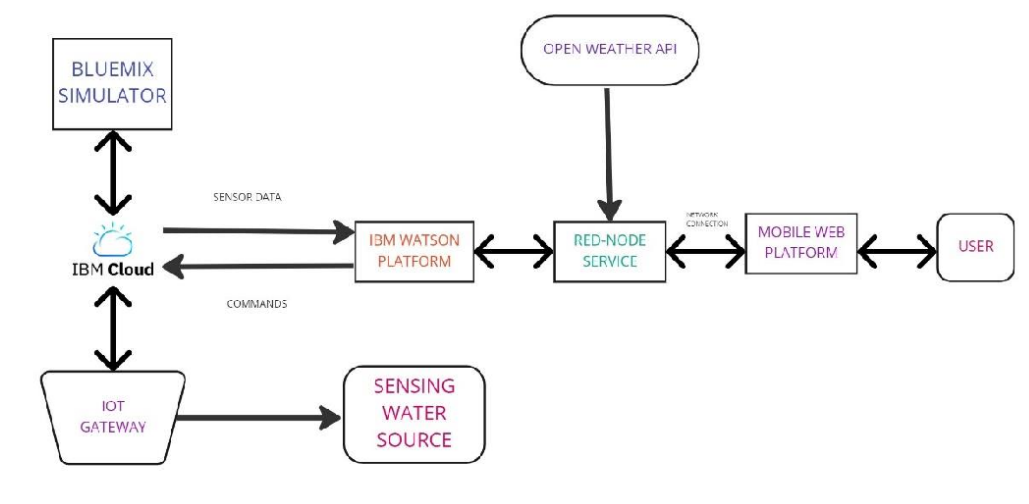
5.2. Technical Architecture:

Real-Time River Water Quality Monitoring and Control System

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2.

Example: The IoT - enabled Water Quality Monitoring (WQM) system enables real-time monitoring of freshwater resources.

TECHNOLOGY ARCHITECHTURE



Industry 2.0 architecture

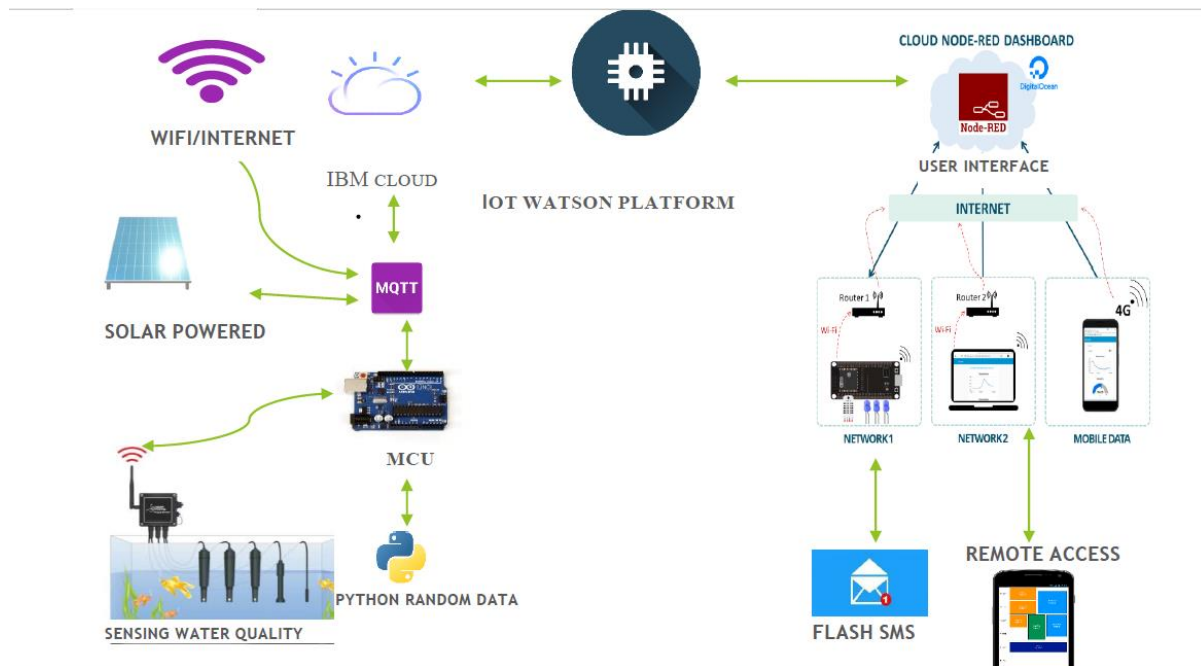


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application	HTML, CSS, Node-Red ,Cloud,etc
2.	Application Logic-1	Logic for a process in the application	JAVA/PYTHON

3.	Application Logic-2	Logic for a process in the application	IBM WATSON STT services
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4.	Application Logic-3	Logic for a process in the application	IBM WATSON Assistant
5.	Database	Data Type, Configurations etc	MySQL, Postgres SQL
6.	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloudant etc
7.	File Storage	File storage requirements	IBM Block Storage or Other StorageService or Local File system
8.	External API-1	Purpose of External API used in the application	IBM Weather API, etc
9.	External API-2	Purpose of External API used in the application	Aadhar API, etc
10.	Machine	Purpose of External API used	Object Recognition Model, etc..

	Learning Model	in the application	
11.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration:	Local, Cloud Foundry, Kubernetes, etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	Technology of OpenSource framework
2.	Security Implementations	List all the security / access controls implemented, use of firewalls etc	e.g. SHA-256, Encryptions, IAM Controls, OWASP etc.

3.	Scalable Architecture	Justify the scalability of architecture (3 – tier, Micro-services)	Technology used
4.	Availability	Justify the availability of application	Technology used
5.	Performance	Design consideration for the performance of the application	Technology used

5.3. User Stories:

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user/remote user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
	Notification	USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
	Signup through third parties	USN-3	As a user, I can register for the	I can register & access the dashboard	Low	Sprint-2

			application through Facebook	with Facebook Login		
		USN-4	As a user, I can register for the application through Gmail	I can register and access the dashboard with Google credentials	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I can register and access the dashboard through the application cred	High	Sprint-1
	Dashboard					
Customer (Web user)		USN-6	As I am a customer I need a proper support and service	Each and every process was under firewall /security protocol	High	Each sprint
Customer Care Executive		USN-7	24/7 service can provided by company			Sprint 3
Administrator		USB-8	Who will have the entire access of this project	All the access was with encrypted	High	Each sprint

6. PROJECT PLANNING & SCHEDULING:

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Kannan, Jayashree.
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	Gnash prabhu, gayathri.
Sprint-2		USN-3	As a user, I can register for the application through Facebook	2	Low	Gnash prabhu, gayathri.
Sprint-1		USN-4	As a user, I can register for the application through Gmail	2	Medium	Gnash prabhu, gayathri.
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	1	High	Kannan, Jayashree.
	Dashboard				High	

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint - 2	User interface experience	USN-6	As a user I need a proper user interface for the project which was contain the graphical representation of received data from the sensors	2	High	Kannan, Jayashree.
Sprint - 2		USN-7	As a user, I can create a IBM cloud account forthe data base which should able to store the data and gather the data from the sensors	1	Medium	Gnash prabhu, gayathri.
Sprint - 2		USN-8	As I a user I can create node-red app for providing commands to the sensors in the IBM cloud	2	Medium	Kannan, Jayashree.
Sprint - 2		USN-9	As a user, I can create IOT Watson assistant for converting the sensors data to the digital data	2	Low	Gnash prabhu, gayathri.
Sprint - 2		USN-10	As a user, I can create a fast to SMS app For providing alert the user which consuming water was not have the quality of consumable	1	High	Kannan, Jayashree.
Sprint - 2		USN-11	As I a user, I can make cloudant data base in the IBM cloud for storing the data from the sensorsfor future references	2	High	Kannan, Jayashree.
Sprint - 3	App interface creation	USN-12	As I a user, I can use the MIT APP INVERTER for creating the user interface which containsinterface between of IBM cloud	1	Medium	Gnash prabhu, gayathri.
Sprint - 3		USN-13	As I am a user, I can create a dashboard which was containing graphical representing the sensors measurements	1	Medium	Gnash prabhu, gayathri.

Sprint - 3		USN-14	As I am a user, I can save or delete the previous measurements which was contain the sensor measurements	2	High	Kannan, Jayashree.
Sprint - 3		USN-15	As I am a user, I need the devices was properly insulated and the devices was must be a water resistant	2	High	Kannan, Jayashree.

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint - 3		USN-16	As I am a user, I can create the devices which was implemented in the project should be maintain properly with the particular interval of time	1	Low	Gnash prabhu, gayathri.
Sprint -3		USN-17	As I am a user, I need a simultaneous data collecting data from the sensors and also save the received data to the cloudant /clouddashboard	2	Low	Kannan, Jayashree.
Sprint -3		USN-18	As a user, I can manage the devices which was implemented in the project	1	High	Kannan, Jayashree.
Sprint -3	User development	USN-19	As a admin, I can manage all the devices and find the drawbacks and also rectify that	1	High	Kannan, Jayashree.

Sprint -3		USN-20	As a admin, I can manage the devices which was not working not properly I should replace that device	1	Medium	Gnash prabhu, gayathri.
Sprint -3		USN-21	As a admin, I can monitor the devices whichwas sending the correct data or not	1	Low	Gnash prabhu, gayathri.
Sprint -3		USN-22	As a admin, I can make changes in the user interface which was able to understand the measurements was easily understandable by user/industry person	2	High	Kannan, Jayashree.
Sprint -4	User command centre	USN-23	As a admin, I can create the command option in the user interface and able to perform thedevices based on the commands	2	High	Kannan, Jayashree.
Sprint -4		USN-24	As a user, I can give the command to the device which was already able understand the command and also perform the function which was mention in the command	2	Medium	Gnash prabhu, gayathri.

Sprint -4		USN-25	As a user, I can need user interface was always be an eco-friendly which was designed in the user interface	2	Medium	Gnash prabhu, gayathri.
Sprint -4		USN-26	As a user, I need a user interface which was contains HTTP command format and also should contain the web page interface	1	High	Kannan, Jayashree.

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint -4		USN-27	As a user, I can make the measurements was also capable to know the web interface	1	Low	Gnash prabhu, gayathri.
Sprint -4		USN-28	As a user, I need a proper statement of the measurements of the data and also	1	Low	Gnash prabhu, gayathri.

Project Tracker, Velocity & Burndown Chart:

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:

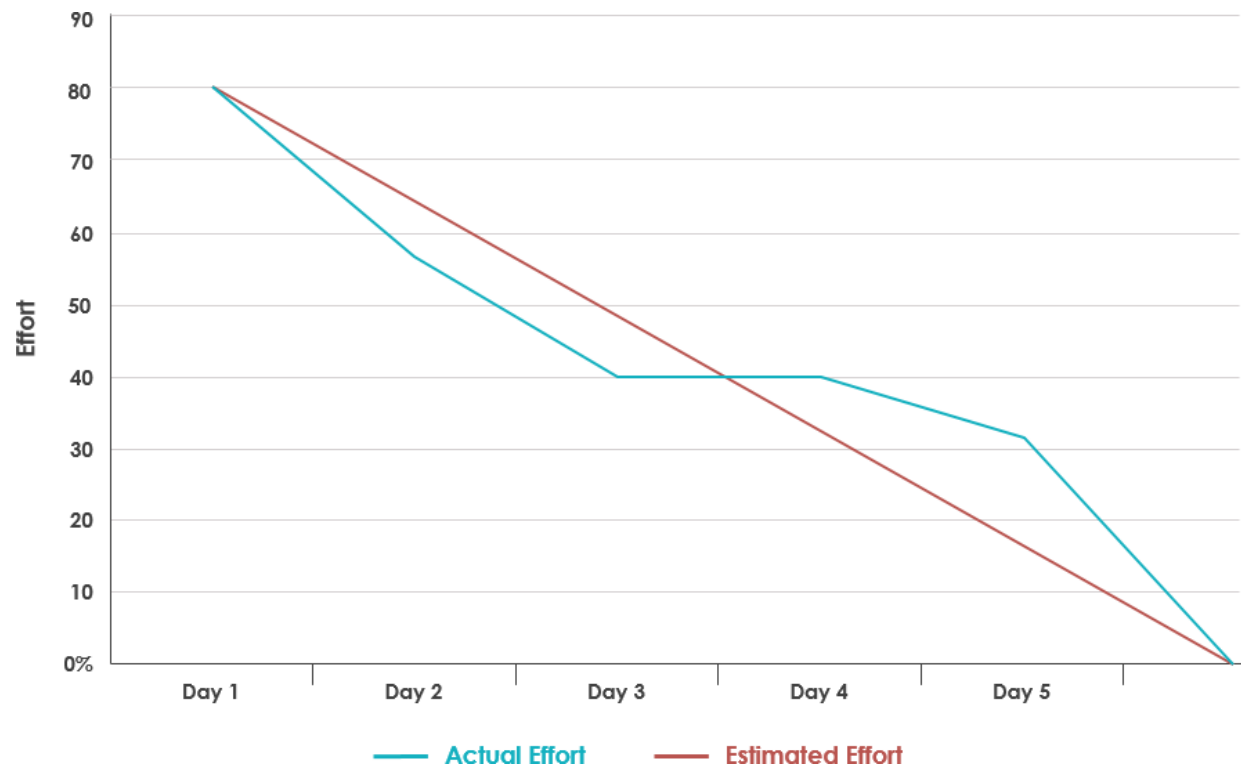
Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

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

The average velocity (AV) per iteration unit =3.33

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 methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.



7. CODING & SOLUTIONING :

7.1.FEATURE:

HTML CODE FOR USER REGSTATION;

```
<html>

<head>

<title>

Registration Page

</title>

</head>

<body>

<br>

<br>

<form>

user credintials

<label> Firstname </label>

<input type="text" name="firstname" size="15"/> <br> <br>

<label> Middlename: </label>

<input type="text" name="middlename" size="15"/> <br> <br>

<label> Lastname: </label>

<input type="text" name="lastname" size="15"/> <br> <br>
```

</select>

project domain

<label> internet of things </label>

<label>

Gender :

</label>

<input type="radio" name="male"/> Male

<input type="radio" name="female"/> Female

<input type="radio" name="Prefer not to say"/> Prefer not to say

<label>

contact details</details> :

</label>

<input type="text" name="country code" value="+91" size="2"/>

<input type="text" name="phone" size="10"/>

Address


```
<textarea cols="80" rows="5" value="address">
```

```
</textarea>
```

```
<br> <br>
```

Email:

```
<input type="email" id="email" name="email"/> <br>
```

```
<br> <br>
```

Password:

```
<input type="Password" id="pass" name="pass"> <br>
```

```
<br> <br>
```

Re-type password:

```
<input type="Password" id="repass" name="repass"> <br> <br>
```

```
<input type="button" value="Submit"/>
```

```
</form>
```

```
</body>
```

alternte contact details

```
<input type="text" name="country code" value="+91" size="2"/>
```

```
<input type="text" name="phone" size="10"/> <br> <br>
```

alternate email id

```
<input type="altrernate email id" name="alternate email"/> <br>
```

```
<br> <br>
```

```
<body>
```

```
<html>
```


OUTPUT:

user credentials Firstname

Middlename:

Lastname:

project domain internet of things

Gender :

☐ Male

☐ Female

☐ Prefer not to say

contact details : +91

Address

Email:

☐ Male

☐ Female

☐ Prefer not to say

contact details : +91

Address

Email:

Password:

Re-type password:

alternte contact details +91

alternate email id

USER LOGIN PAGE CREATION USING HTML CODE:

```
<!DOCTYPE html>
<html>
<head>
  <h1> Real time water quality monitoring system</h1>
<metaname="viewport" content="width=device-width, initial-scale=1">
<style>
body {font-family: Arial,Impact, 'Arial Narrow Bold', sans-serif, sans-serif;}

/* Full-width input fields */
input[type=text], input[type=password] {
  width: 150;
  padding: 23px 24px;
  margin: 8px 0;
  display: inline-block;
  border: 1px solid #ccc;
  box-sizing: border-box;
}

/* Set a style for all buttons */
button {
  background-color: #04AA6D;
  color:blue;
  padding: 15px 21px;
  margin: 8px 0;
  border: none;
  cursor: pointer;
  width: 102;
}

button:hover {
  opacity: 0.7;
}

/* Extra styles for the cancel button */
.cancelbtn {
  width: min-content
  padding: 10px 18px;
  background-color: #f4455f
```

```

}

/* Center the image and position the close button */
{.imgcontainer { }
  text-align: right: ;
  margin: 24px 0 12px 0;
  position: relative
}

img {Real time water quality monitoring and control system}: {
  width: 56;
  border-radius:50%;
}

.container {
  padding: 16px;
}

span.psw {
  float: right;
  padding-top: 16px;
}

/* The Modal (background) */
.modal {
  display: none; /* Hidden by default */
  position: fixed; /* Stay in place */
  z-index: 1; /* Sit on bottom*/
  left: 0;
  top: 0;
  width: 100%; /* full width */
  height: 100%; /* medium height */
  overflow: auto; /* Enable scroll if needed */
  background-color: ybg(0,0,0); /* Fallback color */
  background-color: rgba(0,0,0,0.4); /* Black w/ transparent */
  padding-top: 60px;
}

/* Modal Content/Box */
.modal-content {
  background-color: #fefefe;
  margin: 5% auto 15% auto; /* 5% from the top, 15% from the bottom and centered */
  border: 1px solid #888;

```

```
width: 65%; /* Could be more or less, depending on screen size */
}

/* The Close Button (x) */
.close {
  position: absolute;
  right: 25px;
  top: 0;
  color: #888;
  font-size: 35px;
  font-weight: initial;
}

.close:hover,
.close:focus {
  color: red;
  cursor: pointer;
}

/* Add Zoom Animation */
.animate {
  -webkit-animation: animatezoom 0.6s;
  animation: animatezoom 0.6s
}

@-webkit-keyframes animatezoom {
  from {-webkit-transform: scale(0)}
  to {-webkit-transform: scale(1)}
}

@keyframes animatezoom {
  from {transform: scale(2)}
  to {transform: scale(1)}
}

/* Change styles for span and cancel button on extra small screens */
@media screen and (max-width: 300px) {
  span.psw {
    display: block;
    float: none;
  }
  .cancelbtn {
    width: 100%;
  }
}
```

```

    }
}
</style>
</head>
<body>

<h2>Modal Login Form</h2>

<button onclick="document.getElementById('id01').style.display='block'"
style="width:auto;">Login</button>

<div id="id01" class="modal">

    <form class="modal-content animate" action="/action_page.php" method="post">
        <div class="imgcontainer">
            <span onclick="document.getElementById('id01').style.display='none'"
class="close" title="Close Modal">&times;</span>
        </div>

        <div class="container">
            <label for="uname"><b>Username</b></label>
            <input type="text" placeholder="Enter Username" name="uname" required>

            <label for="psw"><b>Password</b></label>
            <input type="password" placeholder="Enter Password" name="psw" required>
            <label for="captch"></label><123gh@><label>
            <input type="captcha" 123@g="Enter captcha" name="captcha" required>
            <button type="submit">Login</button>
            <label>

                <input type="checkbox" checked="checked" name="remember"> Remember me
            </label>
        </div>

        <div class="container" style="background-color:#f1f1f1">
            <button type="button"
onclick="document.getElementById('id01').style.display='none'"
class="cancelbtn">Cancel</button>
            <span class="psw">Forgot <a href="#">password?</a></span>
        </div>
    </form>
</div>

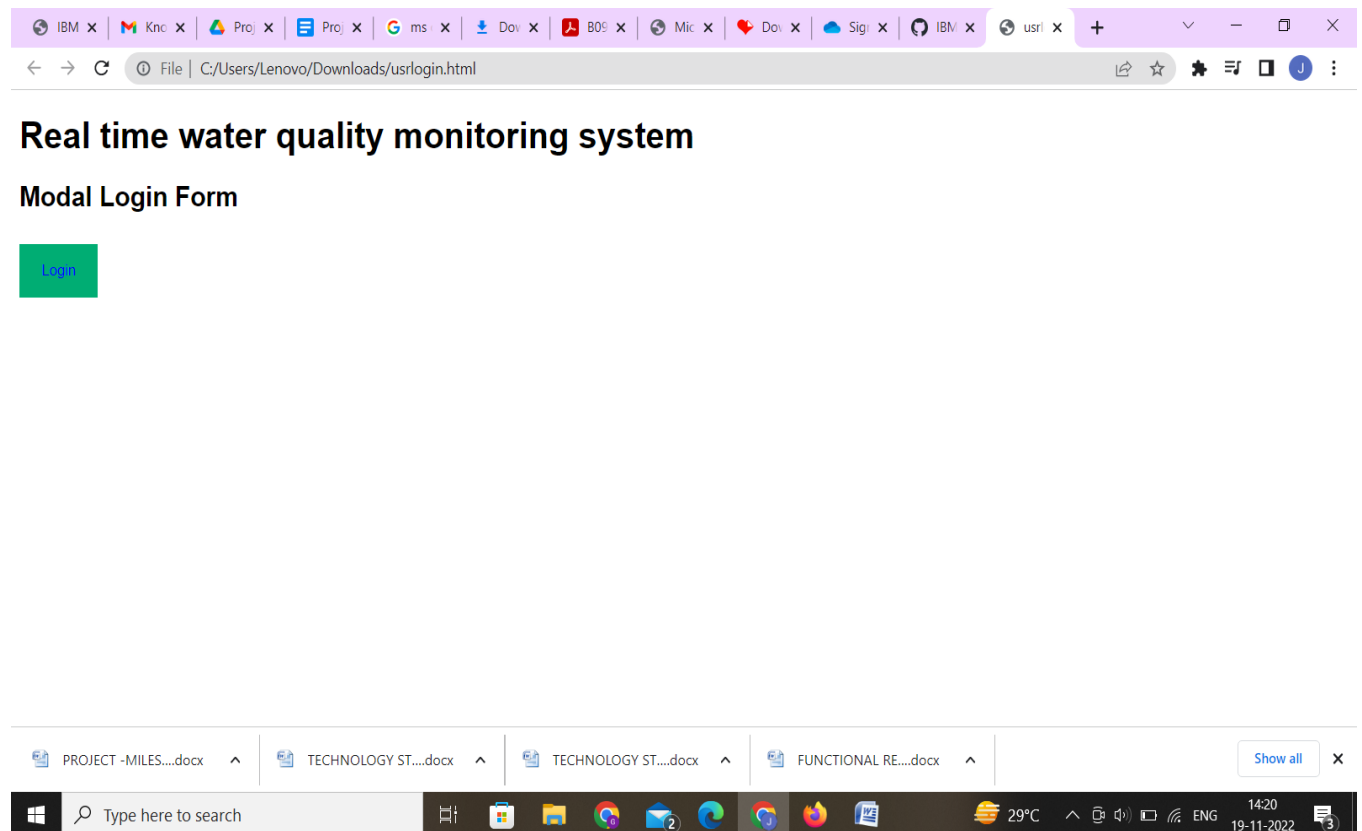
```

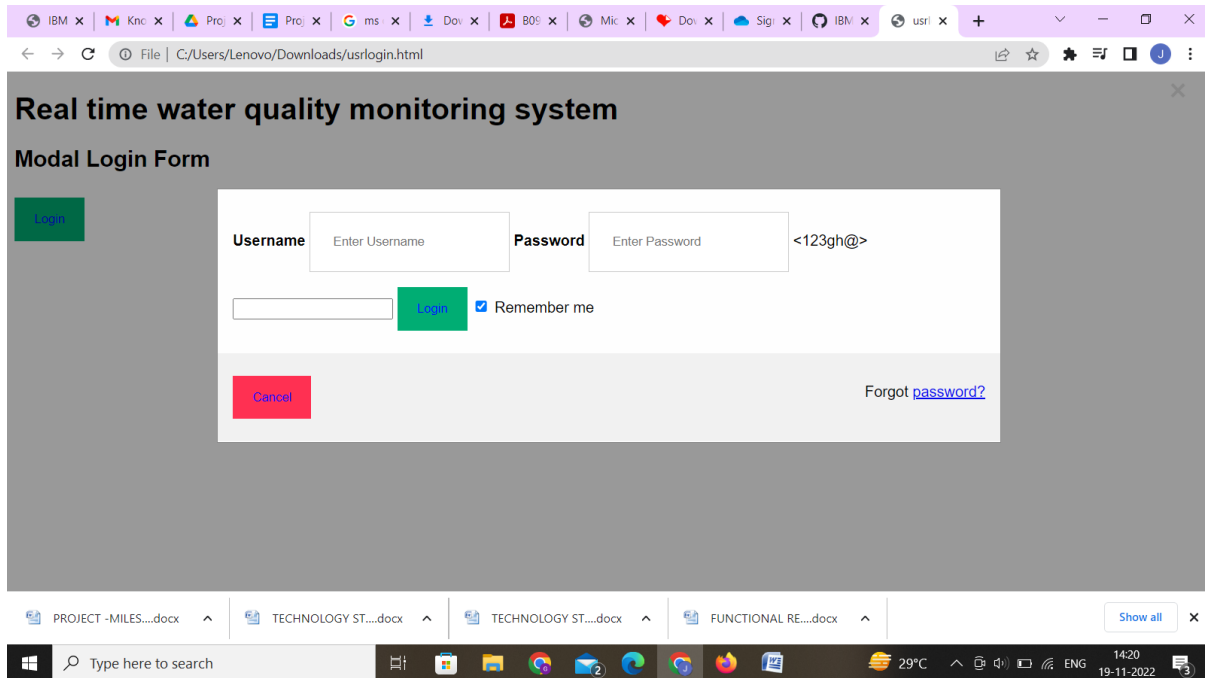
```
<script>
// Get the modal
var modal = document.getElementById('id03');

// When the user clicks anywhere outside of the modal, close it
window.onclick = function(event) {
    if (event.target == modal) {
        modal.style.display = "none";
    }
}
</script>

</body>
</html>
```

OUTPUT:





FEATURE 2:

PYTHON DATA FOR RANDOM DATA PUBLISHING:

DEVELOP THE PYTHON SCRIPT:

```
# -*- coding: utf-8 -*-
```

```
"""
```

```
reated on Fri Nov 11 07:57:51 2022
```

```
@author: KANNAN
```

```
"""
```

```
import random
```

```
import time
```

```
#IBM Watson IOT Platform
```

```
#pip install wiotp-sdk
```

```
import wiotp.sdk.device
```

```
myConfig = {
```

```
    "identity": {
```

```
        "orgId": "eqfbco",
```

```
        "typeId": "REAL_TIME_WATER_QUALITY_MONITORING",
```

```
        "deviceId": "PNT2022TMID47600"
```

```
    },
```

```
    "auth": {
```

```
        "token": "T-axiVGwn*pPDJJ&bW"
```

```
    }
```

```
}
```

```
def myCommandCallback(cmd):
```



```
print("Message received from IBM IoT Platform: %s" % cmd.data['command'])

m=cmd.data['command']


client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)

client.connect()


while True:

    temp=random.randint(-20,125)

    hum=random.randint(0,100)

    PH=random.randint(0,14)

    O2=random.randint(0,100)

    myData={'temperature':temp, 'humidity':hum, 'phvalue':PH, 'dissolved_oxygen':O2}

    client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)

    print("Published data Successfully: %s", myData)

    client.commandCallback = myCommandCallback

    time.sleep(5)

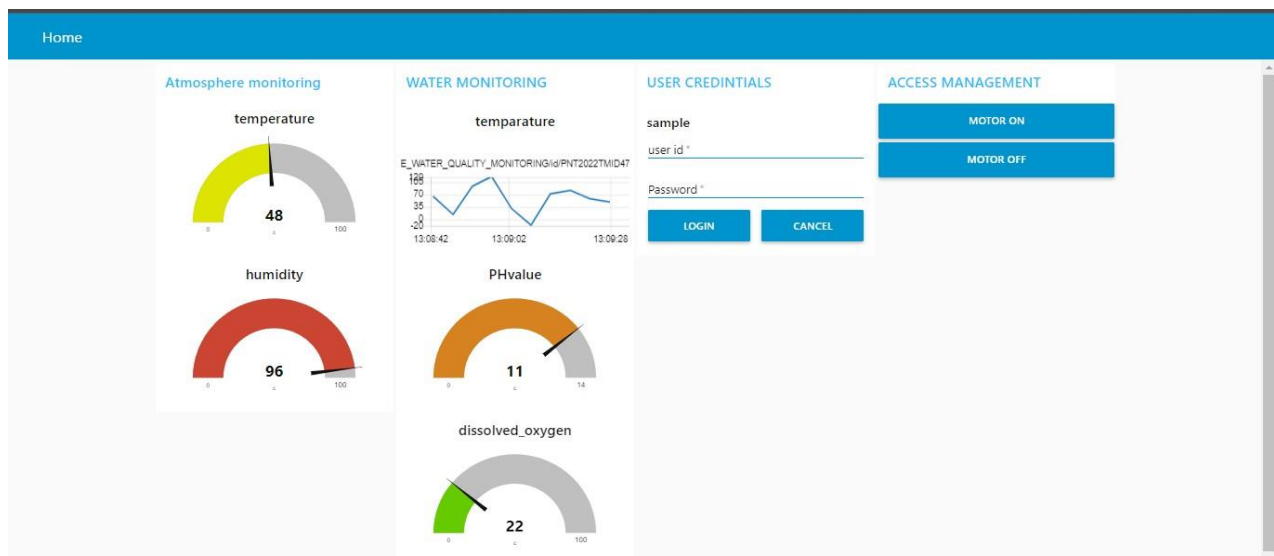
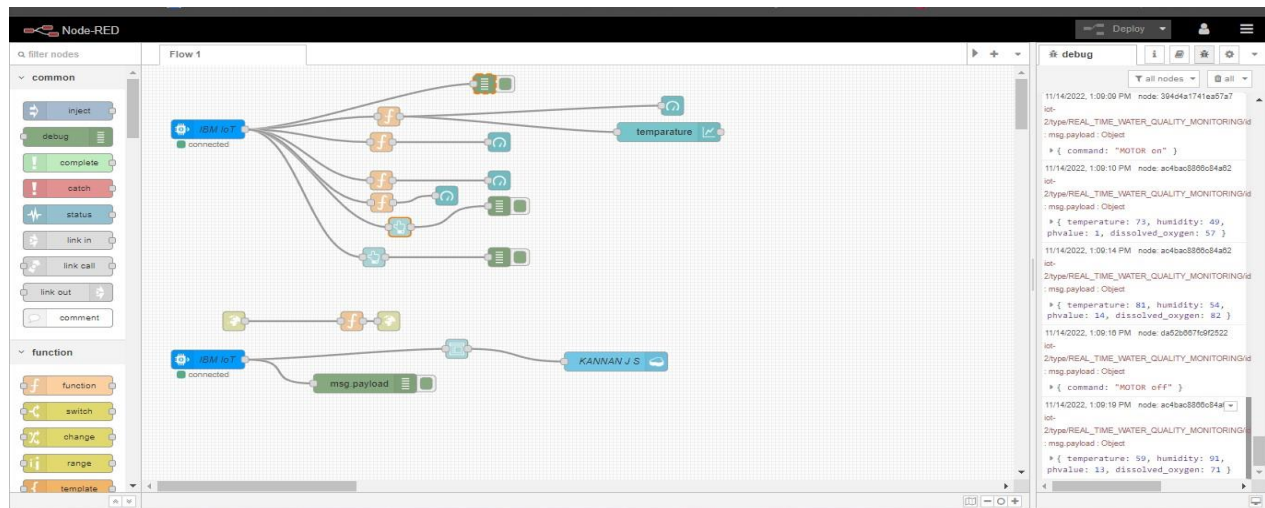
client.disconnect(5)
```

8. TESTING

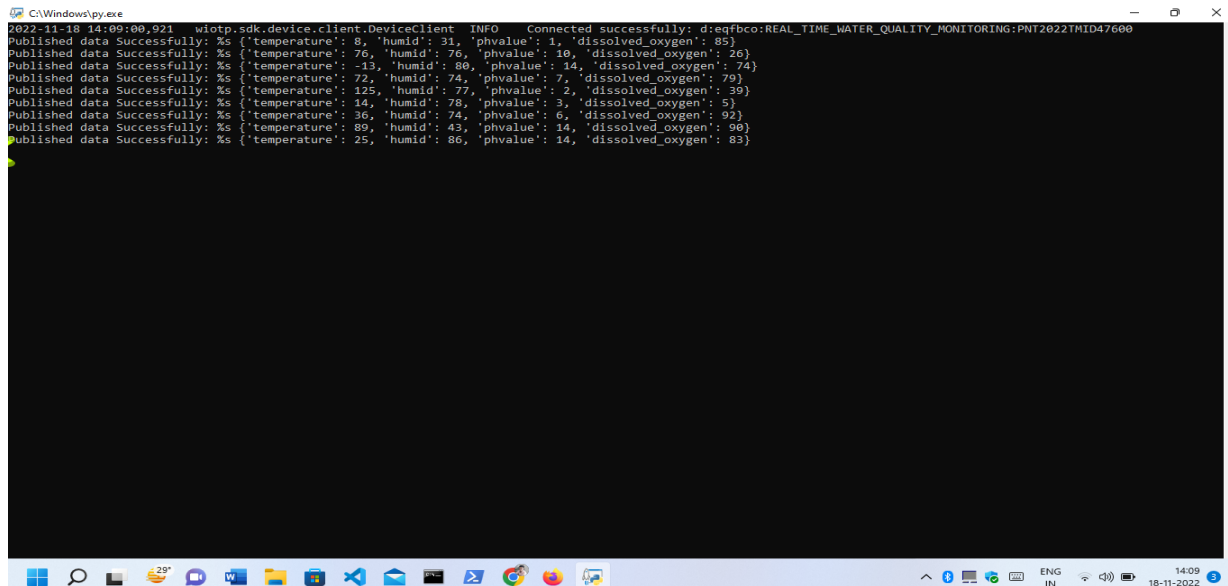
8.1.TEST CASES:

8.1 .1.NODE-RED TESTING:

NODE-RED DASHBOARD



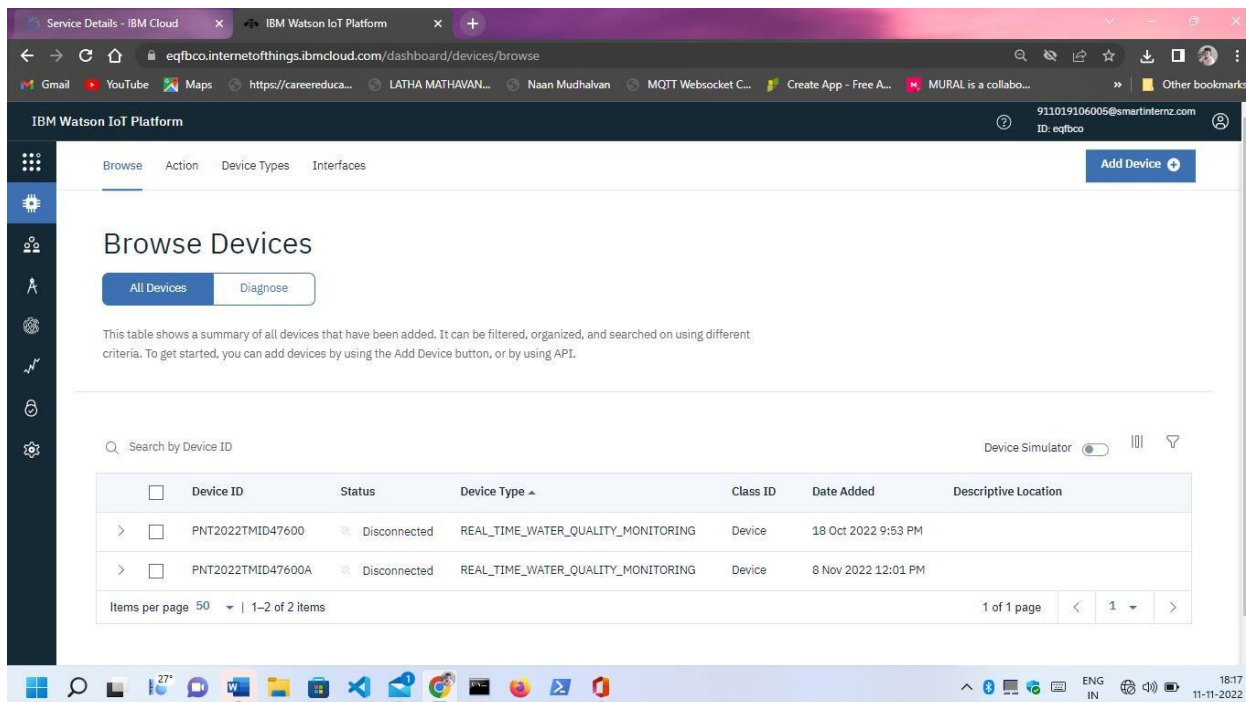
PUBLISHING DATA TO THE IBM IOT WATSON PLATFORM:



```

C:\Windows\py.exe
2022-11-18 14:09:00,921 wiotp.sdk.device.client.DeviceClient INFO Connected successfully: d:eqfbco:REAL_TIME_WATER_QUALITY_MONITORING:PNT2022TMID47600
Published data Successfully: %s {'temperature': 8, 'humid': 31, 'phvalue': 1, 'dissolved_oxygen': 85}
Published data Successfully: %s {'temperature': 26, 'humid': 76, 'phvalue': 10, 'dissolved_oxygen': 26}
Published data Successfully: %s {'temperature': -13, 'humid': 80, 'phvalue': 14, 'dissolved_oxygen': 74}
Published data Successfully: %s {'temperature': 72, 'humid': 74, 'phvalue': 7, 'dissolved_oxygen': 79}
Published data Successfully: %s {'temperature': 125, 'humid': 77, 'phvalue': 2, 'dissolved_oxygen': 39}
Published data Successfully: %s {'temperature': 14, 'humid': 78, 'phvalue': 3, 'dissolved_oxygen': 5}
Published data Successfully: %s {'temperature': 36, 'humid': 74, 'phvalue': 6, 'dissolved_oxygen': 92}
Published data Successfully: %s {'temperature': 89, 'humid': 43, 'phvalue': 14, 'dissolved_oxygen': 90}
Published data Successfully: %s {'temperature': 25, 'humid': 86, 'phvalue': 14, 'dissolved_oxygen': 83}
  
```

GETTING THE DATA FROM THE PYTHON THROUGH THE IBMWATSON DEVICE TO THE NODE-RED



Service Details - IBM Cloud

IBM Watson IoT Platform

eqfbco.internetofthings.ibmcloud.com/dashboard/devices/browse

IBM Watson IoT Platform

Browse Action Device Types Interfaces

Browse Devices

All Devices Diagnose

This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

Search by Device ID

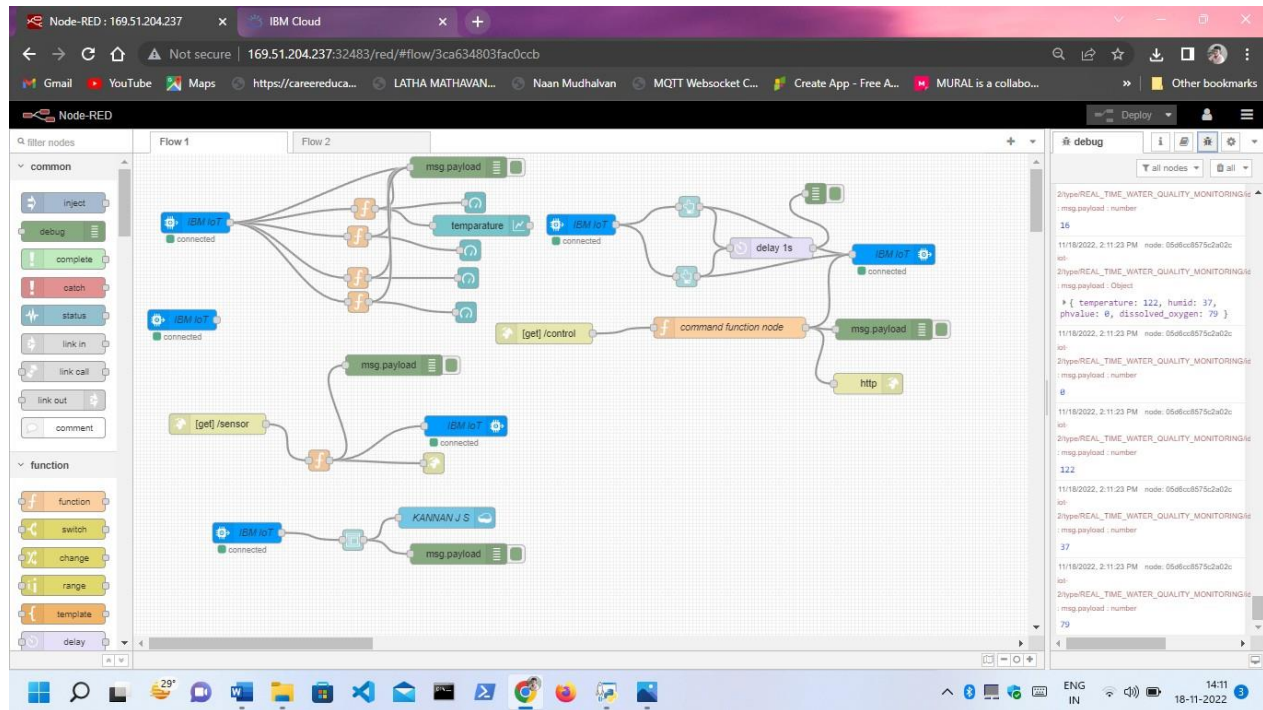
Device Simulator

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
PNT2022TMID47600	Disconnected	REAL_TIME_WATER_QUALITY_MONITORING	Device	18 Oct 2022 9:53 PM	
PNT2022TMID47600A	Disconnected	REAL_TIME_WATER_QUALITY_MONITORING	Device	8 Nov 2022 12:01 PM	

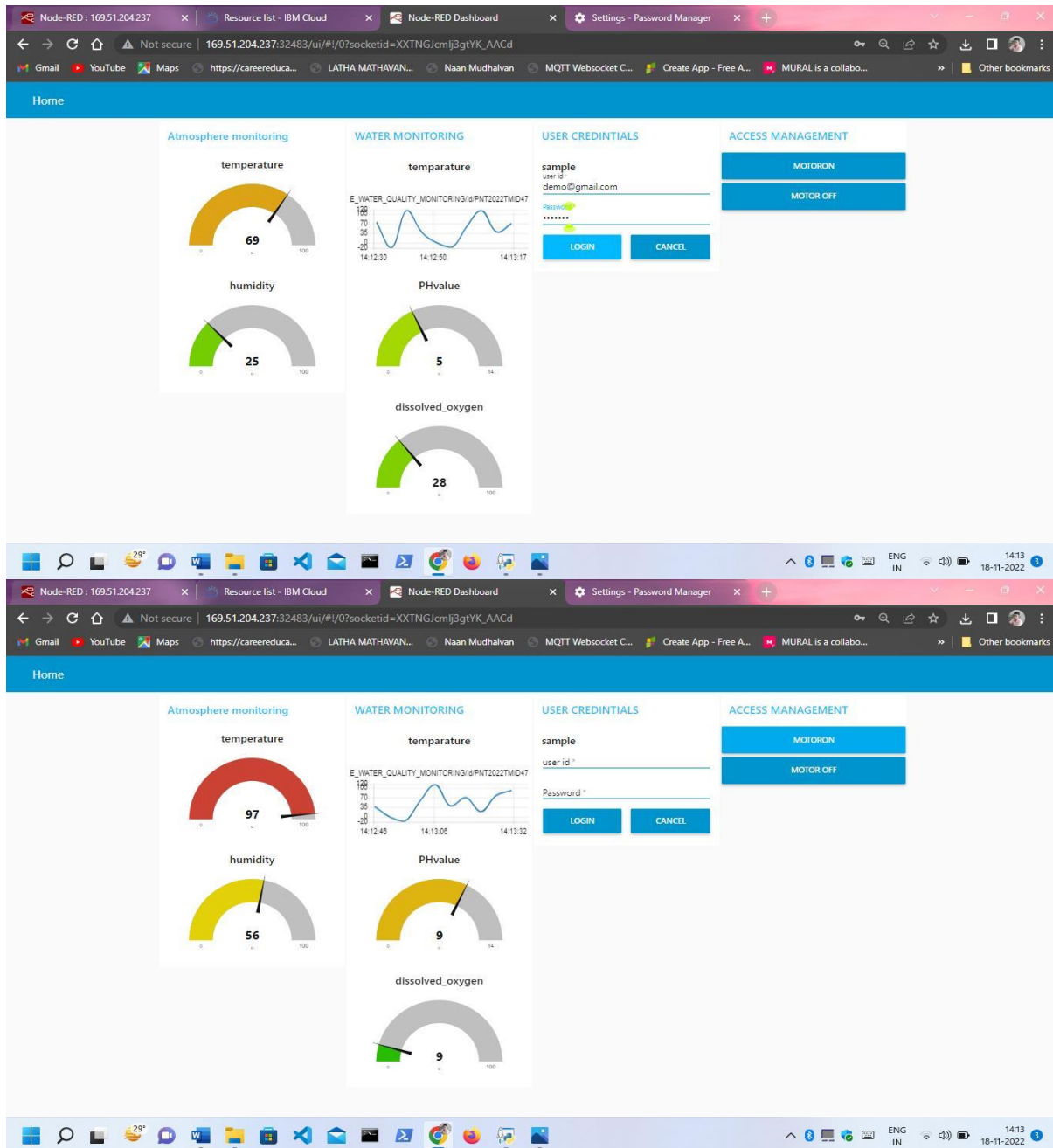
Items per page 50 | 1-2 of 2 items

1 of 1 page

SORING THE USER DATA FROM THE WEB UI INTERFACE:



USING CLOUDANT DATABASE TO STORE THE USER INFORMATION



The screenshot shows the Cloudant Databases dashboard. The browser tabs include Node-RED, Resource list - IBM Cloud, Node-RED Dashboard, and Cloudant Dashboard. The URL is c4f124c0-83d5-4d80-859b-b7f87cdf3c7a-bluemix.cloudant.com/dashboard.html. The dashboard displays a table of databases:

Name	Size	# of Docs	Partitioned	Actions
nodered	37.3 KB	4	No	[Icons for edit, lock, delete]
sample	214 bytes	2	No	[Icons for edit, lock, delete]

At the bottom, it says "Showing 1-2 of 2 databases. Databases per page: 20".

The screenshot shows the Cloudant Databases dashboard with the 'sample' database selected. The left sidebar shows options: All Documents, Query, Permissions, Changes, and Design Documents. The main area displays document details for the 'sample' database. The document ID is '04b93207e1746aedef6d3e01d9546870'. The document content is a JSON object:

```
{
  "id": "04b93207e1746aedef6d3e01d9546870",
  "key": "04b93207e1746aedef6d3e01d9546870",
  "value": {
    "rev": "1-9581cd53360617e929ef9310420e0eb"
  },
  "doc": {
    "_id": "04b93207e1746aedef6d3e01d9546870",
    "_rev": "1-9581cd53360617e929ef9310420e0eb",
    "payload": {
      "user id": "demo@gmail.com",
      "password": "demo123"
    },
    "socketid": "Aa0xu3JE0c-ym-dHAACV"
  }
}
```

At the bottom, it says "Showing document 1-2. Documents per page: 20".

8.2. USER ACCEPTANCE TESTING:

8.2.1. USER REGISTRATION FORM :

user credentials Firstname

Middlename:

Lastname:

project domain internet of things

Gender :

☐ Male

☐ Female

☐ Prefer not to say

contact details : +91

Address

Email:

PROJECT -MILES....docx TECHNOLOGY ST....docx TECHNOLOGY ST....docx FUNCTIONAL RE....docx Show all

Type here to search 29°C 14:17 19-11-2022

☐ Male

☐ Female

☐ Prefer not to say

contact details : +91

Address

Email:

Password:

Re-type password:

Submit

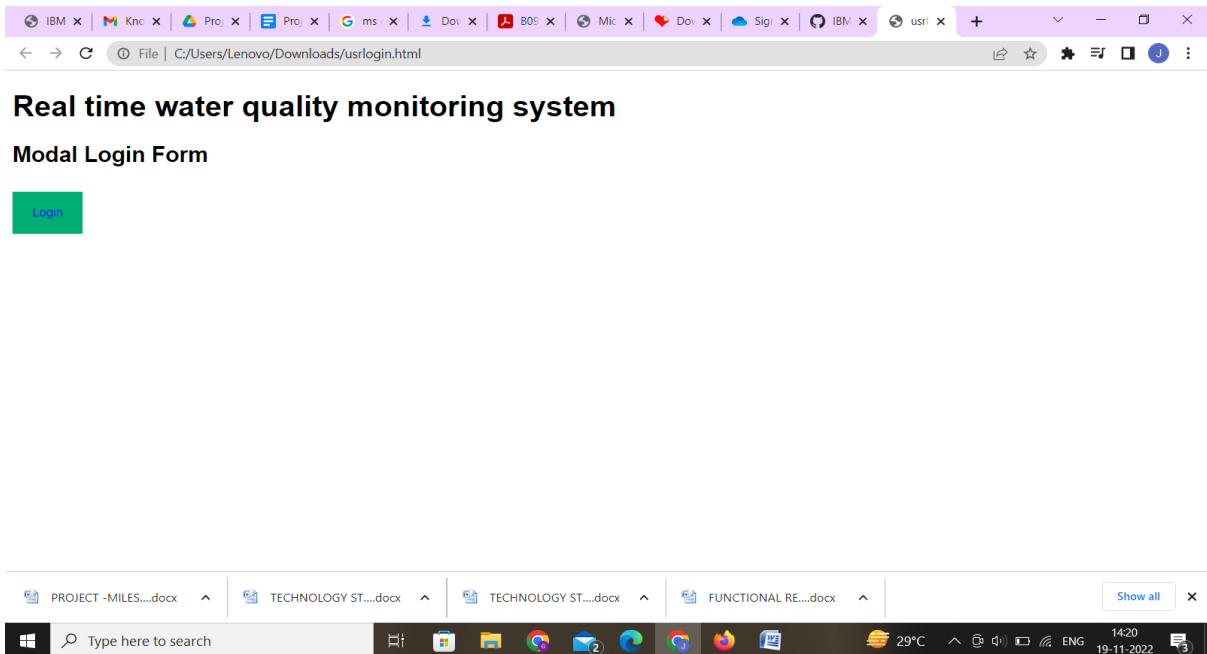
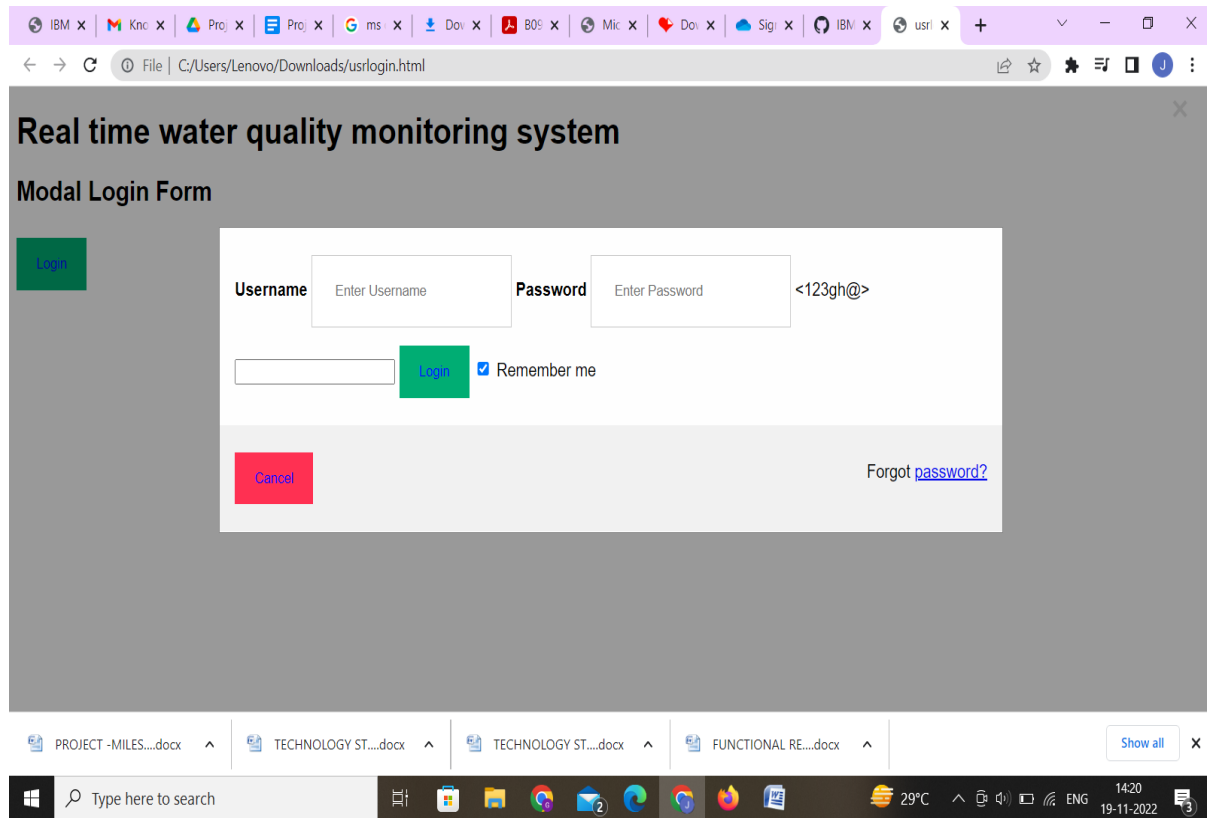
alternate contact details +91

alternate email id

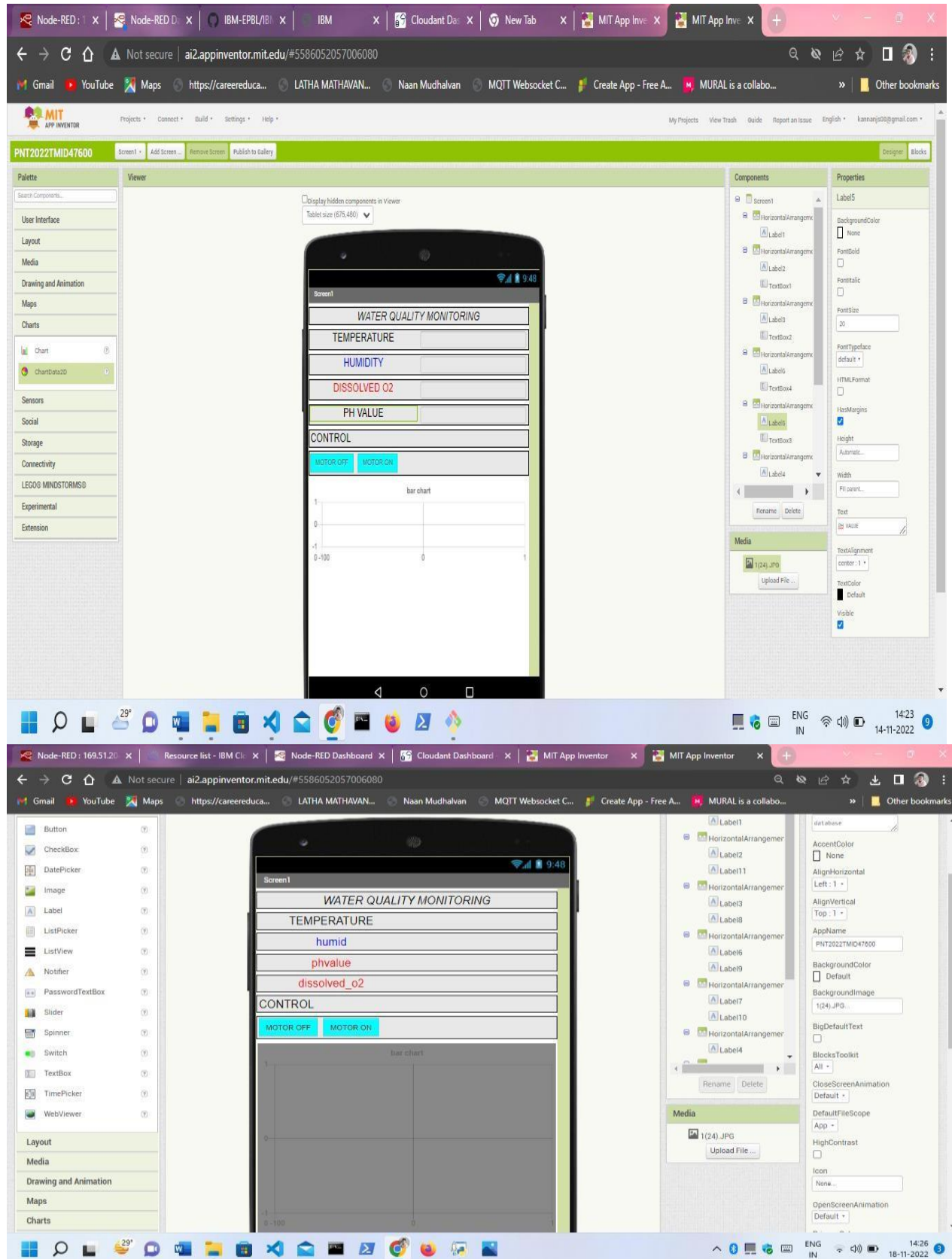
PROJECT -MILES....docx TECHNOLOGY ST....docx TECHNOLOGY ST....docx FUNCTIONAL RE....docx Show all

Type here to search 29°C 14:17 19-11-2022

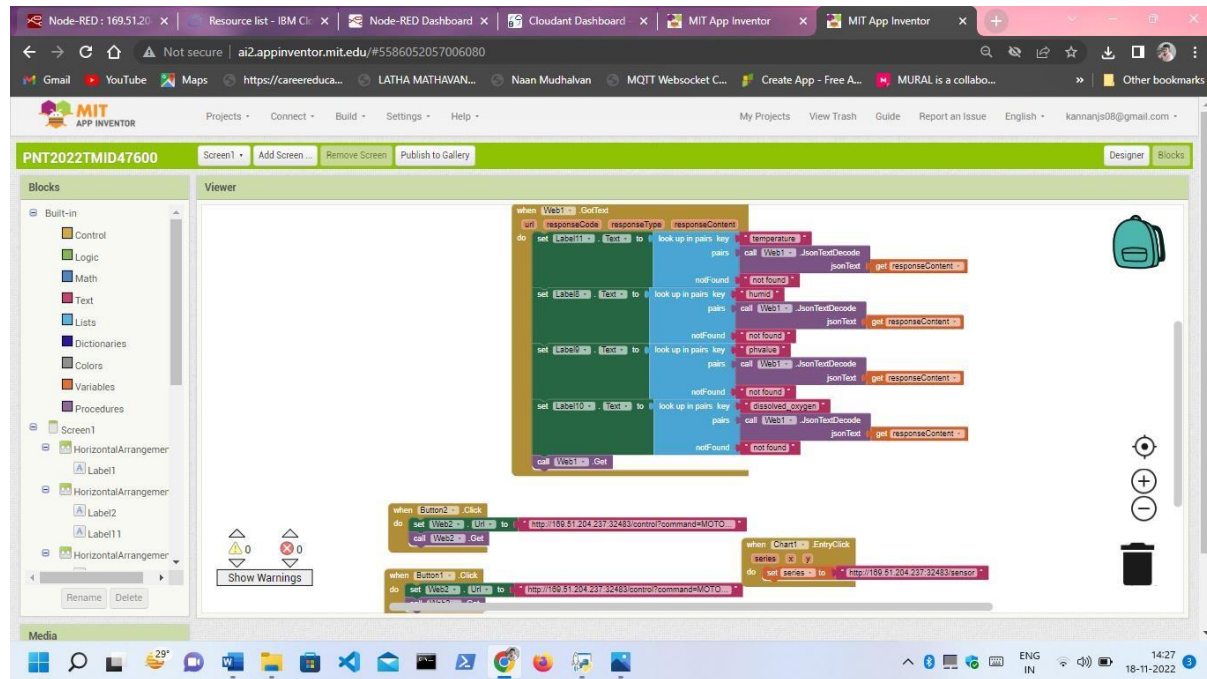
8.2.2.USER LOGIN PREVIEW



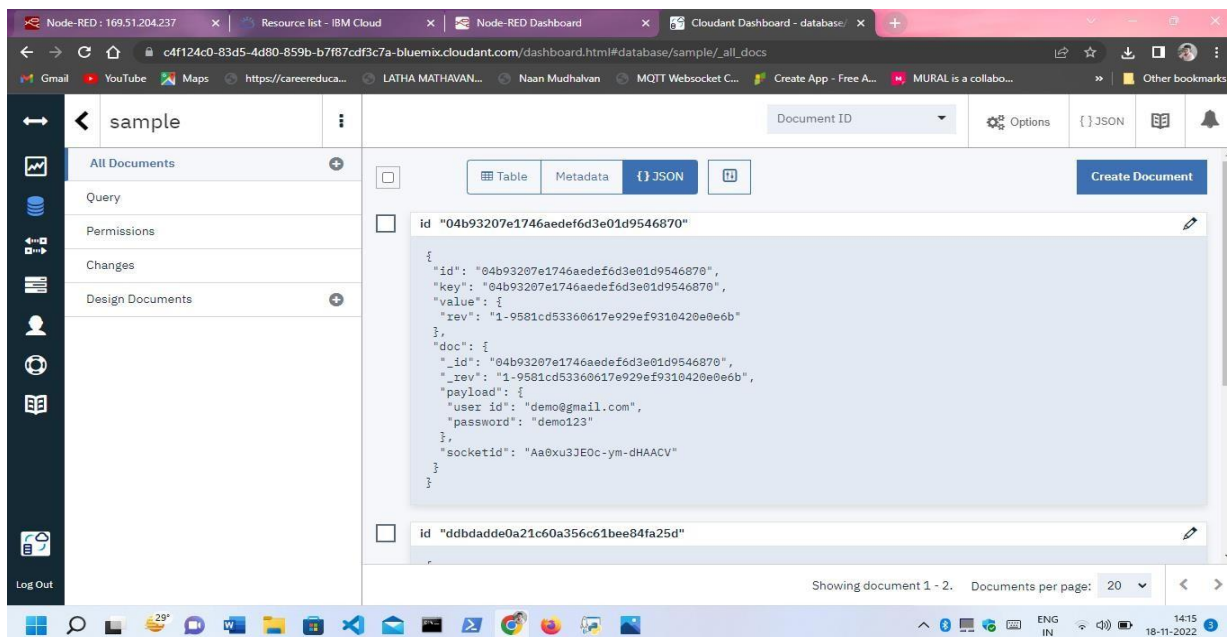
USING MIT APP INVENTOR:



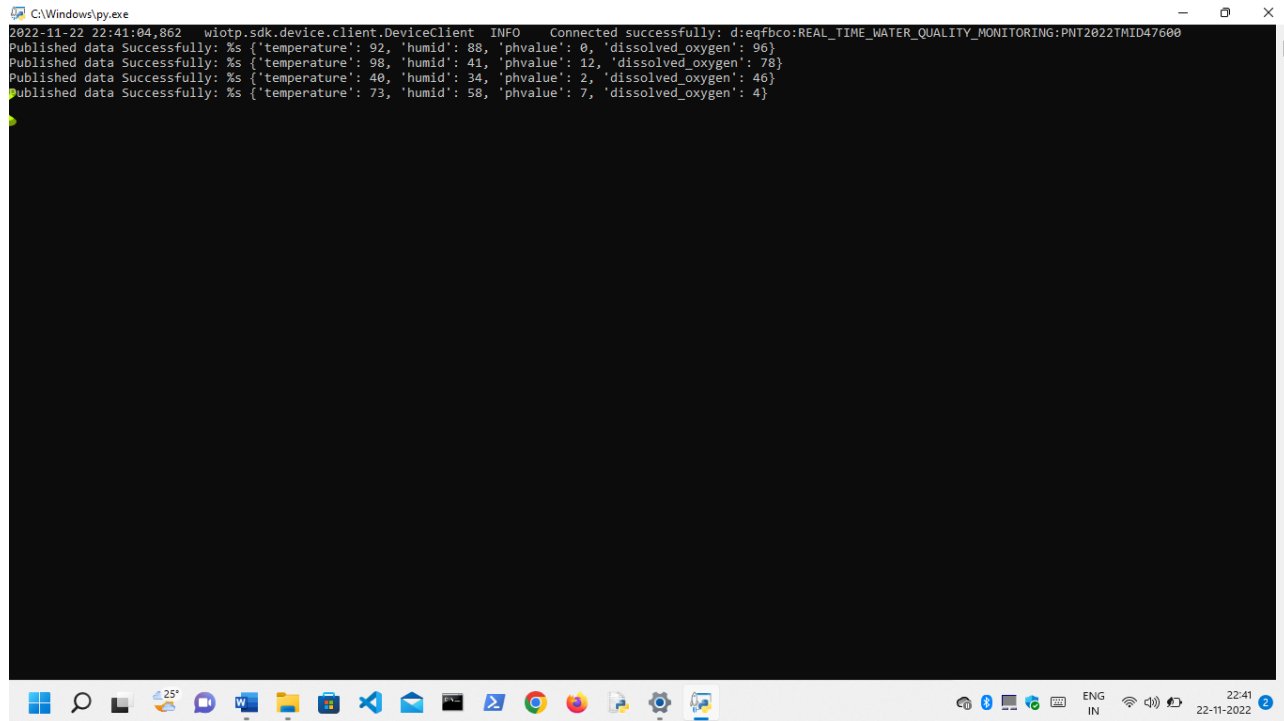
9.RESULTS:



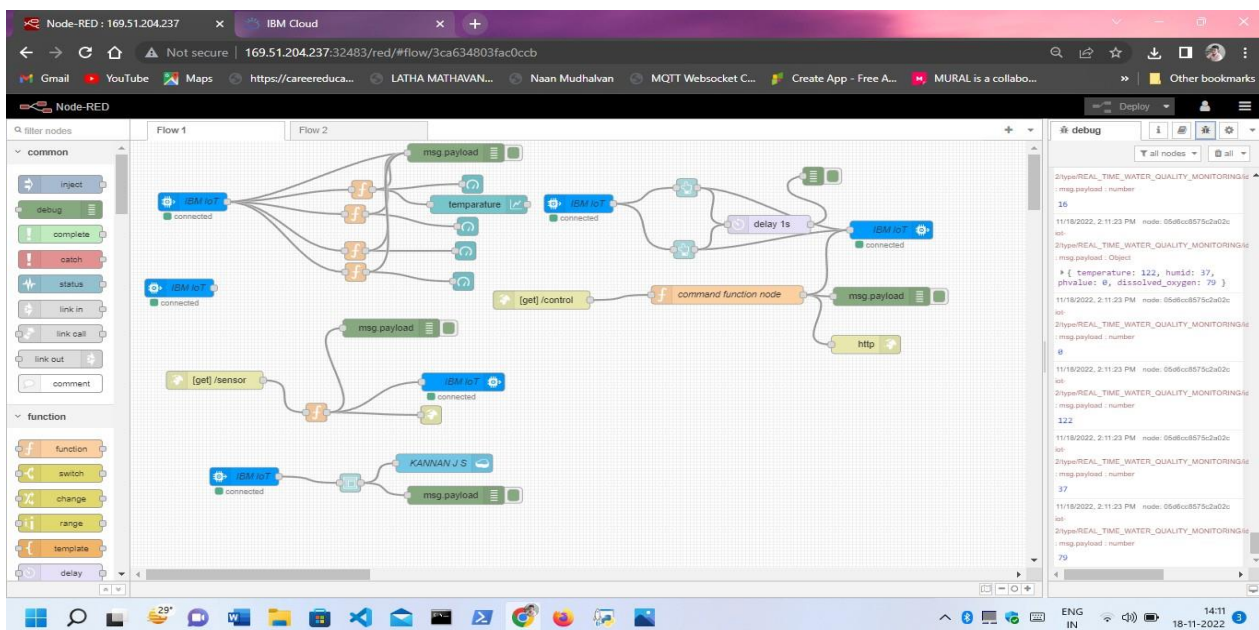
9.1. PERFORMANCE METRICES:



USING PYTHON CODE SUCCESSFULLY PUBLISHED TO THE CLOUD DEVICE AND ALSO NODE-RED



```
C:\Windows\py.exe
2022-11-22 22:41:04,862 wiotp.sdk.device.client.DeviceClient INFO Connected successfully: d:egfbco:REAL_TIME_WATER_QUALITY_MONITORING:PNT2022TMID47600
Published data Successfully: %s {'temperature': 92, 'humid': 88, 'phvalue': 0, 'dissolved oxygen': 96}
Published data Successfully: %s {'temperature': 98, 'humid': 41, 'phvalue': 12, 'dissolved oxygen': 78}
Published data Successfully: %s {'temperature': 40, 'humid': 34, 'phvalue': 2, 'dissolved oxygen': 46}
Published data Successfully: %s {'temperature': 73, 'humid': 58, 'phvalue': 7, 'dissolved oxygen': 4}
```



10.ADVANTAGES AND TESTING:

10.1. ADVANTAGES:

- Use to measure the quality of water.
- Use to analyze which the water was capable to drink.
- Access the device through Remotely.
- Access and Understand the procedure was User Friendly.
- Easily Monitor the device.
- Everyone should able to have some basics of knowledge of water consuming.

10.2. DISADVANTAGES:

- Regular maintain of device
- Always should provide the high Speed Internet.

11. CONCLUSION:

Water turbidity, PH, and temperature are monitored using a water detection sensor that has a unique advantage and is already connected to a IBM CLOUD. The technology can automatically monitor water quality, is low-cost, and does not require personnel to be on duty.

As a result, water quality testing will most likely be more cost-effective, convenient, and quick. The method is very adaptable. This system may be used to monitor different water quality metrics by simply replacing the matching sensors and modifying the required software packages. The procedure is straightforward. The system can be expanded to track hydrologic, air pollution, industrial, and agricultural output, among other things. It is widely used and has a large number of applications. Keeping embedded devices in the environment for monitoring allows the environment to protect itself. (i.e., smart environment). This will necessitate the deployment of sensor devices in the environment for data collection and processing. We can bring the environment to life by placing sensor devices in it, allowing it to communicate with other things over the network. The end user will then have access to the collected data and analysis results via Wi-Fi.

12. FUTURE SCOPE:

To develop the device this was able to access through the GPS module and also to get the vales from the sensors with high speed of internet connectivity

To get the graphical representation of the measurements in real time monitoring
And also to store the previous data from the sensor to the cloud storing device

13.APPENDIX:

13.1. SOURCE CODE:

User registration source code:

```
<html>

<head>

<title>

Registration Page

</title>

</head>

<body>

<br>

<br>

<form>

user credentials

<label> Firstname </label>

<input type="text" name="firstname" size="15"/> <br> <br>

<label> Middlename: </label>

<input type="text" name="middlename" size="15"/> <br> <br>

<label> Lastname: </label>

<input type="text" name="lastname" size="15"/> <br> <br>
```

</select>

project domain

<label> internet of things </label>

<label>

Gender :

</label>

<input type="radio" name="male"/> Male

<input type="radio" name="female"/> Female

<input type="radio" name="Prefer not to say"/> Prefer not to say

<label>

contact details</details> :

</label>

<input type="text" name="country code" value="+91" size="2"/>

<input type="text" name="phone" size="10"/>

Address


```
<textarea cols="80" rows="5" value="address">
```

```
</textarea>
```

```
<br> <br>
```

Email:

```
<input type="email" id="email" name="email"/> <br>
```

```
<br> <br>
```

Password:

```
<input type="Password" id="pass" name="pass"> <br>
```

```
<br> <br>
```

Re-type password:

```
<input type="Password" id="repass" name="repass"> <br> <br>
```

```
<input type="button" value="Submit"/>
```

```
</form>
```

```
</body>
```

alternte contact details

```
<input type="text" name="country code" value="+91" size="2"/>
```

```
<input type="text" name="phone" size="10"/> <br> <br>
```

alternate email id

```
<input type="altrernate email id" name="alternate email"/> <br>
```

```
<br> <br>
```

```
<body>
```

```
<html>
```


User login source code:

```
<!DOCTYPE html>

<html>

<head>

<h1> Real time water quality monitoring system</h1>

<metaname="viewport" content="width=device-width, initial-scale=1">

<style>

body {font-family: Arial,Impact, 'Arial Narrow Bold', sans-serif, sans-serif;}


/* Full-width input fields */

input[type=text], input[type=password] {

    width: 150;

    padding: 23px 24px;

    margin: 8px 0;

    display: inline-block;

    border: 1px solid #ccc;

    box-sizing: border-box;

}


/* Set a style for all buttons */
```

```
button {  
  
    background-color: #04AA6D;  
  
    color:blue;  
  
    padding: 15px 21px;  
  
    margin: 8px 0;  
  
    border: none;  
  
    cursor: pointer;  
  
    width: 102;  
  
}
```

```
button:hover {  
  
    opacity: 0.7;  
  
}
```

```
/* Extra styles for the cancel button */
```

```
.cancelbtn {  
  
    width: min-content  
  
    padding: 10px 18px;  
  
    background-color: #f4455f  
  
}
```

```
/* Center the image and position the close button */
```

```
{.imgcontainer { }
```

```
text-align: right; ;
```

```
margin: 24px 0 12px 0;
```

```
position: relative
```

```
}
```

```
img {Real time water quality monitoring and control system}: {
```

```
width: 56;
```

```
border-radius:50%;
```

```
}
```

```
.container {
```

```
padding: 16px;
```

```
}
```

```
span.psw {
```

```
float: right;
```

```
padding-top: 16px;
```

```
}
```

```
/* The Modal (background) */
```

```
.modal {
```

```
display: none; /* Hidden by default */

position: fixed; /* Stay in place */

z-index: 1; /* Sit on bottom*/

left: 0;

top: 0;

width: 100%; /* full width */

height: 100%; /* medium height */

overflow: auto; /* Enable scroll if needed */

background-color: ybg(0,0,0); /* Fallback color */

background-color: rgba(0,0,0,0.4); /* Black w/ transparent */

padding-top: 60px;

}

/* Modal Content/Box */

.modal-content {

background-color: #fefefe;

margin: 5% auto 15% auto; /* 5% from the top, 15% from the bottom and centered */

border: 1px solid #888;

width: 65%; /* Could be more or less, depending on screen size */

}

/* The Close Button (x) */
```

```
.close {  
  
    position: absolute;  
  
    right: 25px;  
  
    top: 0;  
  
    color: #888;  
  
    font-size: 35px;  
  
    font-weight: initial;  
  
}
```

```
.close:hover,  
  
.close:focus {  
  
    color: red;  
  
    cursor: pointer;  
  
}
```

```
/* Add Zoom Animation */
```

```
.animate {  
  
    -webkit-animation: animatezoom 0.6s;  
  
    animation: animatezoom 0.6s  
  
}
```

```
@-webkit-keyframes animatezoom {
```

```
from {-webkit-transform: scale(0)}  
to {-webkit-transform: scale(1)}  
}  
  
@keyframes animatezoom {  
  from {transform: scale(2)}  
  to {transform: scale(1)}  
}  
  
/* Change styles for span and cancel button on extra small screens */  
  
@media screen and (max-width: 300px) {  
  span.psw {  
    display: block;  
    float: none;  
  }  
  .cancelbtn {  
    width: 100%;  
  }  
}  
  
</style>  
  
</head>  
  
<body>
```

<h2>Modal Login Form</h2>

<button onclick="document.getElementById('id01').style.display='block'"
style="width:auto;">Login</button>

<div id="id01" class="modal">

<form class="modal-content animate" action="/action_page.php" method="post">

<div class="imgcontainer">

<span onclick="document.getElementById('id01').style.display='none'" class="close"
title="Close Modal">×

</div>

<div class="container">

<label for="uname">Username</label>

<input type="text" placeholder="Enter Username" name="uname" required>

<label for="psw">Password</label>

<input type="password" placeholder="Enter Password" name="psw" required>

<label for="captch"></label><123gh@><label>

<input type="captcha" 123@g="Enter captcha" name="captcha" required>

```
<button type="submit">Login</button>
```

```
<label>
```

```
<input type="checkbox" checked="checked" name="remember"> Remember me
```

```
</label>
```

```
</div>
```

```
<div class="container" style="background-color:#f1f1f1">
```

```
<button type="button" onclick="document.getElementById('id01').style.display='none'"
```

```
class="cancelbtn">Cancel</button>
```

```
<span class="psw">Forgot <a href="#">password?</a></span>
```

```
</div>
```

```
</form>
```

```
</div>
```

```
<script>
```

```
// Get the modal
```

```
var modal = document.getElementById('id03');
```

```
// When the user clicks anywhere outside of the modal, close it
```

```
window.onclick = function(event) {
```

```
  if (event.target == modal) {
```



```
        modal.style.display = "none";  
    }  
}  
  
</script>  
  
</body>  
  
</html>
```

Python source code:

```
# -*- coding: utf-8 -*-  
  
"""  
  
reated on Fri Nov 11 07:57:51 2022  
  
@author: KANNAN  
"""  
  
  
import random  
  
import time  
  
  
#IBM Watson IOT Platform  
  
#pip install wiotp-sdk  
  
import wiotp.sdk.device  
  
  
myConfig = {
```

```

"identity": {
    "orgId": "eqfbco",
    "typeId": "REAL_TIME_WATER_QUALITY_MONITORING",
    "deviceId": "PNT2022TMID47600"
},
"auth": {
    "token": "T-axiVGwn*pPDJJ&bW"
}
}

```

```
def myCommandCallback(cmd):
```

```

    print("Message received from IBM IoT Platform: %s" % cmd.data['command'])
    m=cmd.data['command']

```

```

client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()

```

```
while True:
```

```

    temp=random.randint(-20,125)
    h=random.randint(0,100)
    PH=random.randint(0,14)
    o2=random.randint(0,100)
    myData={'temperature':temp, 'humid':h, 'phvalue':PH, 'dissolved_oxygen':o2}
    client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)
    print("Published data Successfully: %s", myData)

```

```
client.commandCallback = myCommandCallback
```

```
time.sleep(5)
```

```
client.disconnect(5)
```

GITHUB LINK:

<https://github.com/IBM-EPBL/IBM-Project-54604-1662357024/tree/main>

PROJECT DEMO:

<https://youtu.be/SpBPjXhHsiI>