PROJECT REPORT

PROJECT TITLE: Real-Time River Water Quality Monitoring and Control System

TEAM ID: PNT2022TMID14476.

TEAM MEMBERS: VASANTH P (TEAM LEAD)

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1. INTRODUCTION

1.1 Project overview

Water is the primary need of all living beings and living without water is impossible. Water pollution is one of the most serious types of this environmental pollution. Our lives depend on the quality of water that we consume in different ways, from juices which are produced by the industries. Any imbalance in the quality of water would severely affect the humans health and at the same time it would affect the ecological balance among all species. Water quality refers to the chemical, biological, radiological, and biological parameters of the water

1.2 Purpose

Nowadays water is the is the most valuable for all the human beings drinking water utilities faces challenges in real- time operation. These challenges occurred because of growing population, limited water resources, ageing infrastructure etc. Hence there is a need of better methodologies for monitoring the water quality.

2.LITERATURE SURVEY

2.1 Existing problem

Existing system has a mechanisms which are semi-automated or manually controlled devices which are to be handled by a person responsible for monitoring the water quality. There is need to have human intervention in taking various reading of the water parameters.

The instruments or tools are used either by putting/inserting a water sensing part into water and seeing the result on small display device or by directly inserting a portable device in water and watching the output on the display. Central Water Commission (CWC) monitors water quality, by collecting samples from representative locations within the processing and distribution system.

These samples are analyzed at the well-equipped laboratories. At these laboratories, samples of raw water, filter water and treated water are taken for analysis, these analysis can be performed by human intervention which for specific period only. The disadvantage of this system is, water is not monitoring seamlessly, and it always needs a human intervention.

it has several drawbacks. Firstly, it is time consuming and labor intensive. Secondly, the cost for this technique is very high due to the operation cost, labor cost and equipment cost, and it is difficult to make critical decisions in the real time.

2.2 Referwnces

NatasaMarkovic et al. [1]: this research paper focuses on Sensor Web for River Water Pollution Monitoring and Alert SystemSensor 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.

K. A. UnnikrishnaMenon et al,[2]: 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.

B. Aswinkumar et al.[3]: This research paper focuses on Detection on water pollution and water management using smart sensors iotTo 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.

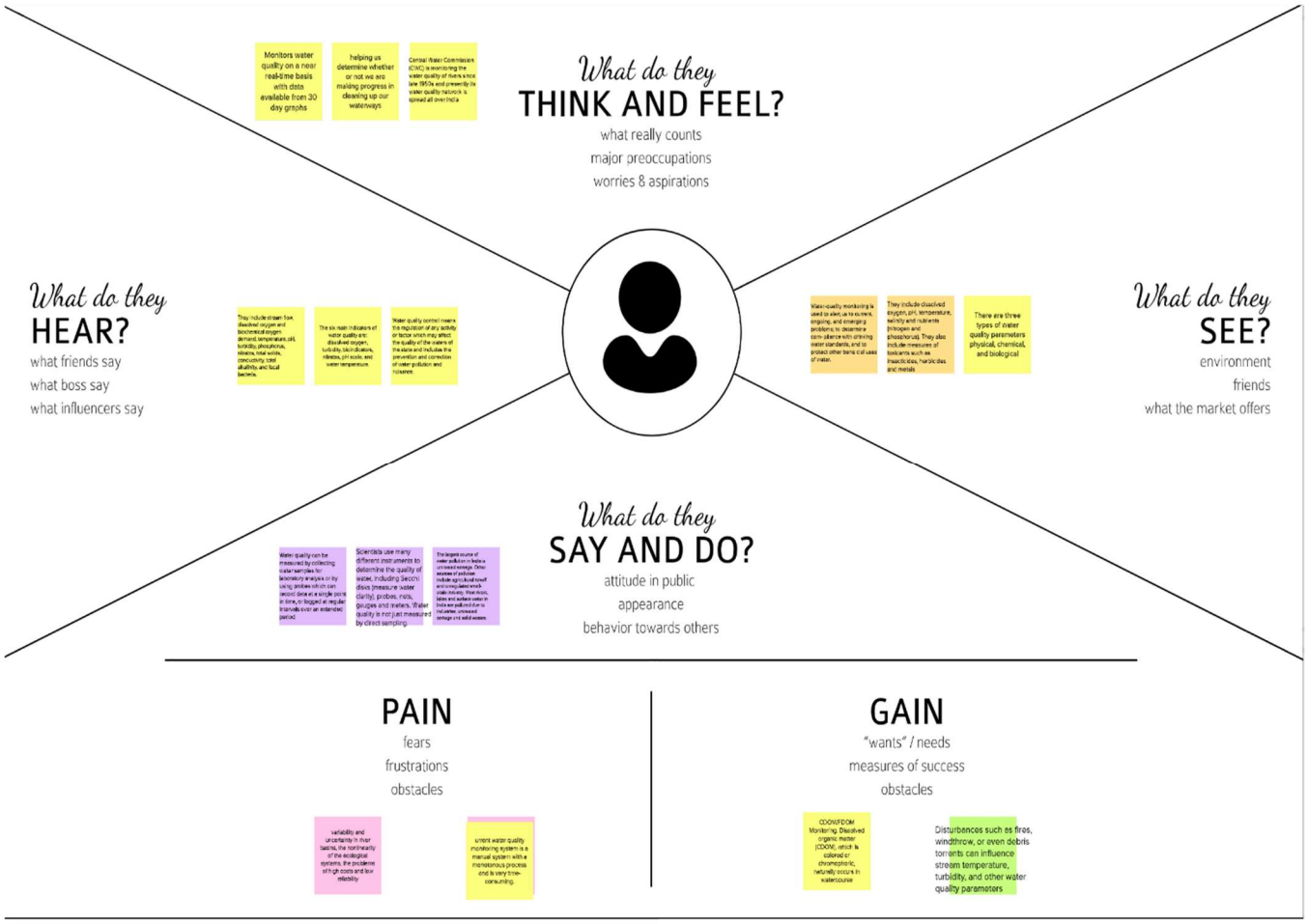
Maneesha V. Rameshet al,[4]: This research paper focuses on Wireless Sensor Network for River Water Quality Monitoring in India This paper introduces a river water quality monitoring system based on wireless sensor network which helps in continuous and remote monitoring of the water quality data in India. 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.

Leonid Stoimenovet al. [5]: this research paper focuses on Sensor Web for River Water Pollution Monitoring and Alert SystemSensor 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

2.3 Problem Statement Definition

3. IDEATIOIN AND PROPOSED SOLUTION

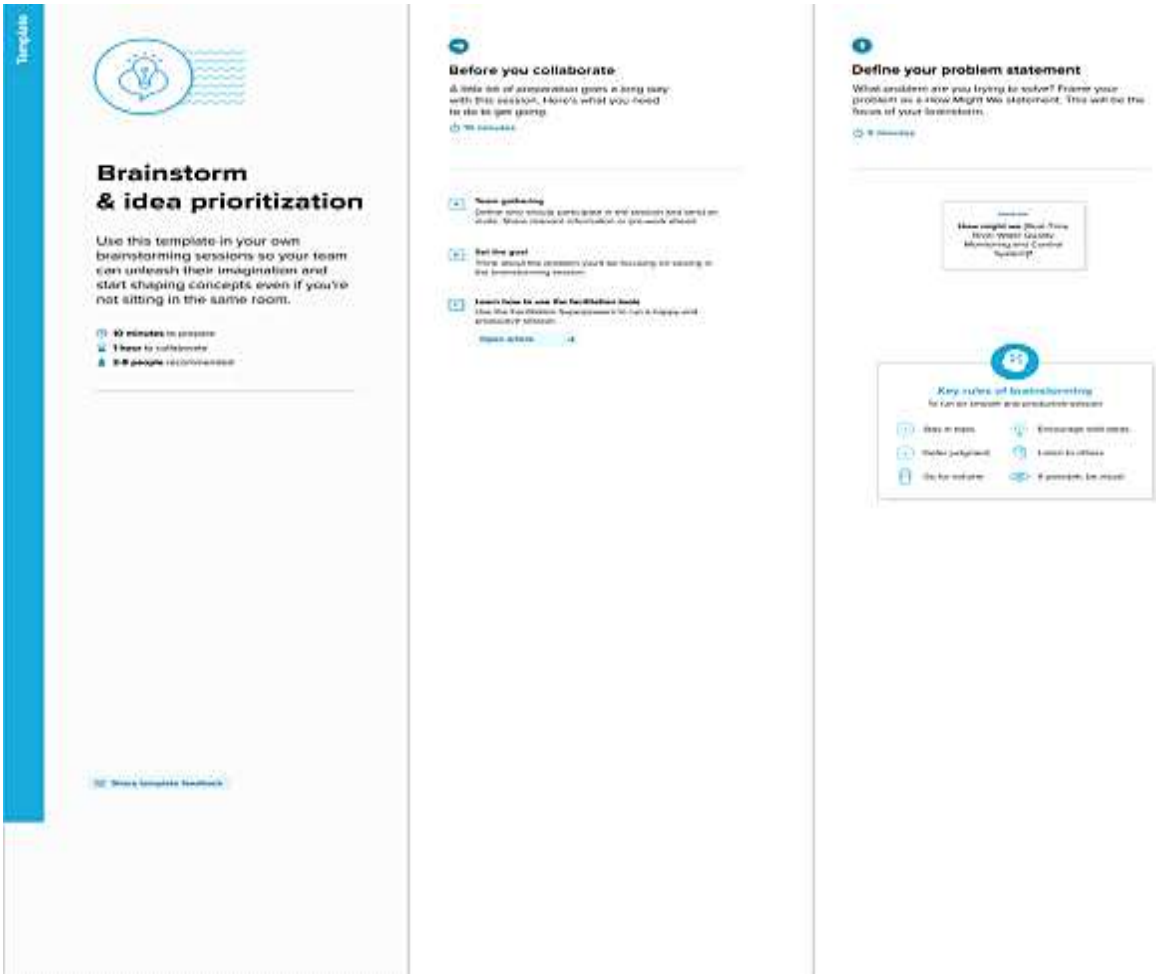
3.1 Empathy Map Canvas

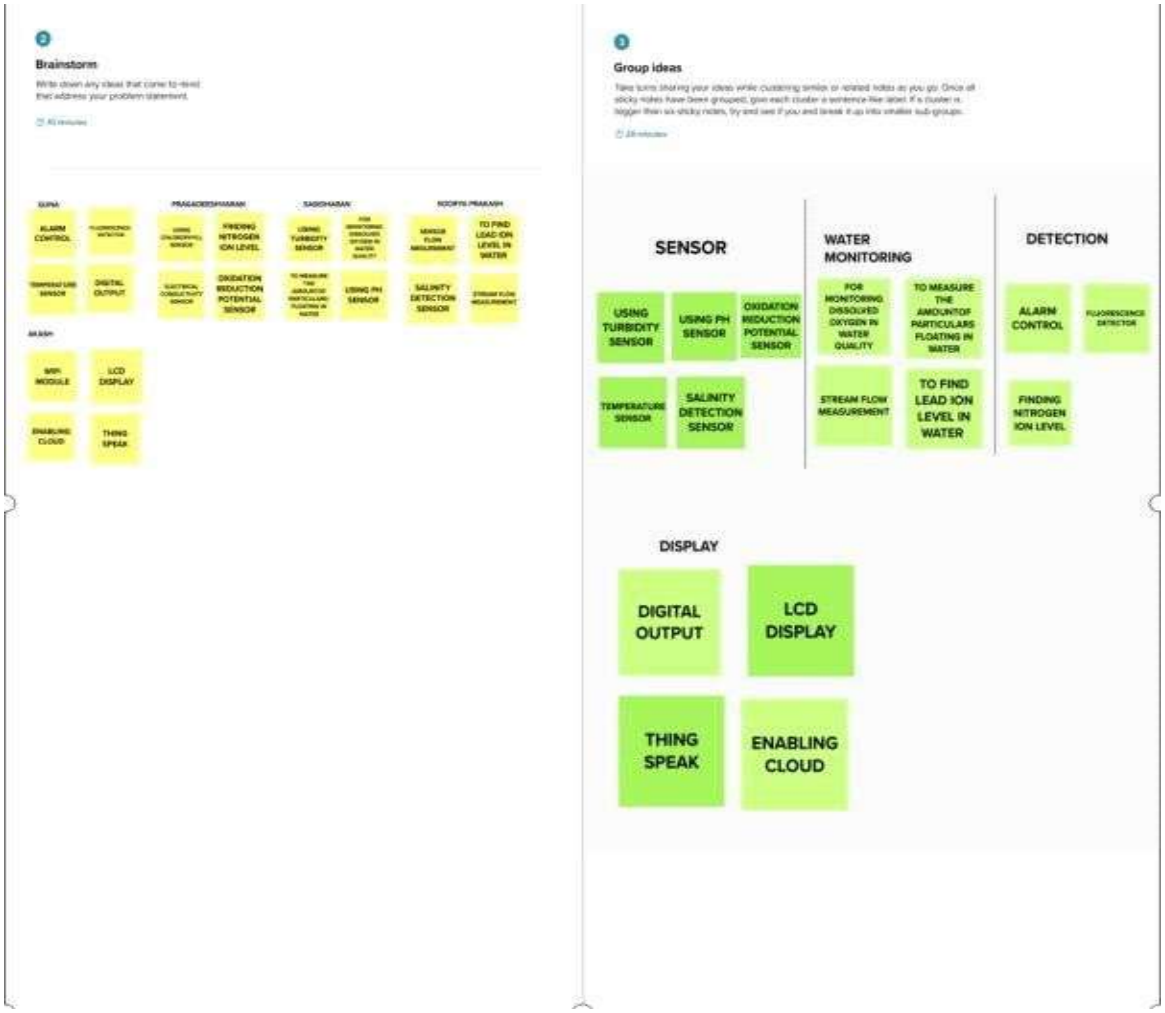


3.2 Ideation and Brainstroming

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.

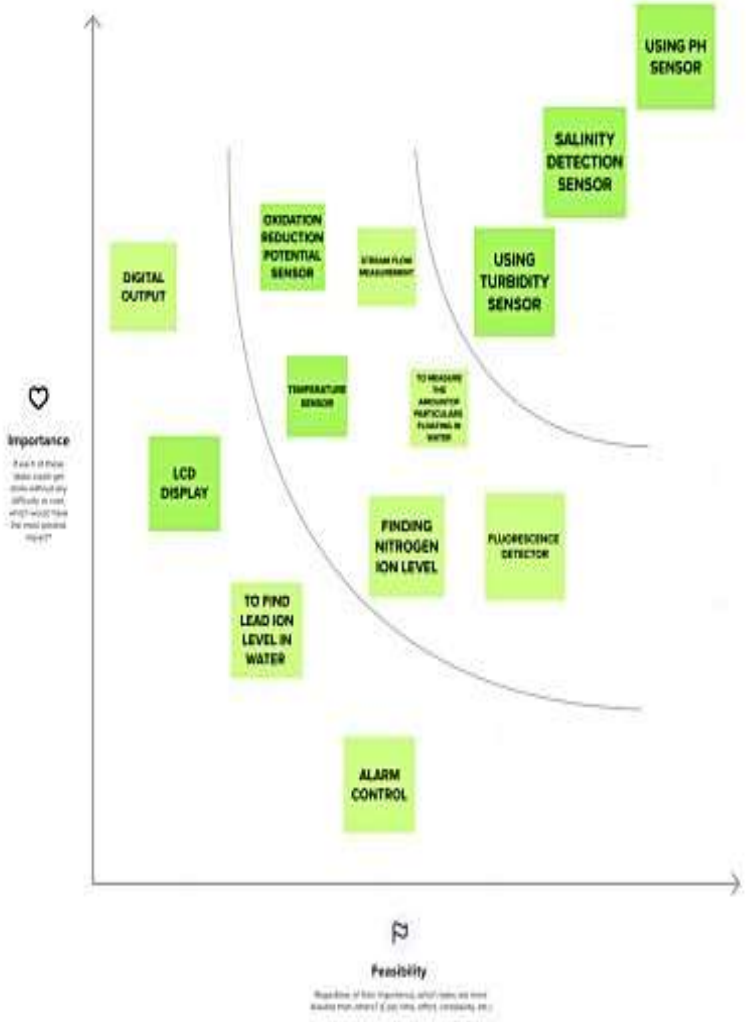



2
Brainstorm
Write down any ideas that come to mind that address your problem statement.
ALARM CONTROL
FINDING NITROGEN ION LEVEL
USING TURBIDITY SENSOR
TO FIND LEAD ION LEVEL IN WATER
DIGITAL OUTPUT
OXIDATION REDUCTION POTENTIAL SENSOR
USING PH SENSOR
SALINITY DETECTION SENSOR
LCD DISPLAY
THING SPEAK
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.
SENSOR
USING TURBIDITY SENSOR
USING PH SENSOR
OXIDATION REDUCTION POTENTIAL SENSOR
TEMPERATURE SENSOR
SALINITY DETECTION SENSOR
WATER MONITORING
FOR MONITORING DISSOLVED OXYGEN IN WATER QUALITY
TO MEASURE THE AMOUNTOF PARTICULARS FLOATING IN WATER
STREAM FLOW MEASUREMENT
TO FIND LEAD ION LEVEL IN WATER
DETECTION
ALARM CONTROL
FLUORESCENCE DETECTOR
FINDING NITROGEN ION LEVEL
DISPLAY
DIGITAL OUTPUT
LCD DISPLAY
THING SPEAK
ENABLING CLOUD

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

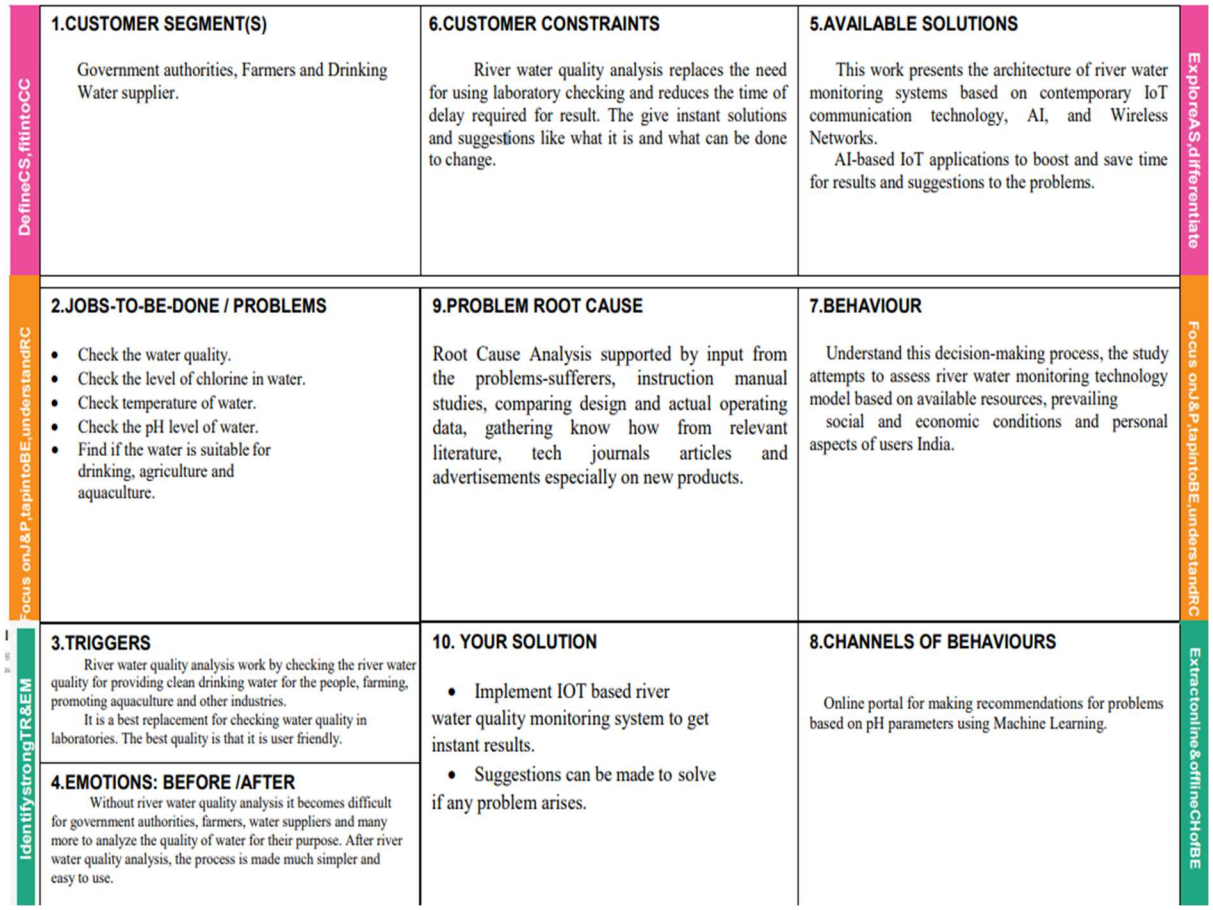
3.3 Proposed Solution:

Proposed Solution Template:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Most of the water is affected by the industrial wastes containing chemicals, medical wastes and by washing vehicles the engine oil is mix with the river water.
2.	Idea / Solution description	* To measure various chemical and physical properties of water like pH, temperature and particle density of water using sensors. * Dispose the industrial waste, toxic chemicals and medical waste properly.
3.	Novelty / Uniqueness	* If the acquired value is above the threshold value automated warning SMS will be sent to the agent. * 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.

3.4PROBLEM SOLUTION:



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 Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Ultrasonic generator	Periodically the waves are generated to destroy algae in the range of 25%,50%,100%
FR-4	Ph level detection	To observe the water quality, Ph sensoris used and the signals are conveyed to the Arduino.
FR-5	Turbidity detection	Turbidity sensor measures the purity of element or marshy utter in the waterand the signals are delivered to Arduino

4.1 Non-functional Requirements:

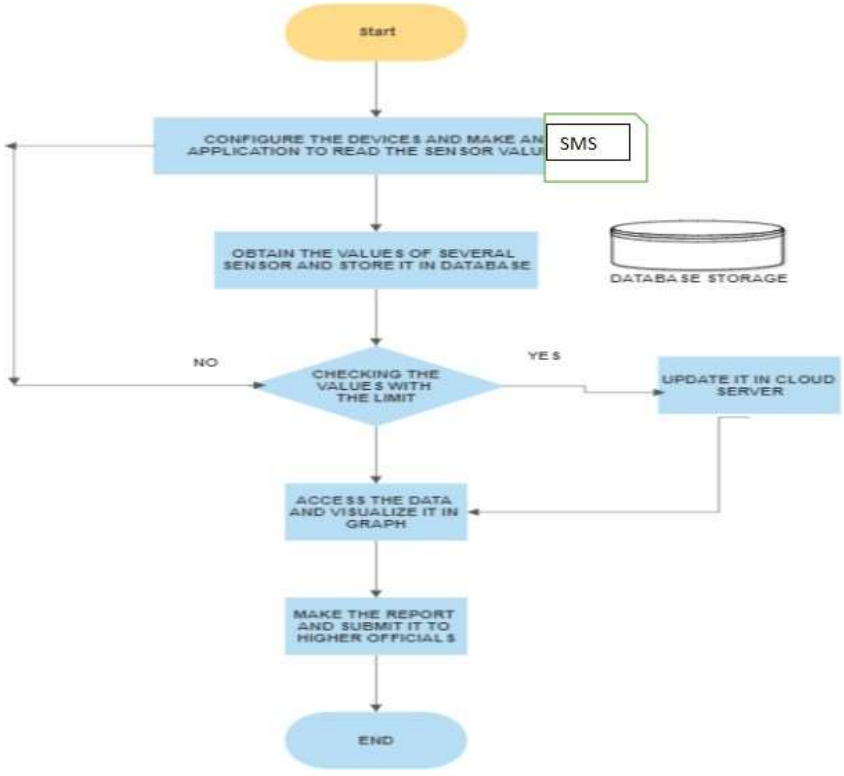
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Monitors the flow and quality of ground water, and investigates surface- and ground-water interactions.
NFR-2	**Security**	The data and information are secured in the application by using the application firewall.
NFR-3	**Reliability**	The Real time sensor output values with future predicted data storage with output efficiency of 98%. It also givescertainty for aquaculture safety.
NFR-4	**Performance**	The performance of system has higher efficiency and environmental friendly.
NFR-5	**Availability**	It is available in the form of mobile UI 24 x 7 monitoring system.
NFR-6	**Scalability**	The system has high scalability. Able to be changed in size or scale to givethe best output.
NFR-7	**Stability**	The ability of the system to bring itself back to its stable configuration. Thestability is high.
NFR-8	**Efficiency**	The monitoring system is highly efficient,high mobility with consumption of power.

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.



5.2SOLUTION 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 signalwill 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 Web 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:

1.	Air Quality Monitoring	Theclarityandpurity ofriver water can be monitored	Surface Mount Sensor
2.	Temperature Monitoring	The temperature of river water can be monitored	Temperature sensor
3.	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	PH level monitoring	The PH level odf river water can be monitoediva placing sensors in river	PH sensor

5.2 User Stories

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

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile 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
		USN-2	As a user, I will	I can receive	High	Sprint-1

			receive confirmation email once I have registered for the application	confirmation email & click confirm		
		USN-3	As a user, I can register for the application through Google	I can register & access the dashboard with Google Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through G mail	I can access through Gmail	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	Login Details are received to me.	High	Sprint-1
	Interface	USN-6	As a user, I can log into the application by entering email & password.	Easy Access application	High	Sprint-1
Customer (Web user)	Dashboard	WUSN-7	As a web User, I can get all information (data)(Temp etc..)	I can easily Understand how to use it.	High	Sprint-1
Customer Care Executive	View Perspective	CCE	As a Customer care, I can view the data in graph plots	Easy Understanding of Graphs	High	Sprint-1
Administrator	Risk factor	ADMIN-1	As a Admin, Update must be done at each step and take care of any errors	Heavy Monitoing is Required.	High	Sprint-2

PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING & SCHEDULING:

TITLE	DESCRIPTION	DATE
Literature Survey & Information Gathering	Literature survey on the selected project is done by gathering information about related details on	06 OCTOBER 2022

	technical papers and web browsing.	
Empathy Map	Prepared Empathy Map Canvas to combine thoughts and pains, gainsof the project with all team members .	08 OCTOBER 2022
Ideation	Brainstorming session is conducted with all team members to list out all the ideas and prioritise the top 3 ideas.	09 OCTOBER 2022
Proposed Solution	Prepared the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution, etc.	28 OCTOBER 2022
Problem Solution Fit	Prepared problem - solution fit document.	30 OCTOBER 2022

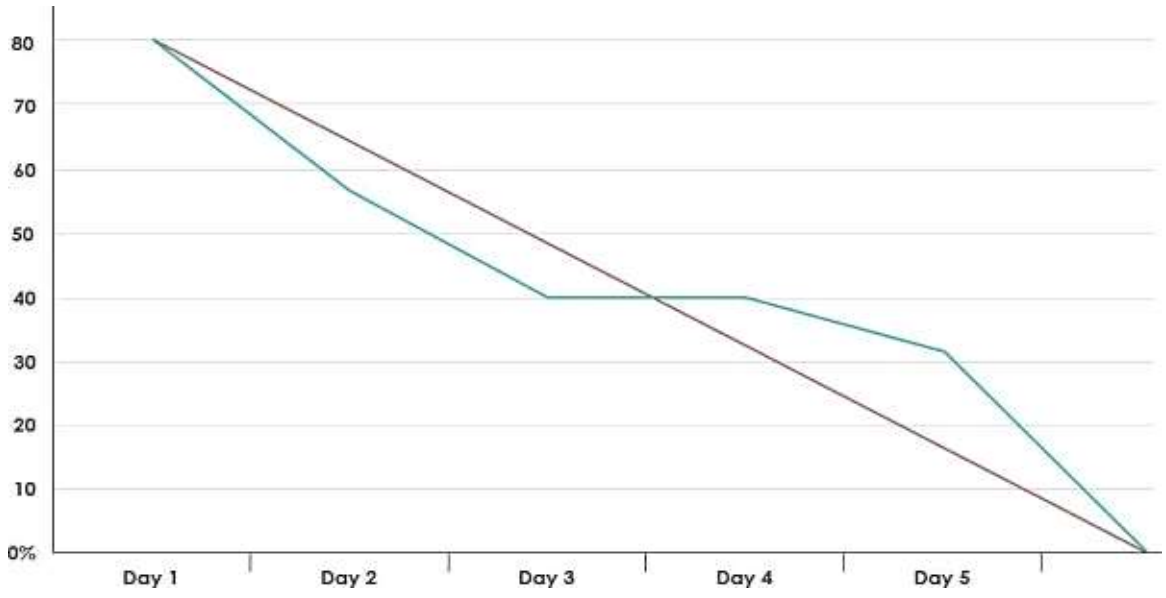
Project Tracker, Velocity & Burndown Charts

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (ason Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	27 Oct 2022
Sprint-2	20	6 Days	28 Oct 2022	04 Nov 2022	30	30 Oct 2022
Sprint-3	20	6 Days	03 Nov 2022	10 Nov 2022	49	04 Nov 2022
Sprint-4	20	6 Days	08 Nov 2022	15 Nov 2022	50	09 Nov 2022

Velocity:

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

Burndown Chart:

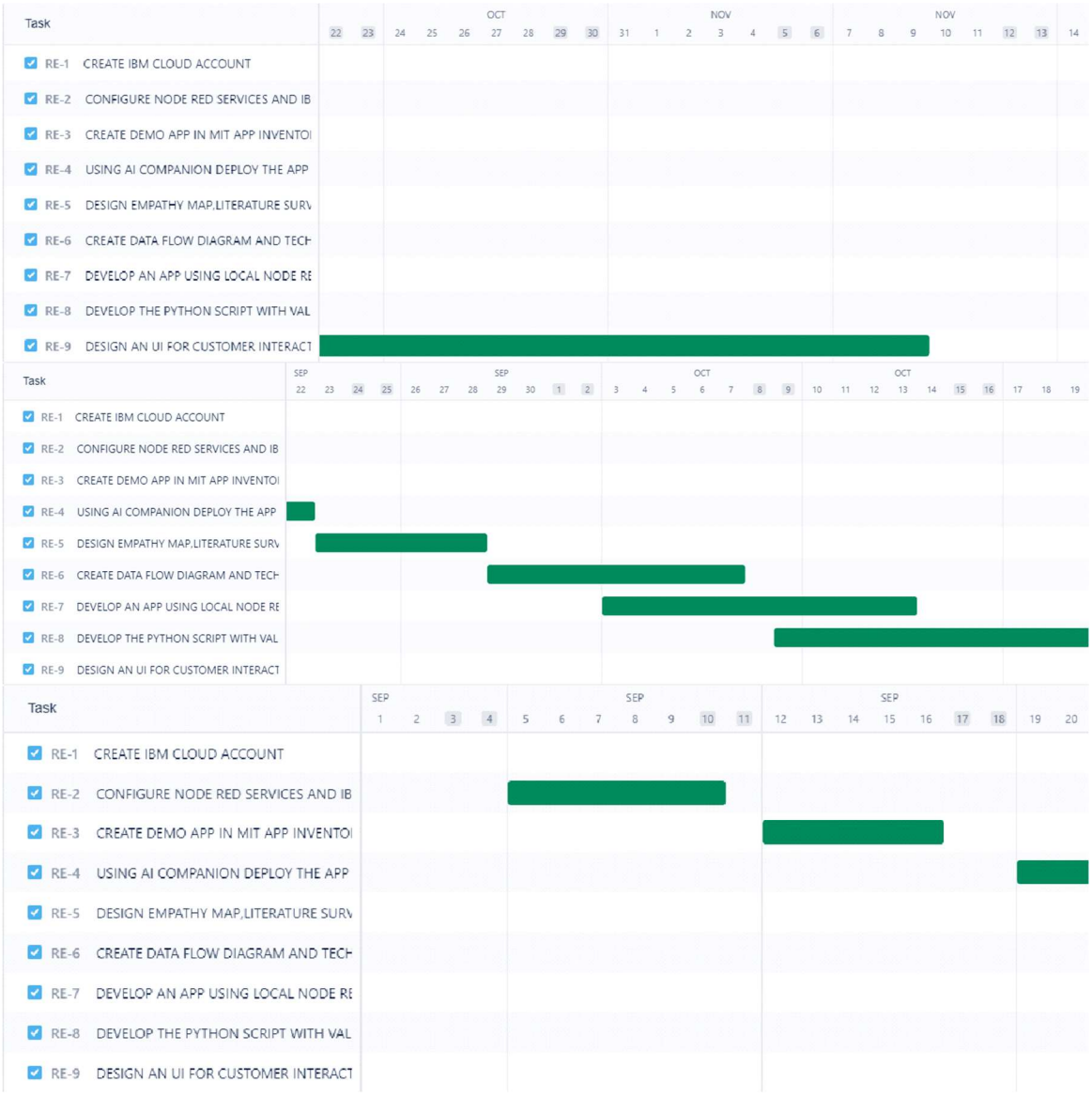


6.3 REPORT FROM JIRA

REFERENCE LINK (JIRA SOFTWARE):

https://ibmprojectrealtimemonitoring.atlassian.net/jira/core/projects/RE/board

TIMELINE CREATED USING JIRA SOFTWARE



https://ibmprojectrealtimemonitoring.atlassian.net/jira/core/projects/RE/list?filter=statusCategory+%3D+Done+AND+statusCategoryChangedDate+%3E%3D+-1w HYPERLINK "https://ibmprojectrealtimemonitoring.atlassian.net/jira/core/projects/RE/list?filter=statusCategor

y+%3D+Done+AND+statusCategoryChangedDate+%3E%3D+-1w&showDone=true&atlOrigin=eyJpIjoiMmVlZjFiNTA2ODIxNDg0MGFmOGZlMTA2Y2M0Y2VjN2IiLCJwIjoiaiJ9"& HYPERLINK "https://ibmprojectrealtimemonitoring.atlassian.net/jira/core/projects/RE/list?filter=statusCategory+%3D+Done+AND+statusCategoryChangedDate+%3E%3D+-1w&showDone=true&atlOrigin=eyJpIjoiMmVlZjFiNTA2ODIxNDg0MGFmOGZlMTA2Y2M0Y2VjN2IiLCJwIjoiaiJ9"showDone=true HYPERLINK "https://ibmprojectrealtimemonitoring.atlassian.net/jira/core/projects/RE/list?filter=statusCategory+%3D+Done+AND+statusCategoryChangedDate+%3E%3D+-1w&showDone=true&atlOrigin=eyJpIjoiMmVlZjFiNTA2ODIxNDg0MGFmOGZlMTA2Y2M0Y2VjN2IiLCJwIjoiaiJ9"& HYPERLINK "https://ibmprojectrealtimemonitoring.atlassian.net/jira/core/projects/RE/list?filter=statusCategory+%3D+Done+AND+statusCategoryChangedDate+%3E%3D+-1w&showDone=true&atlOrigin=eyJpIjoiMmVlZjFiNTA2ODIxNDg0MGFmOGZlMTA2Y2M0Y2VjN2IiLCJwIjoiaiJ9"atlOrigin=eyJpIjoiMmVlZjFiNTA2ODIxNDg0MGFmOGZlMTA2Y2M0Y2VjN2IiLCJwIjoiaiJ9

LISTS IN JIRA:

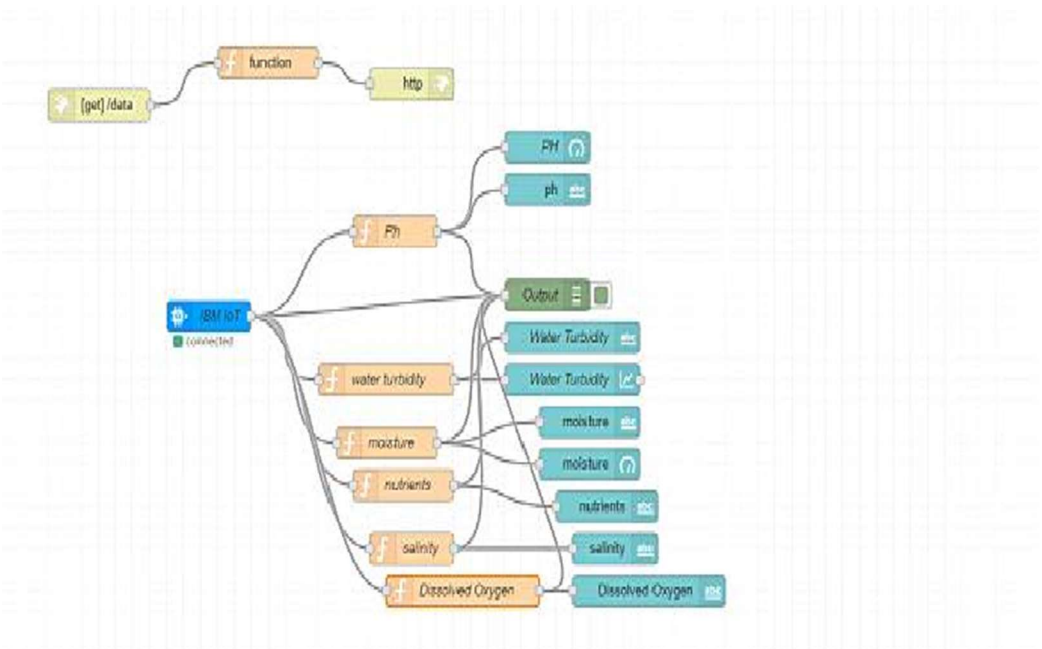
Key	Summary	Status	Category
RE-1	CREATE IBM CLOUD ACCOUNT	DONE	PREREQUISITE
RE-2	CONFIGURE NODE RED SERVICES AND IBM WATSON IOT PLA...	DONE	PREREQUISITE
RE-3	CREATE DEMO APP IN MIT APP INVENTOR 2.	DONE	MOBILE APPLICATION
RE-4	USING AI COMPANION DEPLOY THE APP IN MOBILE	DONE	DEPLOYMENT AND TESTING
RE-5	DESIGN EMPATHY MAP,LITERATURE SURVEY FOR OUR PROJE...	DONE	IDEATION PHASE
RE-6	CREATE DATA FLOW DIAGRAM AND TECHINICAL ARCHITECT...	DONE	PHASE 1
RE-7	DEVELOP AN APP USING LOCAL NODE RED AND DEPLOY IT T...	DONE	SPRINT DETAILS
RE-8	DEVELOP THE PYTHON SCRIPT WITH VALID DEVICE CREDEN...	DONE	SPRINT DETAILS
RE-9	DESIGN AN UI FOR CUSTOMER INTERACTING AND GET IT FO...	DONE	SPRINT DETAILS

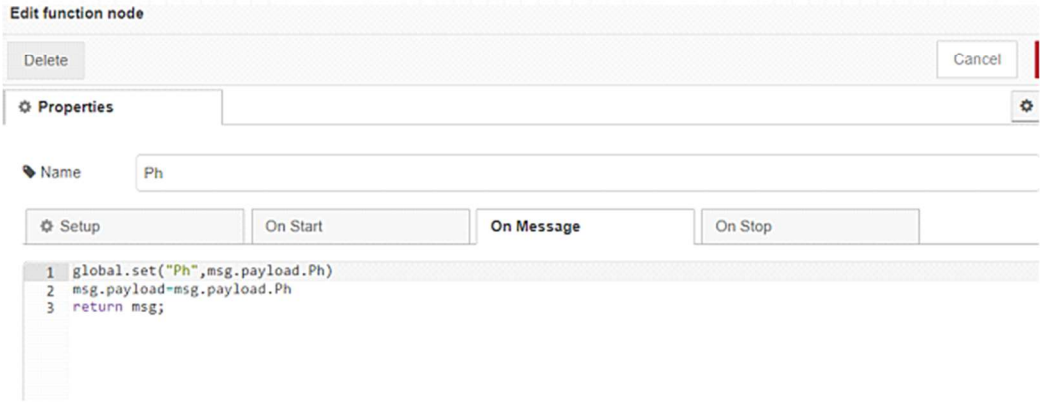
ISSUES :

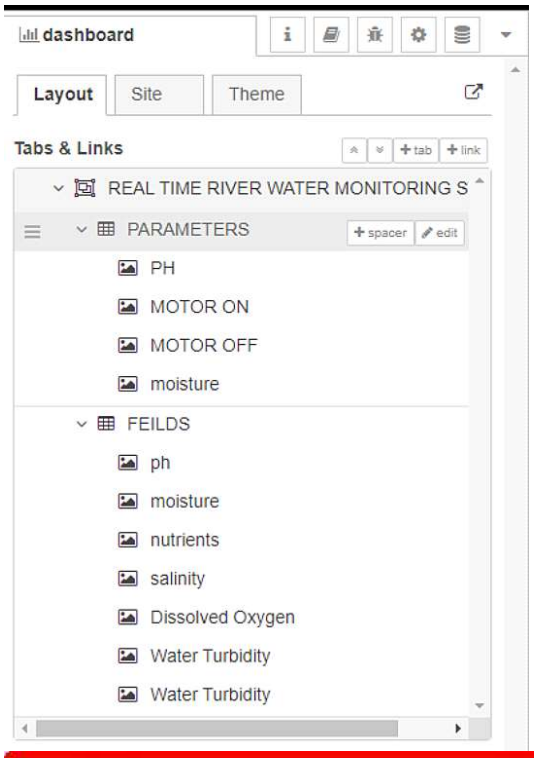
Name	Type	Related Schemes
ERROR IN MSG PAYLOAD EVENTS	Base	Default Issue Type Scheme
ISSUE IN CONFIGURING NODE RED DASHBOARD	Base	Default Issue Type Scheme
ERROR 1101 IN MIT APP INVENTOR	Subtask	Default Issue Type Scheme
URL NOT RESPONDED THE NODE RED DATA URL NOT RESPONDED	Subtask	Default Issue Type Scheme

CODING AND SOLUTIONING

7.1 NODE RED SERVICE ASSOCIATED WITH IBM CLOU






dashboard
Layout
Site
Theme
Tabs & Links
+tab
+link
REAL TIME RIVER WATER MONITORING S
PARAMETERS
+spacer
edit
PH
MOTOR ON
MOTOR OFF
moisture
FEILDS
ph
moisture
nutrients
salinity
Dissolved Oxygen
Water Turbidity
Water Turbidity


REAL TIME RIVER WATER MONITORING SYSTEM
PARAMETERS
FEILDS
Ph
8
ph
8
Water Turbidity
86
moisture
68
nutrients
46
MOTOR ON
salinity
35
MOTOR OFF
Dissolved Oxygen
32
moisture
68
Water Turbidity
100
85
63.75
42.5
21.25
15
15.33.00
15.38.00
15.43.00
15.49.00

7.TESTING

6.1 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

6.2 USER ACCEPTANCE TESTING:

- **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).

- ## Defect Analysis

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

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	9	5	4	3	21
Duplicate	2	0	2	0	4
External	3	4	1	2	10
Fixed	10	1	5	17	33
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	2	3
Won't Fix	0	3	3	1	7
Totals	24	13	17	25	79

8.RESULT

6.3 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 TABL

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

7. 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.
- The method is prone to human errors of various forms.

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.

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 forfarming 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

```
#program to publish data in ibm watson iot platform
import time
import sys
import ibmiotf.application
import ibmiotf.device
import random
#Provide your IBM Watson Device Credentials

#Org_ID
organization = "84708c"
#Device Type
deviceType = "abcd"
#device ID
```

```
deviceId = "12345"
#Method of Authentication
authMethod = "token"
#Auth-token
authToken = "12345678"


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


#to handle the errors
except Exception as e:
    print ("Caught evention connecting device: %s" % str(e))
    sys.exit()
#device connection
deviceCli.connect()
#while Loop for getting the values
while True:
  Ph=random.randint (6,8)
```

```
    WaterTurbidity=random.randint (15,100)
    salinity=random.randint (500,1000)
    DissolvedOxygen=random.randint (60,130)
    conductivity=random.randint (100,1200)
    data = {'Ph' : Ph,
'WaterTurbidity':WaterTurbidity,'salinity':salinity,'DissolvedOxygen':Di
ssolvedOxygen,'conductivity':conductivity}
    #define myonpublishcallback function
    def myonPublishCallback():
        print ("Published Ph = %s" % Ph, "WaterTurbidity = %s %%" %
WaterTurbidity,"salinity = %s" % salinity,"DissolvedO2 = %s" %
DissolvedOxygen,"conductivity = %s" % conductivity)
        if(Ph<7.4 and salinity < 600 and DissolvedOxygen < 80 and
conductivity < 200):
            if(Ph>7.4 and salinity > 900 and DissolvedOxygen > 120 and
conductivity > 1100):
                print("UNSAFE, THE VALUES OF PARAMETERS ARE
NOT IN THE RANGE")
        else:
            print("Quality of River water is measured and its correct")

    success = deviceCli.publishEvent("IoTSensor", "json", data, qos=0,
on_publish = myonPublishCallback)
```

```
    if not success:
        print("Not connected to IOTF")
    #sleep time
    time.sleep(10)
#disconnect device
deviceCli.disconnect()
```

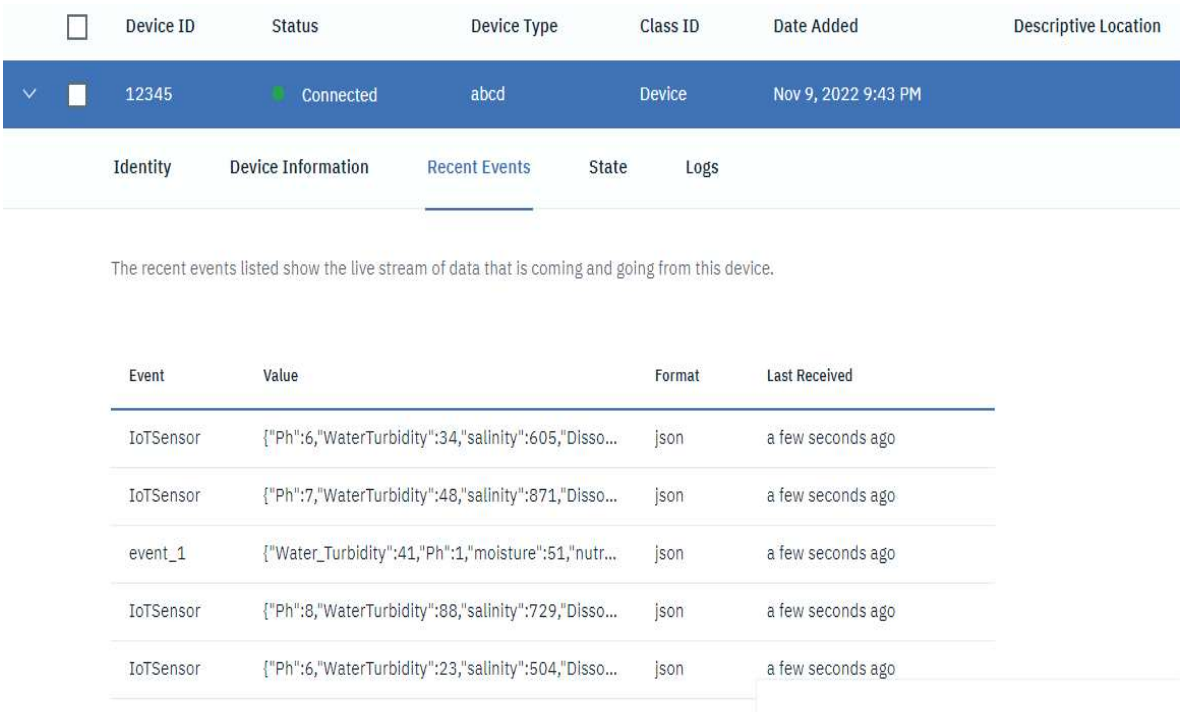
OUTPUT

```
Type "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: E:\IBM PROJECTS\ibmpublish.py ==========
2022-11-17 20:42:47,069   ibmiotf.device.Client      INFO    Connected successfully: d:84708c:abcd:12345
Published Ph = 8 WaterTurbidity = 54 % salinity = 862 DissolvedO2 = 81 conductivity = 175
Quality of River water is measured and its correct
```

Python 3.7.0 Shell

File Edit Shell Debug Options Window Help

```
Quality of River water is measured and its correct
Published Ph = 6 WaterTurbidity = 80 % salinity = 652 DissolvedO2 = 123 conductivity = 306
Quality of River water is measured and its correct
Published Ph = 8 WaterTurbidity = 57 % salinity = 579 DissolvedO2 = 121 conductivity = 459
Quality of River water is measured and its correct
Published Ph = 7 WaterTurbidity = 85 % salinity = 703 DissolvedO2 = 106 conductivity = 165
Quality of River water is measured and its correct
Published Ph = 8 WaterTurbidity = 61 % salinity = 872 DissolvedO2 = 124 conductivity = 892
Quality of River water is measured and its correct
Published Ph = 6 WaterTurbidity = 75 % salinity = 934 DissolvedO2 = 119 conductivity = 351
Quality of River water is measured and its correct
Published Ph = 7 WaterTurbidity = 65 % salinity = 732 DissolvedO2 = 102 conductivity = 1104
Quality of River water is measured and its correct
Published Ph = 7 WaterTurbidity = 97 % salinity = 791 DissolvedO2 = 75 conductivity = 887
Quality of River water is measured and its correct
Published Ph = 8 WaterTurbidity = 47 % salinity = 992 DissolvedO2 = 111 conductivity = 770
Quality of River water is measured and its correct
Published Ph = 8 WaterTurbidity = 23 % salinity = 570 DissolvedO2 = 73 conductivity = 135
Quality of River water is measured and its correct
Published Ph = 6 WaterTurbidity = 76 % salinity = 516 DissolvedO2 = 88 conductivity = 226
Quality of River water is measured and its correct
Published Ph = 8 WaterTurbidity = 23 % salinity = 754 DissolvedO2 = 127 conductivity = 1101
Quality of River water is measured and its correct
```

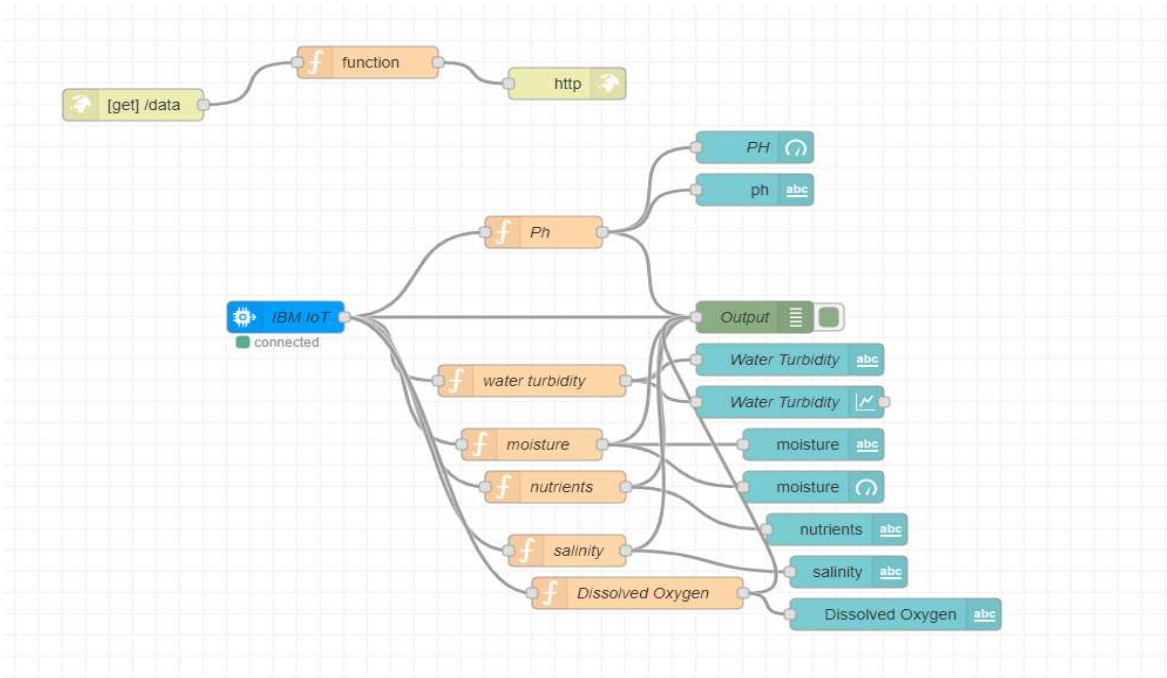


Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
12345	Connected	abcd	Device	Nov 9, 2022 9:43 PM	

Identity | Device Information | Recent Events | State | Logs

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
IoTSensor	{"Ph":6,"WaterTurbidity":34,"salinity":605,"Disso...	json	a few seconds ago
IoTSensor	{"Ph":7,"WaterTurbidity":48,"salinity":871,"Disso...	json	a few seconds ago
event_1	{"Water_Turbidity":41,"Ph":1,"moisture":51,"nutr...	json	a few seconds ago
IoTSensor	{"Ph":8,"WaterTurbidity":88,"salinity":729,"Disso...	json	a few seconds ago
IoTSensor	{"Ph":6,"WaterTurbidity":23,"salinity":504,"Disso...	json	a few seconds ago



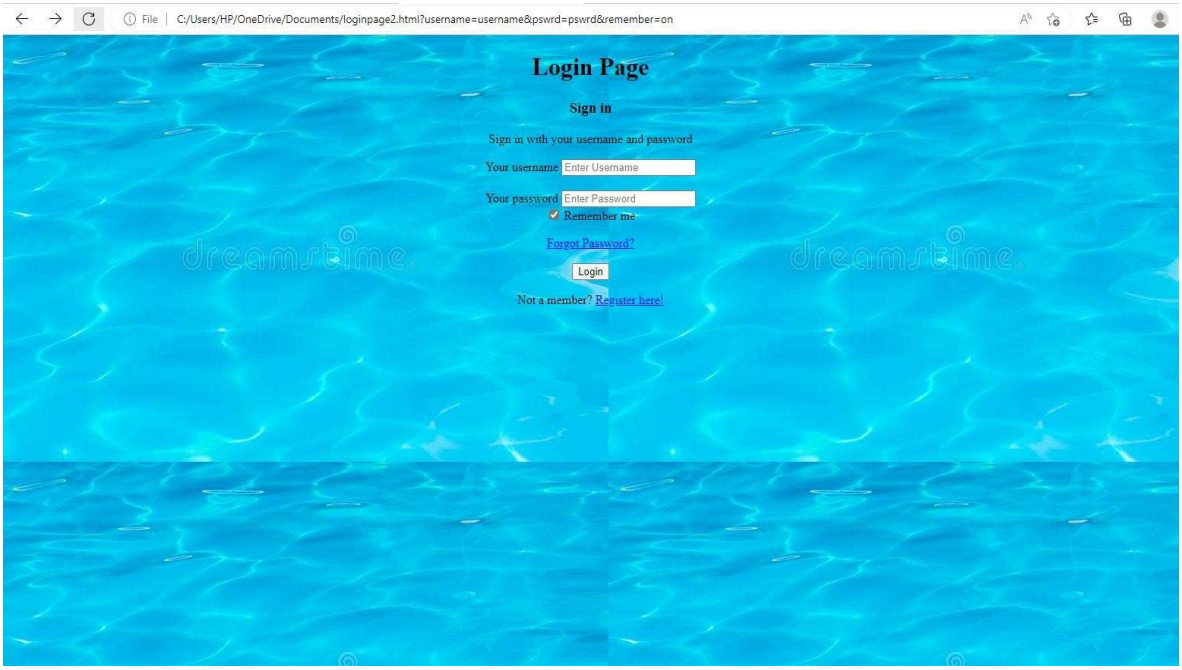
HTML CODE:

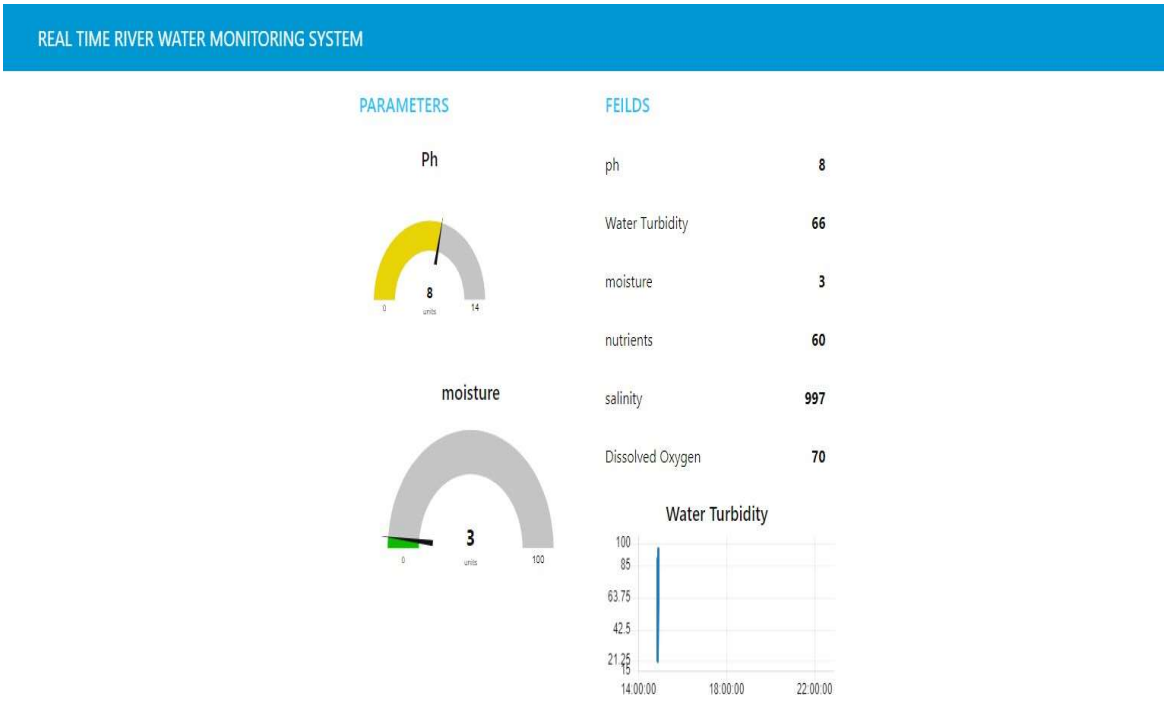
```
<!DOCTYPE html>
<html lang="en">
<head>
  <style>
```

```
    h1 {text-align: center;}
    p {text-align: center;}
    div {text-align: center;}
    body {
        background-image: url("https://thumbs.dreamstime.com/b/clear-transparent-light-blue-water-pool-texture-background-150961732.jpg");
        background-color: #cccccc;
    }
    </style>
    <meta charset="UTF-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Login page in HTML</title>
</head>
<body>

    <h1>Login Page</h1>
    <form action="">
        <!-- Headings for the form -->
        <div class="headingsContainer">
            <h3>Sign in</h3>
            <p>Sign in with your username and password</p>
        </div>

        <!-- Main container for all inputs -->
        <div class="mainContainer">
            <!-- Username -->
            <label for="username">Your username</label>
            <input type="text" placeholder="Enter Username" name="username" required>
```

```
        <br><br>

        <!-- Password -->
        <label for="pswrd">Your password</label>
        <input type="password" placeholder="Enter Password" name="pswrd" required>

        <!-- sub container for the checkbox and forgot password link -->
        <div class="subcontainer">
            <label>
              <input type="checkbox" checked="checked" name="remember"> Remember me
            </label>
            <p class="forgotpsd"> <a href="#">Forgot Password?</a></p>
        </div>
        <button type="submit" onclick="window.location.href = 'https://node-red-qltdp-2022-11-07.eu-gb.mybluemix.net/ui';" HYPERLINK "https://node-red-qltdp-2022-11-07.eu-gb.mybluemix.net/ui';%22%3ELogin%3C/button"> HYPERLINK "https://node-red-qltdp-2022-11-07.eu-gb.mybluemix.net/ui';%22%3ELogin%3C/button"Login HYPERLINK "https://node-red-qltdp-2022-11-07.eu-gb.mybluemix.net/ui';%22%3ELogin%3C/button"< HYPERLINK "https://node-red-qltdp-2022-11-07.eu-gb.mybluemix.net/ui';%22%3ELogin%3C/button"/button>

        <!-- Sign up link -->
        <p class="register">Not a member?  <a href="#">Register here!</a></p>

    </div>
  </p>

 </form>
</body>
```

</html>


File | C:/Users/HP/OneDrive/Documents/loginpage2.html?username=username&pswrd=pswrd&remember=on
Login Page
Sign in
Sign in with your username and password
Your username Enter Username
Your password Enter Password
Remember me
Forgot Password?
Login
Not a member? Register here!


REAL TIME RIVER WATER MONITORING SYSTEM
PARAMETERS
FEILDS
Ph
8
units
0
14
moisture
3
units
0
100
ph 8
Water Turbidity 66
moisture 3
nutrients 60
salinity 997
Dissolved Oxygen 70
Water Turbidity
100
85
63.75
42.5
21.25
15
14:00:00
18:00:00
22:00:00

MOBILE APP

13.2 GIT-HUB LINK:

https://github.com/IBM-EPBL/IBM-Project-10333-1659167593