

**REAL - TIME RIVER WATER QUALITY MONITORING
AND CONTROL SYSTEM**

PROJECT REPORT

Submitted By

NIRSITHA R

737819ITR055

NISHANTHINI N

737819ITR056

HAREN PRABU M

737819ITL110

MITHILA S K

737819ITR047

TEAM ID: PNT2022TMID04782

**BACHELOR OF TECHNOLOGY
IN
INFORMATION TECHNOLOGY
DEPARTMENT OF INFORMATION TECHNOLOGY**



KONGU ENGINEERING COLLEGE

(Autonomous)

PERUNDURAI, ERODE-638 060

INTRODUCTION

PROJECT OVERVIEW

Using the Watson IoT platform to connect IoT devices and exchange sensor data, followed by developing a web application that allows users to communicate with devices to the IBM IoT platform, arbitrary pH and turbidity values will be provided.

Viewing sensor values in the web application is possible which will notify the administrator when random values exceed a certain threshold

PURPOSE

The web application allows for the monitoring of river water quality, it has the ability to detect the presence of dust particles in the water and finally making the authorities aware of poor water quality so they can go and warn the community not to consume the water.

LITERATURE SURVEY

EXISTING PROBLEM

Lack of quality in river water and inefficient monitoring methodologies and control system

REFERENCES

Water quality monitoring system based on Internet of Things Author: Chengcheng Zhang, Jian Wu, Jiancheng Liu Publication: IEEE 2020 Chengcheng et al presents a solution that integrates the design of STM32 single- chip microcomputer, sensors, WiFi wireless transmission and remote water quality management system. It monitors water quality turbidity, pH value, temperature and uploads the data to the management center through wireless communication.

- IoT Based Real-time River Water Quality Monitoring System Author: Mohammad Salah Uddin Chowdurya, Talha Bin Emran b, Subhasish Ghosha , Abhijit Pathak a, Mohd. Manjur Alama, Nurul Absar a, Karl Andersson c, Mohammad ShahadatHossain d Publication: Science Direct 2019 Mohammad et al proposed a manual method for sensorbased water quality monitoring system with high frequency, high mobility, and low power. Here the data collected at the site can be displayed in a visual format on a server PC with the help of Spark streaming analysis through Spark MLlib, Deep learning neural network models, Belief Rule Based (BRB) system and is also compared with standard value.

- Efficient Cloud Based Real Time Water Quality Monitoring System Using Internet Of Things Author: M.Usha Rani, Dr.R.Alageswaran, Sathish Kumar A Publication: JASC:

Journal of Applied Science and Computations(2018) M.Usha Rani et al proposes water sampling system with required sensor. Whenever the water level in the lakes or ponds reaches the lower/upper level it is identified and notification is sent to the administrator. It can also predict overflow and water scarcity in future from the past results. The parameters like PH, calcium, sulphate and nitrate ions that is present in the water is also identified.

- Water Quality Monitoring System Using IOT Author: Dr. Nageswara Rao Moparthy, Ch. Mukesh, Dr. P. Vidya Sagar Publication: IEEE 2018 Dr. Nageswara Rao Moparthy et al implements Water Quality Monitoring System for municipal water tanks and drinking water reservoirs using an Arduino board and GSM module. This module can be easily implemented when a wireless oxygen sensor is used.

- Real-Time Water Quality Monitoring System Author: Jyotirmaya Ijaradar1, Subhasish-Chatterjee Publication:International Research Journal of Engineering and Technology (IRJET) (2018) Jyotirmaya et al proposed real-time water quality monitoring system for water health at residential places. It measure various chemical and physical properties of water like pH, temperature and particle density of water using sensors and send the data to cloud and trigger an alarm when discrepancies are found in water quality

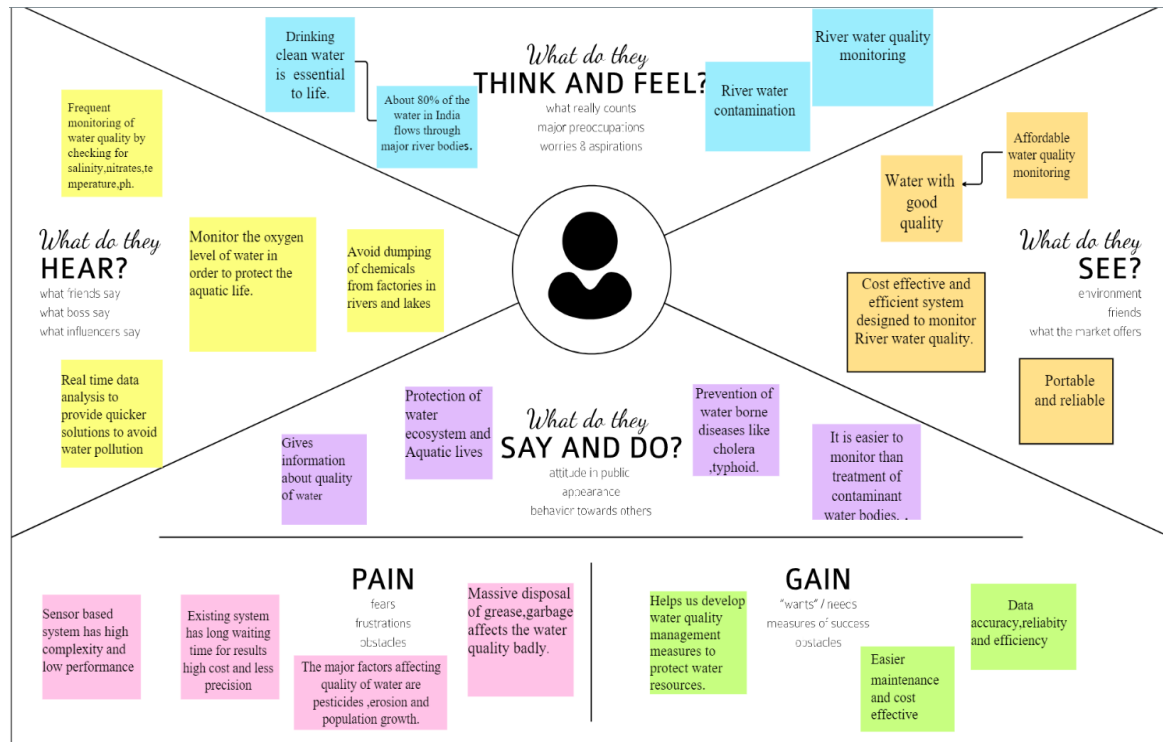
PROBLEM STATEMENT DEFINITION

Statement: Real-Time River Water Quality Monitoring and Control System

Water quality maintenance requires regular monitoring. Consequently, a water monitoring system based on pH and temperature was suggested. Wi-Fi-enabled devices allowed for the use of the Internet of Things (IoT) in the system, allowing for real-time monitoring. Temperature,pH, and turbidity data can therefore be transferred on a regular basis to the cloud and shown on a particular website.

IDEATION AND PROPOSED SOLUTION

EMPATHY MAP CANVAS



IDEATION AND BRAINSTORMING

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!



PROPOSED SOLUTION:

Monitoring the quality in river water and controlling the quality of the water system using IOT integrated with Cloud platform configured with flow based development tool - Nodered

PROBLEM SOLUTION FIT:

DefineCS, fit into CC	1.CUSTOMER SEGMENT(S) Farmers, Government authorities and Drinking Water supplier	6.CUSTOMER CONSTRAINTS River water quality analysis replaces the need for using laboratory checking and reduces the time of delay required for result. The give instant solutions and suggestions like what it is and what can be done to change.	5.AVAILABLE SOLUTIONS This work presents the architecture of river water monitoring systems based on contemporary IoT communication technology, AI, and Wireless Networks. AI-based IoT applications to boost and save time for results and suggestions to the problems.	ExploreAS, differentiate
	2.JOBS-TO-BE-DONE / PROBLEMS <ul style="list-style-type: none"> Check the water quality Check the level of chlorine in water. Check type of water Find if the water is suitable for aquaculture 	9.PROBLEM ROOT CAUSE Root Cause Analysis supported by input from the problems-sufferers, instruction manual studies, comparing design and actual operating data, gathering know how from relevant literature, tech journals articles and advertisements especially on new products.	7.BEHAVIOUR Understand this decision-making process, the study attempts to assess river water monitoring technology model based on available resources, prevailing social and economic conditions and personal aspects of users India.	
Focus on IAP, IAP into BE, understand RC	3.TRIGGERS River water quality analysis work by providing essential nutrients for the development of farming and other industries. It is a best replacement for checking water quality in laboratories. The best quality is that it is user friendly.	10. YOUR SOLUTION <ul style="list-style-type: none"> Implement IOT based river quality monitoring system to get instant results. Suggestions can be made to solve if any problem arises. 	8.CHANNELS of BEHAVIOURS Online portal for making recommendations for problems based on PH parameters using Machine Learning.	Focus on IAP, IAP into BE, understand RC
	4.EMOTIONS: BEFORE /AFTER Without river water quality analysis it was difficult for farmers, industrialists and many more to analyze the quality of water for their purpose. After river water quality analysis, the process is made much simpler and easy to use.			
Identify strong TR & EM				Extract online & offline CH & BE

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 Login	Confirmation through verified password
FR-2	View Water Details	View current water details in website View traditional water eligibility in website
FR-3	Logout	Logs out the user successfully

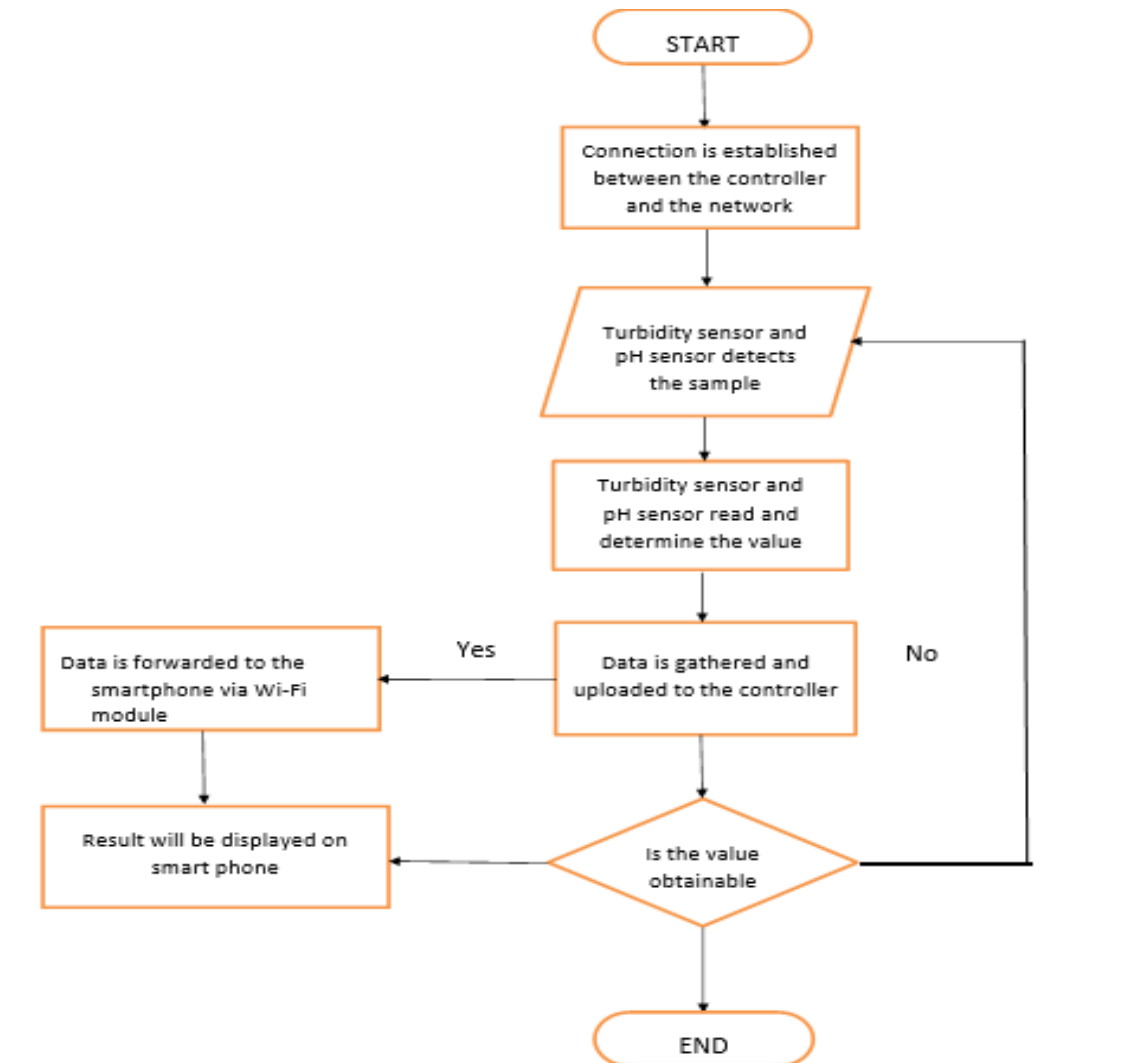
NON-FUNCTIONAL REQUIREMENTS :

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

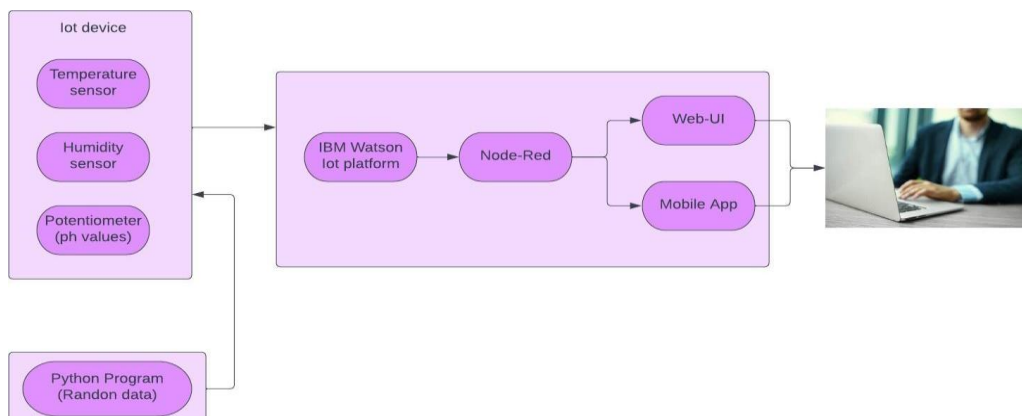
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Load time for user interface screens shall not be more than 2 seconds.
NFR-2	Security	User account is password protected Account creation done only after email verification
NFR-3	Reliability	Users can access their account 98% of the time without failure
NFR-4	Performance	Load time for user interface screens shall not be more than 2 seconds. Login info verified within 10 seconds.
NFR-5	Availability	Maximum down time will be about 4 hours
NFR-6	Scalability	System can handle about 1000 users at any given time

PROJECT DESIGN

DATA FLOW DIAGRAM:



TECHNOLOGY ARCHITECTURE



Components & Technologies:

S. No	Components	Description	Technology
1.	Turbidity sensor	Turbidity probe works by sending a light beam into the water to be tested.	TI CC3200 Launch
2.	pH sensor	pH sensor helps to measure the acidity or alkalinity of the water.	Smart phone
3.	Conductivity sensor	Used in water quality application to measure how well a solution conducts an electrical current.	WI-FI module

USER STORIES

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 email, password, and confirming my password.	I can access my account/dashboard	High	Sprint-1
		USN-2	As a user, I will receive a confirmation email once I have registered for the application	I can receive e confirmation email & click confirm	High	Sprint-2
		USN-3	As a user, I can register for the application through Google	I can register & access the dashboard with Google	High	Sprint-1
		USN-4	As a user, I can register for the application through Gmail	I can register through the mail.	Medium	Sprint-2
	Login	USN-5	As a user, I can log into the application by entering email, password & captcha	I can receive login credentials.	High	Sprint-1
	Interface	USN-6	As a user, the interface should be user-friendly manner	I can able to access easily.	Medium	Sprint-1
Customer (Web user)	dashboard	WUSN-1	As a web user, I can access the specific info (ph value, temp, humidity, quality).	I can able to know the quality of the water.	High	Sprint-1
Customer Care Executive (input)	View manner	CCE-1	As a customer care, I can view data in visual representation manner(graph)	I can easily understand by visuals.	High	Sprint-1
	Taste	CCE-2	As a customer care , I can able to view the quality(salty) of the water	I can easily know whether it is salty or not	High	Sprint-1
	Color visibility	CCE-3	As a customer care , I can able predict the water color	I can easily know the condition by color	High	Sprint-1
Administrator	Risk tolerant	ADMIN-1	An administrator who is handling the system should update and take care of the application.	Admin should monitor the records properly.	High	Sprint-2

PROJECT PLANNING AND SCHEDULING

SPRINT PLANNING AND ESTIMATION:



*** We have faced difficulties in creating instances in the Node red app. We have updated that to our mentor . They informed the IBM team . But we didn't get any clarification regarding that till date . So we couldn't proceed our project further to the code implementing part . Once the issue gets resolved we will do our level best to complete the project***

We have attached our issue screenshot . Kindly rectify our issue.

The screenshot shows the IBM Cloud console interface for creating a new instance. The top navigation bar includes the IBM Cloud logo, a search bar, and user account information. The main configuration area includes a 'New' button and a 'Number of instances' dropdown set to 1. A 'Memory allocation per instance' slider is set to 256 MB. The 'Region' is set to London. The 'Organization' and 'Space' dropdowns are both highlighted with red boxes and error messages: 'The value is required.' The 'Host' field is also highlighted with a red box and an error message, with the text 'Validating host name...' below it. The 'Domain' is set to eu-gb.mybluemix.net. At the bottom, there are 'Cancel' and 'Next' buttons.

IBM Cloud Search resources and products... Catalog Manage MITHILA S K's Account

***** New +

Number of instances
1

Memory allocation per instance
64 MB 2000 MB 256

Region Organization Space
London Organization Space
The value is required. The value is required.

Host Domain
node-red-ndyxj-2022-11-11 eu-gb.mybluemix.net
Validating host name...

Cancel Next