REAL TIME WATER QUALITY MONITORING SYSTEM

IBM NALIYA THIRAN

PROJECT REPORT

Submitted By

GAJAPATI.V.E.S

ROSHINI.S

SURYA.S

WASIMUDEEN.A

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

KNOWLEDGE INSTITUTE OF TECHNOLOGY,

SALEM-637504

ANNA UNIVERSITY : CHENNAI 600 025

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BONAFIDE CERTIFICATE

Certified that this project report titled **"REAL TIME WATER QUALITY MONITORING SYSTEM"** is the bonafide work of **"GAJAPATI.VE.S (611219104019), WASIMUDEEN.A (611219104309) SURYA.S (611219104702), ROSHINI (611219104701)"** who carried out the project work under my supervision.

SIGNATURE

Dr. V. KUMAR M.E., Ph.D.,

HEAD OF THE DEPARTMENT

PROFESSOR

Department of Computer Science and Engineering,

Knowledge Institute of Technology,

Kakapalayam,

Salem- 637 504.

SIGNATURE

MR. R. SIVAGURU M.E.,

FACULTY MENTOR

ASSISTANT PROFESSOR

Department of Computer Science and Engineering,

Knowledge Institute of Technology,

Kakapalayam,

Salem- 637 504.

Submitted for the Project Viva-Voce Examination held on _____

FACULTY EVALUATOR

SPOC

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ACKNOWLEDGEMENT

At the outset, we express our heartfelt gratitude to **GOD,** who has been our strength to bring this project to light.

At this pleasing moment of having successfully completed our project, we wish to convey our sincere thanks and gratitude to our belovedpresident **Mr. C. Balakrishnan,** who has provided all the facilities to us.

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CHAPTER - 1
INTRODUCTION

1.1.Project Overview

In Today's world water is an essential resource without which we cannot live without, hence it can be said that water is a critical resource in the lives of people who both will have benefits from its use and who are harmed by its misuse and unpredictability (flooding, droughts, salinity, acidity, and degraded quality). Water pollution is one of the biggest fears for green globalization. In order to ensure the safe supply of the drinking water the quality needs to be monitored in real time The project is based on solving the issues related with the pollution levels of water by identifying the underlying issues present in the quality of water by analyzing the intrinsic issues which cause the quality of water from a different source to degrade and cause This project is mainly Inspired By The amount of diseases present in the water in most Indian localities which cause a lot of harm to the populace mainly in rural areas and areas where water is not readily available or easy to is not readily available or easy to check.This Project Is highly relevant today's world wheremoneyistime.So,the system allows us to monitor the quality of water in real time easily.This project is executed by considering all the sensor values from the sensors are appropriately taken. These values contain the parameters of the water sample being tested such as temperature, pH , turbidity , flow etcIn addition to the parameters listed above some additional details can also be gained by the use of simple scientific knowledge. For example the density of water can be found using theflow rate of water, which can in turn be used along with the temperature sensor values to find if the water is contaminated by specific bacteria which can exist in the water sample only if specific requirements for their survival are met. One such example is E-coli bacteria which exists in the guts (intestine and stomach mainly) of humans and other animals. It needs a relatively higher temperature and density to survive (the harmful strain of the bacterium E. coli O157:H7, can cause severe abdominal cramps, bloody diarrhea and vomiting). Although it can spread through other sources, one of its main transmission sources is through water sources.

1.2 Purpose

It has been seen that the quality of the water being distributed to most areas (both rural and urban) has been deteriorating with time as the water sources from where the water is being drawn gets polluted, as well as lapses in the part of the civic body responsible for the maintenance of the quality of water. It may also be due to no proper maintenance of the machines which perform the actions necessaryto clean or improve the quality of water being distributed to homes. This has been observed to majorly affect the number of water borne-diseases in the city.This project works on achieving proper evaluation of the quality of water with respect to some of the most basic parameters i.e. the temperature will be monitored so that the climatic changes don't affect the water. The PH will be monitored so that it remains in the most optimal range and is fit for human consumption and prevents the growth of disease-causing microbes. The flow of the water is monitored so that there are no disruptions or leaks and also to maintain a specific flow rate which prevents the growth of fungal and small plants in the transport network. Finally The turbidity of the water is monitored so that it gives us a measure of the amount of impurities in the water and if needed it can prompt the required action to change or modify the quality of water if it's not in the permissible range. A major advantage of the system is the real time monitoring of the quality of the water (i.e : its immediate quality is monitored) which gives us the ability to immediately determine if the water is really safe for consumption or not. The system provides us the facility to immediately identify the attributes or parameters of water and see if there is a WaterMonitoring System being sent to us.This Helps us to make clear cut decisions if we need to purchase additional equipment or not, which in turn helps us to save money and time.

CHAPTER - 2
LITERATURE
REVIEW

SOLVING REAL TIME WATER QUALITY MONITORING SYSTEMUSING SUPPORT RASPBERRY PI AND ARDUINO PYTHON

Internet of Things (IOT) is determined as the network of environmental objects which includes devices, homes, motors which are embedded with sensor, micro-controller, and community associativity It helps combine objects which can then exchange statistics. IOT is a gadget of interrelated computing gadgets, virtual machines, objects, animals or people with specific identifiers and ability to transfer statistics over a community with non-human-to-human or human-to-pc interplay. IOT Includes net enabled devices that use sensors, embedded processor and hardware to retrieve, ship and get entry to information they gather from their environments. IOT gadgets share the sensor records they acquire by using connecting to an IOT gateway to the device where information is both sent to the cloud to be analyzed or analyzed domestically. The real-global programs are net of factors, tiers from purchaser IOT and organization IOT to production and commercial IOT. IOT has advanced from the convergence of wi-fi technologies, microelectromechanical structures, micro services and the internet. IOT encourages agencies to rethink the ways they technique their corporations, industries and markets and gives them equipment to enhance their commercial enterprise techniques.

Because of IOT now more electronic gadgets are connected to the net and communicate to each other without any human interference. ATM (Automated Teller Machine) was one of the earliest IOT enabled devices ever to be introduced. Wearable devices like fitness trackers, smartwatches are connecting extra regular customers to the IOT. The generation of internet-linked garbage is coming. Smart homes are not a factor for the future anymore. Human beings have already commenced adopting smart home, home.

Ensuring the safety of water is a challenge due the excessive sources of pollutants, most of which are man-made. The main causes for water quality problems are overexploitation of natural resources. The rapid pace of industrialization and greater emphasis on agricultural growth combined with latest advancements, agricultural fertilizers and non-enforcement of laws have led to water pollution to a large extent. The problem is sometimes aggravated due to the non-uniform distribution of rainfall. Individual practices also play an important role in determining the quality of water (Central Ground Water Board, 2017) . Water quality is affected by both point and non-point sources of pollution, which include sewage discharge, discharge from industries, run-off from agricultural fields and urban run-off. Other sources of water contamination include floods and droughts and due to lack of awareness and education among users. The need for user involvement in maintaining water quality and looking at other aspects like hygiene, environment sanitation, storage and disposal are critical elements to maintain the quality of water resources. Poor water quality spreads disease, causes death and hampers socio-economic progress. Around 5 million people die due to waterborne diseases around the world (Water Resource Information System of India, 2017). Fertilizers and pesticides used by farmers can be washed through the soil by rain, to end up in rivers. Industrial waste products are also washed into rivers and lakes. Such contaminations enter the food chain and accumulate until they reach toxic levels, eventually killing birds, fish and mammals. Chemical factories also dispose wastes in the water. Factories use water from rivers to power machinery or to cool down machinery. Raising the temperature Geetha and Gouthami Smart Water (2017) 2:1 DOI 10.1186/s40713-017-0005-y of the water lowers

the level of dissolved oxygen and upsets the balance of life in the water (Central Ground Water Board, 2017). All the above factors make water quality monitoring essential. Water quality monitoring is defined as the collection of information at set locations and at regular intervals in order to provide data which may be used to define current conditions, establish trends, etc. (Niel et al., 2016; Muinul et al., 2014; Jianhua et al., 2015). Main objectives of online water quality monitoring include measurement of critical water quality parameters such as microbial, physical and chemical properties, to identify deviations in parameters and provide early warning identification of hazards. Also, the monitoring system provides real time analysis of data collected and suggest suitable remedial measures. The aim of this paper is twofold. One is to provide a detailed survey of recent work carried out in the area of smart water quality monitoring in terms of application, communication technology used, types of sensors employed etc. Second, is to present a low cost, less complex smart water quality monitoring system using a controller with inbuilt Wi-Fi module to monitor parameters such as pH, turbidity and conductivity. The system also includes an alert facility, to inform the user on deviation of water quality parameters. 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. 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

this research paper focuses on Sensor Web for River Water Pollution Monitoring and Alert System Sensor Web has provided infrastructure for

collecting and processing data from distributed and heterogeneous sensors. This set of technologies has found various implementations, especially in the area of environmental monitoring. The Sensor Web architecture for crisis management, described in this paper, provides active monitoring of measuring parameters and timely responses in cases of environmental disasters. The River Water Management and Alert System built on this architecture

Enable access, control and management of river water pollution.

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 Maneesha 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.

This paper describes the conjunction of the Smart City Initiative and the concept of Industry 4.0. The term smart city has been a phenomenon of the last years, which is very inflected especially since 2008 when the world was hit by the financial crisis. The main reasons for the emergence of the Smart City Initiative are to create a sustainable model for cities and preserve quality of life of their citizens. The topic of the smart city cannot be seen only as a technical discipline, but different economic, humanitarian or legal aspects must be involved as well. In the concept of Industry 4.0, the Internet of Things (IoT) shall be used for the development of so–called smart products. Sub[1]components of the product are equipped with their own intelligence. Added intelligence is used both during the manufacturing of a product as well as during subsequent handling, up to continuous monitoring of the product lifecycle (smart processes). Other important aspects of the Industry 4.0 are Internet of Services (IoS), which includes especially intelligent transport and logistics (smart mobility, smart logistics), as well as Internet of Energy (IoE), which determines how the natural resources are used in proper way (electricity, water, oil, etc.). IoT, IoS, IoP and IoE can be considered as an element that can

create a connection of the Smart City Initiative and Industry 4.0 – Industry 4.0 can be seen as a part of smart cities.

D. Zhanwei Sun, Chi Harold Liu, Chatschik Bisdikia_, Joel W. Branch and Bo Yang, 2012 9th Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks.

Zhanwei Sun, Chi Harold Li, Chatschik Bisdikian, Joel W.Branch and Bo Yang entitled "QOI-Aware Energy Management in Internet-of-Things Sensory Environments". In this paper an efficient energy management frame work to provide satisfactory QOI experience in IOT sensory environments is studied. Contrary to past efforts, it is transparent and compatible to lower protocols in use, and preserving energy-efficiency in the long run without sacrificing any attained QOI levels. Specifically, the new concept of QOI-aware "sensor-to-task relevancy" to explicitly consider the sensing capabilities offered by an sensor to the IOT sensory environments, and QOI requirements required by a task. A novel concept of the "critical covering set" of any given task in selecting the sensors to service a task over time. Energy management decision is made dynamically at runtime, as the optimum for long-term traffic statistics under the constraint of the service delay. Finally, an extensive case study based on utilizing the sensor networks to perform water level monitoring is given to demonstrate the ideas and algorithms proposed in this paper, and a simulation is made to show the performance of the proposed algorithms.

The developed model is used to test samples of water and the data collected from the sensors is uploaded over the internet is analysed. This model is less complex and low cost smart water quality monitoring system with a core controller having built-in Wi-Fi module for monitoring quality parameters like turbidity, conductivity and pH.

2.1.EXISTING PROBLEM

The amount of diseases caused by water borne microorganisms in todays India is increasing at an alarming rate and has become a critical issue which hinders the growth of the populace and its affecting the effective working of the citiesas a whole. One The Major reasons for this is the pollution of most water bodies and no proper methods to detect if the water being sent to us is treated properly or not. No Effective measures have been taken with respect the quality control of water sources. Water Monitoring System Identify the reasons for this growing amount of pollution to the water sources in the city.

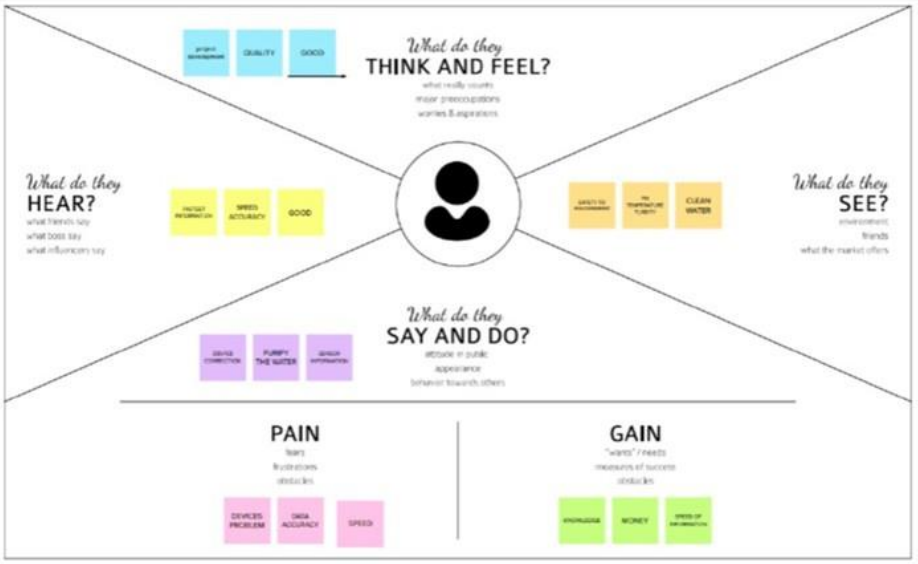
One of the few and most important reasons is that there is no restriction on the private

2.3 PROBLEM STATEMENT DEFINITION.

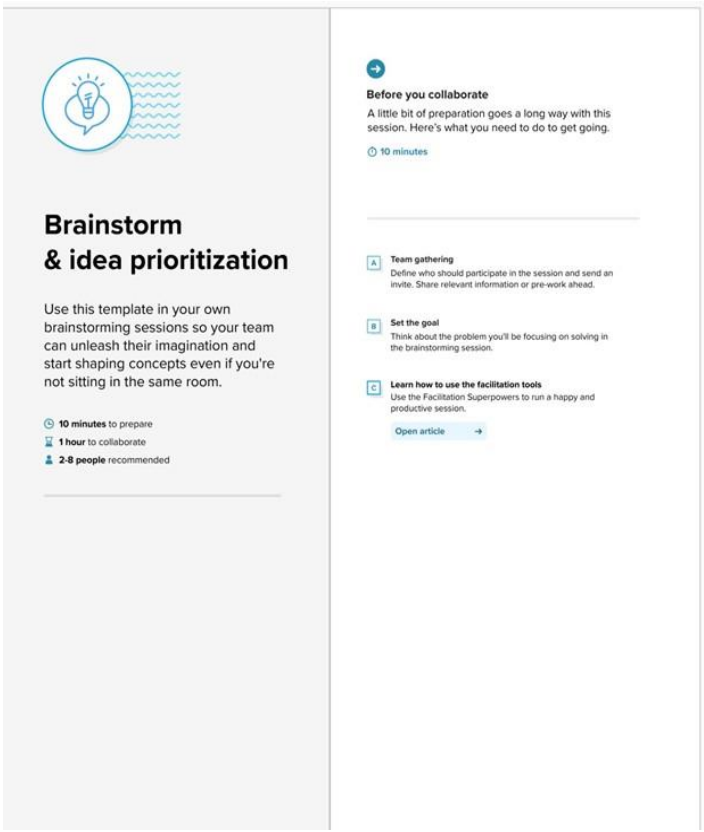
Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1 the problem statement is not quality water available in shop	I am not buy the water in that shop	Get the quality of water in another shop	i will try to avoid these shops to buy water	it is very danger and harmful to people	Angry
PS-2 the problem statement is water contains germs and fungus	I will complain about water managemet system	make awarenes about poor quality of water to people	i willgive complaint about water resource management	This is very badfor childs and peoples	Sadness

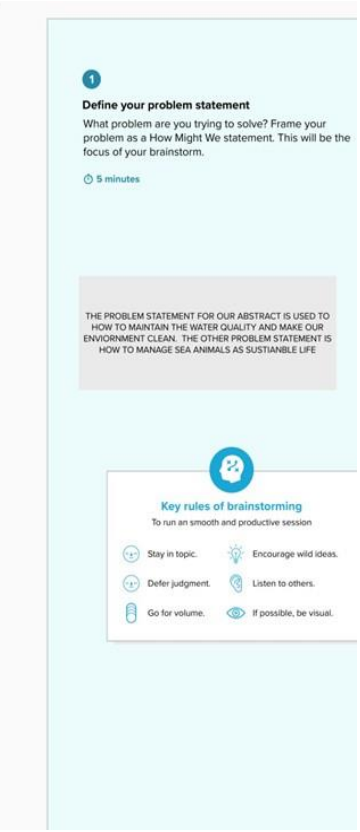
3. IDEATION & PROPOSED SOLUTION

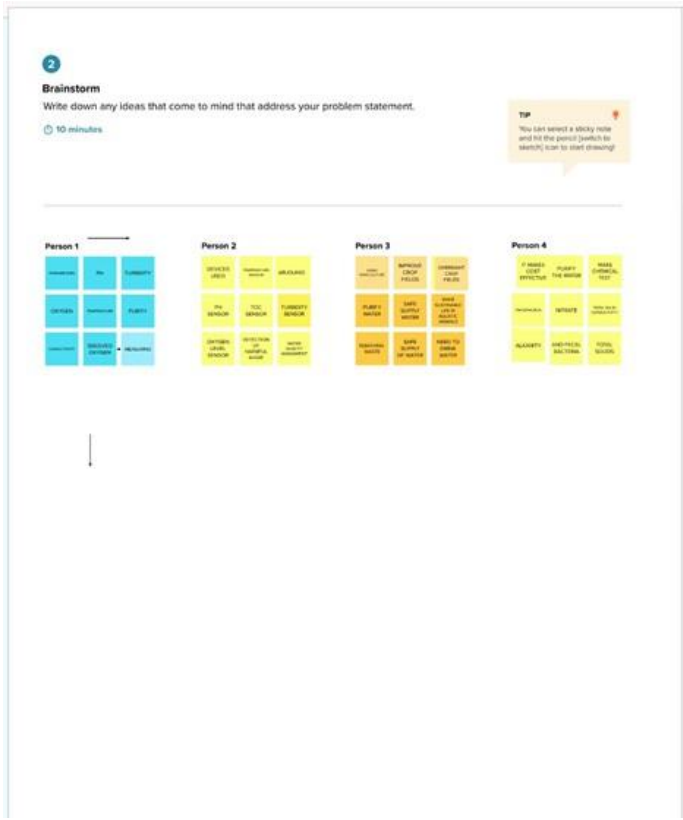
3.1 Empathy Map Canvas

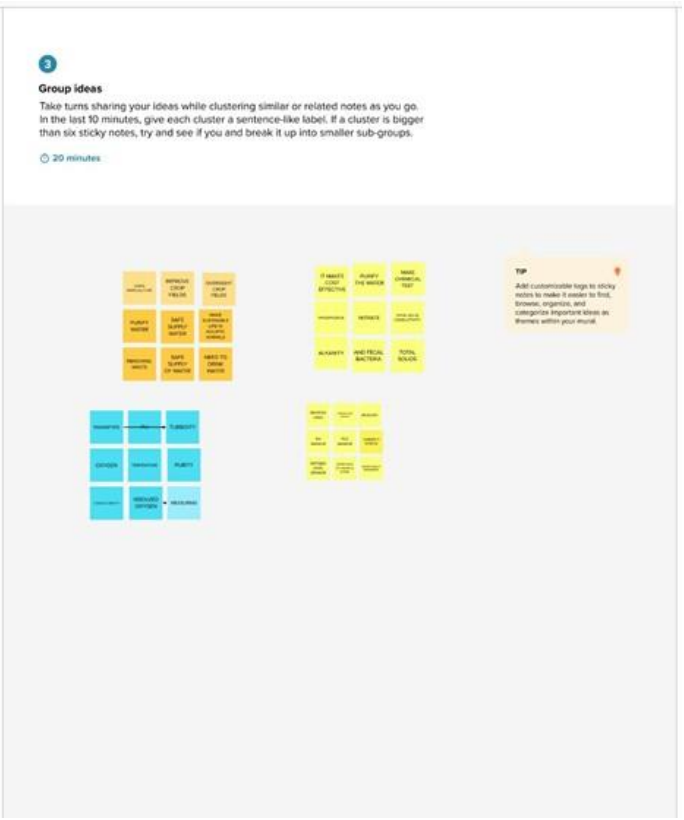


3.2 IDEATION & BRAINSTORMING







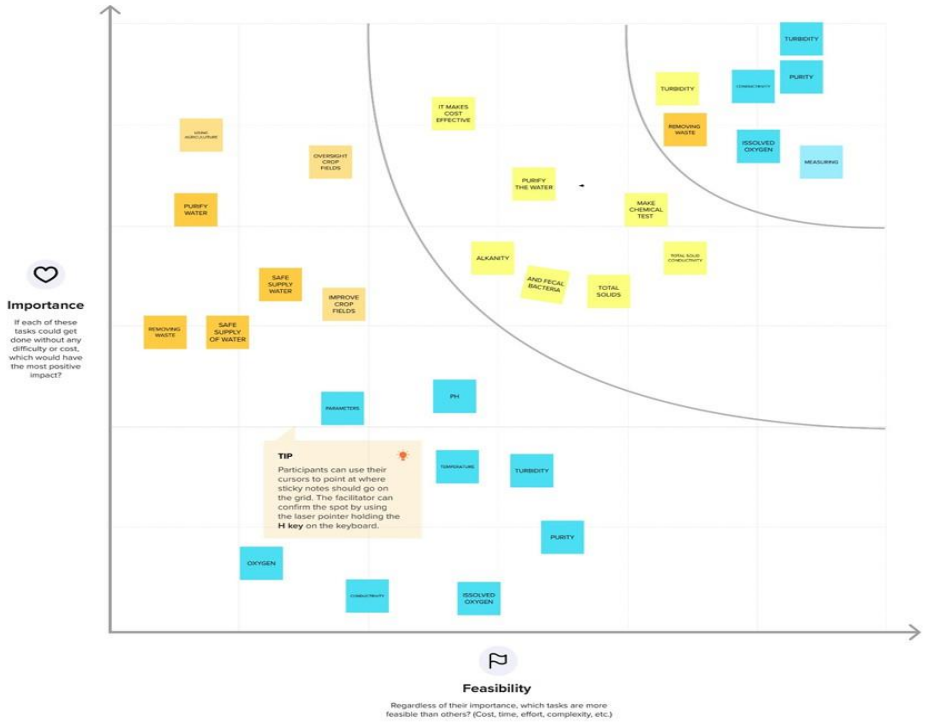


4

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



3.3 Proposed Solution

S.No.	Parameter	Description
1	Problem statement (problem to solved)	The problem statement of real water quality monitoring system is how to maintain the fresh water and avoid how to maintain sustainable.
2	Idea/solution descripritor	The Solution statement Of the project isused to removed all the dust by equipments in water by filter by in device
3	Novelty/uniqueness	The novelty and uniqueness of this project is easily to identify the project easily and used to purify the water easily and giving the alarm signal to the dangerous position immediately of contamination of water
4	Social Impact/customer satisfication	The customer and social impact of this project is very useful for this social used and economically growth used
5	Business model/ revenue model	The business and revenue model for this project is used to manufacture for the instrumentation and selling the NKE to device
6	Scability of the solutior	The main hardware of the system consists of off-shell electronical chemical sensor, a microcontroller, a wireless communication system and the customized buoy. It detects water temperature, dissolved oxygen and ph a pre programming time interval. The develop prototype disseminates the gathered information in graphical and tablur formats through a customized web based portal and preregistered mobile phones

3.4 PROBLEM STATEMENTS

CUSTOMER SEGMENTS(S)	**CUSTOMER LIMITATIONS**	**AVAILABLE SOLUTIONS**
The customers of this project are by type ph testing dissolved oxygen analyser is analyser conductivity sensor. By application marine lab testing ground water surface water residential and commercial.	The customer limitation of this project is must because water is essentialto our earth so customer limitation is very huge level.	The available solutions in this project are used to search in the survey literature and search the website.
PROBLEMS/ PAINS *(ITS FREQUENCY)*	**PROBLEM ROOT/ CAUSE**	**BEHAVIOUR ITS INTENSITY**
The problems and painsof this project are testing methods are more and we have using more devices andthere are some decimalerrors.	The root cause occurs dueto some device issue and varying the levels of nutrient and mineral in water.	The behavior of intensity in this projectis used to search the website and ask experts to relate in thisproject.

TRIGGERS TO ACT	YOUR SOLUTION	CHANNELS OF BEHAVIOUR (ONLINE)
A primary “trigger” mechanism that identifies any addition (chemical or biological) to water within the distribution system. Thismust be instantaneous or “real-time Secondary detection technology that allows for the contaminant to be identified during a period of a few hours, while the discrete segment of the distribution system is shut down..	My solution for this project is used to filter the bacteria and germs and another solution is used to maintain the pH level and maintain the temperature and humidity nutrient.	The channels of behavior of in this project in online are used to search website send the mail and watching the television these are channels of behavior

4. REQUIREMENT ANALYSIS

4.1 Functional requirement

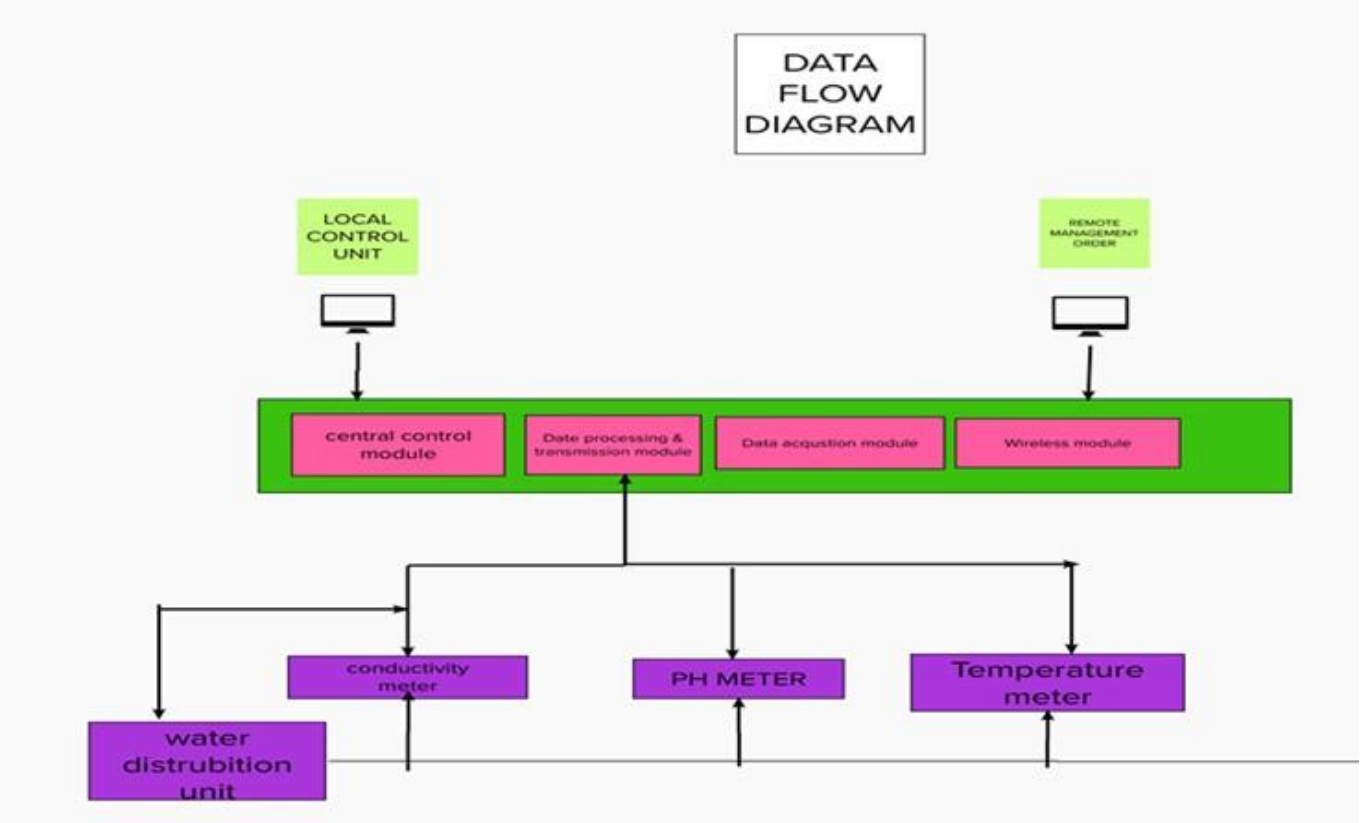
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	the user registration of our project is registering the website and can login the webpage and it also register the form
FR-2	User Confirmation	the user confirmation is after send the reach the confirmation message or mail after the fill the form
FR-3	EXTERNAL INTERFACE	the external interface are used in our project is hardware components and coding method
FR-4	REPORTING REQUIREMENT	the reporting requirement in our project is used to maintain pressure air humidity and pressure
FR-5	certification requirement	the certification requirement of our project is used to maintain the accuracy and quality

4.2 NON FUNCTIONAL REQUIREMENTS

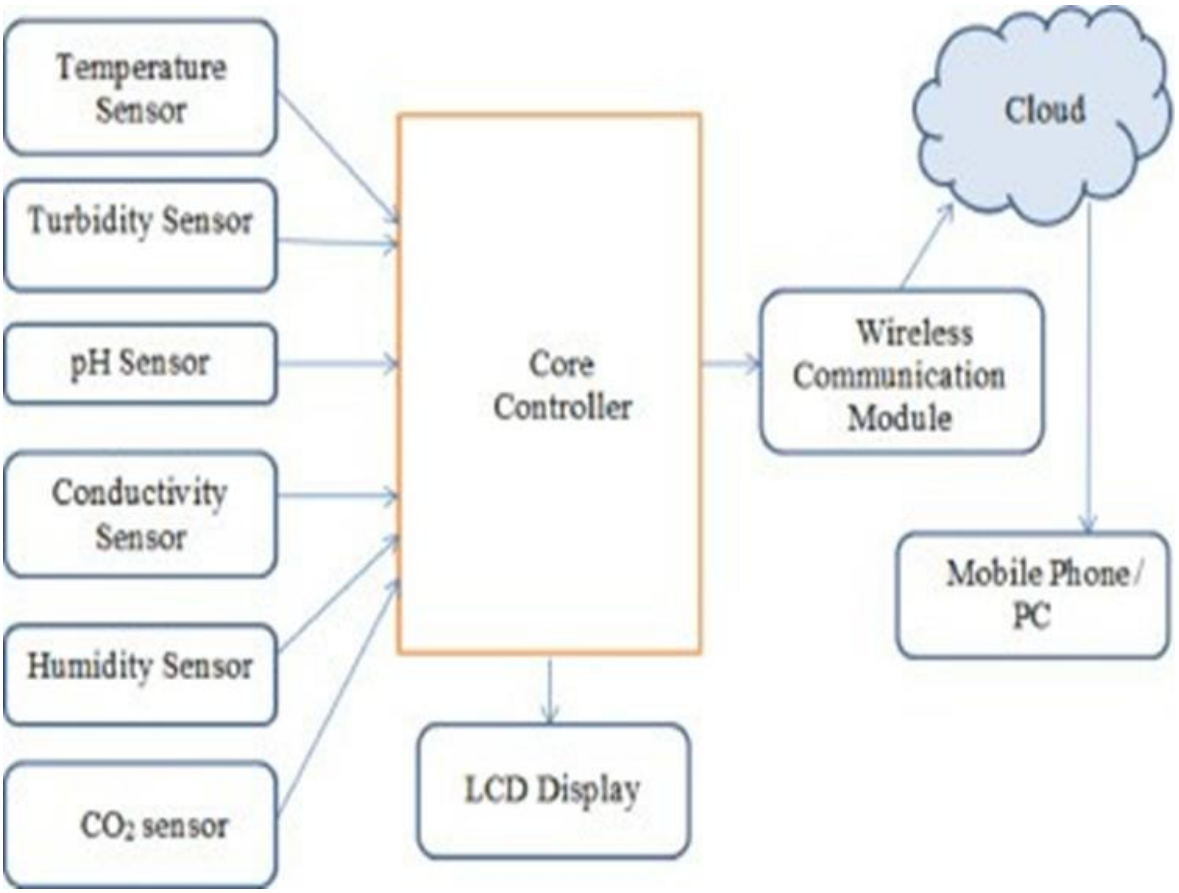
FR No.	Non-Functional Requirement	Description
NFR -1	Usability	The usability of this project is very essential the economic production used to well growth health and it is used for agriculture and maintenance of aquatic animals
NFR-2	Security	The security of this project is very essential, safe and secure if some other person wants to check this in this project.it will not show theparameters measure
NFR-3	Reliability	the reliability of this project areused to very efficient and it canmove to next phase
NFR-4	Performance	The performance of this project isvery good and excellent. it reducetime, cost and it give accurate solution
NFR-5	Availability	the availability of this project arevery accurate and efficient performance
NFR-6	Scalability	the scalability of this project is littlebit advanced because it is very highexternal requirements are used

5.PROJECT DESIGN

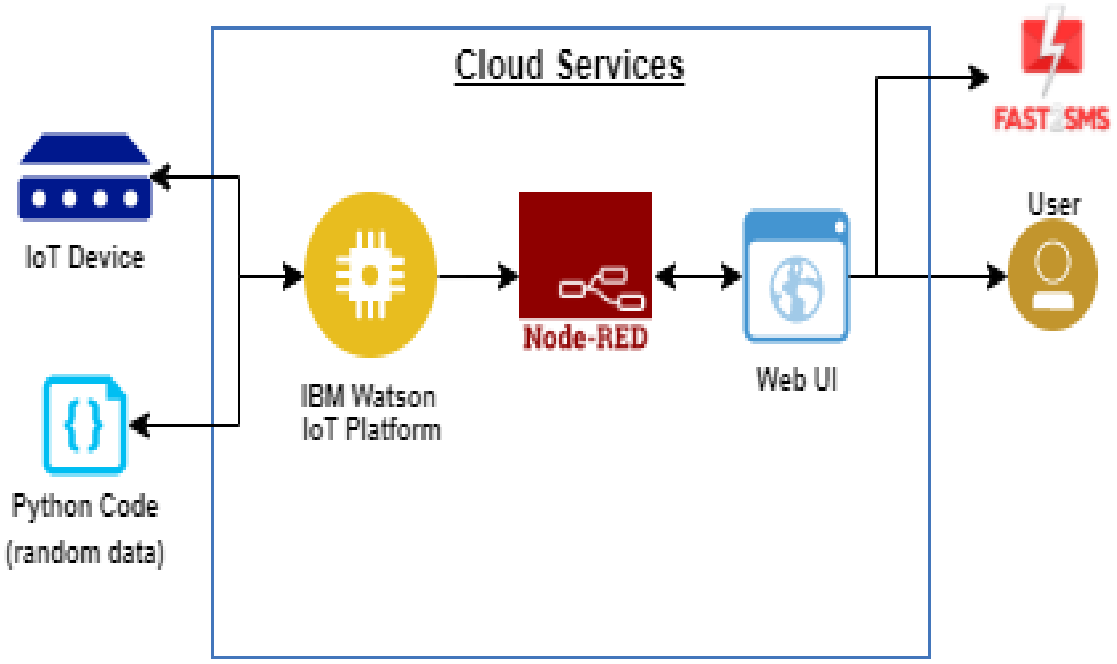
5.1 Data Flow Diagrams



5.2 Solution & Technical Architecture



5.3TECHNICAL ARCHITECTURE



5.4User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Developer	Developing the products	US-1	As i developer i have develop with hardware external check parameters of water and measure it parameters of water and measure it	after getting approval of my project i can launch the project into market	high	sprint 1
Customer mobile user	Registration	US-2	As a user, I will receive confirmation email once I have registered fot the application mobile	I can receive confirmation email & click confirm	high	sprint1
Customer web user	login dashboard	US-3	As user i can register through the facebook and gmail through gmail	I can register & access thedashboard with Facebook Login	high	sprint 1

Customer executive officer	care customer complaints provide approximate solution within the time limits	US-4	If any complaints provided to the customer or any problem occur it or any error will occur the customer executive officer will contact the customer and they provide approprite	As customer executive officr they provided appropriate solutions to the customer	medium	sprint 1
Administrate	The functional system works within the support functional application support	US-5	Preparing, organizing and storing information in paper and digital form. Dealing with queries on the phone nd by email,greeting visitor at reception	As i administrator he will maintains all record	low	sprint 2

6 PROJECT PLANNING & SCHEDULING

6.1Sprint Planning & Estimation

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	roshini waisumden
Sprint-2	login	USN-2	As a user i will login the through website and developer will see registration process	1	medium	gajapati.ve.s roshni
Sprint-3	login dashboard	USN-3	As a user, I can register in the login dashboard	2	Low	surya gajapati .ve.s
Sprint -4	developing the product	USN-4	As a developer i can able to develop the products requirements by hardware and connecting to the software requirements	2	high	roshini waismuden gajapati.ve. s surya

Sprint-5	IoT Platforms and Security	USN-5	As a developer develop I can able to secure my iot platform with safety purpose so i canbe able to protect my data by hackers	1	High	Gajapati.v s surya

6.1 Sprint Delivery Schedule

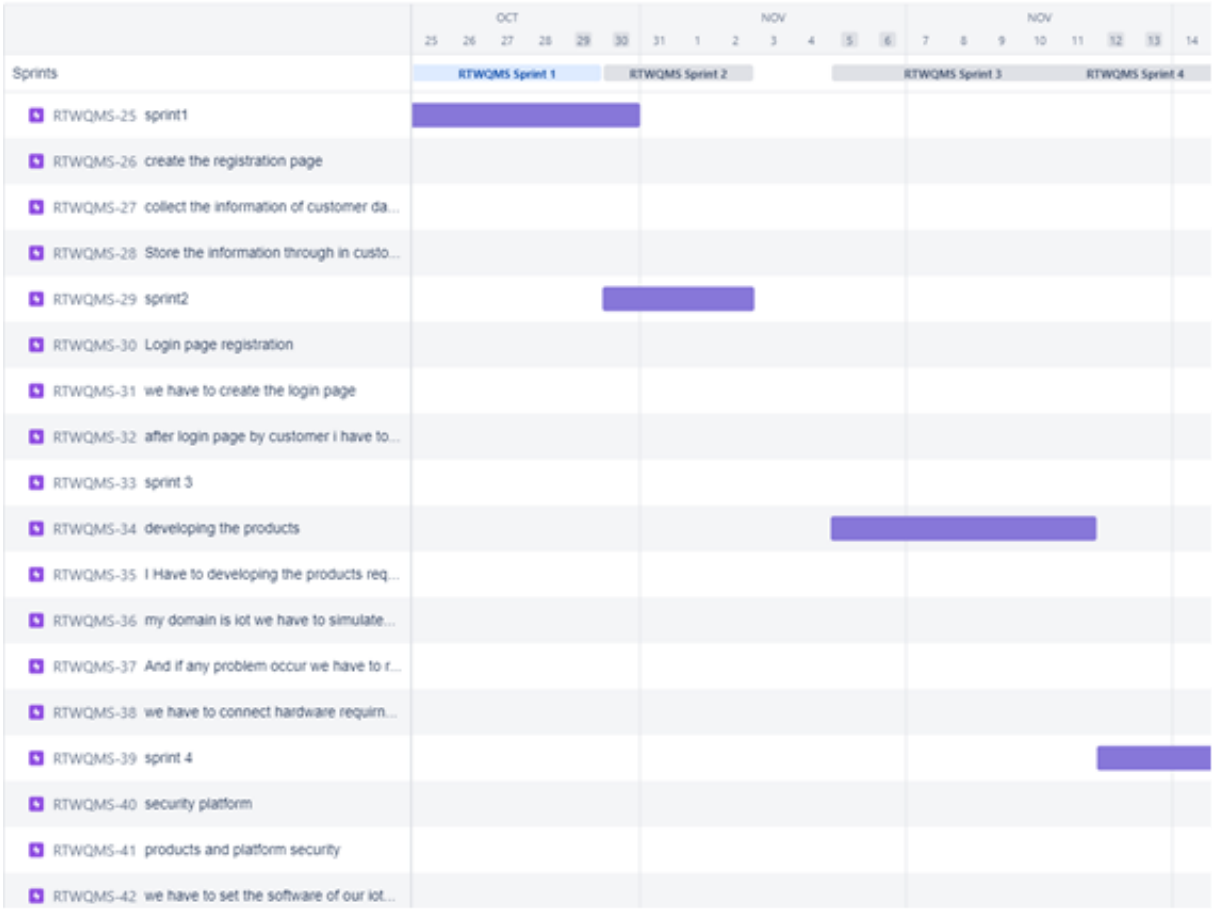
Sprint	total store Points	duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned EndDate)	Sprint Release Date (Actual date sprint)
Sprint-1	5	4 Days	24 Oct 2022	29 Oct 2022		
Sprint-2	5	5 Days	31 Oct 2022	05 Nov 2022		
Sprint-3	6	4 Days	07 Nov 2022	12 Nov 2022		
Sprint-4	13	13 Days	14 Nov 2022	26 Nov 2022		
Sprint-5	8	8 DAYS	27 nov 2022	6 Nov 2022		

Velocity:

Imagine we have a 25-day sprint duration, and the velocity of the team is10 (pointsper sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

Average velocity = sprint duration/velocity = 25/10 =2.5

6.2 Reports from JIRA



7.CODING & SOLUTIONING (Explain the features added in the project along withcode)

7.1Feature 1

The features added in the our project are node red and ibm cloud The node red are used tools for programming visually and allow the user to program without having to type a language. Node-RED is a browser-based flow editor where you can add or remove nodes andwire them together in order to make them communicate with each other. The another feature added in our project is dashboard the dashboard it contains all the parameter of water like ph temperatureturbidity moisture and dust and it give percentage of all parametersof water and it will give percentage also it will connected with alarm signal if the water will danger or moisture level the alarm will signal to people to avoid the drinking water of people. The next is sendingsms to the user and it will send the information of the quality of water and percentage of minerals contained in the water. These arethe 1st features added in our project.

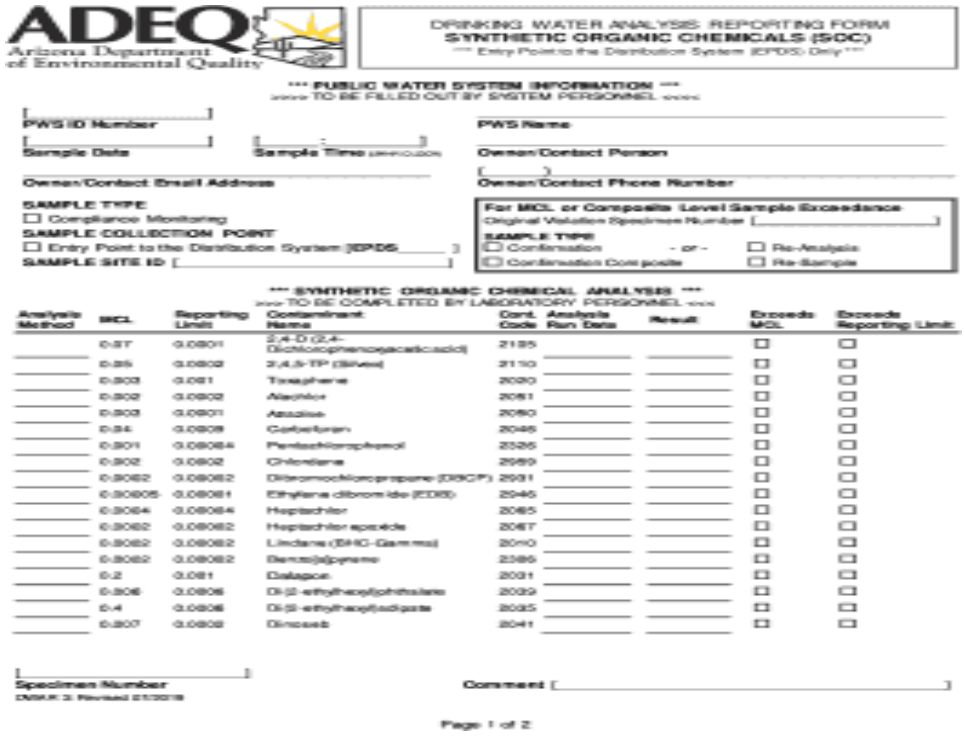
7.2 feature 2

The second feature is the ibm watson iot platform the ibm watson iot platform is A fully managed, cloud-hosted service with capabilities for device registration, connectivity, control, rapid visualization and data storage. it is a fully managed, cloud-hosted service designed to make itsimple to derive value from your Internet of Things devices. It provides capabilities such as device registration, connectivity, control, rapid visualization and storage of Internet of Things data. The ibm Watson iot platform is used to store data and used to register the device. Is the fastest device and used to store large amount of data and it uses to send the data toweb ui server .The next is used to generate the random code for pycharm it isused to fix all the values of parameters range in feature the next is Zigbee is a standards-based wireless technology developed to enable low-cost, low-power wireless machine-to-machine (M2M) and internet of things.

8.TESTING

8.1.Test Cases

Parameter	Dirty Water		Purified Water		WHO/EPA Standards
	Value	DF	Value	DF	
Color	12200	50	93	1	<15 (EPA)
Odor	ND	1	ND	1	ND (WHO)
pH	6.98	1	7.75	1	6.5 -8.5 (WHO)
Turbidity (NTU)	2420	50	4.1	1	<=5 (WHO)
Sodium (mg/l)	53200	100	5.86	1	<=20 (WHO)
Chloride (mg/l)	32100	2000	5.5	1	<=5 (EPA)
TDS (mg/l)	110000	1	68	1	<1000 (WHO)



ADEQ Arizona Department of Environmental Quality

DRINKING WATER ANALYSIS REPORTING FORM
SYNTHETIC ORGANIC CHEMICALS (SOC)
*** Entry Point to the Distribution System (EPDS) Only ***

*** PUBLIC WATER SYSTEM INFORMATION ***
TO BE FILLED OUT BY SYSTEM PERSONNEL

PWS ID Number
PWS Name
Sample Date
Sample Time (24H:MM)
Owner/Contact Person
Owner/Contact Email Address
Owner/Contact Phone Number

SAMPLE TYPE
☐ Compliance Monitoring
SAMPLE COLLECTION POINT
☐ Entry Point to the Distribution System (EPDS)
SAMPLE SITE ID

For MCL or Composite Level Sample Exceedance
Original Violation Specimen Number
SAMPLE TYPE
☐ Confirmation - or - ☐ Re-Analysis
☐ Confirmation Composite ☐ Re-Sample

*** SYNTHETIC ORGANIC CHEMICAL ANALYSIS ***
TO BE COMPLETED BY LABORATORY PERSONNEL

Analysis Method	MCL	Reporting Limit	Contaminant Name	Cont. Code	Analysis Run Date	Result	Exceeds MCL	Exceeds Reporting Limit
	0.07	0.00001	2,4-D (2,4-Dichlorophenoxyacetic acid)	2105			☐	☐
	0.05	0.0002	2,4,5-TP (Silvex)	2110			☐	☐
	0.003	0.001	Toxaphene	2020			☐	☐
	0.002	0.0002	Alachlor	2051			☐	☐
	0.003	0.0001	Atrazine	2050			☐	☐
	0.04	0.0009	Carbofuran	2046			☐	☐
	0.001	0.00004	Pentachlorophenol	2326			☐	☐
	0.002	0.0002	Chlordane	2959			☐	☐
	0.0002	0.00002	Dibromochloropropane (DBCP)	2931			☐	☐
	0.00005	0.00001	Ethylene dibromide (EDB)	2946			☐	☐
	0.0004	0.00004	Heptachlor	2065			☐	☐
	0.0002	0.00002	Heptachlor epoxide	2067			☐	☐
	0.0002	0.00002	Lindane (BHC-Gamma)	2010			☐	☐
	0.0002	0.00002	Benzo[a]pyrene	2306			☐	☐
	0.2	0.001	Dalapon	2031			☐	☐
	0.006	0.0006	Di(2-ethylhexyl)phthalate	2039			☐	☐
	0.4	0.0006	Di(2-ethylhexyl)adipate	2035			☐	☐
	0.007	0.0009	Dinoseb	2041			☐	☐

Specimen Number
DWAF-3 Revised 01/2019
Comment

Page 1 of 2

The test case will refer to show all the parameters of water like ph temperature turbidity and moisture will give the information to user itcan the user will collect all information and show the output

8.2User Acceptance Testing

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	7	6	5	27
Duplicate	2	6	7	5	20
External	0	3	7	1	11
Fixed	5	3	4	17	29
Not Reproduced	0	0	2	1	3
Skipped	0	0	0	0	0
Won't Fix	0	0	0	0	0
Totals	17	19	26	26	82

Outsource Shipping	2	0	0	3
Exception Reporting	6	0	0	6
Final Report Output	8	0	0	8
Version Control	14	0	0	14

9.RESULTS

9.1.Performance Metrics

s.no	Project name	Scope/ feature	Functional change	Hardware change	Software change	Impact of downtime	justification	Load/ Volume change
1	Real water quality monitor system		Existing	Moderate	Low	moderate	low	>5 to 10%
2	Real water quality monitoring system		existing	Moderate	Low	moderate	low	No changes
3	Real water quality monitoring system		sno	moderate	Low	moderate	low	>5 to 10%
4	Real water quality monitor system	NEW	new	NO CHANGES		moderate	HIGH	>10 to 20%

NFT-detailed test plan				
s.no	Project overview	NFT test approch	Assumption/dependencies/risk	Approval/signoff
1	As part of simulation we have checking the parameters of water	yes we can have nt test approach	there is no risk but we have assumption in testing	yes we canhave approval sign off

sno	Project overview	NFT test approch	NFR- MET	Test overcome	Go/no-go decision	Recommendation	Identified defects
1	As part of simulator we have checking the para meters of water	yes it can approach	yes we can met the functional requirnments	positive	No desicion	No recommendation	Closed
2	To global ization of waterand making enviro nment clean	Yes it ca n approa ch	yes we can met nr test	positive	NO GO decision	Yes recommendation	Closed

3	To make purify of water	yes it can approch	yes we can met nr test	positive	NO GO DECISION	Yes recommendation Closed

10.ADVANTAGES & DISADVANTAGES

Advantage of real time water quality monitoring system

Modern smart water monitoring systems analyze data continually and instantly alert users to changes in the system, giving peace ofmind and reducing the need for unreliable and expensive sampling.

The advantage of a real time water quality monitoring system is Water purification can protect against harmful organisms.

The third advantage of real time water quality monitoring systems is Water in the

The fourth advantage is the alarm will be fixed and it will send themessage signal to theuser.

Then it will give a warning message to the people that water will be dangerous so will avoid drinking the poisonous water.

The fifth advantage is more user friendly, efficient. Drawback is the high cost smart sensors. This system uses wireless sensors for monitoring quality of water parameter monitored areph, turbidity, conductivity, temperature.

A microcontroller has the task of signal digitizing, data transmission, and Network management.

This developed novel water quality monitoring system has variousadvantages like of less consumption power, no carbon emission and higher limberness.

The seventh advantage is that it's also doing simulation method soit can't be bad for the environment and nature also. It safe for environment is Advantage of real time water quality monitoring system

The first disadvantage is the real water quality monitoring system.The system is less effective as sensors are installed very deep inside the water and their positions are fixed

The second disadvantage is the real time water quality monitoringsystem, the sensor and devices are very costly.

The fourth disadvantage is the real time water quality monitoring system. The maintenance is costly and high so that the electricity power and area of consumption is also high. These are the fourth disadvantage of water quality monitoring systems.

The fifth disadvantage is for the power problem if the devices willrun the power will shut down the process of work will get delayedsometimes it may error occur.

11. CONCLUSION

Monitoring of Turbidity, PH & Temperature of Water makes use of water detection sensors with unique advantage and existing GSM network. The need to monitor these values of water arises with the risein the risk caused due to the current water quality and standards of water available for drinking, domestic and household purposes. Even if we humans get adapted to the current standards and quality of water content, there are many other living widespread applications and an extension value. In this project, a IOT based bio monitoring system is proposed which uses sensors to get the most essential values which can be used to obtain other parameters of all the sensors that are being used in the model. The project serves its purpose well to cater the needsof current and future generations. The fact that it focuses on the most sensitive and basic need for survival makes it that valuable and resourceful. The project focuses completely on something that goes completely unnoticed and ignored, the quality of water being consumedand used for other needs. If the quality of water of many places were known, people would immediately stop consuming or avoid using that particular water due to how harmful and dangerous it may turn out to be for daily usage. People moving into new locations have no idea aboutthe water quality and standards of that place, and need a source to monitor the same, this project would definitely prove to be of great use in such circumstances. Also, knowledge of such quality of water would help make changes and provide better water henceforth, as prevention is always better than cure. Monitoring of Turbidity, PH & Temperature of Water makes use of a 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 byreplacing 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 keepingthe embedded devices in the environment for monitoring enables self protection (i.e., smart environment) to the environment. To implement this, we 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 dataand analysis results will be available to the end user through the Wi-Fi.

12. FUTURE SCOPE

The data that is collected over time can be sent to a system or program that can be used to obtain additional parameters such as density, amount of bacteria, the viscosity of water etc. and then these parameters can be analyzed by the software. This project serves as a great purpose to current and future generations. Water monitoring in these times of having irregular and low quality water supply proves to be very essential to household and domestic needs. The current generation, having suffered a lot of water pollution and unsafe water, definitely need an approach to keep track of the water that they are consuming and using for domestic needs. The future however, this project can be implemented just the way it is or also with major and minor changes to suit the needs of the future generations. The fact thatthere are a lot of dying water bodies and the need for water arising every day, this project would indeed be of great help to many people.

In the future we will use the IOT concept in this project Detecting the more parameters for the most secure purpose Increase the parameters by addition of multiple sensors. By interfacing the relay we control the supply of water. a prototype water monitoring system using IoT is presented. .For this some sensors are used. The collected data from all the sensors are used for analysis purposes for better solution of water problems. The data is sent to the cloud server via Wi-Fi module ESP8266.

So this application will be the best challenger in real time monitoring & control system and used to solve all the water related problems

.

13. APPENDIX

Source Code

```
<html>
<head>
<meta name="viewport" content="width=device-width, initial-scale=1">
<title> Login Page </title>
<style>
Body {
  font-family: Calibri, Helvetica, sans-serif;
  background-color: pink;
}
button {
       background-color: #4CAF50;
       width: 100%;
        color: orange;
        padding: 15px;
        margin: 10px 0px;
        border: none;
        cursor: pointer;
         }
 form {
        border: 3px solid #f1f1f1;
    }
 input[type=text], input[type=password] {
        width: 100%;
            margin: 8px 0;
         padding: 12px 20px
```

```
  display: inline-block; border:
k2px solid green;box-sizing: border-box;
                }
             button:hover {
                 opacity: 0.7;
                }
              .cancel btn {
                 width: auto;
                 padding: 10px 18px;
                 margin: 10px 5px;
                }
                < center> <h1> Student Login Form </h1> </center>
                <form>
                   <div class="container">
                      <label>Username : </label>
                      <input type="text" placeholder="Enter Username" name="username" required>
                      <label>Password : </label>
                      <input type="password" placeholder="Enter Password" name="password"
            required>
                      <button  type="submit">Login</button>
                      <input type="checkbox" checked="checked"> Remember me
                      <button  type="button"  class="cancel  btn"> Cancel</button>
                      Forgot <a href="#"> password? </a>
                   </div>
                </form>
            </body>
            </html>
```

Arduino code for sensation generate the value

```
for i in range(5):
```

```
print("Test case:",i+1)
print("Welcome to Real-Time River Water Quality Monitoring and ControlSystem")
temperature = int(rand.randint(-40,125))pH =
int(rand.randint(0,14))
DO = int(rand.randint(0,100)) TSS =
int(rand.randint(0,3700))
Manganese = int(rand.randint(0,1000)) Copper =
int(rand.randint(0,2000)) ammonia_Nitrate =
int(rand.randint(0,100))Hardness =
int(rand.randint(0,1000))
Zinc =      int(rand.randint(0,100))
Conductivity =       f"{float(rand.uniform(0.001,2000)):.2f}"Chloride
= int(rand.randint(0,200))
Sulfate = int(rand.randint(0,1000))
#These variables store value of random data to be shared to the cloud

#printing the values
print(
      "Temperature:", temperature,
        "\npH:", pH,
      "\nDO:", DO,
      "\nTSS:", TSS,
      "\nManganese:", Manganese,
      "\nCopper:", Copper,
      "\nAmmonia & Nitrate:",ammonia_Nitrate,
      "\nHardness:",Hardness,
      "\nZinc:", Zinc, "\nConductivity:",
      Conductivity,
      "\nChloride:", Chloride,
      "\nSulphate:", Sulphate, "\n"
```

GitHub & Project Demo Link

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