# PROJECT REPORT

## 1. INTRODUCTION

### 1.1 PROJECT OVERVIEW

Water is considered as a vital resource that affects various aspects of human health and lives. The quality of water is a major concern for people living in urban areas. The quality of water serves as a powerful environmental determinant and a foundation for the prevention and control of waterborne diseases. Water Quality Index (WQI) assessment is required for the purpose of public health. In this project, an effective linear regression model is developed to predict the WQI based on the parameters like temperature, dissolved oxygen, pH value, Turbidity, Nitrates and fecal coliform. So this project aims at building a Machine Learning (ML) model to Predict Water Quality by considering all water quality standard indicators.

### 1.2 PURPOSE

- Freshwater is a critical resource for human, agriculture and industry's survival.
- Examination of water quality is a fundamental stage in the administration of freshwater assets.
- As indicated by the World Health Organization's yearly report, many individuals are getting sick or some are dead due to the lack of safe drinking water, especially pregnant ladies and kids.
- Water quality testing is a strategy for finding clean drinking water.
- Accordingly, appropriate water monitoring is basic for safe, clean, and sterile water.
- Water testing is fundamental for looking at the legitimate working of water sources, testing the safety of drinking water, identifying disease outbreaks, and approving methodology and safeguard activities. Water quality is a proportion of a water's readiness for a specific utilize in view of physical, chemical, and biological qualities.

# 2.LITERATURE SURVEY

## 2.1 EXISTING PROBLEM

Water makes up about 70% of the earth's surface and is one of the most important sources vital to sustaining life. Rapid urbanization and industrialization have led to a deterioration of water quality at an alarming rate, resulting in harrowing diseases. Water quality has been conventionally estimated through expensive and time-consuming lab and statistical analyses, which render the contemporary notion of real-time monitoring devices. There must be a quicker, more practical solution because of the dire effects of bad water quality. In order to estimate the water quality index (WQI), a unique index to characterise the general quality of water, and the water quality class (WQC), a distinct class established on the basis of the WQI, this research investigates a number of supervised machine learning techniques. The suggested methodology uses temperature, turbidity, pH, and total dissolved solids as its four input parameters. With mean absolute errors (MAE) of 1.9642 and 2.7273, respectively, gradient boosting with a learning rate of 0.1 and polynomial regression with a degree of 2 predict the WQI the most accurately. A multi-layer perceptron (MLP), on the other hand, classifies the WQC most accurately (0.8507), with a configuration of (3, 7). The suggested methodology validates the viability of its usage in real-time water by achieving reasonable accuracy with a small number of parameters. systems for detecting quality.

## 2.2 REFERENCES

[1] Khan, Yafra, and Chai Soo See. "Predicting and analyzing water quality using Machine Learning: a comprehensive model." 2016 IEEE Long Island Systems, Applications and Technology Conference (LISAT). IEEE, 2016.

[2] Ragi, Nikhil M., Ravishankar Holla, and G. Manju. "Predicting water quality parameters using machine learning." 2019 4th International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT). IEEE, 2019.

[3] Ali, Maqbool, and Ali Mustafa Qamar. "Data analysis, quality indexing and prediction of water quality for the management of rawal watershed in Pakistan." Eighth International Conference on Digital Information Management (ICDIM 2013). IEEE, 2013.

[4] Nair, Jitha P., and M. S. Vijaya. "Predictive Models for River Water Quality using Machine Learning and Big Data Techniques-A Survey." 2021 International Conference on Artificial Intelligence and Smart Systems (ICAIS). IEEE, 2021.

[5] Alahakoon, A. M. P. B., et al. "Water Quality Index Based Prediction of Ground Water Properties for Safe Consumption." 2020 2nd International Conference on Advancements in Computing (ICAC). Vol. 1. IEEE, 2020.

## 2.3 PROBLEM STATEMENT DEFINITION

Water is considered as a vital resource that affects various aspects of human health and lives. The quality of water is a major concern for people living in urban areas. The quality of water serves as a powerful environmental determinant and a foundation for the prevention and control of waterborne diseases.Water makes up about 70% of the earth's surface and is one of the most important sources vital to sustaining life. Rapid urbanization and industrialization have led to a deterioration of water quality at an alarming rate, resulting in harrowing diseases. Water quality has been conventionally estimated through expensive and time-consuming lab and statistical analyses, which render the contemporary notion of real-time monitoring devices.  Water Quality Index (WQI) assessment is required for the purpose of public health. In this project, an effective linear regression model is developed to predict the WQI based on the parameters like temperature, dissolved oxygen, pH value, Turbidity,Nitrates and fecal coliform. so this project aims at building a Machine Learning (ML) model to Predict Water Quality by considering all water quality standard indicators.

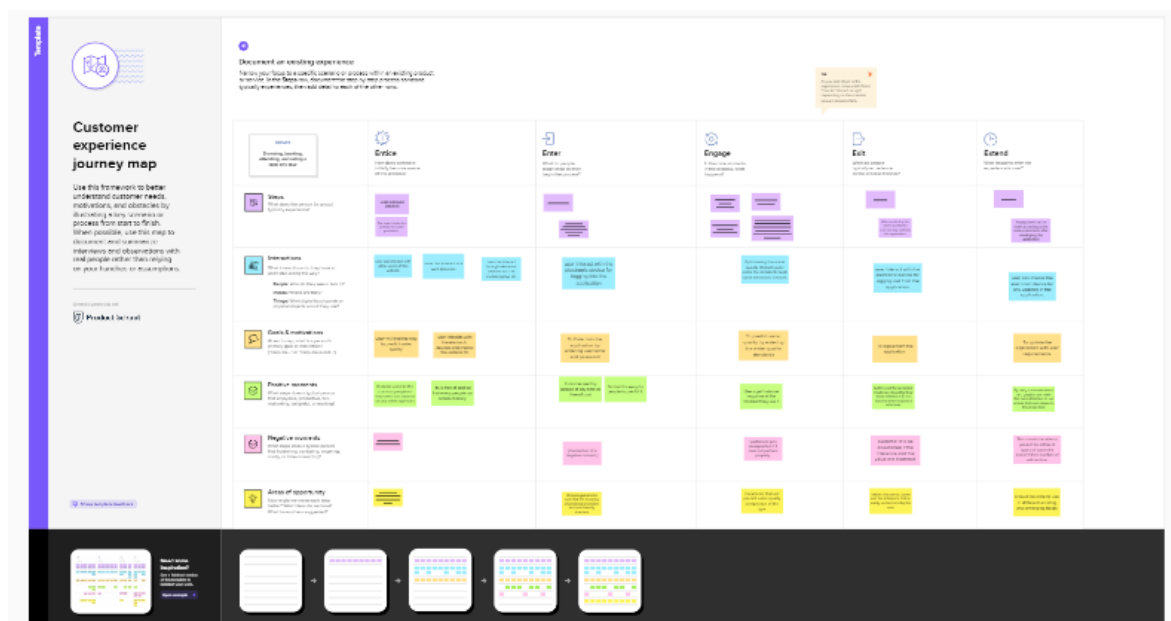## 3. IDEATION AND PROPOSED SOLUTION

### 3.1 EMPATHY MAP CANVAS

- An empathy map is a straightforward, simple-to-understand picture that summarizes information about a user's actions and views.

- Teams can utilize an empathy map as a collaborative tool to obtain a deeper understanding of their customer.

- An empathy map is a popular visualization tool in the UX and HCI fields of practice.

- An empathy map's main objective in empathetic design is to bridge the understanding of the end user.

- A rectangle divided into four quadrants, with the user or client in the center, is an empathy map. A category is included in each of the four quadrants to assist us better understand the user's perspective.

- The four empathy map quadrants examine the user's actions, thoughts, and feelings.
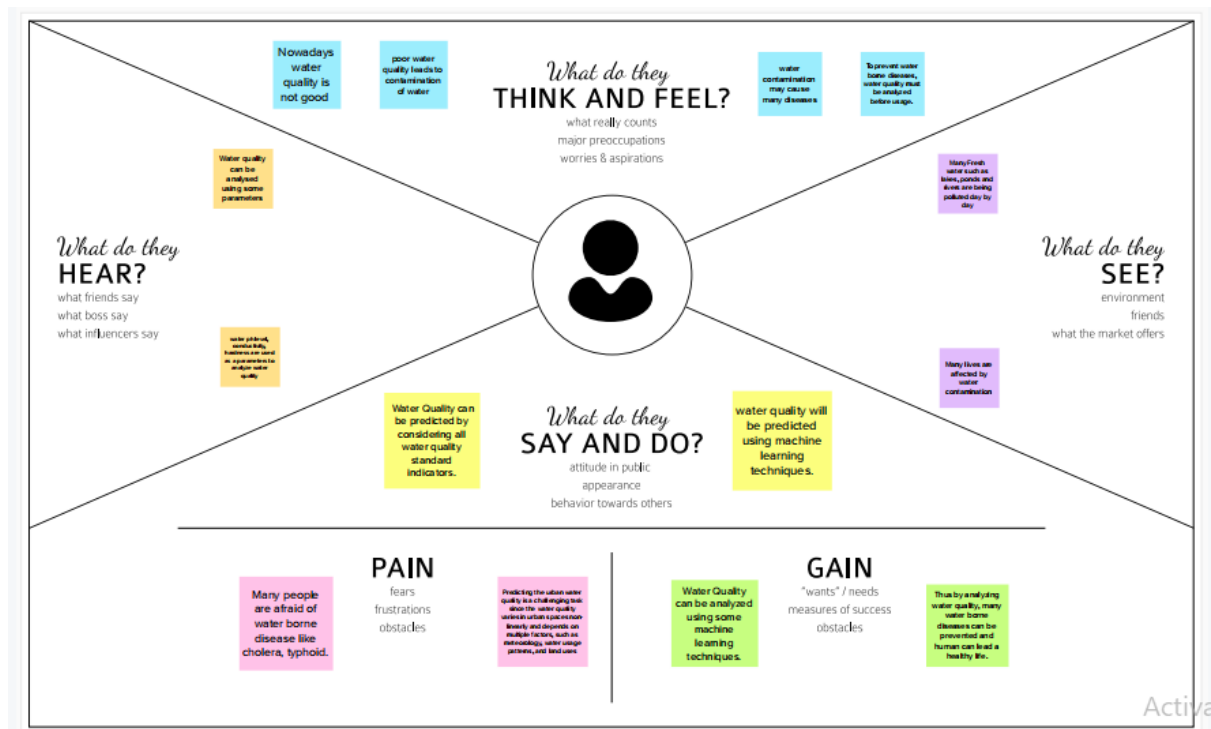


## 3.2 IDEATION AND BRAINSTORMING

## 3.3 PROPOSED SOLUTION

The quality of water is a major concern for people living in urban areas. The quality of water serves as a powerful environmental determinant and a foundation for the prevention and control of waterborne diseases. Water makes up about 70% of the earth's surface and is one of the most important sources vital to sustaining life. Rapid urbanization and industrialization have led to a deterioration of water quality at an alarming rate, resulting in harrowing diseases. Water quality has been conventionally estimated through expensive and time-consuming lab and statistical analyses, which render the contemporary notion of real-time monitoring devices. Water Quality Index (WQI) assessment is required for the purpose of public health. In this project, an effective linear regression model is developed to predict the WQI based on the parameters like temperature, dissolved oxygen, pH value, Turbidity,Nitrates and fecal coliform. so this project aims at building a Machine Learning (ML) model to Predict Water Quality by considering all water quality standard indicators. So this project aims at building a Machine Learning (ML) model to Predict Water Quality by considering all water quality standard indicators.

### Idea / Solution description:

The proposed model predicts water quality by considering all water quality standard indicators using PH,DO,etc. We need to train the datasets to run smoothly and see an incremental improvement in the prediction rate using Random Forest Regression algorithm on our dataset. We will be building a web application that is integrated to the model built. A UI is provided for the uses where he has to enter the values for predictions. The enter values are given to the saved model and prediction is showcased on the UI.

### Novelty / Uniqueness:

With machine learning techniques, the implementation was done by the Water Quality Index (WQI) which is a single numeric index that mirrors the overall quality of water with high accuracy. The heart of the project depends upon the prediction of the quality of the water. As abundant as algorithms are present in order to achieve such a goal, it is mandatory to select the best and the most efficient algorithm to finalize the predicted value. Web app is developed as UI is provided for the user where he has to enter the values for predictions.

**Social Impact / Customer Satisfaction:**

Water makes up about 70% of the earth's surface and is one of the most important sources vital to sustaining life. Rapid urbanization and industrialization have led to a deterioration of water quality at an alarming rate, resulting in harrowing diseases. Most of the research either employed manual lab analysis, not estimating the water quality index standard, or used too many parameters to be efficient enough. With machine learning techniques, the implementation was done by the Water Quality Index (WQI). Web app is developed as UI is provided for the customer/user where he has to enter the values for predictions.

**Business Model (Revenue Model):**

A web application that is integrated to the model built. A UI is provided for the uses where he has to enter the values for predictions. The enter values are given to the saved model and prediction is showcased on the UI and deploy it on IBM cloud. We can sell it for the prediction of water in various environments if the model preforms well, also can make the app as premium one.

## 3.4 PROBLEM SOLUTION FIT

# 4. REQUIREMENT ANALYSIS

## 4.1 FUNCTIONAL REQUIREMENTS

Following are the functional requirements of the proposed solution.

### a) User Registration

Registration through Form
Registration through Gmail

### b) User Confirmation

Confirmation via Email

### c) User Authentication

Authentication via Email

### d) User Authorization

Open ID Authorization

### e) External Interfaces

Software Interfaces like frontend, backend are used for the interaction between the user and software

### f) Reporting

Email notification for reporting or alerting the user.

## 4.2 NON-FUNCTIONAL REQUIREMENTS

### a) Usability

Usability is that experience gained by the users when interacting with the application. Usability tells about the efficiency of the application and overall satisfaction of the user while using the application. In this app the user will be able to predict the quality of water by using water quality parameters like PH, Turbidity, Alkalinity, Nitrate, Hardness and can decide whether the water can be used to drink or for other purpose according to the predicted value.

### b) Security

Application security is that the prevention of data being stolen or hacked by others. Our application ensures security by protecting the app from malware attacks and unauthorized users.

### c) Reliability

This application works without failure while in a specified environment over a set duration of time. It detects the correct and accurate value of water quality without error

### d) Performance

This app performs in an efficient manner to give the user good experience and it takes really a very less time to give the predicted value of water quality.

### e) Availability

This app ensures that it can be easily used by all the users without any inconvenience. This app performs in order to meet the users expectations and requirements.

### f) Scalability

The proposed can be implemented in real time water quality analysis by getting water sample using devices (Internet Of Things). Real time applications can be used in various places like schools, colleges etc. Machine learning model integrated with IOT can make users more comfortable and to use in real time.

# 5. PROJECT DESIGN

## 5.1 DATA FLOW DIAGRAMS

A two-dimensional diagram explains how data is processed and transferred in a system. The graphical depiction identifies each source of data and how it interacts with other data sources to reach a common output. Individuals seeking to draft a data flow diagram must identify external inputs and outputs, determine how the inputs and outputs relate to each other, and explain with graphics how these connections relate and what they result in. This type of diagram helps business development and design teams visualize how data is processed and identify or improve certain aspects.

| Data flow Symbols: | Description |
|---|---|
|  | An **entity**. A source of data or a destination for data. |
|  | A **process** or task that is performed by the system. |
|  | A **data store**, a place where data is held between processes. |
|  | A **data flow**. |

## LEVEL 0

The Level 0 DFD shows how the system is divided into 'sub-systems' (processes), each of which deals with one or more of the data flows to or from an external agent, and which together provide all of the functionality of the system as a whole. It also identifies internal data stores that must be present in order for the system to do its job, and shows the flow of data between the various parts of the system.

```
┌─────────────┐      ┌──────────────────┐      ┌─────────────┐
│    User     │ ───> │  Efficient water │ ───> │  Database   │
│             │      │ quality anaysis  │      │             │
└─────────────┘      │  using machine   │      └─────────────┘
                     │     learning     │
                     └──────────────────┘
```
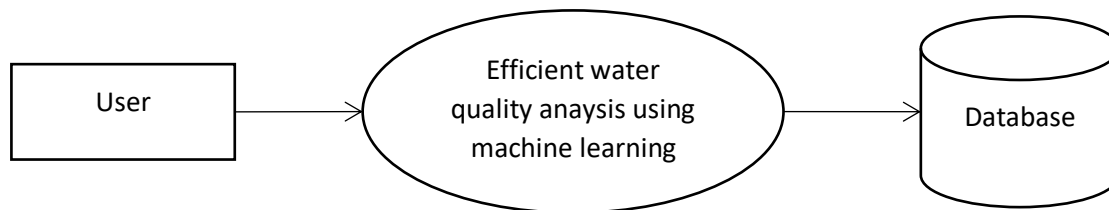
## LEVEL 1

The next stage is to create the Level 1 Data Flow Diagram. This highlights the main functions carried out by the system. As a rule, to describe the system was using between two and seven functions - two being a simple system and seven being a complicated system. This enables us to keep the model manageable on screen or paper.

```
┌────────────────┐    ┌──────────────┐    ┌──────────────┐
│ Training phase │ ─> │ Preprocessing│ ─> │   Removing   │
│                │    │ the dataset  │    │irrelevant data│
└────────────────┘    └──────────────┘    └──────────────┘
                                                  │
                                                  v
                                          ┌──────────────┐
                                          │  Predicting  │
                                          │ the dataset  │
                                          └──────────────┘
```
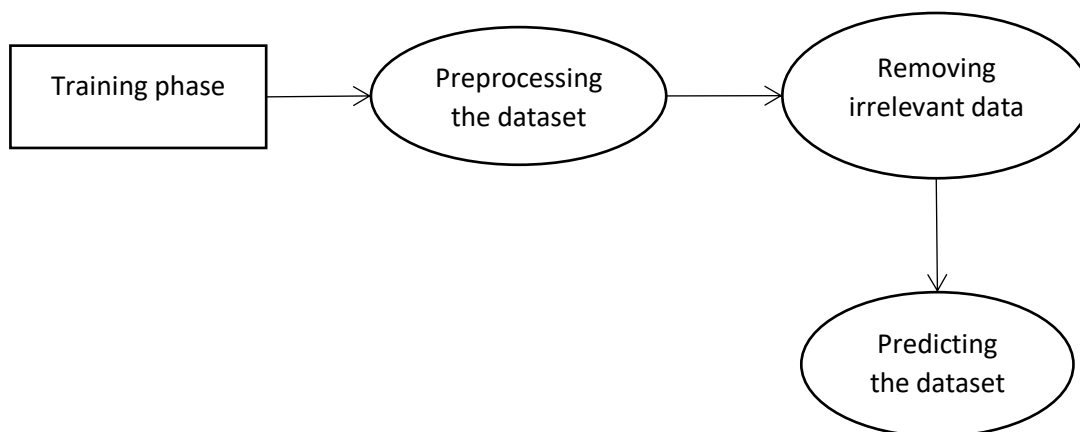
## LEVEL 2

A Data Flow Diagram (DFD) tracks processes and their data paths within the business or system boundary under investigation. A DFD defines each domain boundary and illustrates the logical movement and transformation of data within the defined boundary. The diagram shows 'what' input data enters the domain, 'what' logical processes the domain applies to that data, and 'what' output data

leaves the domain. Essentially, a DFD is a tool for process modeling and one of the oldest.

```
┌──────────────────┐        ╭─────────────────╮        ╭─────────────────╮
│                  │        │  Preprocessing  │        │    Removing     │
│  Training phase  │───────▶│   the dataset   │───────▶│ irrelevant data │
│                  │        │                 │        │                 │
└──────────────────┘        ╰─────────────────╯        ╰────────┬────────╯
                                                                │
                                                                ▼
                                                       ╭─────────────────╮
                                                       │    Predicting   │
                                                       │   the dataset   │
                                                       ╰─────────────────╯
```
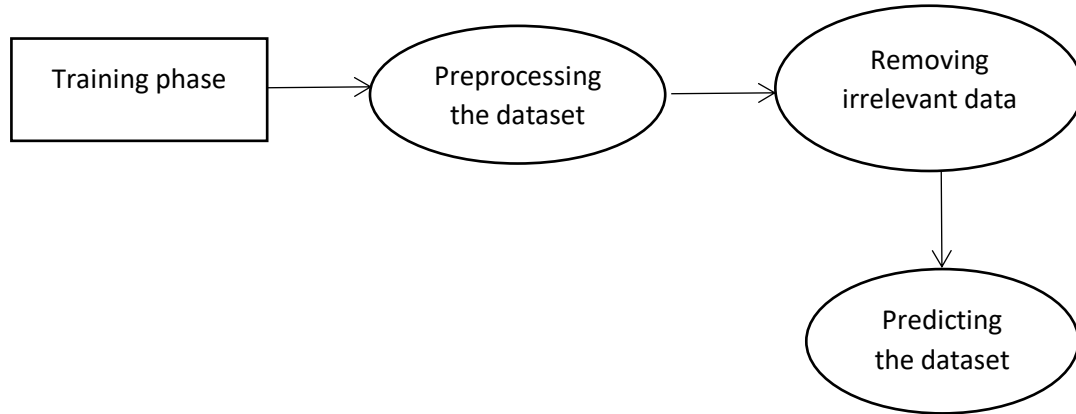
## 5.2 SOLUTION AND TECHNICAL ARCHITECTURE
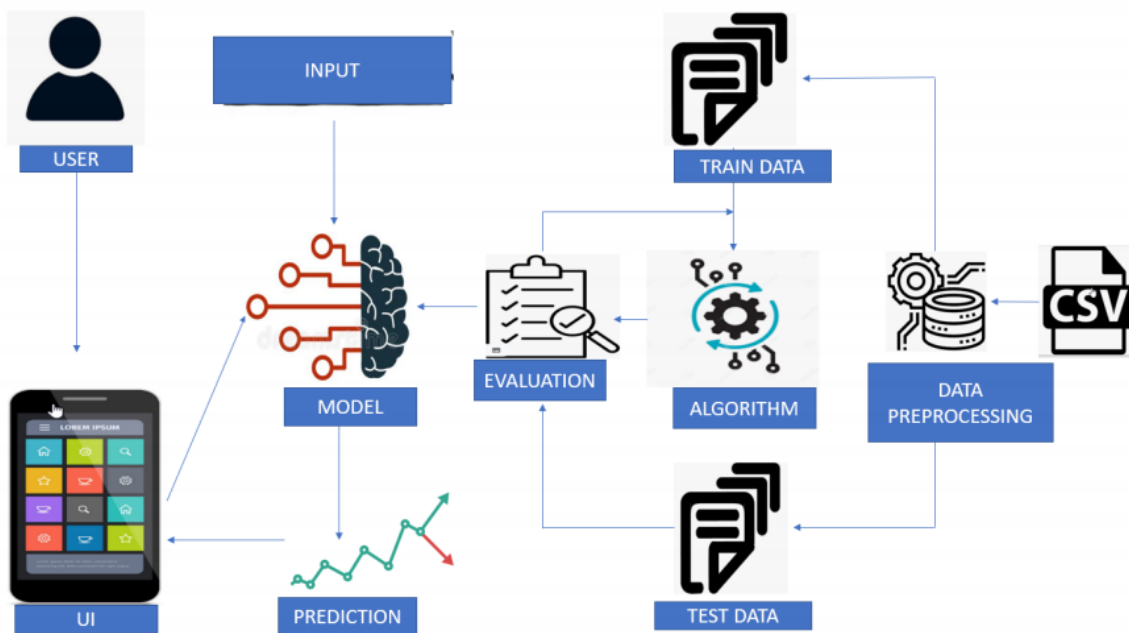


## 5.3 USER STORIES

**User Story-1 (USN-1):**

As a user, I can register by providing the asked information.

**User Story-2 (USN-2):**

As a user, I will receive confirmation email once I have registered.

**User Story-3 (USN-3):**

As a user, I can log into the application by entering email & password.

**User Story-4 (USN-4):**

As a user, I will provide the values to calculate WQI

**User Story-5 (USN-5):**

At last, I will get the result

**User Story-6 (USN-6):**

As an admin, I have the user details

**User Story-7 (USN-7):**

As an admin, I can decide the parameter required for the calculation of WQI

**User Story-8 (USN-8):**

As an admin, based on the given values by the user I will provide the information whether the water is fit for consumption or not.

## 6. PROJECT PLANNING AND SCHEDULING

### 6.1 SPRINT PLANNING AND ESTIMATION

| User Type | Functional requirement (Epic) | User Story Number | User Story / Task | Acceptance criteria | Priority | Release | Team Member |
|---|---|---|---|---|---|---|---|
| Customer (Web user) | Registration | USN-1 | As a user, I can register by providing the asked information | I can register in the webpage. | High | Sprint-1 | Thivagaran M |
| | Login | USN-3 | As a user, I can log into the application by entering email & password | I can access the dashboard | Medium | Sprint-1 | Prathyusha B |
| | Dashboard | USN-4 | As a user, I will provide the values to calculate WQI | For accurately calculating providing the parameter | Medium | Sprint-2 | Krishnapriya D |
| | Result | USN-5 | At last, I will get the result | Knowing if it is fit for consumption | High | Sprint-2 | Logadharshini M |
| Administrator | Database | USN-6 | As an admin, I have the user details | Access to user details | High | Sprint-3 | Prathyusha B |
| | Dashboard | USN-7 | As an admin, I can decide the parameter required for the calculation of WQI | For calculating accurately | High | Sprint-3 | Krishnapriya D Logadharshini M |
| | Prediction | USN-8 | As an admin, based on the given values by the user I will provide the | Providing result to user | High | Sprint-4 | Thivagaran M |

| User Type | Functional requirement (Epic) | User Story Number | User Story / Task | Acceptance criteria | Priority | Release | Team Member |
|---|---|---|---|---|---|---|---|
| | | | information whether the water is fit for consumption or not | | | | |

## 6.2  SPRINT DELIVERY SCHEDULE

| TITLE | DESCRIPTION | DATE |
|---|---|---|
| Literature Survey & Information Gathering | Literature survey on the selected project & gathering information byreferring the, technical papers, research publications etc. | 19  Sept 2022 |
| Prepare Empathy Map | Prepare Empathy Map Canvas to capture the user Pains & Gains, Prepare list of problem statements | 19 Sept 2022 |
| Ideation Brain  Storming | List the by organizing the brainstorming session and prioritize the top 3 ideas based on the feasibility & importance. | 26 Sept 2022 |

| | | |
|---|---|---|
| Proposed Solution | Prepare the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution, etc. | 3 Oct 2022 |
| Problem Solution Fit | Prepare problem solution fit document | 3 Oct 2022 |
| Solution Architecture | Prepare solution architecture document. | 3 Oct 2022 |
| Customer Journey | Prepare the customer journey maps to | 10 Oct 2022 |

| | understand the user interactions & experiences with the application (entry to exit). | |
|---|---|---|
| Solution Requirement | Prepare the functional requirement document | 10 Oct 2022 |
| Data Flow Diagrams | Draw the data flow diagrams and submit for review. | 10 Oct 2022 |
| Technology Architecture | Prepare the technology architecture diagram. | 15 Oct 2022 |
| Prepare Milestone & Activity List | Prepare the milestones & activity list of the project. | 17 Oct 2022 |
| Project Development - Delivery of Sprint-1, 2, 3 & 4 | Develop & submit the developed code by testing it. | 14 Nov 2022 |

## 7.CODING AND SOLUTIONING

### 7.1 Registration Action:

User can register here using name, email id, password.

### 7.2 Login Action:

After completing the registration process user can login the application using their registered email id and password. If the email id and password is correct, the user will be navigated into the application.

### 7.3 Input Action:

User provides the details of the standard water quality indicators like Year, D.O, PH, conductivity, B.O.D, NITRATENAN N+ NITRITENANN.

### 7.4 Water quality prediction Action:

From the details of standard water quality indicators provided by the user, the machine learning application uses the linear regression algorithm to predict the quality of water and hence it will be used to find whether the water can be used for drinking or other purpose.

## 8.TESTING

### 8.1 TEST CASES

A test case has components that describe input, action and an expected response, in order to determine if a feature of an application is working correctly. A test case is a set of instructions on "HOW" to validate a particular test objective/target, which when followed will tell us if the expected behavior of the system is satisfied or not.

Characteristics of a good test case:

  ➢ Accurate: Exacts the purpose.

- ➢ Economical: No unnecessary steps or words.
- ➢ Traceable: Capable of being traced to requirements.
- ➢ Repeatable: Can be used to perform the test over and over.
- ➢ Reusable: Can be reused if necessary

| Scenario | Input | Expected output | Actual output |
|---|---|---|---|
| User Login Form | User name and password | Login | Login success. |
| Chemical components | Chemical components details | Added successfully | Chemical component stored in database. |
| Pre processing | Chemical values | Removing irrelevant data | Predicting water quality |

## 8.2 USER ACCEPTANCE TESTING

This is a type of testing done by users, customers, or other authorized entities to determine application/software needs and business processes. Acceptance testing is the most important phase of testing as this decides whether the client approves the application/software or not. It may involve functionality, usability, performance, and U.I of the application. It is also known as user acceptance testing (UAT), operational acceptance testing (OAT), and end-user testing.

## 9. ADVANTAGES AND DISADVANTAGES

### Advantages:

The water quality prediction helps to obtain quantitative information on the physical, chemical, and biological characteristics of water via statistical sampling.

The chemical analysis of water provides insight into the health and workings of lakes, rivers, oceans, and groundwater.

It also shows the limits of a waterbody's ability to take in some level of pollution without harming the water system, its aquatic plants and animals, and humans who may use the water.

It is used to provide trend data that can complement other surveillance data to inform public health decision making.

### Disadvantages:

Machine learning is usually dependent on large amounts of high-quality data. Obtaining sufficient data with high accuracy in water treatment and management systems is often difficult owing to the cost or technology limitations.

As the conditions in real water treatment and management systems can be extremely complex, the current algorithms may only be applied to specific systems, which hinders the wide application of machine learning approaches.

The implementation of machine learning algorithms in practical applications requires researchers to have certain professional background knowledge.

## 10. CONCLUSION

As we all know the importance of water for the human body.So, knowing the Quality of the water is very much necessary because if we drink water without knowing that it is safe for drinking we could get sick. There are plenty of water-borne diseases like Cholera, Typhoid, Giardia, E.Coli, Hepatitis A, and so on. These types of diseases happen if we drink non-drinkable water. So, knowing the quality of the water is the most important thing. By efficient water quality analysis and prediction app we can able to predict the quality of water and can predict whether the water is safe to drink or not and hence we can avoid many waterborne diseases. As like Prevention is better than cure, predict the water before use.

## 11. FUTURE SCOPE

This project describes crop yield prediction ability of the algorithm. In future we can determine the efficient algorithm based on their accuracy metrics that will helps to choose an efficient algorithm for crop yield prediction.

## 12.APPENDIX

**//Index.html**

```
<html xmlns="">
<head>
<meta http-equiv="content-type" content="text/html; charset=utf-8" />
<title>EFFICIENT WATER QUALITY ANALYSIS AND PREDICTION</title>
<meta name="keywords" content="" />
<meta name="description" content="" />
```

```
<link href="default.css" rel="stylesheet" type="text/css" />
<style>




body {

margin: 0;

padding: 0;

background: #FFFFFF url(static/images/img01.gif) repeat-x;

font-family: Georgia, "Times New Roman", Times, serif;

font-size: 13px;

color: #666666;

}


h1, h2, h3 {

margin: 0;

font-weight: normal;

color: #3F586B;

}


h1 {

font-size: 197%;

}


h2 {

font-size: 167%;
```

```css
}

h3 {
font-size: 100%;
font-weight: bold;
}

p, ol, ul {
line-height: 170%;
}

p {
}

ol {
margin-left: 0;
padding-left: 0;
list-style-position: inside;
}

ul {
margin-left: 0;
padding-left: 0;
list-style: none;
}
```

```css
ul li {

padding-left: 15px;

background: url(static/images/img07.gif) no-repeat 0px 7px;

}


blockquote {

margin: 0;

padding-left: 20px;

font-style: italic;

}


blockquote * {

}


a {

color: #FF5723;

}


a:hover {

text-decoration: none;

color: #1777B1;

}


img {

border: none;

}
```

```css
img.left {

float: left;

margin: 3px 15px 0 0;

}


img.right {

float: right;

margin: 3px 0 0 15px;

}


hr {

display: none;

}


/* Header */


#header {

width: 1500px;

height: 135px;

margin: 0 auto;

background: #cab8d5 url(static/images/img02.jpg) no-repeat;


}


/* Logo */
```

```css
#logo {

height: 190px;

}


#logo h1, #logo h2 {

text-align: center;

}


#logo h1 {

padding-top: 40px;

font-size: 350%;

}


#logo h2 {

font-size: 150%;

}


#logo a {

text-decoration: none;

color: #3F586B;

}

/* Menu */


#menu {
```

```
padding-top: 0;

width: 798px;

}


#menu ul {

margin: 0;

padding: 10px 0 0 0;

list-style: none;

line-height: normal;

text-align: left;

}


#menu li {

display: block;

margin: 35;

padding: 15;

}


#menu a {

padding: 0 20px;

text-decoration: none;

font-size: 156%;

font-weight: bold;

color: #823991;

}
```

```css
#menu a:hover {

text-decoration: underline;

}


#menu .active a {

color: #681212;

}


/* Page */


#page {

width: 730px;

margin: 0 auto;

padding: 30px 0;

}


/* Content */

#content {

float: left;

width: 800px;

padding-top: 8px;

}


.twocols {

}
```

```css
.twocols .title {

padding-bottom: 10px;

border-bottom: 1px solid #97C984;

}


.twocols .col1, .twocols .col2 {

width: 190px;

}


.twocols .col1 {

float: left;

}


.twocols .col2 {

float: right;

}


.twocols ul {

}


.twocols ul li {

padding-left: 0;

}


/* Sidebar */
```

```css
#sidebar {

float: right;

width: 260px;

}


.boxed {

margin: 0 0 20px 0;

}


.boxed .title {

width: 250px;

height: 35px;

margin: 0;

padding: 10px 0 0 10px;

background: #A8C3CB url(static/images/img03.jpg) no-repeat;

font-size: 136%;

color: #144B6B;

}


.boxed .content {

padding: 50px;

border: 1px solid #97C984;

border-top: none;

}


.boxed h3 {
```

```css
margin: 0;

}


.boxed p, .boxed ul, .boxed ol {

margin: 0;

padding: 0;

list-style: none;

line-height: normal;

}


.boxed ul {

}


.boxed ul li {

padding: 8px 0 8px 10px;

background: url(static/images/img04.gif) no-repeat 0px 13px;

}


.boxed ul li.first {

border: none;

}


/* Search */


#search {

}
```

```css
#search form {

margin: 0;

padding: 0;

}


#search fieldset {

margin: 0;

padding: 0;

border: none;

}


#search p {

float: left;

padding-top: 5px;

font-size: 85%;

}


#searchinput {

width: 210px;

margin-bottom: 5px;

}


#searchsubmit {

float: right;

}
```

```css
/* Footer */

#footer {

height: 100px;

padding: 20px;

background: #5F919E;

border-top: 5px solid #4C747E;

}


#footer p {

margin: 0;

text-align: center;

line-height: normal;

font-size: 85%;

color: #FFFFFF;

}


#footer a {

color: #FFFFFF;

}


.tiledBackground{


background-image:    url(https://media.istockphoto.com/photos/light-blue-
watercolor-background-picture-
```

```
id1301156172?b=1&k=20&m=1301156172&s=612x612&w=0&h=IMT1g2Zc
vqZjnAnUbLyB18Imd2IscR-SUGeb3jp86Cs=);

background-size: cover;

background-position:center ;

background-repeat: no-repeat;

height:30%;




}
</style>


</head>
<body>



<div id="header">
<div id="logo">
<h1><a href="#">EFFICIENT WATER QUALITY ANALYSIS AND PREDICTION
</a></h1>
</div>
<div id="menu">
<ul>
<li class="active"><a href="/">HOME</a></li>


<li><a href="/user">LOGIN</a></li>
<li><a href="/NewUser">REGISTER</a></li>
```

```html
</ul>
<!--<imgsrc="https://www.w3schools.com/images/w3schools_green.jpg"
alt="W3Schools.com">-->


</div>




</div>
<div id="page">
<div id="content">
<div style="margin-bottom: 50px;">
<h1 class="title"> </h1>


<h2> </h2>
<p> </p>
</blockquote>
</div>
<div> </div>
<div class="twocols"></div>
</div>


<div style="clear: both;"> </div>
<div class="tiledBackgroungd"></div>
```

```
</div>


<div align=center> <a href='#'></a></div>


<div class="tiledBackgroungd"></div>


</body>
</html>
```

## //userhome.html

```
<html xmlns="">
<head>
<meta http-equiv="content-type" content="text/html; charset=utf-8" />
<title>Secured data communication</title>
<meta name="keywords" content="" />
<meta name="description" content="" />
<link href="default.css" rel="stylesheet" type="text/css" />
<style>



body {
margin: 0;
padding: 0;
background: #FFFFFF url(static/images/img01.gif) repeat-x;
```

```css
font-family: Georgia, "Times New Roman", Times, serif;

font-size: 13px;

color: #666666;

}


h1, h2, h3 {

margin: 0;

font-weight: normal;

color: #3F586B;

}


h1 {

font-size: 197%;

}


h2 {

font-size: 167%;

}


h3 {

font-size: 100%;

font-weight: bold;

}


p, ol, ul {

line-height: 170%;
```

```css
}

p {
}

ol {
margin-left: 0;
padding-left: 0;
list-style-position: inside;
}

ul {
margin-left: 0;
padding-left: 0;
list-style: none;
}

ul li {
padding-left: 15px;
background: url(static/images/img07.gif) no-repeat 0px 7px;
}

blockquote {
margin: 0;
padding-left: 20px;
font-style: italic;
```

```css
}

blockquote * {

}

a {
color: #FF5723;
}

a:hover {
text-decoration: none;
color: #1777B1;
}

img {
border: none;
}

img.left {
float: left;
margin: 3px 15px 0 0;
}

img.right {
float: right;
margin: 3px 0 0 15px;
```

```css
}

hr {
display: none;
}

/* Header */

#header {
width: 1500px;
height: 235px;
margin: 0 auto;
background: #cab8d5 url(static/images/img02.jpg) no-repeat;
}

/* Logo */

#logo {
height: 190px;
}

#logo h1, #logo h2 {
text-align: center;
}

#logo h1 {
```

```css
padding-top: 40px;

font-size: 350%;

}


#logo h2 {

font-size: 150%;

}


#logo a {

text-decoration: none;

color: #3F586B;

}


/* Menu */


#menu {

padding-top: 0;

width: 798px;

}


#menu ul {

margin: 0;

padding: 10px 0 0 0;

list-style: none;

line-height: normal;

text-align: center;
```

```css
}

#menu li {
display: inline;
margin: 0;
padding: 0;
}

#menu a {
padding: 0 20px;
text-decoration: none;
font-size: 136%;
font-weight: bold;
color: #610720;
}

#menu a:hover {
text-decoration: underline;
}

#menu .active a {
color: #FFFFFF;
}

/* Page */
```

```css
#page {
width: 730px;
margin: 0 auto;
padding: 30px 0;
}

/* Content */

#content {
float: left;
width: 800px;
padding-top: 8px;
}

.twocols {
}

.twocols .title {
padding-bottom: 10px;
border-bottom: 1px solid #97C984;
}

.twocols .col1, .twocols .col2 {
width: 190px;
}
```

```css
.twocols .col1 {
float: left;
}


.twocols .col2 {
float: right;
}


.twocols ul {
}


.twocols ul li {
padding-left: 0;
}


/* Sidebar */


#sidebar {
float: right;
width: 260px;
}


.boxed {
margin: 0 0 20px 0;
}
```

```css
.boxed .title {
width: 250px;
height: 35px;
margin: 0;
padding: 10px 0 0 10px;
background: #A8C3CB url(static/images/img03.jpg) no-repeat;
font-size: 136%;
color: #144B6B;
}

.boxed .content {
padding: 20px;
border: 1px solid #97C984;
border-top: none;
}

.boxed h3 {
margin: 0;
}

.boxed p, .boxed ul, .boxed ol {
margin: 0;
padding: 0;
list-style: none;
line-height: normal;
}
```

```css
.boxed ul {

}

.boxed ul li {

padding: 8px 0 8px 10px;

background: url(static/images/img04.gif) no-repeat 0px 13px;

}

.boxed ul li.first {

border: none;

}

/* Search */

#search {

}

#search form {

margin: 0;

padding: 0;

}

#search fieldset {

margin: 0;

padding: 0;
```

```css
    border: none;
}

#search p {
float: left;

padding-top: 5px;

font-size: 85%;
}

#searchinput {
width: 210px;

margin-bottom: 5px;
}

#searchsubmit {
float: right;
}

/* Footer */

#footer {
height: 100px;

padding: 20px;

background: #5F919E;

border-top: 5px solid #4C747E;
}
```

```css
#footer p {

margin: 0;

text-align: center;

line-height: normal;

font-size: 85%;

color: #FFFFFF;

}


#footer a {

color: #FFFFFF;

}

.tiledBackground{


background-image:                                          url(https://encrypted-
tbn0.gstatic.com/images?q=tbn:ANd9GcQ3bsl1jlFAzu1WgS574HLwacmixpb
IhXDglXzM3xIl20EhrY_iHFgatRYfADG46J8ZSYQ&usqp=CAU);

background-size: cover;

background-position:center ;

background-repeat: no-repeat;

height:30%;



}

.style5 {color: #2c5a88}

.style6 {font-size: 16px}
```

```html
.style8 {color: #3d5b99}
</style>


</head>


<body>
<div id="header">
<div id="logo">
<h1><a href="#">EFFICIENT WATER QUALITY ANALYSIS AND PREDICTION </a></h1>


</div>
<div id="menu">
<ul>
<li><a href="/userhome">HOME</a></li>


<li><a href="/">LOGOUT</a></li>
</ul>
</div>
</div>
<div id="page">
<div id="content">
<div style="margin-bottom: 20px;">
```

```html
<p align="justify"><strong>

<form action="/predict" method="post" enctype="multipart/form-data" name="form1">

<table border="0" align="center">

<tr>

<td colspan="2"><div align="center" class="style5">

<h2 class="style5"><span class="style8">---ENTER THE BELOW DETAILS--</span></h2>

</div></td>

</tr>



<tr>

<td height="37"><h2 class="style5 style6">1.YEAR </h2></td>

<td><label>

<input name="year" type="text" id="year" />

</label></td>

</tr>



<tr>

<td height="37"><h2 class="style5 style6">2.D.O. (mg/l) </h2></td>

<td><label>

<input name="do" type="text" id="do" />

</label></td>

</tr>
```

```html
<tr>
<td height="37"><h2 class="style5 style6">3.PH </h2></td>
<td><label>
<input name="ph" type="text" id="ph" />
</label></td>
</tr>


<tr>
<td height="37"><h2 class="style5 style6">4.CONDUCTIVITY (µmhos/cm)
</h2></td>
<td><label>
<input name="co" type="text" id="co" />
</label></td>
</tr>


<tr>
<td height="37"><h2 class="style5 style6">5.B.O.D. (mg/l) </h2></td>
<td><label>
<input name="bod" type="text" id="bod" />
</label></td>
</tr>


<tr>
<td height="37"><h2 class="style5 style6">6.NITRATENAN N+ NITRITENANN
(mg/l) </h2></td>
<td><label>
<input name="na" type="text" id="na" />
```

```html
</label></td>

</tr>


<tr>

<td      height="37"><h2     class="style5    style6">7.TOTAL    COLIFORM
(MPN/100ml)Mean </h2></td>

<td><label>

<input name="tc" type="text" id="tc" />

</label></td>

</tr>
```

```html
<tr>

<td>


<td>{{prediction}}</td>

</td>

</tr>

<tr>

<td> </td>

<td><label>
```

```html
<input type="submit" name="Submit" value="RESULT" />

<input type="reset" name="Submit2" value="RESET">

<a href="user_reg.jsp"></a></label></td>

</tr>

</table>

</form>

</p>

<p> </p>

</blockquote>

</div>

<div> </div>

<div class="twocols"></div>

</div>


<div style="clear: both;"> </div>

</div>


<div align=center> <a href='#'></a></div>

<div class="tiledBackground"></div>


</body>

</html>
```

**//user.html**

```
<html xmlns="">

<head>

<meta http-equiv="content-type" content="text/html; charset=utf-8" />

<title>Secured data communication</title>

<meta name="keywords" content="" />

<meta name="description" content="" />

<link href="default.css" rel="stylesheet" type="text/css" />

<style>


body {

margin: 0;

padding: 0;

background: #FFFFFF url(static/images/img01.gif) repeat-x;

font-family: Georgia, "Times New Roman", Times, serif;

font-size: 13px;

color: #666666;

}


h1, h2, h3 {

margin: 0;

font-weight: normal;

color: #3F586B;

}


h1 {
```

```
font-size: 197%;

}


h2 {

font-size: 167%;

}


h3 {

font-size: 100%;

font-weight: bold;

}


p, ol, ul {

line-height: 170%;

}


p {

}


ol {

margin-left: 0;

padding-left: 0;

list-style-position: inside;

}


ul {
```

```css
margin-left: 0;

padding-left: 0;

list-style: none;

}


ul li {

padding-left: 15px;

background: url(static/images/img07.gif) no-repeat 0px 7px;

}


blockquote {

margin: 0;

padding-left: 20px;

font-style: italic;

}


blockquote * {

}


a {

color: #FF5723;

}


a:hover {

text-decoration: none;

color: #1777B1;
```

```css
}

img {
border: none;
}

img.left {
float: left;
margin: 3px 15px 0 0;
}

img.right {
float: right;
margin: 3px 0 0 15px;
}

hr {
display: none;
}

/* Header */

#header {
width: 1500px;
height: 235px;
margin: 0 auto;
```

```css
background: #cab8d5 url(static/images/img02.jpg) no-repeat;

}


/* Logo */


#logo {

height: 190px;

}


#logo h1, #logo h2 {

text-align: center;

}


#logo h1 {

padding-top: 40px;

font-size: 350%;

}


#logo h2 {

font-size: 150%;

}


#logo a {

text-decoration: none;

color: #3F586B;

}
```

```css
/* Menu */

#menu {
padding-top: 0;
width: 798px;
}


#menu ul {
margin: 0;
padding: 10px 0 0 0;
list-style: none;
line-height: normal;
text-align: center;
}


#menu li {
display: inline;
margin: 0;
padding: 0;
}


#menu a {
padding: 0 20px;
text-decoration: none;
font-size: 136%;
```

```css
font-weight: bold;

color: #610720;

}


#menu a:hover {

text-decoration: underline;

}


#menu .active a {

color: #FFFFFF;

}


/* Page */


#page {

width: 730px;

margin: 0 auto;

padding: 30px 0;

}


/* Content */


#content {

float: left;

width: 800px;

padding-top: 8px;
```

```css
}

.twocols {

}

.twocols .title {

padding-bottom: 10px;

border-bottom: 1px solid #97C984;

}

.twocols .col1, .twocols .col2 {

width: 190px;

}

.twocols .col1 {

float: left;

}

.twocols .col2 {

float: right;

}

.twocols ul {

}

.twocols ul li {
```

```css
padding-left: 0;

}


/* Sidebar */


#sidebar {

float: right;

width: 260px;

}


.boxed {

margin: 0 0 20px 0;

}


.boxed .title {

width: 250px;

height: 35px;

margin: 0;

padding: 10px 0 0 10px;

background: #A8C3CB url(static/images/img03.jpg) no-repeat;

font-size: 136%;

color: #144B6B;

}


.boxed .content {

padding: 20px;
```

```css
border: 1px solid #97C984;

border-top: none;

}


.boxed h3 {

margin: 0;

}


.boxed p, .boxed ul, .boxed ol {

margin: 0;

padding: 0;

list-style: none;

line-height: normal;

}


.boxed ul {

}


.boxed ul li {

padding: 8px 0 8px 10px;

background: url(static/images/img04.gif) no-repeat 0px 13px;

}


.boxed ul li.first {

border: none;

}
```

```css
/* Search */

#search {

}

#search form {
margin: 0;
padding: 0;
}

#search fieldset {
margin: 0;
padding: 0;
border: none;
}

#search p {
float: left;
padding-top: 5px;
font-size: 85%;
}

#searchinput {
width: 210px;
margin-bottom: 5px;
```

```css
}

#searchsubmit {

float: right;

}


/* Footer */


#footer {

height: 100px;

padding: 20px;

background: #5F919E;

border-top: 5px solid #4C747E;

}


#footer p {

margin: 0;

text-align: center;

line-height: normal;

font-size: 85%;

color: #FFFFFF;

}


#footer a {

color: #FFFFFF;

}
```

```css
.tiledBackground{

background-image:                                    url(https://encrypted-
tbn0.gstatic.com/images?q=tbn:ANd9GcQ3bsl1jlFAzu1WgS574HLwacmixpb
IhXDglXzM3xIl20EhrY_iHFgatRYfADG46J8ZSYQ&usqp=CAU);

background-size: cover;

background-position:center ;

background-repeat: no-repeat;

height:30%;




}
.style5 {color: #793107}
```
```html
</style>
</head>
<body>
<div id="header">
<div id="logo">
<h1><a href="#">EFFICIENT WATER QUALITY ANALYSIS AND PREDICTION </a></h1>

</div>
<div id="menu">
<ul>
<li><a href="/">HOME</a></li>
<li class="active"><a href="/user">LOGIN</a></li>
```

```html
<li ><a href="/NewUser">REGISTRATION</a></li>

</ul>

</div>

</div>

<div id="page">

<div id="content">

<div style="margin-bottom: 20px;">

<p align="justify"><strong>

<form name="form1" method="post" action="/userlog">

<table width="389" height="214" border="0" align="center">

<tr>

<td colspan="2"><div align="center" class="style5">

<h2 class="style5">--LOGIN HERE-- </h2>

</div></td>

</tr>

<tr>

<td height="37"><h2 class="style5">EMAIL ID  </h2></td>

<td><label>

<input name="_id" type="text" id="_id" />

</label></td>

</tr>

<tr>

<td><h2 class="style5">PASSWORD</h2></td>

<td><label>
```

```html
<input name="psw" type="password" id="psw" />

</label></td>

</tr>

<tr>

<td> </td>

<td>

<input type="submit" name="Submit" value="OK" />  <input type="reset"
name="reset" value="Reset" />

</td>

</tr>

</table>

</form>

</p>

<p> </p>

</blockquote>

</div>

<div> </div>

<div class="twocols"></div>

</div>

<div style="clear: both;"> </div>

</div>


<div align=center> <a href='#'></a></div>

<div class="tiledBackground"></div>


</body>

</html>
```

**//newuser.html**

```html
<html xmlns="">
<head>
<meta http-equiv="content-type" content="text/html; charset=utf-8" />
<title>Secured data communication</title>
<meta name="keywords" content="" />
<meta name="description" content="" />
<link href="default.css" rel="stylesheet" type="text/css" />
<style>



body {
margin: 0;
padding: 0;
background: #FFFFFF url(static/images/img01.gif) repeat-x;
font-family: Georgia, "Times New Roman", Times, serif;
font-size: 13px;
color: #666666;
}

h1, h2, h3 {
margin: 0;
font-weight: normal;
```

```css
color: #3F586B;

}


h1 {

font-size: 197%;

}


h2 {

font-size: 167%;

}


h3 {

font-size: 100%;

font-weight: bold;

}


p, ol, ul {

line-height: 170%;

}


p {

}


ol {

margin-left: 0;

padding-left: 0;
```

```css
list-style-position: inside;

}


ul {

margin-left: 0;

padding-left: 0;

list-style: none;

}


ul li {

padding-left: 15px;

background: url(static/images/img07.gif) no-repeat 0px 7px;

}


blockquote {

margin: 0;

padding-left: 20px;

font-style: italic;

}


blockquote * {

}


a {

color: #FF5723;

}
```

```css
a:hover {

text-decoration: none;

color: #1777B1;

}


img {

border: none;

}


img.left {

float: left;

margin: 3px 15px 0 0;

}


img.right {

float: right;

margin: 3px 0 0 15px;

}


hr {

display: none;

}


/* Header */
```

```css
#header {
width: 1500px;
height: 235px;
margin: 0 auto;
background: #cab8d5 url(static/images/img02.jpg) no-repeat;
}

/* Logo */

#logo {
height: 190px;
}

#logo h1, #logo h2 {
text-align: center;
}

#logo h1 {
padding-top: 40px;
font-size: 350%;
}

#logo h2 {
font-size: 150%;
}
```

```css
#logo a {

text-decoration: none;

color: #3F586B;

}


/* Menu */


#menu {

padding-top: 0;

width: 798px;

}


#menu ul {

margin: 0;

padding: 10px 0 0 0;

list-style: none;

line-height: normal;

text-align: center;

}


#menu li {

display: inline;

margin: 0;

padding: 0;

}
```

```css
#menu a {

padding: 0 20px;

text-decoration: none;

font-size: 136%;

font-weight: bold;

color: #610720;

}


#menu a:hover {

text-decoration: underline;

}


#menu .active a {

color: #FFFFFF;

}


/* Page */


#page {

width: 730px;

margin: 0 auto;

padding: 30px 0;

}


/* Content */
```

```css
#content {

float: left;

width: 800px;

padding-top: 8px;

}


.twocols {

}


.twocols .title {

padding-bottom: 10px;

border-bottom: 1px solid #97C984;

}


.twocols .col1, .twocols .col2 {

width: 190px;

}


.twocols .col1 {

float: left;

}


.twocols .col2 {

float: right;

}
```

```css
.twocols ul {

}


.twocols ul li {

padding-left: 0;

}


/* Sidebar */


#sidebar {

float: right;

width: 260px;

}


.boxed {

margin: 0 0 20px 0;

}


.boxed .title {

width: 250px;

height: 35px;

margin: 0;

padding: 10px 0 0 10px;

background: #A8C3CB url(static/images/img03.jpg) no-repeat;

font-size: 136%;

color: #144B6B;
```

```css
}


.boxed .content {

padding: 20px;

border: 1px solid #97C984;

border-top: none;

}


.boxed h3 {

margin: 0;

}


.boxed p, .boxed ul, .boxed ol {

margin: 0;

padding: 0;

list-style: none;

line-height: normal;

}


.boxed ul {

}


.boxed ul li {

padding: 8px 0 8px 10px;

background: url(static/images/img04.gif) no-repeat 0px 13px;

}
```

```css
.boxed ul li.first {

border: none;

}


/* Search */


#search {

}


#search form {

margin: 0;

padding: 0;

}


#search fieldset {

margin: 0;

padding: 0;

border: none;

}


#search p {

float: left;

padding-top: 5px;

font-size: 85%;

}
```

```css
#searchinput {

width: 210px;

margin-bottom: 5px;

}


#searchsubmit {

float: right;

}


/* Footer */


#footer {

height: 100px;

padding: 20px;

background: #5F919E;

border-top: 5px solid #4C747E;

}


#footer p {

margin: 0;

text-align: center;

line-height: normal;

font-size: 85%;

color: #FFFFFF;

}
```

```css
#footer a {

color: #FFFFFF;

}


.tiledBackground{


background-image:                                url(https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQ3bsl1jlFAzu1WgS574HLwacmixpbIhXDglXzM3xIl20EhrY_iHFgatRYfADG46J8ZSYQ&usqp=CAU);

background-size: cover;

background-position:center ;

background-repeat: no-repeat;

height:30%;




}
.style5 {color: #1A3B5C}
</style>
</head>
<body>
<div id="header">
<div id="logo">
<h1><a href="#">EFFICIENT WATER QUALITY ANALYSIS AND PREDICTION </a></h1>
```

```html
</div>
<div id="menu">
<ul>
<li><a href="/">HOME</a></li>
<li><a href="/user">LOGIN</a></li>
<li class="active"><a href="/NewUser">REGISTRATION</a></li>


</ul>
</div>
</div>
<div id="page">
<div id="content">
<div style="margin-bottom: 20px;">

<p align="justify"><strong>
<form name="form1" method="post" action="/newuse">
<table width="389" height="214" border="0" align="center">
<tr>
<td colspan="2"><div align="center" class="style5">
<h2 class="style5">--REGISTER HERE-- </h2>
</div></td>
</tr>


<tr>
```

```html
<td height="37"><h2 class="style5">NAME </h2></td>

<td><label>

<input name="name" type="text" id="name" />

</label></td>

</tr>

<tr>

<td height="37"><h2 class="style5">EMAIL ID </h2></td>

<td><label>

<input name="_id" type="text" id="_id" />

</label></td>


</tr>

<tr>

<td><h2 class="style5">PASSWORD</h2></td>

<td><label>

<input name="psw" type="password" id="psw" />

</label></td>

</tr>

<tr>

<td> </td>

<td>

<input type="submit" name="Submit" value="OK" /> <input type="reset" name="reset" value="Reset" />

</td>

</tr>

</table>

</form>
```

```html
</p>

<p> </p>

</blockquote>

</div>

<div> </div>

<div class="twocols"></div>

</div>


<div style="clear: both;"> </div>

</div>


<div align=center> <a href='#'></a></div>

<div class="tiledBackground"></div>




</body>

</html>
```

**//goback.html**

```html
<!DOCTYPE html>

<html>

<body>


<p>{{data}}</p>
```

```html
<button onclick="goBack()">Go Back</button>


<script>
function goBack() {
  window.history.back();
}
</script>


</body>
</html>
```

**//output.html**

```html
<!DOCTYPE html>
<html lang="en">
<head>
<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>Output</title>
</head>
<style>
body{
background-image:  url('https://img.freepik.com/free-vector/elegant-white-background-with-shiny-lines_1017-17580.jpg?w=2000');
}
</style>
```

```html
<body>
<br/>
<br/>
<h2><center>Prediction : {{ prediction }}.</center></h2>
</body>
</html>
```

**RESULT:**

# EFFICIENT WATER QUALITY ANALYSIS AND PREDICTION

HOME    LOGIN    REGISTRATION

--REGISTER HERE--

NAME           prathu
EMAIL ID       prathu31@gmail.com
PASSWORD       ••••••

OK   Reset



Registered Successfully!!!

Go Back

# EFFICIENT WATER QUALITY ANALYSIS AND PREDICTION

HOME    LOGIN    REGISTRATION

--LOGIN HERE--

EMAIL ID        kalaiselvan.siva2002@gma

PASSWORD        •••••    👁

OK    Reset



# EFFICIENT WATER QUALITY ANALYSIS AND PREDICTION

HOME    LOGOUT

---ENTER THE BELOW DETAILS--

| | |
|---|---|
| 1.YEAR | 2014 |
| 2.D.O. (mg/l) | 6.7 |
| 3.PH | 7.5 |
| 4.CONDUCTIVITY (μmhos/cm) | 203 |
| 5.B.O.D. (mg/l) | 2 |
| 6.NITRATENAN N+ NITRITENANN (mg/l) | 0.1 |
| 7.TOTAL COLIFORM (MPN/100ml)Mean | 27 |

RESULT    RESET

We can see that the water is

Poor, the Predicted value is 20.940194584714295.