

## **Project Report Format**

|                     |   |
|---------------------|---|
| <b>Date</b>         | <b>18.11.2022</b>   |
| <b>Team id</b>      | <b>PNT2022TMID49528</b>   |
| <b>Project name</b> | <b>Efficient water quality analysis and prediction<br/>using machine learning</b> |

## **1. INTRODUCTION**

### **1.1 Project Overview**

Water is the most significant resource of life, crucial for supporting the life of most existing creatures and human beings. Living organisms need water with enough quality to continue their lives. Water quality has a direct impact on public health and the environment. In this project we are going to implement a water quality prediction using machine learning techniques. In this technique, our model predicts that the water is safe to drink or not using some parameters like Ph value, conductivity, hardness, etc.

### **1.2 Purpose**

The goal is to predict the spatio - temporal water quality in terms of the power of hydrogen (pH), value for the next day based on the historical data of water measurement indices. This model predicts water quality and is used to indicate whether or not it is suitable for drinking based on some parameters

## **2. LITERATURE SURVEY**

### **2.1 Existing problem**

<https://www.mdpi.com/2073-4441/11/11/2210>

### **2.2 References**

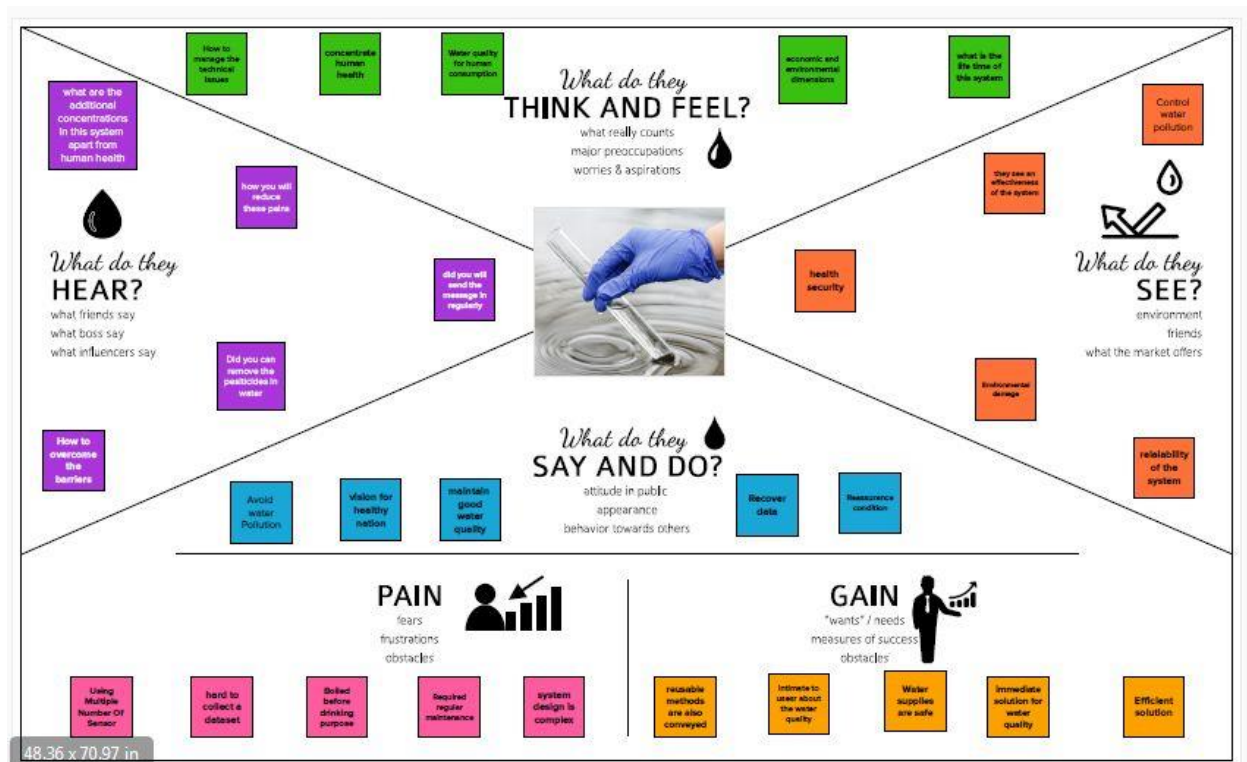
1. PCRWR. National Water Quality Monitoring Program, Fifth Monitoring Report (2005–2006); Pakistan Council of Research in Water Resources Islamabad: Islamabad, Pakistan, 2007. Available online: <http://www.pcrwr.gov.pk/Publications/Water%20Quality%20Reports/Water%20Quality%20Monitoring%20Report%202005-06.pdf> (accessed on 23 August 2019).
2. Mehmood, S.; Ahmad, A.; Ahmed, A.; Khalid, N.; Javed, T. Drinking Water Quality in Capital City of Pakistan. Open Access Sci. Rep. 2013, 2. [CrossRef]
3. PCRWR. Water Quality of Filtration Plants, Monitoring Report; PCRWR: Islamabad, Pakistan, 2010. Available online: <http://www.pcrwr.gov.pk/Publications/Water%20Quality%20Reports/FILTRTAION%20PLANTS%20REPOT-CDA.pdf> (accessed on 23 August 2019).

## 2.3 Problem Statement Definition

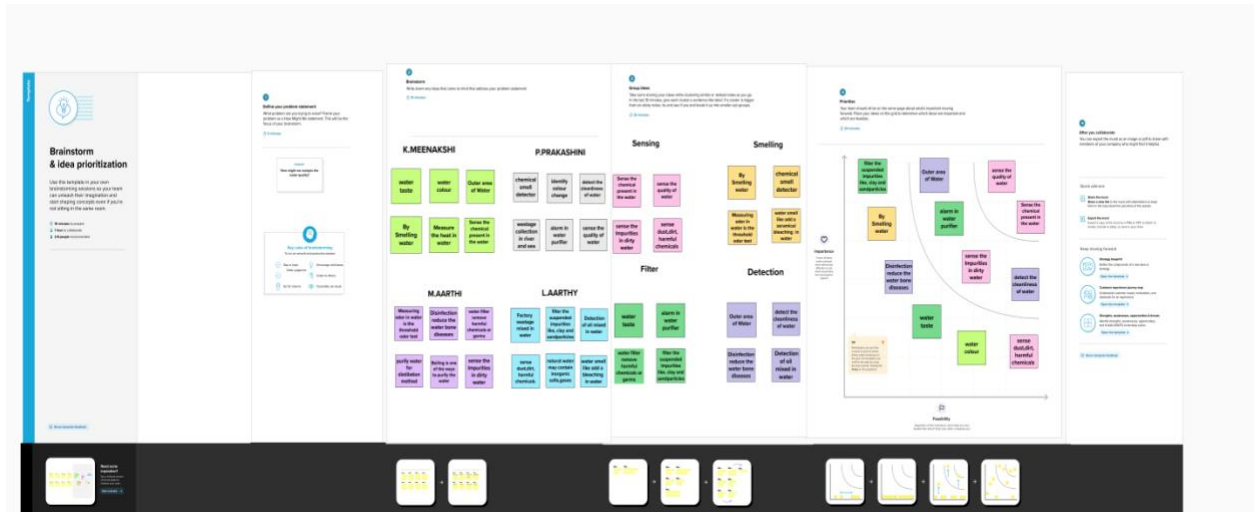
1. Deepak is a/an Officer  
Who needs To monitor the purity level of drinking water  
Because He is responsible for people welfare
2. Banu is a/an counselor of the area  
Who needs To know about the alternate methods to using a impurity water  
Because she will not know about these alternative methods
3. Priya is a/an one of person in this person  
Who needs To know about the alternate methods to using a impurity water  
Because she will not know about these alternative methods

## 3. IDEATION & PROPOSED SOLUTION

### 3.1 Empathy Map Canvas



## 3.2 Ideation & Brainstorming




## 3.3 Proposed Solution

| S.NO | Parameter                                | Description   |
|------|--|---|
| 1.   | Problem Statement (Problem to be solved) | ➤ In a current situation the human beings health in a bad condition . It is the water that is used daily that causes people to formed a diseases.   |
| 2.   | Idea / Solution description              | ➤ Collecting data sets ,Analysing a water quality by comparing the current data set values with previous collected data set values and convey message to the user about the water quality and reusable methods also.  |
| 3.   | Novelty / Uniqueness                     | ➤ The information is sent to the user very quickly without any delay.<br>➤ Recycling methods are also reported along with water quality.  |
| 4.   | Social Impact / Customer satisfaction    | ➤ Clean water consumption leads to healthy life.<br>➤ Learn about ways to reuse water without wasting it.<br>➤ Medical care, loss of productivity and even death can be avoided.  |
| 5.   | Business Model (Revenue Model)           | ➤ Through advertisement can sell my project the private organization and public sectors can earn more.<br>➤ In an organization (hospital, school, college etc..) we explain our process to them and do water quality analysis and earn income in our business.<br>➤ Water quality is an important factor in economic development. |

|    |                             |   |
|----|-----------------------------|---|
| 6. | Scalability of the solution | ➤ Obtain quantitative information on the physical, chemical, and biological characteristics of water. |
|----|-----------------------------|---|

### 3.4 Problem Solution fit

| Problem-Solution fit canvas 2.0          |  | Purpose / Vision  |
|--|--|---|
| Define CS, fit into CC                   | <b>1. CUSTOMER SEGMENT(S)</b> <span>CS</span><br>Who is your customer?<br>i.e. working parents of 0-5 y.o. kids<br><br>1. caretaker to monitoring patient health<br>2. The researcher learns and predicts natural processes in the environment   | <b>6. CUSTOMER CONSTRAINTS</b> <span>CC</span><br>What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.<br><br>1. To monitor the quality of water and sent messages in advance of use from this water<br><br>2. The customer expect a low cost and efficient |
|  | <b>5. AVAILABLE SOLUTIONS</b> <span>AS</span><br>Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking<br><br>1. Artificial Neural Network(ANN) method is used to predict the water quality.<br>2. It can be executed in any application and it can continue without some issues by its parallel features.<br>3. We use GSM(Global system for Mobile communication) technologies and it provides basic to advanced voice and data services including roaming service.              | Explore AS, differentiate   |
| Focus on J&P, tap into BE, understand RC | <b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <span>J&amp;P</span><br>Which jobs-to-be-done (or problems) do you address for your customers?<br>There could be more than one; explore different sides.<br><br>Jobs to be done:<br>1. Monitoring the water quality<br>2. collect the data sets<br><br>Problems:<br>1. Routinely analysis the data sets<br>2. drinking unhygienic water causes various diseases   |   |
|  | <b>7. BEHAVIOUR</b> <span>BE</span><br>What does your customer do to address the problem and get the job done?<br>i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)<br><br>1. Think about the budget of this project<br><br>2. Identify the accuracy of water quality<br><br>3. Service, flexibility and Convenience<br><br>4. accurate and relevant information  | Focus on J&P, tap into BE, understand RC  |
| Identify strong TR & EM                  | <b>3. TRIGGERS</b> <span>TR</span><br>What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.<br><br>1. Advertising that by drinking clean water you will get good health<br><br><b>4. EMOTIONS: BEFORE / AFTER</b> <span>EM</span><br>How do customers feel when they face a problem or a job and afterwards?<br>i.e. lost, insecure → confident, in control - use it in your communication strategy & design.<br>1. If the customer drinks a impurified water, he feels the insecurity of his health<br>2. In our project customer feel drink a quality water and secure of him health |   |
|  | <b>8. CHANNELS OF BEHAVIOUR</b> <span>CH</span><br><b>8.1 ONLINE</b><br>What kind of actions do customers take online? Extract online channels from #7<br>In online the customer read the informations and descriptions carefully and calculate the total purchasing amount,taxes,services and etc<br><br><b>8.2 OFFLINE</b><br>What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.<br><br>1. Using services properly, speaking out against wrong doing and lawfully purchasing goods and services   | Extract online & offline CH of BE   |

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**AMALTAMA**

## 4. REQUIREMENT ANALYSIS

### 4.1 Functional requirement

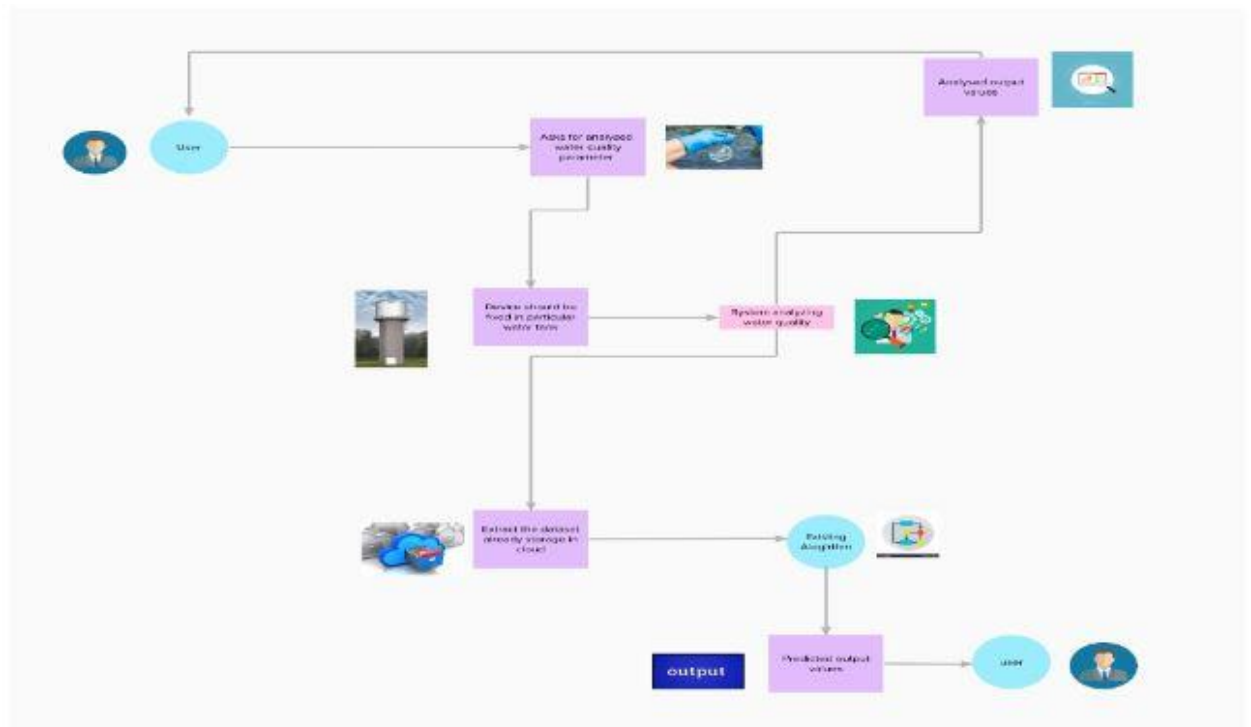
| FR No. | Functional Requirement (Epic) | Sub Requirement (Story / Sub-Task)   |
|--------|-------------------------------|--|
| FR-1   | User Registration             | To every family we will provide a form when a new user account is created  |
| FR-2   | User Confirmation             | The system send an approval message after the user account is activated  |
| FR-3   | Authorization level           | We provide secure water quality monitoring system approved by TNPCB(Tamilnadu pollution control board)   |
| FR-4   | Transaction processing system | analyse ,send a message about real time water quality and reusable method via online,  |
| FR-5   | Reporting                     | 1.Analysis the real time water quality and send the message to the users.<br>2.The real time water quality report is collected and the dataset is using to predict the water in upcoming days  |
| FR-6   | business rules                | 1.Any one of the family member fill the appropriate form and provide the current usable mobile number<br>2.After receiving the verification message user send the confirmation message<br>3.We will providing our service continuously<br>4. If any problem occurs register the complaint in our website ,we will provide a immediate solution |

### 4.2 Non-Functional requirements

| FR No. | Non-Functional Requirement | Description  |
|--------|----------------------------|--|
| NFR-1  | Usability                  | Allows users to identify specific missing data elements available in the water quality portal data.  |
| NFR-2  | Security                   | To ensure that the access of safe drinking water for all people in a country   |
| NFR-3  | Reliability                | Above 90% of the operations that are completed correctly.  |
| NFR-4  | Performance                | System effectively compare the incoming water quality parameters with the required dataset   |
| NFR-5  | Availability               | This system is available for every family or any part of the area people.  |
| NFR-6  | Scalability                | High mineral levels are found in water as well as Water Quality Index (WQI) and Water Quality Classification (WQC) are accurately predicted. |

## 5. PROJECT DESIGN

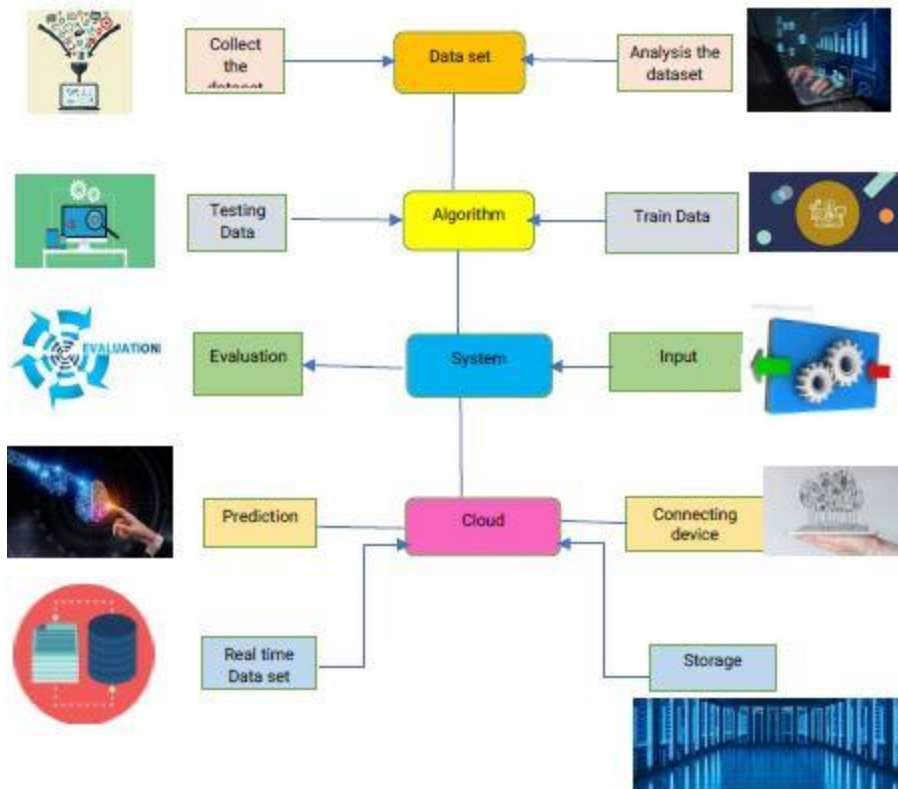
### 5.1 Data Flow Diagrams



## **5.2 Solution & Technical Architecture**



## SOLUTION ARCHITECTURE FIT



### 5.3 User Stories

| User Type                            | Functional Requirement (Epic) | User Story Number | User Story / Task   | Acceptance criteria                                | Priority | Release  |
|--------------------------------------|-------------------------------|-------------------|---|--|----------|----------|
| Customer (Mobile user)               | Registration                  | USN-1             | As a user, I can register for the application by entering my email, password, and confirming my password. | I can access my account/dashboard                  | High     | Sprint-1 |
|                                      |                               | USN-2             | As a user, I will receive confirmation email once I have registered for the application                   | I can receive confirmation email & click confirm   | High     | Sprint-1 |
|                                      |                               | USN-3             | As a user, I can register through website   | I can register and access the account with website | High     | Sprint-1 |
|                                      |                               | USN-4             | As a user, I can register for the application through Gmail   | I can register and access the gmail                | Medium   | Sprint-1 |
|                                      | Login                         | USN-5             | As a user, I can log into the application by entering email & password                                    | I can successfully login into application          | High     | Sprint-1 |
|                                      | Dashboard                     | USN-6             | As a user, I can access the dashboard   | I can referred dashboard for certainty             | Medium   | Sprint-1 |
| Customer (Ordinary people, Industry) | Analysis the water quality    | USN-7             | As a user, I can access the water quality analysis in all over india                                      | I can predict the water quality earlier            | High     | Sprint-1 |
| Customer Care Executive              | Customer queries              | USN-8             | As a user, I can register the complaint in website  | I can get immediate solution                       | High     | Sprint-1 |
| Administrator                        | Getting value                 | USN-9             | when there is a issues in getting analysed value  | through administrator getting predicted value      | Low      | Sprint-2 |

## 6. PROJECT PLANNING & SCHEDULING

### 6.1 Sprint Planning & Estimation

| Sprint   | Functional Requirement (Epic)                    | User Story Number | User Story / Task   | Story Points | Priority | Team Members             |
|----------|--|-------------------|---|--------------|----------|--------------------------|
| Sprint-1 | Analysing the water quality                      | USN-1             | The man who wants to save our health to do the necessary steps  | 2            | High     | L.Aarthy<br>P.Prakashini |
| Sprint-2 | Prevention of drinking polluted water            | USN-2             | The officer worried about the people health because unpurified water causes many health issues            | 2            | High     | P.Prakashini<br>M.Aarthy |
| Sprint-3 | Detect the water quality                         | USN-3             | The socialist can collect the various water parameters to detect the water quality at various environment | 2            | High     | M.Aarthy<br>K.Meenakshi  |
| Sprint-4 | Using hardware kit,cloud and various sensors     | USN-4             | The government take more steps to implementing this hardware setup  | 2            | Medium   | K.Meenakshi<br>M.Aarthy  |
| Sprint-5 | Training and testing the water quality detection | USN-4             | The programmer build a model for water quality detection by train the dataset                             | 2            | High     | P.Prakashini<br>L.Aarthy |
| Sprint-6 | Notification                                     | USN-6             | The model can detect the water quality this detected values is notify to the users                        | 2            | High     | L.Aarthy<br>K.Meenakshi  |

## 6.2 Sprint Delivery Schedule

| Sprint   | Total Story Points | Duration | Sprint Start Date | Sprint End Date (Planned) | Story Points Completed (as on Planned End Date) | Sprint Release Date (Actual) |
|----------|--------------------|----------|-------------------|---------------------------|---|------------------------------|
| Sprint-1 | 20                 | 4Days    | 24 Oct 2022       | 27 Oct 2022               | 20  | 27 Oct 2022                  |
| Sprint-2 | 20                 | 4 Days   | 28 Oct 2022       | 01 Nov 2022               | 20  | 01 Nov 2022                  |
| Sprint-3 | 20                 | 4 Days   | 02 Nov 2022       | 06 Nov 2022               | 20  | 06 Nov 2022                  |
| Sprint-4 | 20                 | 4 Days   | 07 Nov 2022       | 10 Nov 2022               | 20  | 10 Nov 2022                  |
| Sprint-5 | 20                 | 4 Days   | 11 Nov 2022       | 15 Nov 2022               | 20  | 15 Nov 2022                  |
| Sprint-6 | 20                 | 4 Days   | 16 Nov 2022       | 19 Nov 2022               | 20  | 19 Nov 2022                  |

## 6.3 Reports from JIRA

|   | T | NOV      | DEC | AN '23 |
|---|---|----------|-----|--------|
| Sprints   |   | EWQAP... |     |        |
| > EWQAPUML-7 Analysis the water quality               |   |          |     |        |
| > EWQAPUML-8 Prediction of drinking polluted water    |   |          |     |        |
| > EWQAPUML-9 Detect the water quality                 |   |          |     |        |
| > EWQAPUML-10 Using hardware kit,cloud and vario...   |   |          |     |        |
| > EWQAPUML-11 Training and testing the water quali... |   |          |     |        |
| > EWQAPUML-12 Notification                            |   |          |     |        |

## 7. CODING & SOLUTIONING

### 7.1 Feature 1

|      | STATION<br>CODE | LOCATIONS  | STATE          | Temp | D.O.<br>(mg/l) | PH  | CONDUCTIVITY<br>(µmhos/cm) | B.O.D.<br>(mg/l) | NITRATENAN N+<br>NITRITENANN (mg/l) | FECAL COLIFORM<br>(MPN/100ml) | TOTAL COLIFORM<br>(MPN/100ml)Mean | year |
|------|-----------------|--|----------------|------|----------------|-----|----------------------------|------------------|-------------------------------------|-------------------------------|-----------------------------------|------|
| 0    | 1393            | DAMANGANGA AT D/S OF<br>MADHUBAN, DAMAN              | DAMAN &<br>DIU | 30.6 | 6.7            | 7.5 | 203                        | NAN              | 0.1                                 | 11                            | 27                                | 2014 |
| 1    | 1399            | ZUARI AT D/S OF PT. WHERE<br>KUMBARJRIA CANAL JOI... | GOA            | 29.8 | 5.7            | 7.2 | 189                        | 2                | 0.2                                 | 4953                          | 8391                              | 2014 |
| 2    | 1475            | ZUARI AT PANCHAWADI                                  | GOA            | 29.5 | 6.3            | 6.9 | 179                        | 1.7              | 0.1                                 | 3243                          | 5330                              | 2014 |
| 3    | 3181            | RIVER ZUARI AT BORIM BRIDGE                          | GOA            | 29.7 | 5.8            | 6.9 | 64                         | 3.8              | 0.5                                 | 5382                          | 8443                              | 2014 |
| 4    | 3182            | RIVER ZUARI AT MARCAIM<br>JETTY                      | GOA            | 29.5 | 5.8            | 7.3 | 83                         | 1.9              | 0.4                                 | 3428                          | 5500                              | 2014 |
| ...  | ...             | ...  | ...            | ...  | ...            | ... | ...                        | ...              | ...                                 | ...                           | ...                               | ...  |
| 1986 | 1330            | TAMBIRAPARANI AT<br>ARUMUGANERI, TAMILNADU           | NAN            | NAN  | 7.9            | 738 | 7.2                        | 2.7              | 0.518                               | 0.518                         | 202                               | 2003 |
| 1987 | 1450            | PALAR AT VANIYAMBADI WATER<br>SUPPLY HEAD WORK, T... | NAN            | 29   | 7.5            | 585 | 6.3                        | 2.6              | 0.155                               | 0.155                         | 315                               | 2003 |
| 1988 | 1403            | GUMTI AT U/S SOUTH<br>TRIPURA, TRIPURA               | NAN            | 28   | 7.6            | 98  | 6.2                        | 1.2              | NAN                                 | NAN                           | 570                               | 2003 |
| 1989 | 1404            | GUMTI AT D/S SOUTH TRIPURA,<br>TRIPURA               | NAN            | 28   | 7.7            | 91  | 6.5                        | 1.3              | NAN                                 | NAN                           | 562                               | 2003 |
| 1990 | 1726            | CHANDRAPUR, AGARTALA D/S<br>OF HAORA RIVER, TRIPURA  | NAN            | 29   | 7.6            | 110 | 5.7                        | 1.1              | NAN                                 | NAN                           | 546                               | 2003 |

## 7.2 Feature 2

```

<!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>DEPLOYMENT</title>
  <link rel="stylesheet" href="../static/css/style.css">

</head>

<body>
  <header>
    <nav>
      <div class="row">
        <div class="row1">
          
        </div>
        <div class="row2">
          <h1>Water Quality Prediction</h1>
        </div>
      </div>
    </nav>
  </header>
  <main>
    <div class="column">
      <form action="/login" method="post">

```

```
<label for=""></label>
<input type="text" name="year" id="" placeholder="Enter Year">
<label for=""></label>
<input type="text" name="do" id="" placeholder="Enter D.O">
<label for=""></label>
<input type="text" name="ph" id="" placeholder="Enter PH">
<label for=""></label>
<input type="text" name="co" id="" placeholder="Enter Conductivity">
<label for=""></label>
<input type="text" name="bod" id="" placeholder="Enter B.O.D">
<label for=""></label>
<input type="text" name="na" id="" placeholder="Enter Nitratenen">
<label for=""></label>
<input type="text" name="tc" id="" placeholder="Enter Total Coliform">
<label for=""></label>
<div class="last">
  <input type="submit" value="Predict">
</div>
<div class="bor">
  {{showcase}}
</div>

</form>
</div>
</main>
</div>
</body>
</html>
```

## 8. TESTING

### 8.1 Test Cases

| Test case ID     | Feature Type | Component  | Test Scenario               | Pre-Requisite                           | Steps To Execute   | Test Data   | Expected Result  |
|------------------|--------------|------------|-----------------------------|---|--|---|--|
| LoginPage_TC_OO1 | Functional   | Home Page  | Location Test Case          | Indicate the near by location           | By using GPS   | <a href="http://127.0.0.1:5000/">http://127.0.0.1:5000/</a>       | Display the current location                           |
| LoginPage_TC_OO2 | UI           | Home Page  | Industrial Test Case        | Know the record of particular industry. | By using Advertisement                                       | <a href="http://127.0.0.1:5000/">http://127.0.0.1:5000/</a>       | Detect the toxic chemicals                             |
| LoginPage_TC_OO3 | Functional   | Home page  | Environment Test Case       | Maintain the good environment           | Provide more information about the surrounding of the river. | Username: chalam@gmail.com<br>password: Testing123                | Detect the nature of the river surrounded by the river |
| LoginPage_TC_OO4 | Functional   | Login page | pH Test Cases               | Accurate quality of water               | By using pH sensor.  | Username: chalam@gmail.com<br>password: Testing123                | Detect the water quality                               |
| LoginPage_TC_OO4 | Functional   | Login page | Purity and Dirty Test Cases | Good water as well as bad water         | By comparing the pH level for good water and bad water.      | Username: chalam@gmail.com<br>password: Testing123678686786876876 | Identify which kind of water can be drunk              |
| LoginPage_TC_OO5 | Functional   | Login page | Agriculture Test Cases      | Evergreen process                       | By using the different kind of strategy                      | Username: chalam@gmail.com<br>password: Testing123678686786876876 | Better growth in agriculture                           |

### 8.2 User Acceptance Testing

#### ■ Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [ProductName] project at the time of the release to User Acceptance Testing (UAT).

#### ■ Defect Analysis

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

| Resolution     | Severity 1 | Severity 2 | Severity 3 | Severity 4 | Subtotal |
|----------------|------------|------------|------------|------------|----------|
| By Design      | 15         | 4          | 3          | 4          | 27       |
| Duplicate      | 1          | 0          | 2          | 0          | 3        |
| External       | 1          | 2          | 0          | 1          | 4        |
| Fixed          | 13         | 3          | 6          | 23         | 45       |
| Not Reproduced | 0          | 1          | 0          | 0          | 1        |
| Skipped        | 0          | 1          | 0          | 1          | 2        |
| Won't Fix      | 0          | 6          | 1          | 1          | 8        |
| Totals         | 30         | 17         | 12         | 30         | 90       |

#### ■ Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

| Section             | Total Cases | Not Tested | Fail | Pass |
|---------------------|-------------|------------|------|------|
| Print Engine        | 7           | 0          | 0    | 7    |
| Client Application  | 39          | 0          | 0    | 39   |
| Security            | 4           | 0          | 0    | 4    |
| Outsource Shipping  | 3           | 0          | 0    | 3    |
| Exception Reporting | 8           | 0          | 0    | 8    |
| Final Report Output | 5           | 0          | 0    | 5    |
| Version Control     | 3           | 0          | 0    | 3    |

## 9. RESULTS

### 9.1 Performance Metrics

#### Model Performance Testing:

Project team shall fill the following information in model performance testing template.

| S.No | Parameter | Values   | Screenshot  |
|------|-----------|--|---|
| 1.   | Metrics   | <b>Model Evaluation:</b><br><b>MAE :</b><br><br>1.0140200501253205<br><b>MSE :</b><br>5.786707157894741<br><br><b>RMSE :</b><br><br>2.405557556554143<br><br><b>R2 score :</b><br><br>0.9684566685516488 | <b>Model Evaluation</b><br><br><pre>[ ] from sklearn import metrics print('MAE:',metrics.mean_absolute_error(y_test,y_pred)) print('MSE:',metrics.mean_squared_error(y_test,y_pred)) print('RMSE:',np.sqrt(metrics.mean_squared_error(y_test,y_pred)))  MAE: 1.0140200501253205 MSE: 5.786707157894741 RMSE: 2.405557556554143</pre><br><pre>[ ] metrics.r2_score(y_test, y_pred)  0.9684566685516488</pre> |

|    |                |   |  |
|----|----------------|---|--|
| 2. | Tune the Model | <b>Validation Method :</b><br><br><b>Testing Accuracy</b><br><br>0.9684566685516488 | <b>Model Evaluation</b><br><br><pre>[ ] from sklearn import metrics print('MAE:',metrics.mean_absolute_error(y_test,y_pred)) print('MSE:',metrics.mean_squared_error(y_test,y_pred)) print('RMSE:',np.sqrt(metrics.mean_squared_error(y_test,y_  MAE: 1.0140200501253205 MSE: 5.786707157894741 RMSE: 2.405557556554143</pre><br><pre>[ ] metrics.r2_score(y_test, y_pred)  0.9684566685516488</pre> |
|----|----------------|---|--|

## **10. ADVANTAGES**

1. In this technique, our model predicts that the water is safe to drink or not using some parameters like Ph value, conductivity, hardness, etc. Access to safe drinking-water is essential to health, a basic human right and a component of effective policy for health protection.

2. During the last years, water quality has been threatened by various pollutants. Therefore, modeling and predicting water quality have become very important in controlling water pollution.

## **11. DISADVANTAGES**

1. The output of an algorithm after it has been trained on a historical dataset and applied to new data when forecasting the likelihood of a particular outcome.

2. Dataset collection is difficult, because more number of dataset is needed for training the model

## **12. CONCLUSION**

## **13. FUTURE SCOPE**

Machine learning models fail silently, which means they will make predictions even if the incoming data looks nothing like the data they were trained against. it allow businesses to make highly accurate guesses as to the likely outcomes of a question based on historical data these historical data is used to build a mathematical model that captures important trends.

## **14. APPENDIX**

### **Source Code**



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ashwinirajan Add files via upload eb97a1a now History

...

Sprint 1 Add files via upload 8 days ago

Sprint 2 Add files via upload yesterday

Sprint 3 Add files via upload now

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https://github.com/IBM-EPBL/IBM-Project-20715-1659761232

CANAL JOI

|                | 2 | 1475 | ZUARI AT PANCHAWADI | GOA | 28.5 | 6.3 | 6.9 | 179 | 1.7 | 0.1 | 3243 | 5330 | 2014 |
|----------------|---|------|---------------------|-----|------|-----|-----|-----|-----|-----|------|------|------|
| RIVER ZUARI AT |   |      |                     | GOA | 28.7 | 5.8 | 6.6 | 84  | 2.6 | 0.5 | 4393 | 3443 | 2014 |

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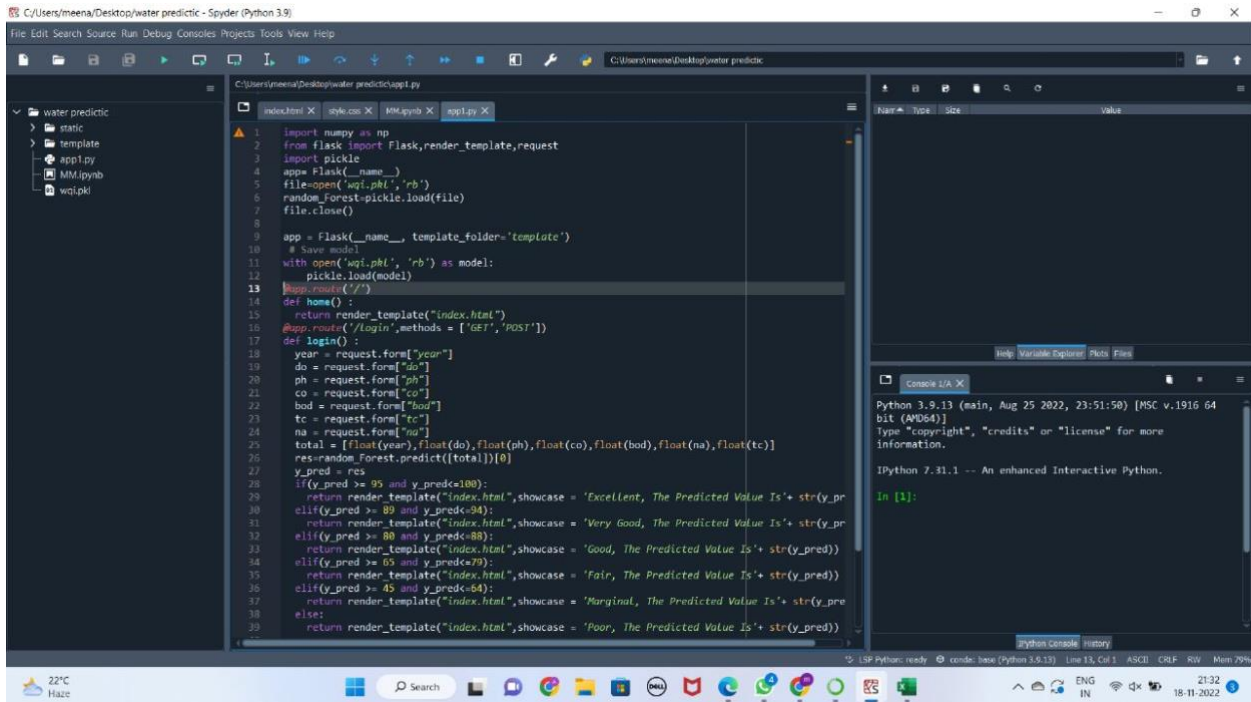
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## GitHub & Project Demo Link

[https://drive.google.com/file/d/1ceDPBP4zZ3ObLyyy5uTSFU4dS6CL58Wn/view?usp=share\\_link](https://drive.google.com/file/d/1ceDPBP4zZ3ObLyyy5uTSFU4dS6CL58Wn/view?usp=share_link)