

**Project Design Phase-I**  
**Proposed Solution**

Date	19 September 2022
Team ID	PNT2022TMID16124
Project Name	Efficient water quality analysis and prediction using Machine Learning
Maximum Marks	2 Marks

**Proposed Solution:**

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<ul style="list-style-type: none"><li>• People living in urban areas are concerned about the quality of water. Prevention and control of waterborne diseases are dependent on the quality of water as an environmental determinant. The water on the planet makes up about 70% of its surface and is one of the most important sources for life. Water quality has deteriorated at an alarming rate because of rapid urbanization and industrialization. Water quality has been conventionally estimated through expensive and time-consuming lab and statistical analyses, which render the contemporary notion of real-time monitoring moot.</li><li>• It is, however, challenging to predict the quality of urban water since it varies nonlinearly in urban spaces and depends on a range of factors, including meteorology, water use patterns, and land uses. Hence, this project aims at developing a Machine Learning (ML) model that predicts water quality by taking into account all the indicators of water quality.</li></ul>
2.	Idea / Solution description	<ul style="list-style-type: none"><li>• A proposed model uses PH, DO, and other water quality standard indicators to predict water quality.</li><li>• On our dataset, we need to train the datasets to run smoothly and see an incremental improvement in prediction rate using Random Forest Regression</li></ul>

		<ul style="list-style-type: none"> <li>Our plan is to build a web application that is integrated with the model. It provides a user interface where the user can enter predictions. On the UI, predictions are displayed based on the values entered into the saved model.</li> </ul>
3.	Novelty / Uniqueness	<ul style="list-style-type: none"> <li>Using the model, it is possible to determine whether the water is suitable for drinking. Therefore, it contributes to the maintenance of health.</li> </ul>
4.	Social Impact / Customer Satisfaction	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>With machine learning techniques, the implementation was done by the Water Quality Index (WQI).</li> <li>Web app is developed as UI is provided for the customer/user where he has to enter the values for predictions.</li> </ul>
5.	Business Model (Revenue Model)	<ul style="list-style-type: none"> <li>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 entered 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 performs well, also can make the app as premium one.</li> </ul>
6.	Scalability of the Solution	<ul style="list-style-type: none"> <li>The proposed can be implemented in realtime water quality analysis by getting water sample using devices (Internet Of Things).</li> <li>Real time applications can be used in various places like schools, colleges etc.</li> <li>Machine learning model integrated with IOT can make users more comfortable and to use in realtime.</li> </ul>