Project Design Phase-I
Proposed Solution Template

Date	23 September 2022
Team ID	PNT202022TMID35159
Project Name	Project - Efficient Water Quality Analysis and Prediction using Machine Learning
Maximum Marks	2 Marks

Proposed Solution Template:

S.No	Parameter	Description
1.	Problem Statement (Problem to besolved)	To establish safe drinking water sources in the future, it is imperative to understand the quality and pollution level of existing groundwater. The prediction of water quality with high accuracy is the key to controlling water pollution and the improvement of water management. In this study, a Machine learning (ML) based model is proposed for predicting groundwater quality
2.	Idea / Solution description	In this study, a Machine learning (ML) based model isproposed for predicting groundwater quality and compared with three other machine learning (ML) models, namely, random forest (RF), eXtreme gradient boosting (XGBoost), and artificial neural network (ANN). A total of 226 groundwater samples are collected fan agriculturally intensive areas of India, and various physicochemical parameters are measured to compute the entropy weight-based groundwater quality index (EWQI).
3.	Novelty / Uniqueness	• The main reason behind the success of this MLtechnique is that it ignores the requirements of selective features that are most representative compared to that of traditional ML algorithms. • The ML technique is a self-deterministic approach that learns features to discover thecorrect representation required for the giventask the ML technique is a self-deterministic approach that learns features to discover thecorrect representation required for the giventask. • ML methods can progressively construct high-level attributes from the given dataset

4.	Social Impact / Customer Satisfaction	Generation of unprocessed effluents, municipalrefuse, factory wastes, and junking of compostable and non-compostable effluents has hugely contaminated nature-provided water bodies like rivers, lakes, and ponds. Therefore, there is a necessity to look into the water standards before usage. This is a problemthat can greatly benefit from Artificial Intelligence (AI). Traditional methods require human inspection and are time-consuming. Automatic Machine Learning (AutoML) facilitiessupply machine learning with the push of a button, or, on a minimum level, ensure to retain algorithm execution, data pipelines, and code, generally, are kept from sight and are anticipated to be the stepping stone for normalizing AI.
5.	Business Model (Revenue Model)	Assessment of water quality using conventionalmethods causes losses in eco-nomic value, which in turn affects the decision-making capacity for water quality management programs. Therefore, to tackle these issues, it isessential to adopt a potential and cost-efficientapproach for quick and accurate assessment of water quality. In our project, the application of machine learning (ML) techniques can be an effective and reliable approach for the evaluation of water quality.
6.	Scalability of the Solution	• Objective weighting system-based approachesare more reliable because they consider local variations in a dataset during the computation process. • This ML technique is an extension of the artificial neural network method; it has additional complex architectures that make thisapproach suitable for managing multi-dimensional inputs because of its high model configuration flexibility, greater generalization power, and robust learning capacity.