

**TITLE: Efficient Water Quality Analysis and Prediction using  
Machine Learning**

**PROPOSED SOLUTION**

**PROBLEM STATEMENT:**

Establish the 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 control water pollution and the improvement of water management. In this study, a deep learning (DL) based model is proposed for predicting groundwater quality

**IDEA/ SOLUTION DESCRIPTION:**

In this study, a deep learning (DL) based model is proposed 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 from an agriculturally intensive areas of India, and various physicochemical parameters are measured to compute entropy weight-based groundwater quality index (EWQI).

**NOVELTY/UNIQUENESS:**

- The main reason behind the success of these ML technique is that it ignores the requirements of selective features that are most representative compared to that of traditional ML algorithms.
- The DL technique is a self-deterministic approach that learns features to discover the correct representation required for the given task the DL technique is a self-deterministic approach that learns features to discover the correct representation required for the given task.
- DL methods can progressively construct high-level attributes from the given dataset.

### **SOCIAL IMPACT/CUSTOMER SATISFACTION:**

Generation of unprocessed effluents, municipal refuse, factory wastes, 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 the usage. This is a problem that can greatly benefit from Artificial Intelligence (AI). Traditional methods require human inspection and is time consuming. Automatic Machine Learning (AutoML) facilities supply machine learning with 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 normalising AI

### **BUSINESS MODEL:**

Assessment of water quality using conventional methods causes losses in economic value, which in turn affects the decision-making capacity for water quality management programs. Therefore, to tackle these issues, it is essential to adopt a potential and cost-efficient approach 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.

### **SCALABILITY OF SOLUTION:**

- Objective weighting system-based approaches are 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 this approach suitable for managing multi-dimensional inputs because of its high model configuration flexibility, greater generalization power, and robust learning capacity.