IDEATION REPORT

Efficient Water Quality Analysis and Prediction Using Machine Learning

INTRODUCTION

- Water is the most important source for sustaining all kinds of life.
- however, it is in constant threat of pollution by life itself. Water is one of the most communicable mediums with a far reach.
- Rapid industrialization has consequently led to the deterioration of water quality at an alarming rate.
- Water quality is currently estimated through expensive and time-consuming lab and statistical analyses, which require sample collection, transport to labs, and a considerable amount of time and Water Calculation.

TECHNOLOGIES TO BE USED

1. **Machine Learning**
    - Machine learning can be defined as the classification of data based on knowledge already gained or statistical information extracted from patterns and their representation.
2. **Deep Neural Networks**
    - Deep Neural Networks are used to estimate the water quality using Machine learning.
    - Deep neural networks use the data which is given in the input.
3. **Data Analysis**
    - After all the data processing, for data analysis, several machine learning algorithms were employed to predict the WQI and WQC using the minimal number of parameters.
    - Different types of analyses like box-plot, and hist are used to structure the data.

METHODOLOGY

1. **Data Collection**
    - Data collection is the process of gathering and measuring information from countless sources in order to use the data we collect to develop practical AI and machine learning.
2. **Data Preprocessing**
    - Data pre-processing is a process of cleaning the raw data i.e. the data is collected in the real world and is converted to a clean data set.
3. **Data Analyzing**
    - After all the data processing, for data analysis, several machine learning algorithms were employed to predict the WQI and WQC using the minimal number of parameters.
4. **Data visualization**
    - Data visualization is where a given dataset is presented in a graphical format. It helps the detection of patterns, trends, and correlations that might go undetected in text-based data.

USER CHARACTERISTICS

- System interface will allow users to enter the water quality levels.
- The data is then processed using machine learning algorithms.
- The water quality index and water quality class are calculated based on the data provided.
- User will get the output whether the water is of good quality or not.

CONCLUSION

- water is one of the most essential resources for survival and its quality is determined through WQI.
- To test water quality, one has to go through expensive and cumbersome lab analysis. This research explored an alternative method of machine learning to predict water quality using minimal and easily available water quality parameters.

- The data used to conduct the study were acquired from PCRWR and contained 663 samples from 12 different sources in Rawal Lake, Pakistan.
- A set of representative supervised machine learning algorithms were employed to estimate WQI.