**PROJECT TITLE:**

* The project involves analyzing water quality data to assess the suitability of water for specific purposes, such as drinking. The objective is to identify potential issues or deviations from regulatory standards and determine water potability based on various parameters. This project includes defining analysis objectives, collecting water quality data, designing relevant visualizations, and building a predictive model

**ABSTRACT:**

* Water quality analysis is to measure the required parameters of water, following standard methods, to check whether they are in accordance with the standard.
* Colorimeters and Photometers are used to analyze samples of water, suspended sediment, and bottom material for their content of inorganic and organic constituents.
* Commonly used methods include chelating ion-exchange and, for trace organic analysis, solvent extraction, carbon adsorption, and resin adsorption using nonionic macroeticular resins. Minor variations in microbiological analyses can cause significant changes in results.

**OBJECTIVES:**

* Water quality analysts monitor and analyze the chemical, physical, and biological components of water to ensure that it meets safety standards for human consumption
* Water has a neutral pH of 7, which indicates that it is neither acidic or basic. The scale ranges from 0 (very acidic) to 14 (very basic). It is normal for water to have a range of between 6.5 and 8.5 on the scale. PH in water may fluctuate with differing environmental factors.
* 0 to 60 mg/L (milligrams per liter) as calcium carbonate is classified as soft; 61 to 120 mg/L as moderately hard; 121 to 180 mg/L as hard; and more than 180 mg/L as very hard.

**ANALYSIS APPROCH:**

1. Sample Collection: Collect water samples from various sources, ensuring they are representative of the area of interest. Properly label and store the samples to prevent contamination.

2. Physical Parameters: Measure physical characteristics like temperature, turbidity, color, and odor. These can provide initial insights into water quality.

3. Chemical Analysis: Conduct chemical tests to determine the levels of key constituents such as pH, dissolved oxygen (DO), nutrients (nitrogen and phosphorus), heavy metals, and organic contaminants. This helps assess pollution levels and potential health risks.

4. Biological Assessment: Examine the presence and diversity of aquatic organisms, such as macroinvertebrates and algae. These can indicate the ecological health of the water.

5. Microbiological Testing: Test for the presence of bacteria, viruses, and other microorganisms. High levels of certain pathogens can pose health risks.

6. Suspended Solids and Sediment Analysis: Determine the amount of suspended solids and sediment in the water, which can affect water clarity and aquatic habitats.

7. Taste and Odor Analysis: Evaluate the taste and odor of the water, which can be indicative of contamination or the presence of certain chemicals.

8. Statistical Analysis: Analyze the data using statistical methods to identify trends, correlations, and anomalies. This helps in understanding the overall water quality.

9. Regulatory Compliance: Compare the results with local, state, and national water quality standards and regulations to assess compliance.

10. Geographic Information Systems (GIS): Use GIS to map and visualize water quality data spatially, aiding in identifying pollution sources and patterns.

11. Long-Term Monitoring: Establish regular monitoring programs to track changes in water quality over time, which can be critical for detecting trends and addressing issues.

12. Interpretation and Reporting: Interpret the findings and prepare reports that communicate the water quality status, potential risks, and recommended actions to relevant stakeholders.

13. Mitigation and Remediation: Implement measures to address water quality issues, which may include treatment, pollution control, and habitat restoration.

14. Public Awareness: Educate the public about water quality concerns and promote responsible water use and conservation.

**VISUALIZATION SELECTION:**

