DATA ANALYTICS WITH COGNOS

WATER QUALITY ANALYSIS

GROUP-I

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1.Problem Statement:

The project's objective is to assess the potability of water in a given area, leveraging data-driven methods. This assessment will help ensure the safety and suitability of the water for consumption and other uses.

2.Design Thinking Process:

Empathize:

- ❖ Understand the problem: Recognize the importance of safe drinking water.
- ❖ Identify stakeholders: Gather input from water quality experts, environmental agencies, and the community.
- ❖ Define the problem: Clearly define the objectives and scope of the analysis.

Define:

- ❖ Formulate a clear problem statement: "Determine the potability of water in a specific area based on data."
- ❖ Set goals and objectives: Establish measurable criteria for assessing water quality and potability.

Ideate:

- ❖ Brainstorm potential data sources and features for analysis.
- ❖ Consider various predictive modeling techniques.
- ❖ Create a plan for data collection and analysis.

Prototype:

- ❖ Develop a data collection and preprocessing plan.
- ❖ Create a prototype of the predictive model.
- ❖ Decide on data visualization methods to communicate results.

Test:

- ❖ Validate the model's accuracy and reliability.
- ❖ Solicit feedback from stakeholders and experts.
- ❖ Adjust the approach as needed.

Implement:

- ❖ Deploy the model for real-time or batch analysis of water quality.
- ❖ Share results with stakeholders.

3.Development Phases:

Data Collection:

- o Gather water quality data from various sources (e.g., sensors, laboratory tests, historical records).
- o Acquire relevant features, such as pH, turbidity, conductivity, temperature, total dissolved solids, and various chemical concentrations.

Data Preprocessing:

- o Handle missing data and outliers.
- o Normalize or standardize features.
- o Split data into training and testing sets.

Exploratory Data Analysis (EDA):

- o Analyze basic statistics of the dataset.
- o Identify correlations and relationships between features.
- o Visualize data distributions and patterns.

Data Visualization:

- o Create informative plots and graphs to highlight key findings.
- o Use visualizations to represent water quality trends over time or across locations.
- o Develop an interactive dashboard for users to explore data.

Predictive Modeling:

- o Select appropriate machine learning algorithms (e.g., logistic regression, random forests, or neural networks).
- o Train the model on the training dataset.
- o Evaluate model performance using metrics like accuracy, precision, recall, and F1 score.

- Tune hyperparameters for optimal performance.

4.Insights from Analysis:

Water Quality Assessment:

- The analysis will provide a quantitative assessment of water quality, indicating its suitability for consumption.
- Predictive modeling will classify water samples as potable or non-potable based on their quality parameters.

Identifying Factors Affecting Potability:

- Insights can reveal which water quality parameters have the most significant impact on potability.
- This information can guide water treatment and purification efforts.

Monitoring and Early Warning:

- The model can be used for continuous monitoring of water quality.
- Early warning alerts can be generated if water quality deteriorates, allowing timely intervention.

Policy and Resource Allocation:

- Government and regulatory agencies can use the analysis to allocate resources for water quality improvement in specific areas.

Community Awareness:

- The findings can be communicated to the public to raise awareness about water quality and safety.

5. Conclusion:

In conclusion, this project utilizes data-driven analysis and modeling to assess water quality and potability. It follows a design thinking process to ensure that the analysis aligns with the needs of stakeholders and provides actionable insights for maintaining safe and potable water sources.