

Build PowerBI Dashboard for Water Quality Sensor Data Analysis

Business Overview:

Data Analysis is the process of examining, cleaning, transforming, and modeling data to discover useful information, draw conclusions, and support decision-making. Data analysis enables organizations to make informed, data-driven decisions by uncovering trends, optimizing operations, and enhancing customer experiences. By analyzing data, businesses can identify opportunities for efficiency, manage risks proactively, and personalize their offerings to better meet customer needs. This leads to improved decision-making, cost savings, and a competitive edge in the market, ultimately driving innovation and supporting long-term strategic goals.

Importance of Data Analysis:

- **Informed Decision-Making:** Data analysis provides evidence-based insights, enabling businesses to make decisions grounded in factual data rather than intuition.
- **Trend Identification:** Helps in identifying emerging trends in the market, customer behavior, and operational performance, allowing businesses to stay ahead of the curve.
- **Cost Efficiency:** Optimizes resource allocation, reduces waste, and enhances efficiency by identifying areas for improvement.
- **Customer Insights:** Provides deep insights into customer preferences, behaviors, and needs, enabling personalized marketing and improved customer satisfaction.
- **Risk Management:** Identifies potential risks and vulnerabilities, helping businesses to mitigate or avoid them.
- **Competitive Advantage:** Businesses that leverage data analysis effectively can gain a significant edge over competitors by being more responsive and innovative.

Aim:

This project aims to analyze and visualize extensive water quality sensor data collected from various European countries over multiple periods using Power BI. The goal is to transform raw data into actionable insights by leveraging Power BI's capabilities, including data preparation, modeling, and visualization. The project involves importing and cleaning data, building relationships between datasets, and using DAX to create calculated measures for deeper analysis. Through interactive dashboards and advanced visualizations, the analysis will uncover trends, anomalies, and comparative insights, supporting regulatory compliance and environmental sustainability. Additionally, the project emphasizes mastering Power BI's features, such as drill-through, filters, and collaborative sharing, to demonstrate its effectiveness in data-driven decision-making.

Data Description:

The dataset constitutes a complex view of aggregated water sensor data with 32 columns and more than one million rows collected across different European countries across the years. It includes detailed information on various aspects such as country, water body category, determinands obtained, concentration level (minimum, maximum, mean, and median) of determinands across particular time stamps, and quality samples conducted out of the total samples for each observation. Given the ongoing data collection at every timestamp, each recorded value is associated with a specific country, capturing different determinands content across various monitoring sites.

Tech Stack

- Tool: Power BI
- Database: Microsoft SQL Server
- Services: Azure SQL Database

Key Takeaways

- Understanding the Data Analysis in detail
- Understanding the need for Data Analysis
- Understanding the different steps involved in Data Analysis
- Understanding the different BI tools for Data Analysis
- Understanding Power BI in detail
- Downloading and Installing Power BI in Windows
- Downloading and Installing Power BI in Mac

- Understanding the UI of Power BI
- Understanding the different functionalities of Power BI
- Loading data from AWS S3 to Power BI
- Loading data from Azure SQL to Power BI
- Changing data types of columns in Power BI
- Creating new measures and new columns in Power BI
- Understanding different types of Visualizations in Power BI
- Understanding Dax in Power BI
- Building a dashboard in Power BI
- Exporting a dashboard into PDF and PPT in Power BI

Dashboard:

