Project Brief

Clustering & Visualization Dashboard for Uganda WWTPs

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GitHub Repo: https://github.com/Salrahim21/Uganda-WWTP-Clustering-Visualization-Dashboard

Objective

To develop a user-friendly data visualization tool that supports data-driven planning and decision-making around wastewater treatment infrastructure in Uganda.

Background

Urbanization and population growth in East Africa have increased pressure on wastewater treatment systems. However, limited access to organized and digestible data hampers effective planning. This project aims to bridge that gap by using clustering techniques to group WWTPs based on similar characteristics and visualize them for easier interpretation by policymakers, environmental agencies, and researchers.

Methodology

- Data Cleaning & Preprocessing: WWTP characteristics standardized for modeling
- Clustering: K-Means algorithm applied to identify plant groupings
- Visualization: Interactive dashboard built using Plotly Dash + Mapbox
- Outcome: A dynamic map and charts showing clusters of WWTPs by operational similarity and geographic distribution

Impact

This dashboard provides a practical civic tech solution for environmental monitoring and infrastructure equity. It enables non-technical stakeholders to:

- Understand plant performance and coverage
- Identify under-served regions
- Prioritize investments and interventions

Tools Used

Python, Pandas, Scikit-learn, Plotly Dash, Mapbox