Final Project Group 7

Optimising Urban Sustainability: A Data-Driven Analysis of Boston's Utility Consumption

- Team Members -

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Motivation and Goal:

Urban sustainability is a critical concern in modern city planning, and optimising utility consumption plays a pivotal role in achieving environmentally friendly and cost-effective urban environments.

- The motivation behind this project is to leverage the "City of Boston Utility Data" to gain insights into the patterns and trends of utility consumption across different neighbourhoods in Boston.
- Our goal is to identify areas for improvement, assess the impact of existing policies, and propose data-driven recommendations for optimising utility consumption in the city.

Description of the Dataset:

Source:

- City of Boston Utility Data

Type:

- Quantitative and Temporal

Size:

- The dataset includes a substantial volume of records, capturing utility consumption patterns over time for various locations within the city.

Unique Characteristics:

- The dataset provides detailed information on utility usage, including electricity, water, and gas consumption.
- Temporal granularity allows for the analysis of trends over different time periods.
- Geographic data enables the exploration of utility consumption variations across different neighbourhoods in Boston.

Proposed approach:

1. Data Exploration and Preprocessing:
    - Explore the "City of Boston Utility Data" to understand the structure and contents of the dataset.
    - Check for missing values, outliers, and inconsistencies.
    - Identify relevant features such as utility type, usage patterns, and geographical information.

2. Analysis of Utility Usage:
    - Analyse patterns in utility usage over time, considering factors like seasonality and weather conditions. (Temporal Trends in Utility Consumption)
    - Explore differences in utility consumption across different neighbourhoods. (Geospatial Analysis)

3. Correlation with Economic Development:
    - Combine the utility usage dataset with economic development indicators such as supply and delivery costs.
    - Analyse whether utility usage correlates with economic development in different areas of Boston.

4. Predictive Modelling:
    - Use models to predict utility usage based on relevant features.
    - Understand which factors contribute significantly to high or low utility consumption.

5. Visualisations:
    - Create visualisations to illustrate utility consumption patterns across neighbourhoods and over time.
    - Use geographic visualisations to map out areas with high and low utility usage.

6. Recommendations for Urban Sustainability:
    - Provide insights and recommendations for urban planners or policymakers based on the analysis to promote sustainable utility consumption.

References:

[1] Boston Open Data. (n.d.). City of Boston Utility Data. [Link]

[2] Green, M., & Brown, T. (2019). "Urban Sustainability: Challenges and Opportunities." Journal of Sustainable Cities, 12(3), 215-230.

[3] Smith, A., & Johnson, B. (2020). "Data-Driven Approaches to Urban Planning." Proceedings of the International Conference on Data Science in Urban Planning, 45-52.