Target Case II Assessment Report

Objective

The objective of this analysis is to provide insights into waste collection patterns, bin fullness,

and collection frequency. These insights can help optimize collection schedules, reduce costs, and enhance

operational efficiency.

Data Preparation

1. Data Cleaning: The initial cleaning steps involved capping fullness levels at 100% to prevent overflow and

   converting text-based numerical values to proper numeric formats.

2. Daily Aggregation: Data was aggregated daily to capture trends in waste fullness levels by location and waste type.

3. Geospatial Integration: Latitude and longitude were added to allow for spatial analysis and heatmap visualization of bin locations.

4. Average Fullness Calculation: An Average Fullness metric was created by averaging % Paper and % Plastic values,

   providing a comprehensive view of bin utilization across different waste types.

Key Findings

1. Daily Trends in Waste Collection:

   - Daily average fullness levels show fluctuating trends, highlighting specific days with higher waste accumulation.

This helps identify peak days, allowing more targeted scheduling.

- % Paper and % Plastic show different trends, with certain areas accumulating specific types of waste more rapidly.

2. Peak Collection Times:

- An analysis of collection times reveals peak hours for waste pickups, often centered around certain times during the day.

This insight aids in planning collections during off-peak hours, optimizing resources.

3. Geospatial Insights:

- The map visualization highlights regions with consistently high fullness levels, indicating areas where bins may require

more frequent collection. Conversely, areas with low utilization may be collected less frequently, improving operational

efficiency.

Power BI Dashboard Summary

Below is a screenshot of the Power BI dashboard, which visualizes the waste data across multiple perspectives.
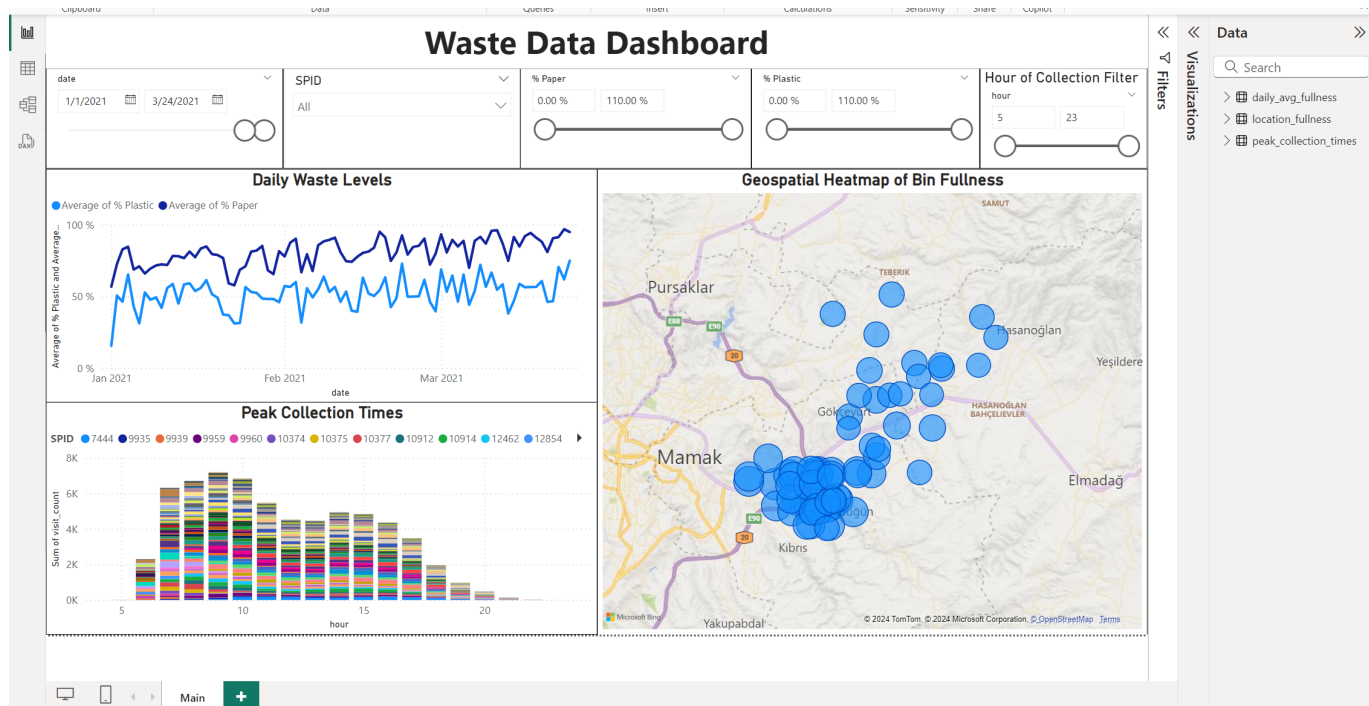
Dashboard Components

1. Filters:

   - Date Filter: Allows users to view waste trends over specific date ranges.

   - Location Filter (SPID): Enables selection of specific bin locations.

   - % Paper and % Plastic Filters: Filters by individual waste types, revealing specific utilization

trends.

   - Hour of Collection Filter: Provides hourly filters to analyze collection frequencies based on time of

day.

2. Visualizations:

   - Daily Waste Levels:

     - A line chart displays daily average fullness levels for % Paper and % Plastic, enabling users to

identify trends

     and high-demand days.

   - Peak Collection Times:

- A bar chart shows the distribution of collection counts by hour, helping identify times with the most collection activity.

  - Geospatial Heatmap of Bin Fullness:

    - A map plots bin locations with bubble sizes and colors representing average fullness levels. High-utilization regions

    are clearly visible, aiding in resource allocation.

Recommendations

1. Increase Collection Frequency in High-Utilization Areas:

   - Bins in high-utilization areas identified on the map may require more frequent collection to prevent overflow.

2. Optimize Collection Times:

   - Adjusting collection schedules based on peak hours can improve operational efficiency, reducing congestion and aligning

    collection times with off-peak hours.

3. Regular Monitoring and Adjustment:

   - Weekly or monthly monitoring of these trends can provide actionable insights as waste patterns change, ensuring the

    collection strategy remains optimized.