Computation and Visualization

IE 6600

Fall 2024

Assignment 1

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The day score captures the incidents occurring on specific days, and to ensure accuracy, I have removed all null values in the day score column. This exclusion of days without recorded events guarantees that the total number of incidents accurately reflects the occurrences based on the available dataset. Additionally, I have filtered out rows lacking day, week, month, and quarter scores, and eliminated any duplicate entries.


DataFrame Shape: Rows and Columns

| Dimension	Count
Rows	37053
Columns	18

Count of Each Metric Name
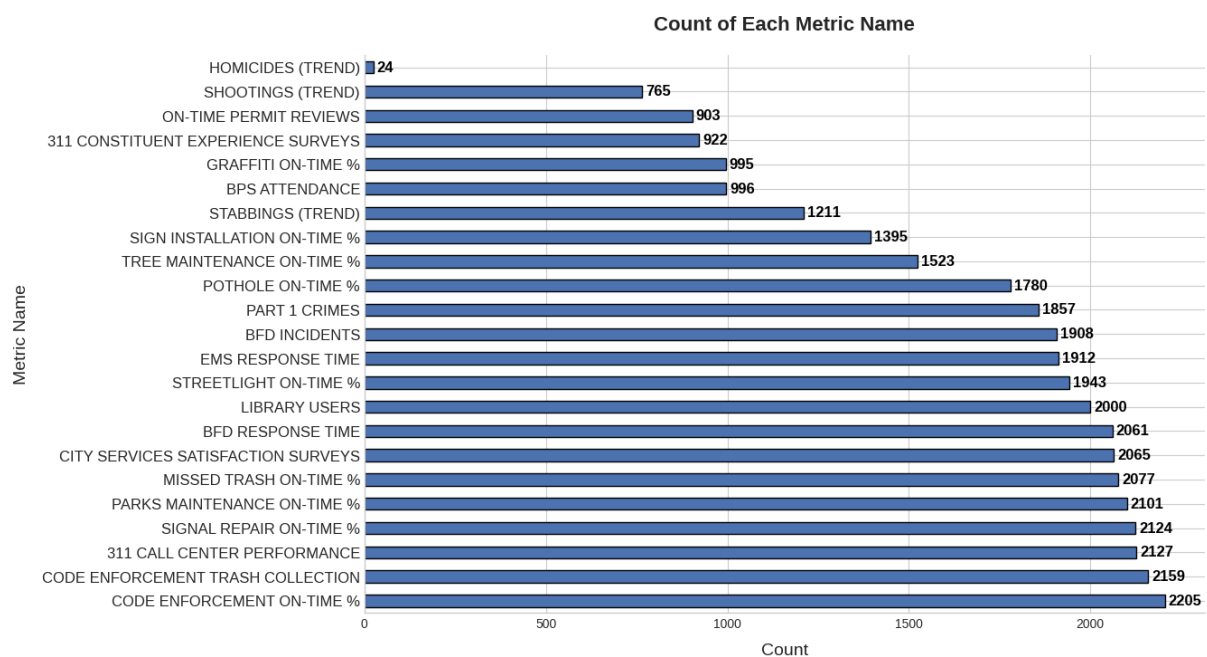
Metrics have been categorized into four distinct groups:

1. **Crime and Safety Metrics:** Stabbings (Trend), Shootings (Trend), and Homicides (Trend),

2. **Operational Efficiency:** EMS Response Time, BFD Response Time, On-Time Permit Reviews, and several others, all aimed at evaluating how effectively city services are delivered.

3. **City Services Satisfaction Surveys:** 311 Call Center and constituent experience surveys

4. **Service Delivery Metrics:** BPS Attendance and Library Users

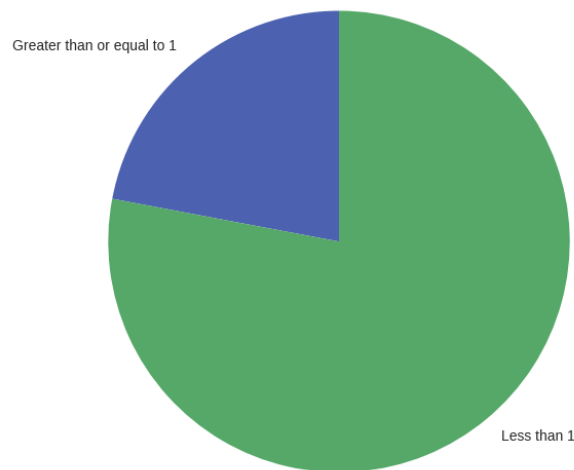Total Sum of Incidents by Hour of the Day (Selected Metrics)
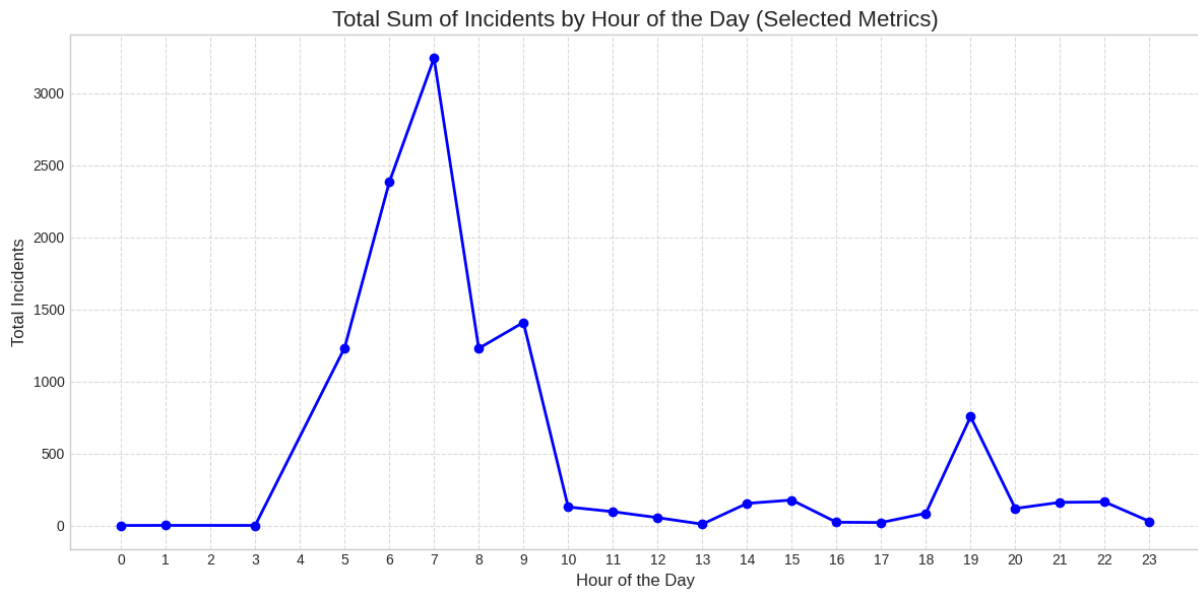
The data reveals a morning peak with over 3,000 incidents occurring around 7 AM, followed by a sharp decline after 8 AM. During the daytime, from 10 AM to 5 PM, incidents stabilize. An evening surge occurs around 6 PM, likely related to post-work activities, while incidents decrease significantly after 8 PM, reaching low levels by 2-3 AM.

Operational Efficiency Metrics Count Based on Day Score
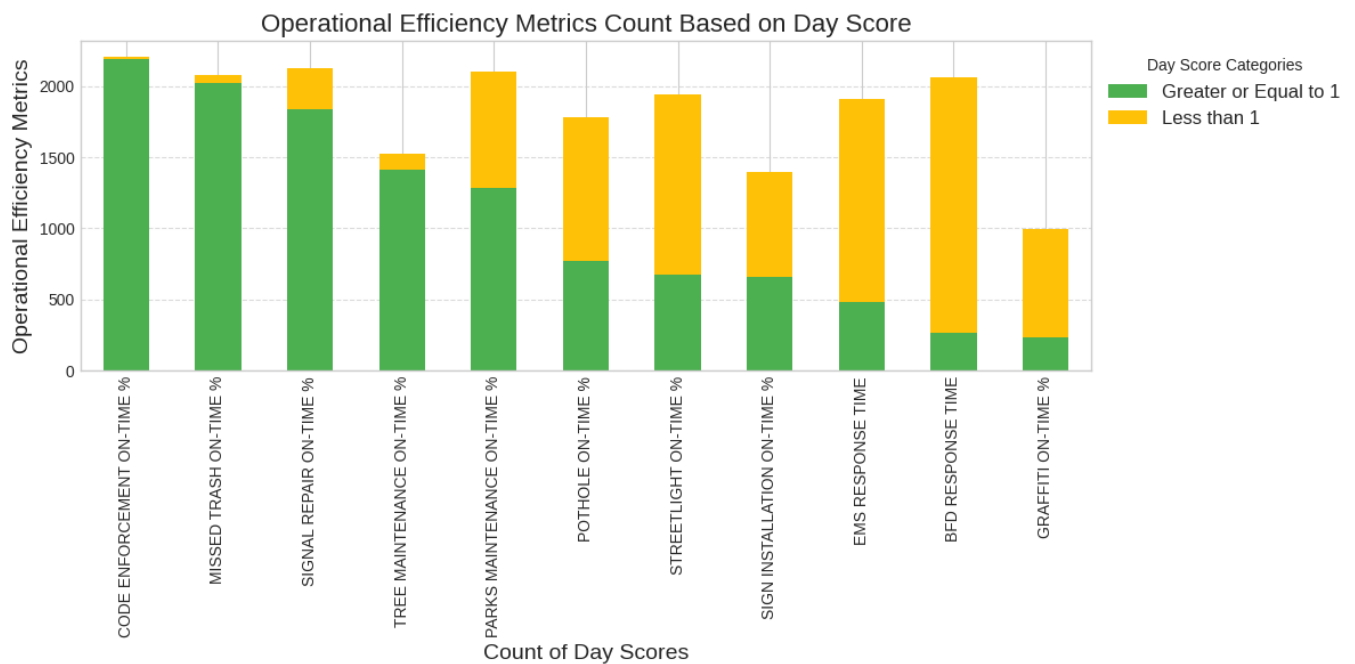
Improvement is needed in operational efficiency metrics, such as Streetlight On-Time % and EMS Response Time, as current averages fall short of historical benchmarks. Furthermore, City Services Satisfaction Surveys have not met target response times and require substantial enhancement.

CITY SERVICES SATISFACTION SURVEYS >=1 or < 1 for Year 2024

Greater than or equal to 1

Less than 1

311 CALL CENTER PERFORMANCE >=1 or < 1 for Year 2024

Greater than or equal to 1

Less than 1
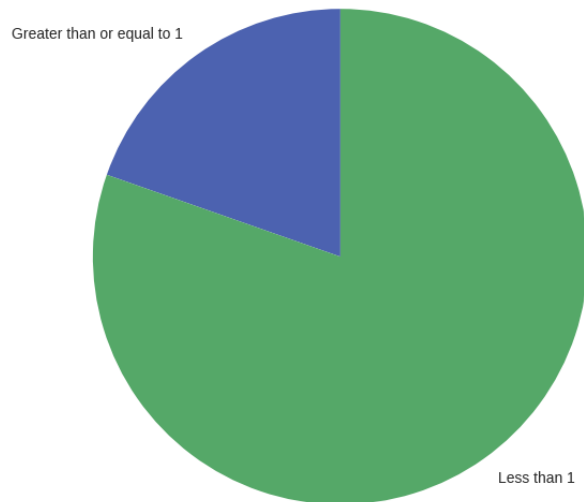
ON-TIME PERMIT REVIEWS >=1 or < 1 for Year 2024

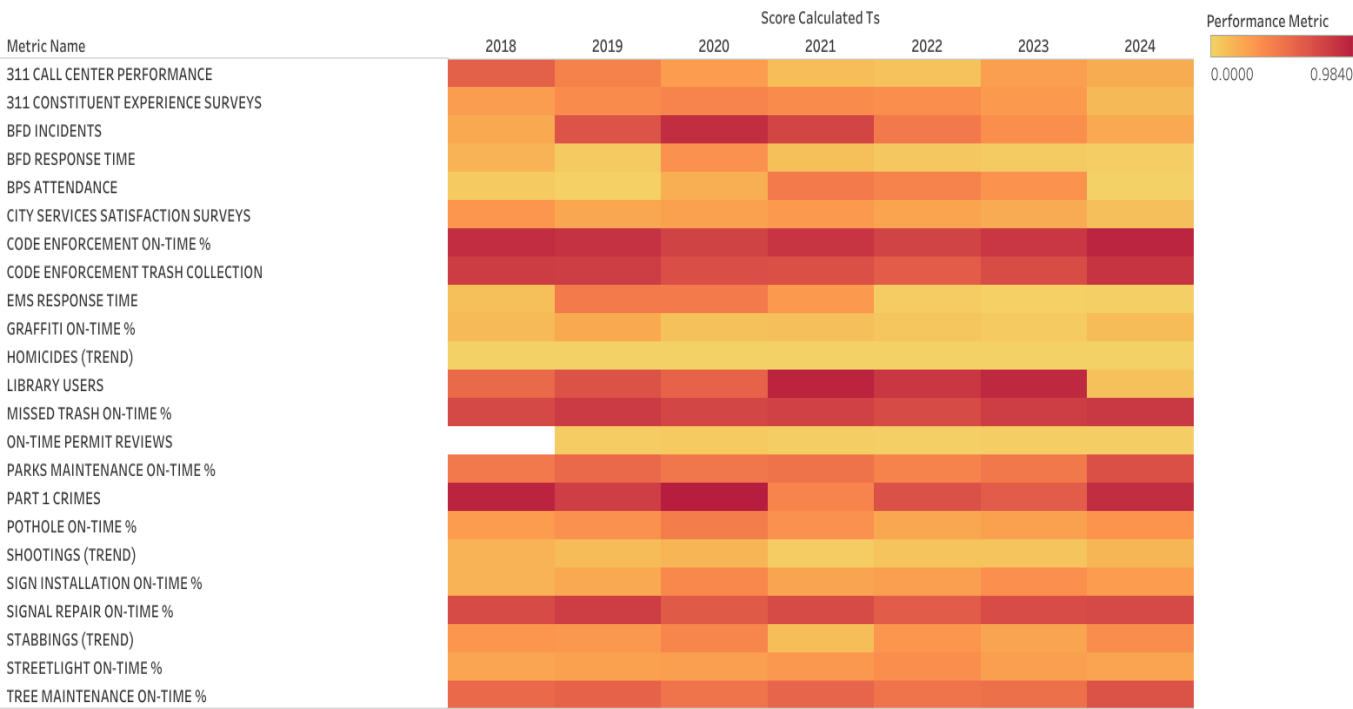Greater than or equal to 1

Less than 1
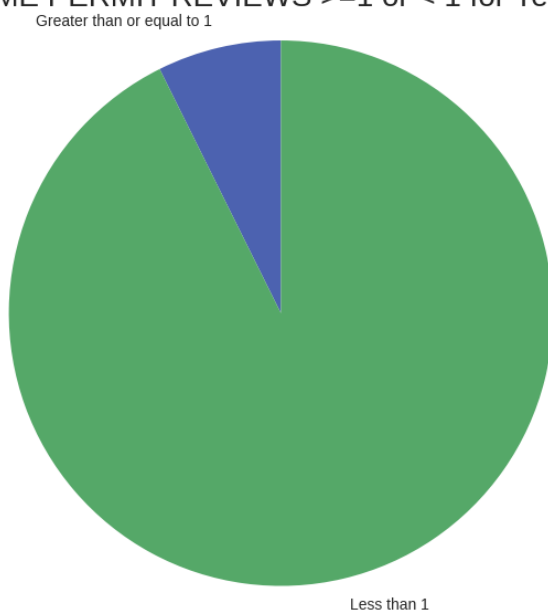
Despite minor fluctuations, daily scores exhibit a comforting stability throughout the year. A notable spike in library usage during December and January suggests an increase in patrons seeking cozy reading environments. Overall, scores hover around 1.75, indicating steady engagement from library users. The BPS Attendance Day Score Line Chart for 2023-2024 indicates consistent attendance, with a worrying decline at the end of June. Lastly, I have calculated the yearly sum of monthly scores for each metric to provide a comprehensive view of performance over time.

Library Users Day Score Scatter Plot for 2023-2024

BPS ATTENDANCE Day Score Line Chart for 2023-2024

For part-to-whole

I have drawn the trend analysis of each metric throughout the year and also the percentage of each metric's contribution to the overall total score daily.

Sheet 2

Metric Name	2018	2019	2020	2021	2022	2023	2024	Performance Metric
311 CALL CENTER PERFORMANCE								0.0000 0.9840

Yearly Sum of Month Score for Each Metric