

**Analysis of Dallas Street Service Requests (2020-2021)**

**NAME:**

**INSTRUCTOR: GAHANGIR HOSSAIN**

**Data Visualization INFO 5709**

**Final Project**

**Introduction:**

The 311-service system is a highly functioning non-emergency contact system used by residents to request information and report concerns regarding city services. The system borders a wide array of local concerns like road tears and wear, disturbances and spoilage that do not need police or other emergency services’ immediate attention. The provision of a communicative bridge between citizens and the municipal government is vital in ensuring public order and safety. Additionally, the saved data from the functioning of this service system can be beneficial for assessing community needs, urban sock, and best ways to change the allocations to the preferred areas. For urban testing, the saved data helps in running off all the service needs and ultimately maps the location most of them occur. This ideal information helps in city planning and development. When a government has data at hand, it will never downplay emergencies and shortcomings of service delivery in one dominated area. With this analysis, this data story is set to explore the 311-service data to get useful insights that can lead to better choices and improve urban life.

**Dataset Overview:**

This dataset includes records of service requests that are not emergencies, reported by the residents of Dallas, Texas to the city’s 311 services. These may include problems that are typically linked with urban areas, such as road hazards, public disturbance, and vandalism. The dataset aims to provide a view of the level of operation of their services as well as the types of civic issues the departments are solving across all districts. The major attributes of the dataset are as follows:   
Time period: January 2020- February 2021;  
Volume: 10907 records and 19 variables. Each record represents one service request.

**Dataset Source:** <https://www.dallasopendata.com/Services/311-Service-Requests-for-Fiscal-Year-2020-2021-Str/s3gf-a952>

**Attributes:**

The dataset pulled from the 311-service system contains multiple fields with detailed information on each service request in Dallas, Texas. The data is described through references to the available columns as below: SERVICE\_REQUEST\_NUMBER: This is a unique identifier to a specific service request.

ADDRESS: the actual physical address or a location description where the service is needed.

CITY\_COUNCIL\_DISTRICT: this is the identification number for the city council district the request location belongs to; it can be helpful in analyzing geography.

DEPARTMENT: it defines the city department that is supposed to take care of the request.

SERVICE\_REQUEST\_TYPE: it explains what the service needed is for example street cleaning or debris removal.

ERT (ESTIMATED\_RESPONSE\_TIME): this is the maximum estimated time within which the service needs to be delivered given in business or days.

ERT\_MEASURED\_IN: this is for communicating whether the ERT field is in business days or normal days.

OVERALL\_SERVICE\_REQUEST\_DUE\_DATE: this is the expected date when the service will be delivered. it is a day.

STATUS: gives the current status of the request, for example, closed, opened, and transferred.

CREATED\_DATE, UPDATED\_DATE, CLOSED\_DATE: this is the time the service request was created, updated, and closed.

OUTCOME: the service give a description of how the request was met like work done or request transferred.

PRIORITY: statement of urgency of the request whether standard or high.

METHOD\_RECEIVED\_DESC: how the service request was received i.e., through call, API, in person.

UNIQUE\_KEY- Another unique identification for request tracking.

LATITUDE, LONGITUDE: this is the geographical region that requests fall and this can be good for mapping.

**Exploratory Data Analysis:**

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* Here is the dataset I have cleaned the data columns after removed missing values.

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1. **Count of Service Requests by Department**

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The above bar graph shows the number of service requests by department. The y-axis shows the department names, and the x-axis shows the count. The department with the most requests is Public Works, followed by Transportation.

1. **Top 10 Service Request Types**

The bar graph shows the frequency of the top 10 service request types. The y-axis shows the service request type, and the x-axis shows the count of requests. The most frequent service request type is "Street Repair-Routine - PBW", followed by "Alley/Sidewalk/Street Repair - Hazardous - PBW" and "Street Spillage/Debris in Right of Way - Hazardous - PBW".

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1. **Service Request Status Distribution**

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The pie chart shows the distribution of service requests by status. The slice labels and corresponding percentages displays their count.

1. **Monthly Service Requests Over Years**

**A graph with lines and dots

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The line graph shows the number of service requests per month over several years. The x-axis shows the month, and the y-axis shows the number of service requests. There is a trend of higher service requests in the summer months (June, July, August) compared to winter months (December, January, February) for each of the years. It appears that 2021 has the most service requests overall, followed by 2020.

1. **Distribution of Estimated Response Times**

The histogram shows the distribution of estimated response times for service requests. The x-axis shows the estimated response time in units of days **A graph with blue lines

Description automatically generated**

**Hypothesis:**

* Analyze the distribution and trends of service request types.
* Investigate the response times and service levels for different request types or locations.
* Analyze the status and completion rates of service requests.

**1. Analyze the distribution and trends of service request types.**

For this hypothesis I have taken 3 different graphs Bar, line, and Tree plots.

In this hypothesis we will explore how the service requests impacts on various other properties.

The Bar plot shows the number of requests by service request type for a 311 system. It appears that street repair and street cleaning are the most common types of service requests.

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The line chart depicts the trend in the number of service requests made through a 311 system over a two-year period. There seems to be a seasonal pattern, with more requests in the summer months compared to winter months.

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The tree map visualizes the distribution of service requests within a 311 system. Street repairs, specifically “Street Repair-Routine PBW” and “Alley/Sidewalk/Street Repair-Hazardous-PBW”, are the most frequent request types.

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**2.** **Investigate the response times and service levels for different request types or locations.**

In the second hypothesis we will be looking at different requests or locations. Here Scatter, Box and pie plots are used to explore the hypothesis.

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The above scatter plot describes the data from 2020-2021 of public works and Transportation departments.

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The box plot provides the response time for raised requests based on the service requests.

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This pie plot covers the Outcome results of the service requests along with their response time.

**3. Analyze the status and completion rates of service requests.**

In this hypothesis we recommend verifying how the service requests are updated and how their status is completed based on the time and locations. Here used a table, staked bar and tree plots.

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This is a highlighted table, and we can see status and the number of service requests recorded in each status.

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The above stacked bar plot is stacking status values based on the yearly data from 2020 – 2021.

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The above Tree plot details the status and grouped with priority orders.

**Dashboard:**

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This is a dashboard where we can add our required plots to the page and also we can hover the data and it can be used present in meetings for business requirements. I have added actions on it if we provide filters then automatically the variable in different plots will be highlighted and it will be helpful analysis purpose in real time projects. We can observe in the below image.

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**Conclusion:**

The dataset contains such critical metrics as response times, resolution times, and the nature of complaints, making it possible to determine how well-compromised areas of streets were addressed and how quickly and well the city manages a particular nuisance. Thus, the presence of these metrics allows stakeholders to assess whether the city honors its commitments of service and identify areas that have shown weak performance.

**References:**

* *Dallas 311*. (n.d.). <https://dallascityhall.com/services/311/Pages/default.aspx>
* *311 service requests for fiscal Year 2020 - 2021 Street | Dallas OpenData*. (2024, May 4). <https://www.dallasopendata.com/Services/311-Service-Requests-for-Fiscal-Year-2020-2021-Str/s3gf-a952>