**Abstract**

This report offers an analysis of service requests using 311 data for 2023. The analysis addresses specific questions related to issue types, completion times, and geographical correlations. Conducted in Databricks, this analysis aims to empower decision-makers with actionable insights for optimized resource allocation and service delivery.

Analysis of service requests: 311 Data

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**Methodology**

**Data Collection**

The initial data extraction involved sourcing dataset from Miami Dade County’s 311 open data hub. The data containing 311-service request data for the year 2023 was uploaded via API.

These Data Frames served as the foundation for subsequent data exploration, analysis, and correlation assessments.

**Data Preparation**

Descriptive statistics and exploratory data analysis (EDA) were conducted using PySpark to delve into the dataset and extract insights related to issue type, method type, and various other key parameters.

**Results and Discussion**

**Overview of Service Requests**

The exploratory analysis revealed a spectrum of service requests, with "Bulky Trash Request by Appointment," “Green Waste Cart Request”, “Bulky Trash Request” and” Recycling Blue Cart Issues," emerging as the most common issues. These findings offer a window into the community's primary concerns, setting the stage for strategic planning and prioritized service delivery.

**Correlation Analysis**

A substantial allocation of resources to the solid waste management department, justified by the county's 2.7 million population, suggests resilience to budget cuts. Notably, the department continues to receive FEMA reimbursement for Hurricane Irma cleanup, as detailed in their FY 2022-23 business plan (<https://www.miamidade.gov/performance/library/business-plans/FY-2022-23-solid-waste.pdf>).

This visualization illustrates the spatial clustering of service request locations across Miami-Dade County using K-means clustering. Each point represents a service request location, color-coded according to the cluster it belongs to. The red "X" markers indicate the centroids of each cluster. The clustering reveals three distinct clusters, suggesting areas with high service demand and potential resource allocation challenges.

**City-wise Ticket Distribution**

The city-wise distribution analysis notably identified "City of Miami Gardens" as a central focal point, leading with the highest number of closed service requests at 49,081. This prominence suggests an increased demand for community services within this city. Following closely, the "City of Miami" and "Town of Cutler Bay" exhibit substantial engagement, closing 23,314 and 19,055 service requests, respectively. "City of Pinecrest" and "City of Doral" contribute significantly with 11,643 and 10,319 closed requests, respectively. These figures represent the diverse distribution of service requests within each city.

The concentration of closed service requests in "City of Miami Gardens" propels a more focused examination into the specific challenges faced by the city. These insights become instrumental in directing resources effectively, enabling tailored solutions to address the distinct needs of each community and strategically align with the demands of each city.

**Method Usage**

The analysis of request methods highlights diverse channels, emphasizing how residents interact. Key methods are phone, web, Xterface, iPhone, and email. Recognizing these diverse channels emphasizes the need for responsive communication. Phone requests show a preference for traditional communication, while web and email indicate a shift to digital. The prominence of Xterface and iPhone reflects reliance on mobile interfaces. These insights guide strategies for efficient, user-friendly communication, aligning with evolving resident expectations for an adaptive service request system.

**Conclusions/Recommendations**

**Business Recommendations**

1. **Staff Allocation:** In response to observed patterns in service request volume, dynamic staff allocation strategies should be implemented. This ensures that staffing levels are appropriate to meet established target goals and maintain an optimal level of responsiveness. Based on the analysis, areas with consistently high service request volumes, such as City of Miami Gardens, may benefit from increased staffing levels.
2. **Communication Channels Enhancement:** With "PHONE" identified as a prevalent method, optimization efforts should focus on enhancing this communication channel. This involves improvements in staff training, response times, and the overall user experience for residents.
3. **District-specific Strategies:** Tailoring strategies to the unique characteristics of each district is imperative. The correlation analysis serves as a guide for understanding district-specific challenges, facilitating the formulation of targeted solutions and service delivery strategies.
4. **Regular Performance Monitoring:** Establishing a robust performance monitoring system is essential for ongoing improvement. Regular reporting and analysis, informed by insights from the analysis, will ensure sustained positive impacts on service delivery and continual refinement of strategies.
5. **Operational Efficiency:** From an efficiency standpoint, the Citations & Tags division is a high performing team. County commissioners should look deeper into the department operational team and apply their best practices to enhance the performance of other departments within the county. One division that needs immediate attention is Right-of-Way Aesthetic & Assets Management Division (RAAM 27-93) as currently is the most underperforming division in the county.

Our analysis of Miami-Dade County's 311 service data revealed significant completion time variations by neighborhood and priority. Emergency requests in District 3 took an average of 46.3 days to complete, while standard requests in District 4 averaged 28.5 days. Examining the top 10 completion times by neighborhood and priority highlighted response time disparities, especially in neighborhoods with more emergency requests. K-means clustering identified three service request clusters, indicating areas with high demand and resource allocation challenges.

Bulky trash pick-up requests were the most common, emphasizing the need for better waste management services. Neighborhoods with more emergency requests faced longer completion times, suggesting challenges in resource allocation or prioritization. Understanding spatial clustering can aid in prioritizing resources and service planning for specific communities.