Analyzing 311 Responses

Final Report

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Introduction

Project Goal and Overview

311 is a telephone number that connects people with service representatives who are always ready to provide non-emergency city services and information. Our project aims to understand the city's response to 311 service requests by analyzing 311 data. By doing this, we are able to understand which communities feel empowered to demand services and how the city responds. Specifically, we collected and pre-processed the data from CLIMATE READY BOSTON SOCIAL VULNERABILITY dataset and the 311 requests from th past 8 years. We then normalized the data to ensure all variables have fair impacts to the result.

Base Analysis

How did we calculate the social vulnerability index of each census group? That is, how do we define social vulnerability status of a census group?

We used the ranking method to calculate CDC/ATSDR SVI. We first divided the number of people in each social group by the total number of the population. Then we sorted census groups by the rate contributed by each social group, and for every census group at the first 10% in each sort, add one point to their SVI. After going through all social group, we got a rank of social vulnerability status.

How do we estimate 311 request based on the calculated SVI?

With the SVI of all census group, we analyzed how well the SVI predict the load of 311 request. For every district in each SVI rank, if the position in 311 cases number list is in the range of it's rank's district, we classify the SVI rank as a good predict (For example, let's say district EX has a SVI rank 2 and all districts in 151 to 171 position has a SVI rank 2. If we found that in 311 cases number list the position of district EX is between 151 and 171, we say SVI rank did a good predict). As a result, 135 out of 183 census blocks received a good predict. We think the bias between the two features might be that there are spam calls, and also the SVI rank only gives an approximate predict as it is a rank. Below is the visualization of SVI we calculated.
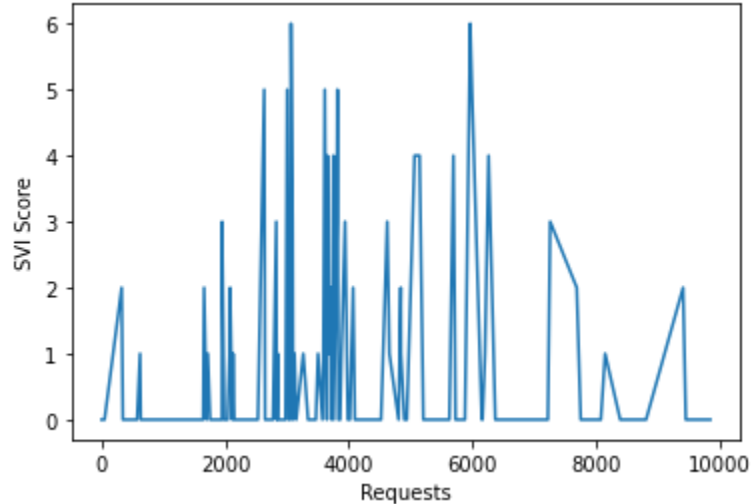

Figure 1. SVI scores at different number of requests

Analyze which cities submitted the most service requests

A huge part of this project is that we want to know which communities are most empowered based on 311 service requests. A good way to get the result is to analyze which insert geography submitted the most service requests. We decided to use CT ID instead of region to conduct our analysis because CT ID is more specific and precise if we want to get an accurate result. We broke down our analysis into three stages: CT with most service requests, CT with the greatest ratio of service requests to its population, and CT with over 500 service requests and that the greatest ratio of service requests to its population. We decided to take the percentage and the number of total requests into consideration because it is more meaningful and unbiased to interpret the percentage when the data is larger. Below is the three graphs of the stages mentioned above.
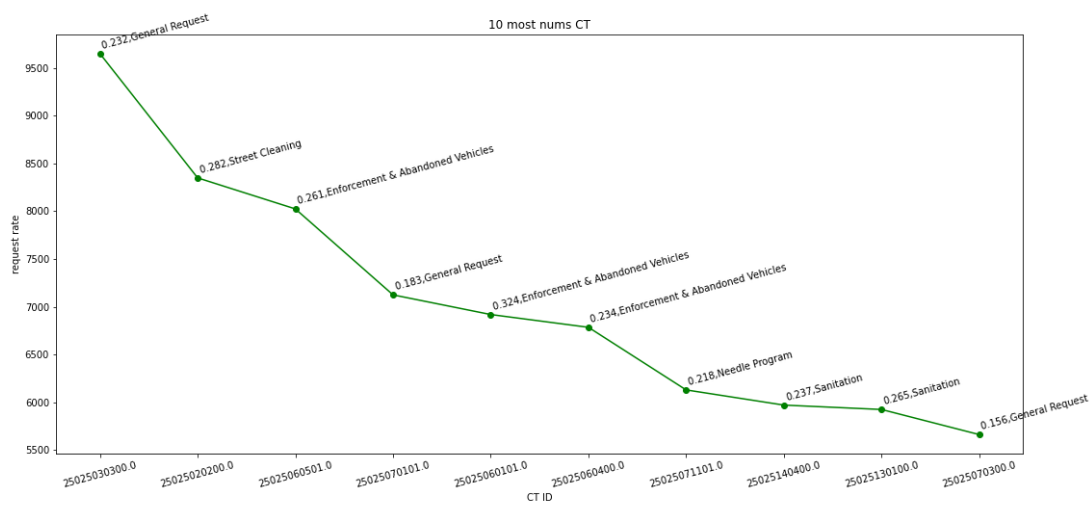

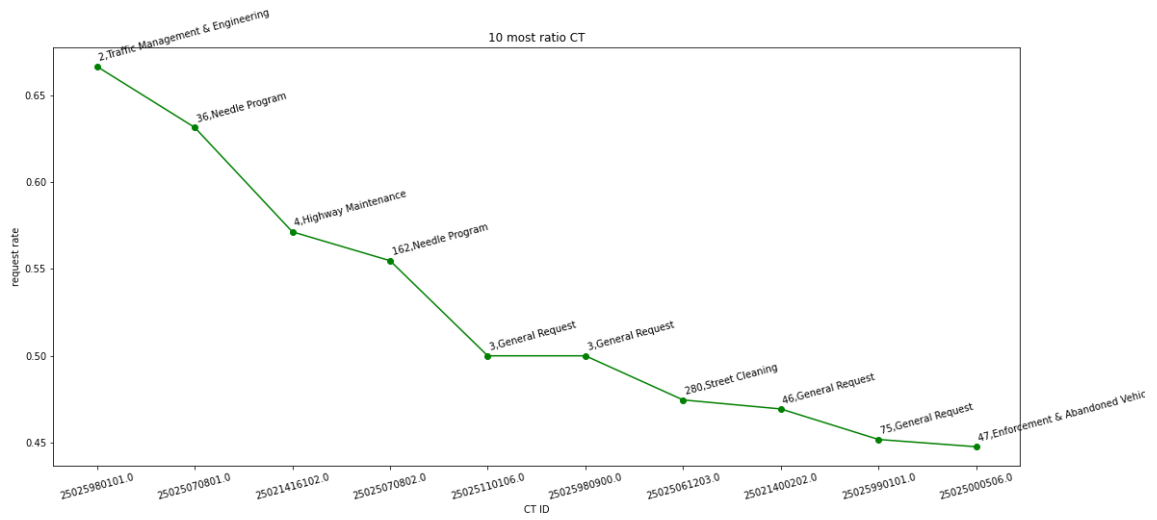
Figure 2. 10 CT IDs with most service requests

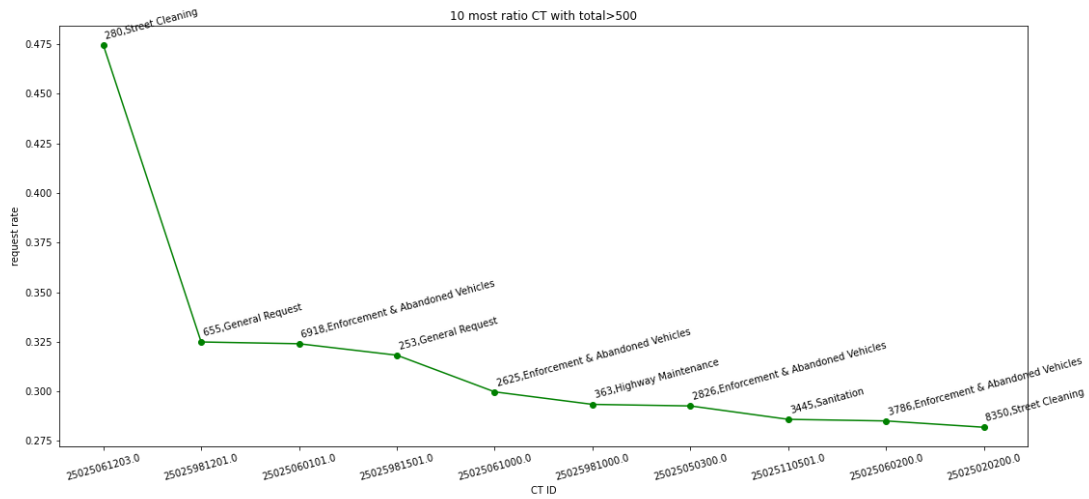*Figure 3. 10 CT IDs with greatest ratio of service requests to population*

Figure 4. 10 CT IDs with more than 500 requests andwith greatest ratio of service requests to population

Extension Analysis

Extension Project Goal and Analysis

So far we have stressed a lot on the relationship between social vulnerability and the number of service requests across different areas. To conduct a further analysis, we decided to explore what types of service do certain areas demand or lack. By doing this, we believe that the 311 service would be more comprehensive and satisfying.

Have the types of requests changed over the years for areas with high social vulnerability people?

In our base analysis, we figured out the areas with high social vulnerability through the calculation of social vulnerability index. Within those areas, we analyzed their service requests from the past ten years. In the graph below, we can see that the numbers of a couple types of requests such as General Requests and Parking Enforcement increased over the years while service such as scheduling a bulk item pick up went down a lot. This can be a possible indicator of whether some services require more resources or capitals.
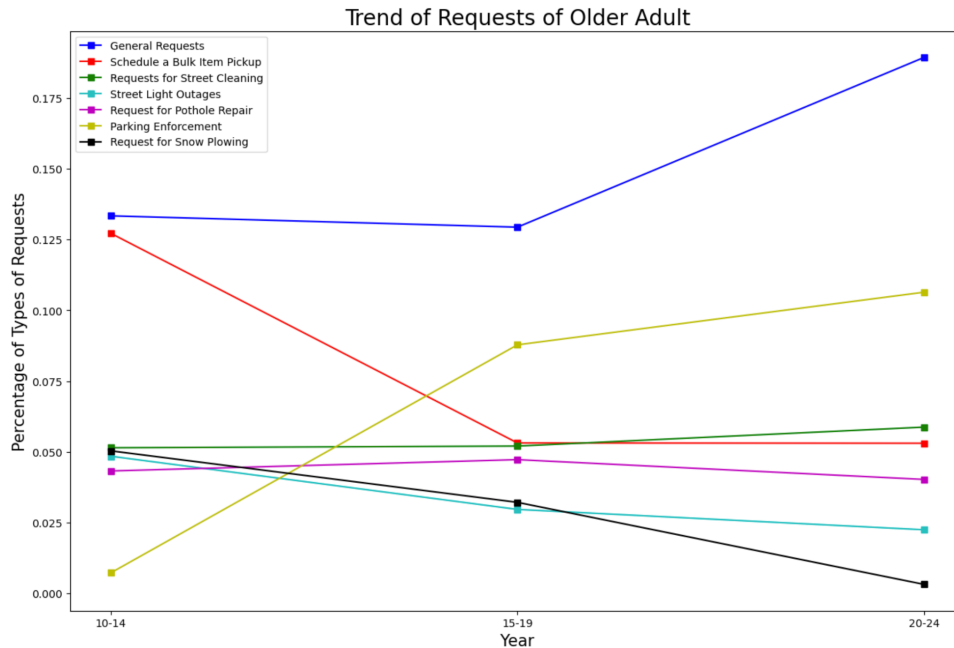
Figure 5. Trend of Service Requests of Older Adult

How are people reporting service requests?

By understanding how people are reporting requests, we can tell what forms are popular and efficient. In figure 6, we can tell that mobile requests are getting more and more popular. On the other hands, constituent calls are less common over the years. This result shows that more requests are coming from mobile calls and also implies that various types of service requests can be made through mobile. Although constituents calls is still an important format of reporting, more and more service requests are made by mobile calls due to its convenience. In addition, the City App has also been growing and has a lot of potential due to the technological advancements. Therefore, we think more emphasis should be placed on mobile calls and City App requests to make the system more well-rounded.
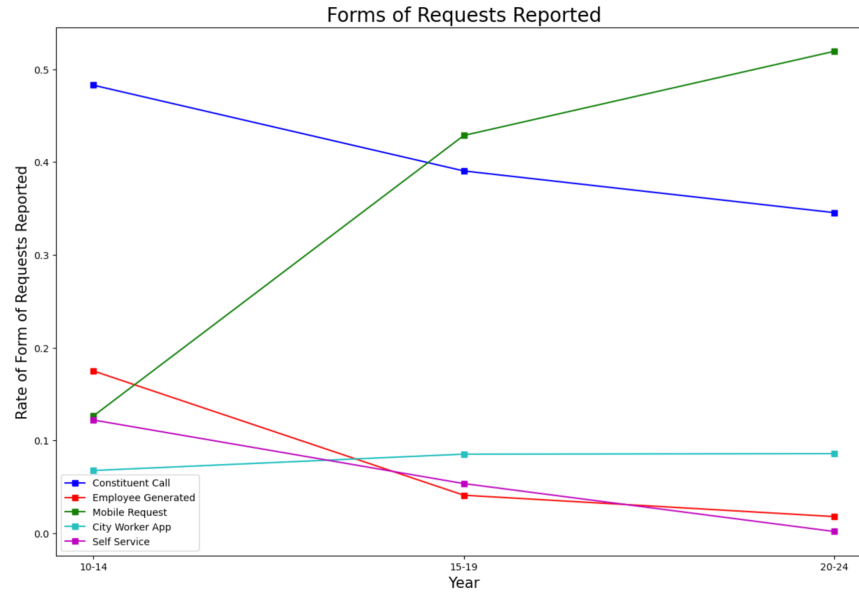
Figure 6. Forms of Requests over Years

Members' Contributions

Cheng-Ping Lin: data cleaning and pre-processing, SQL data sorting, analyze requests from different regions for base analysis, final report draft

Kyren Chen: data cleaning and preprocessing, SQL data sorting,analyze different types of requests from regions of base analysis, extension analysis

Weichen Jiang: data cleaning and preprocessing, python dataframe analysis and visualization, calculated SVI and rank of CT IDs for base analysis.