CS 507
311 Requests in District 7
Project Deliverable 2

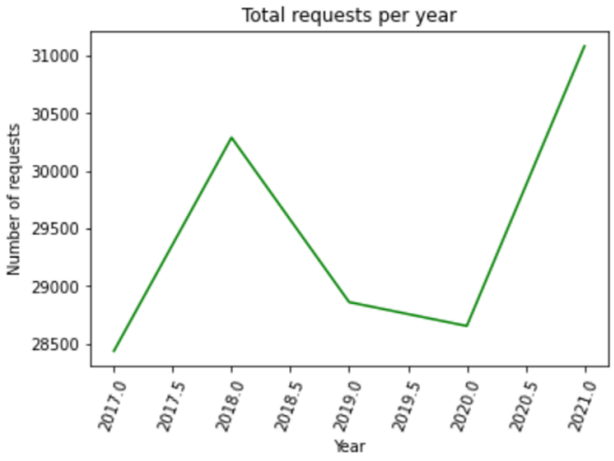
Project goal:

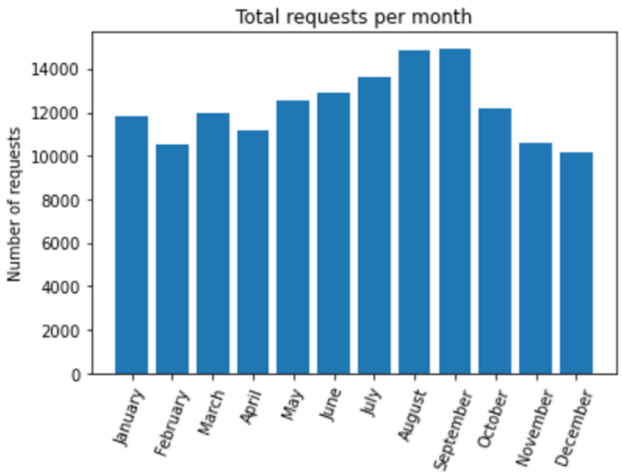
To understand how district 7 is being served vs. other districts in Boston in regards to 311 service requests, to obtain a better picture of how city resources are being allocated. To do so, we have a source of public information and are exploring the analysis up to five years in the past to map the evolution of these requests.

Refine the preliminary analysis of the data performed in PD1

Frequency of requests analysis

The following visualizations were created based on the initial exploration made for delivery 1 regarding the frequency of 311 requests for District 7, containing the evolution of volume of requests by year and by month. These are the first visualizations proposals for the potential dashboard that our client wants to build during next semesters based on our initial work.





Data Collection and Preliminary analysis:

Merging of databases

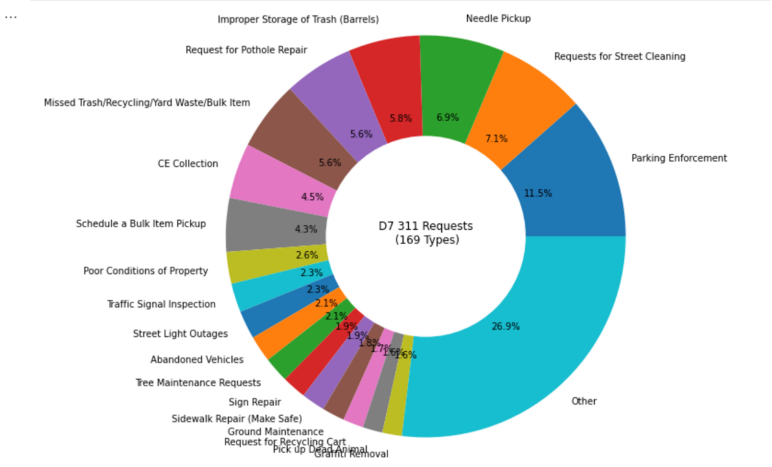
For this deliverable we finished the data collection portion of the project. We were able to merge the census data with race and income information for each census tract with the Massachusetts shapefile which contains the different census tracts. Once we had the demographic data for each census tract in the region, we merged the 311 request dataset with the demographics by census tract dataset. The resulting dataset now contains the tract

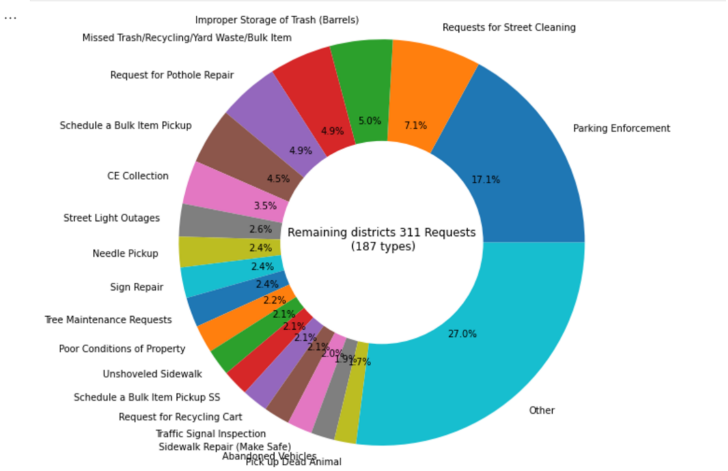
number and the demographic information such as population per race and median household income for each request of the 311 dataset. This will allow us to conduct a more granular and detailed analysis of the requests done in D7 vs in other Boston districts from the demographic perspective later on.

Types of requests analysis

We also performed the analysis on the type of requests variable. During the last 5 years, District 7 has had 169 different types of requests filed. However 19 of these represent around 73% of the total requests. Parking enforcement requests tops the list with 11.5% of all requests, followed by requests for street cleaning, Needle pickup, improper storage of trash, requests for pothole repair, and missed items that represent at least 5% of the requests each. Grouping the rest of the districts as a whole, we find that there is slightly more variety, with 18 more types of requests compared to D7's, but again around 73% of all requests are contained in the top 19 types. And consistent with D7, Parking enforcement and requests for street cleaning are the top 7 types of requests, with 17.1% and 7.1% of the total requests.

Similar graphs were generated for each of the remaining districts individually, these graphs will be presented to the client so she can decide which districts and which variables are the most relevant ones and we can focus on them.





Average completion time for types of requests

In deliverable 0, we established that of all the requests in D7, 11.83% were never completed and in all districts outside of D7, 10.66% were never completed. We also established that by only looking at the closed requests, the average time to close was 11.17 days in D7 and 11.5 days outside of D7. However, to get a better understanding of the needs of D7 and how this district may be underserved, we then filtered these average completion times by most popular requests in D7. Specifically, this analysis was done on the 19 most common request types in D7 which make up 73% of the total, as discussed above. The types of requests that showed most skew towards faster service times outside of D7 were Requests for Street Cleaning (33.52 hours for D7, 27.33 outside), Request for Pothole Repair (5.11 days for D7, 3.96 days outside), CE Collection (10.11 hours for D7, 7.5 hours outside), Traffic Signal Inspection (11.14 days for D7, 9.94 days outside), Street Light Outages (45.36 days for D7, 36.15 days outside), Sign Repair (15.63 days for D7, 12.26 days outside), and Sidewalk Repair (20.99 days for D7, 18.24 days outside).

Key questions answered.

- What are the most common types of requests for D7?
- How do these requests compare to the rest of the districts?

Scope and limitations re-evaluation.

One limitation that has been run into is the fact that the client would like to see analysis on demographic data per neighborhood, however the census data we are using does not provide per neighborhood data.

Tasks detail of the team members:

Samantha and Ryan:

• Merge census data to shapefile of MA and to 311 data using geopandas to include census tract column and demographic information in the 311 dataset.

Kevin:

• Display a summary of what request types are most common overall and by district

Brian:

- Look for outliers in completion time based on request type
- Filter average completion times by request type for D7 and rest of districts