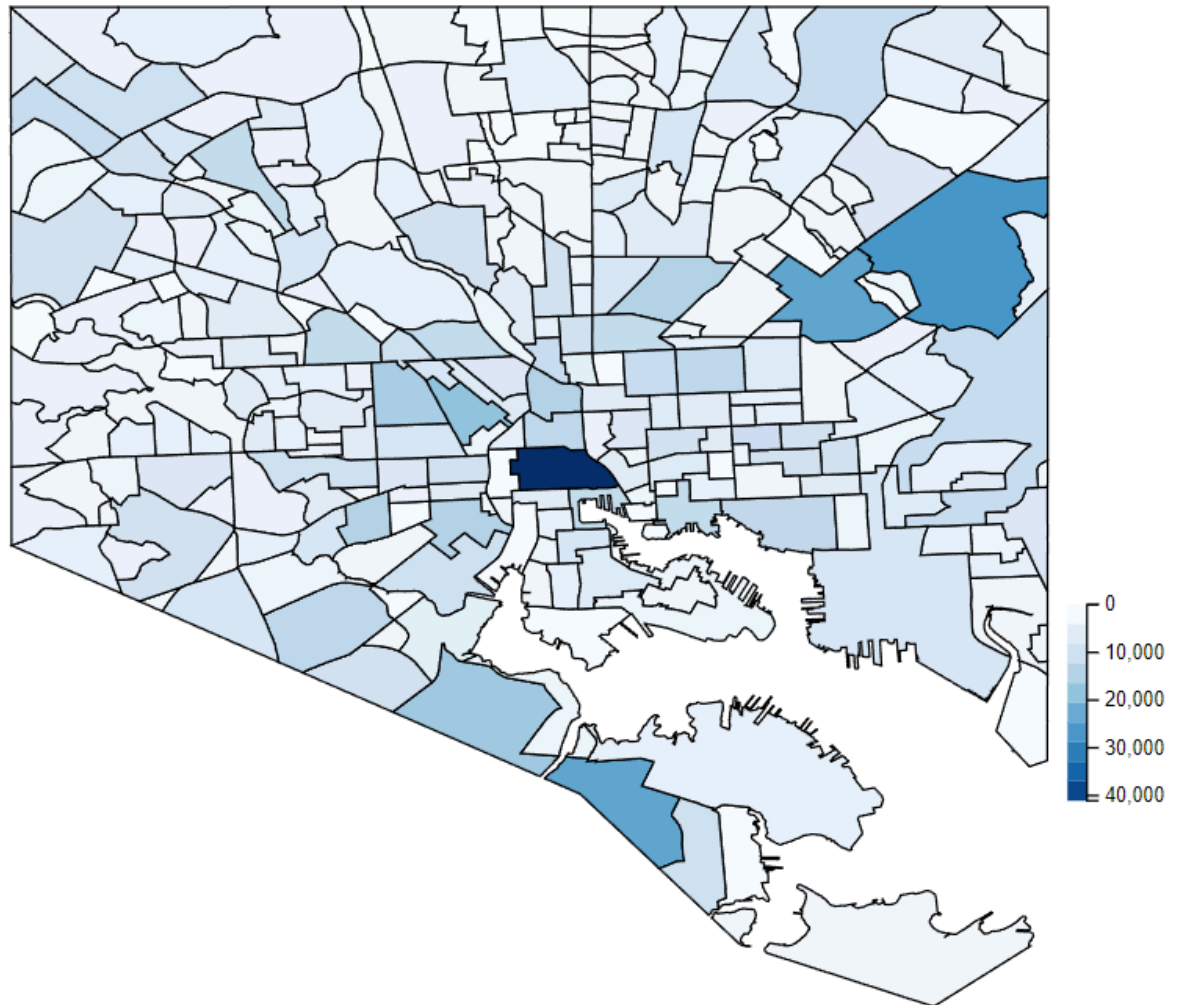
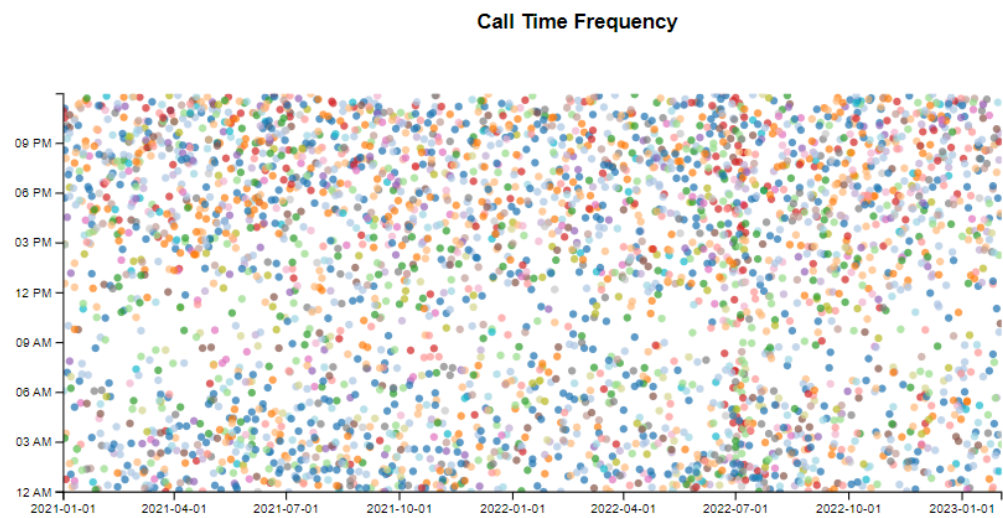
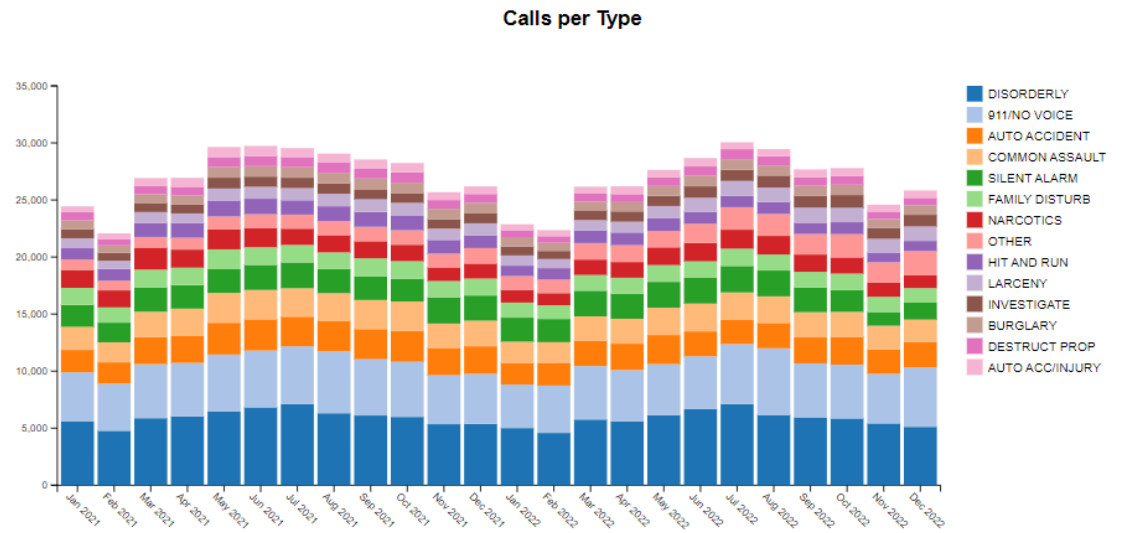


- *Overview and Motivation:* The goal of this project is to provide a clear overview of where, when, and why 911 calls occur in the city of Baltimore, utilizing data from 2021 and 2022.
- *Related Work:* The heatmap was directly inspired by the heatmap of Atlanta crime in Assignment 3.
- *Questions:* Where do the majority of 911 calls occur in Baltimore? When do the majority of 911 calls occur? Why do the majority of calls occur? How does the rate of occurrence of different call reasons change by neighborhood? Are there trends in certain call reasons occurring more frequently at certain times of day or times of the year?
- *Data:* Source, scraping method, cleanup, etc. The data was sourced from kaggle (<https://www.kaggle.com/datasets/ahmadrafiee/911-calls-for-service-metadata-1-million-record>), with geographic data coming from the city of baltimore website (<https://data.baltimorecity.gov/>). The data was cleaned utilizing python scripts to remove unused categories.
- *Exploratory Data Analysis:* A heatmap, as well as a bar chart for total number of calls by type, were part of the exploratory analysis. These were made with tableau to help identify trends we could look for in the final visualization.
- *Design Evolution:* The idea for the heatmap was something we had from the outset, however the other two visualizations changed multiple times. Originally instead of the scatterplot that we settled on, we planned on a line chart of calls per month. Instead of the stacked bar chart that we now have, a bar chart with a slider to filter by month was used. These changes were made as they showed more information about the data, and made it easier to view trends.

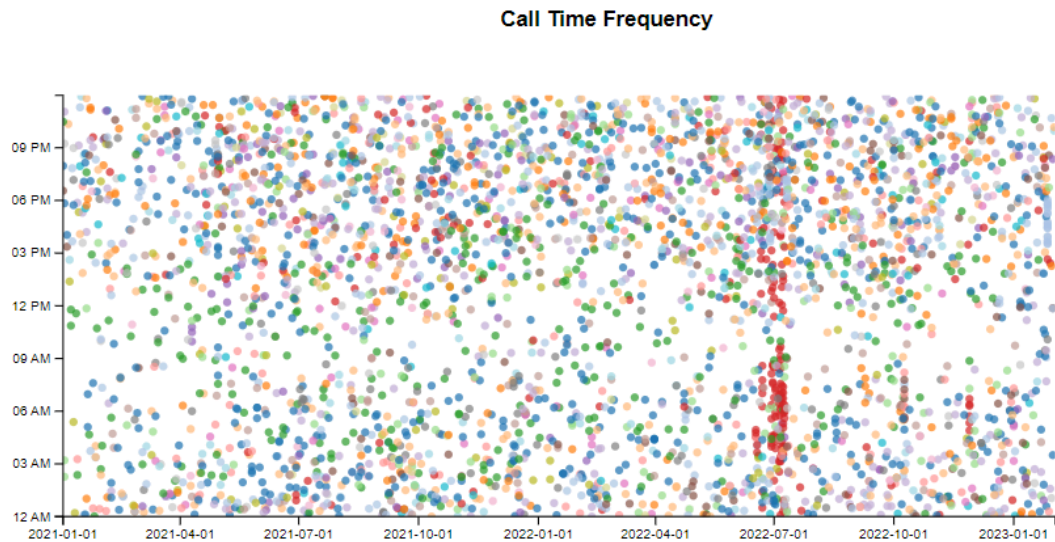
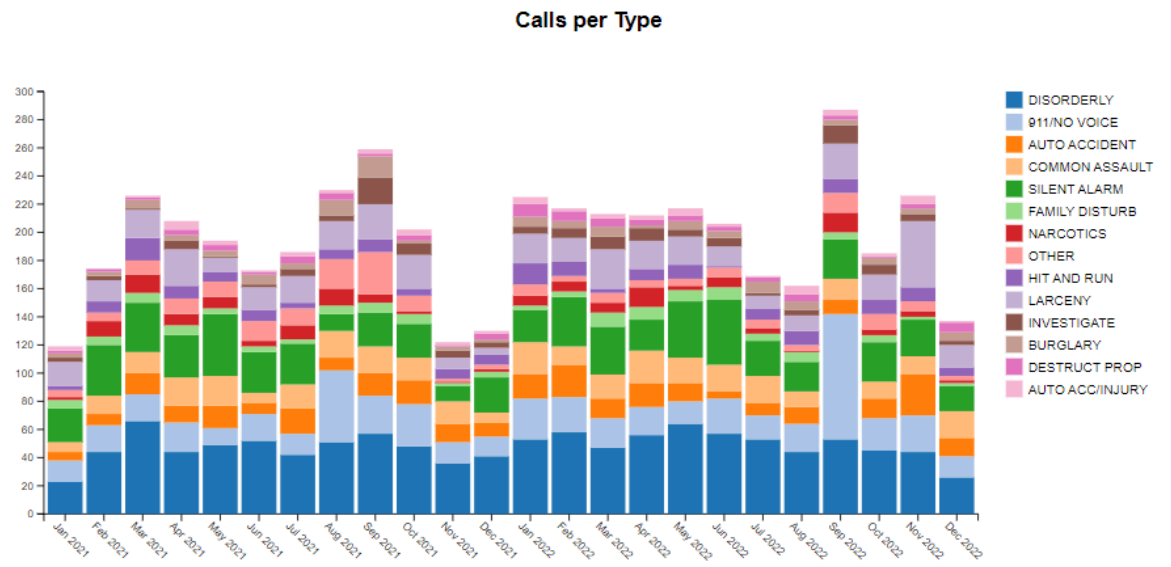
- *Implementation:*



Hovering over any of the neighborhoods creates a tooltip which tells you the neighborhood name as well as the number of calls from that neighborhood. If the neighborhood is clicked, it filters the other charts to only show data points from that neighborhood.



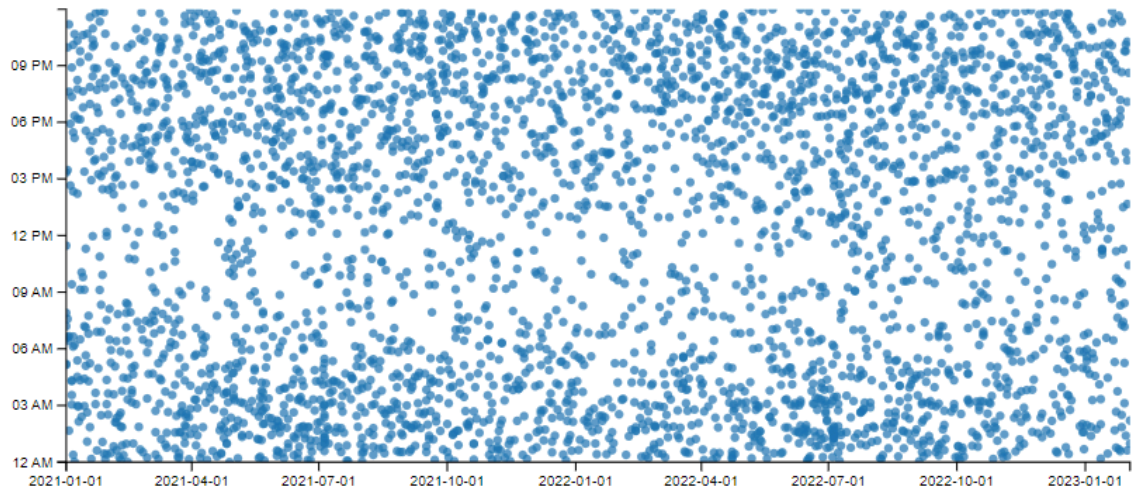
This shows the charts with data from every neighborhood, and below are the charts with just data for the Hampden neighborhood.



There is a button to reset the filters directly below the map. The frequency chart has tooltips that show date, time, severity, reason, and neighborhood. You can zoom in on the x-axis to get a better view of specific date ranges, without changing the y-axis. In addition, you can click the call reason on the bar chart to add an additional filter to the

scatterplot. Below is the plot when it is just showing disorderly calls.

Call Time Frequency



- *Evaluation:* Through our visualizations, we learned that Downtown has a significantly higher number of calls than any other neighborhood, and that Frankford and Brooklyn had the second and third highest number, respectively. We learned that calls are most common before 9 AM and after 3 PM, and that the largest reason for this trend were disorderly conduct calls, which were the most common across nearly every month and neighborhood, with a few exceptions. You can also see through interaction with the heatmap that neighborhoods closer to the border of the city have a higher number of calls for auto accidents. Our visualization works pretty well, but could be improved with faster loading times and potentially an easier way to see what neighborhood is currently being viewed.