

Battle of the Neighborhoods

COVID-19 in New York City

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Introduction

New York City, now the epicenter of the novel coronavirus pandemic, is looking for locations to take in patients with symptoms of COVID-19. People are getting sick at an overwhelming rate, putting a strain on the healthcare system.

Business Problem

To help combat the influx of patients, temporary locations need to be set up to take care of patients.

In this project, we will try to find new hospital locations in one of the five boroughs:

- Bronx,
- Brooklyn,
- Manhattan,
- Queens), and
- Staten Island.

Factors to consider:

- Distance from existing hospital
- Population
- Population density
- Hospital beds per person

Data

Data sources:

1. The City of New York dataset contains neighborhoods along with their geospatial data , and boroughs.
2. Population data was retrieved from Wikipedia mostly. [City-data.com](http://city-data.com), where Wikipedia gets population data for it's own website, was used to fill in missing data.
3. Hospital data was provided through the Foursquare API.

Methodology

Data was first downloaded from the New York City website to get the neighborhood names, latitudes, longitudes, and the borough names. The data needed some small formatting and then was merged with the population data from Wikipedia. Because some of the Wikipedia data was missing, I decided to do a left merge so that I did not lose neighborhoods that were missing population data. After choosing which borough

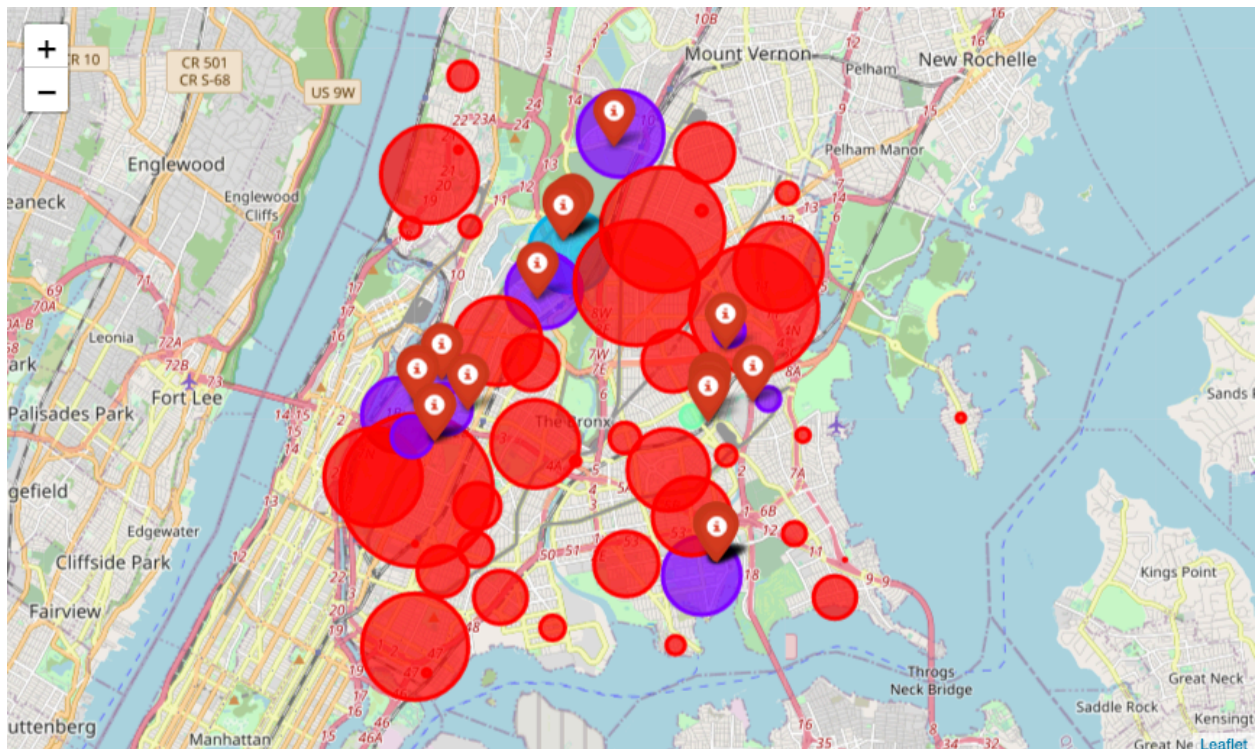
to focus on, I looked up the small number of rows where data was missing and retrieved it from the City-Data website.

I chose to focus on the Bronx as it has the highest number of cases of the five boroughs according to [NYC.gov](https://www.nyc.gov). I then created a map of the neighborhoods in the Bronx to visualize the 48 neighborhoods better.

Then, I retrieved hospital data by using the Foursquare API. When using the API, users need to be cognizant of what specifically they are looking for. With medical facilities for example, it is best to specify exactly what type of medical facility is of interest. Otherwise, an excessive amount of data will be provided. I took the previous Bronx map and the hospital data to create a new map to show where the hospitals are located in relation to the neighborhoods.

Finally, I took the hospital data and found the mean of hospitals in the Bronx neighborhoods. I then used k-means to cluster the neighborhoods. Not surprisingly, the cluster with zero hospitals and emergency rooms is the largest cluster. I then created a map that included markers for hospital location and markers of the neighborhood. The radius size of the neighborhood markers reflected the neighborhood population.

Results



In the map above, the red drop pins are the hospital and emergency room locations, the red circles represent the cluster of neighborhoods that do not have a hospital or emergency room while the size represents the population, the purple circles represent neighborhoods with more than 1 hospital or emergency room, the teal circle represents the neighborhood with 1 hospital and 1 emergency room, and the green circle represents the neighborhood with 2 emergency rooms and 1 hospital.

As you can see there appears to be an area in the south eastern part of the Bronx that could use a temporary facility to triage the inflow of patients coming into the existing hospitals.

Discussion

Foursquare data is not a great data source for hospital data, since some hospitals are missing from it or are not accurate. I would have liked to use a better data source. Number of cases by neighborhood would have also helped to focus what areas could use extra facilities.

Conclusions

In this report, I analyzed the relationship between neighborhood locations, neighborhood populations, and hospital locations. I also identified what area could use a temporary facility to relieve hospitals of the crushing inflow of patients because of COVID-19. This could be useful if a second wave of the novel coronavirus happens later this year.