

Capstone Project - The Battle of Neighborhoods

Introduction

Discussion of the problem:

After considering the data available, I have decided to consider the following problem: In Manhattan (NYC), if someone is looking to open a restaurant, where would you recommend that they open it? A recommendation will be made at the 'neighborhood-level'.

A client or a group of restaurateurs would be interested in this project because setting up at a good starting point and greatly improve the chances of their businesses surviving and/or even thriving in the competitive industry today.

Discussion of the background:

Since just simply reproducing what has already been taught in this course provides minimal value, I have searched the internet for more datasets that would be useful (discussed in more detail in the section on data). Besides looking at the number of existing potential competitors (as done in the course), I will also be using two additional datasets:

- 1) The historic NYPD shooting incident data
- 2) The population of each of the neighborhoods in each of the Borough in NYC (in years 2000 and 2010)

Reasons for the additional datasets and the additional value they provide:

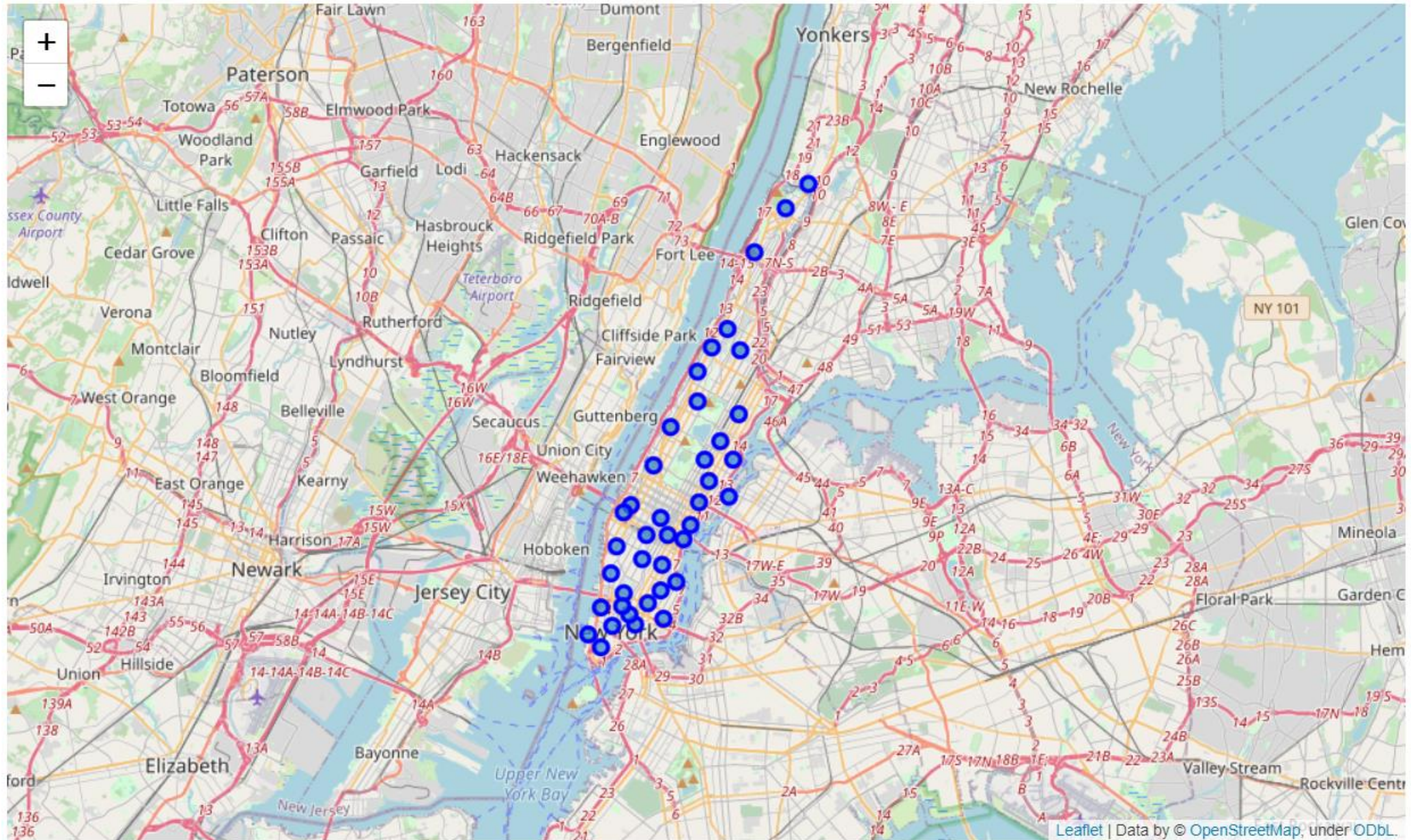
- 1) The number of shooting incidents in a neighborhood is a telling sign of the stability and level of violence/ criminality in that particular neighborhood, and should also definitely be of concern to any business owner.
- 2) However, merely comparing the number of shooting incidents across the neighborhoods would be an unfair comparison, since one can expect the number of shooting incidents to be influenced by the size of the population. As such, the data on the population size of each neighborhood would be used to calculate the number of shooting incidents per capita for each of these neighborhoods.
- 3) While it will likely lead to an increase in shooting incidents, a greater population size will potentially result in a larger potential customer base.

Methodology:

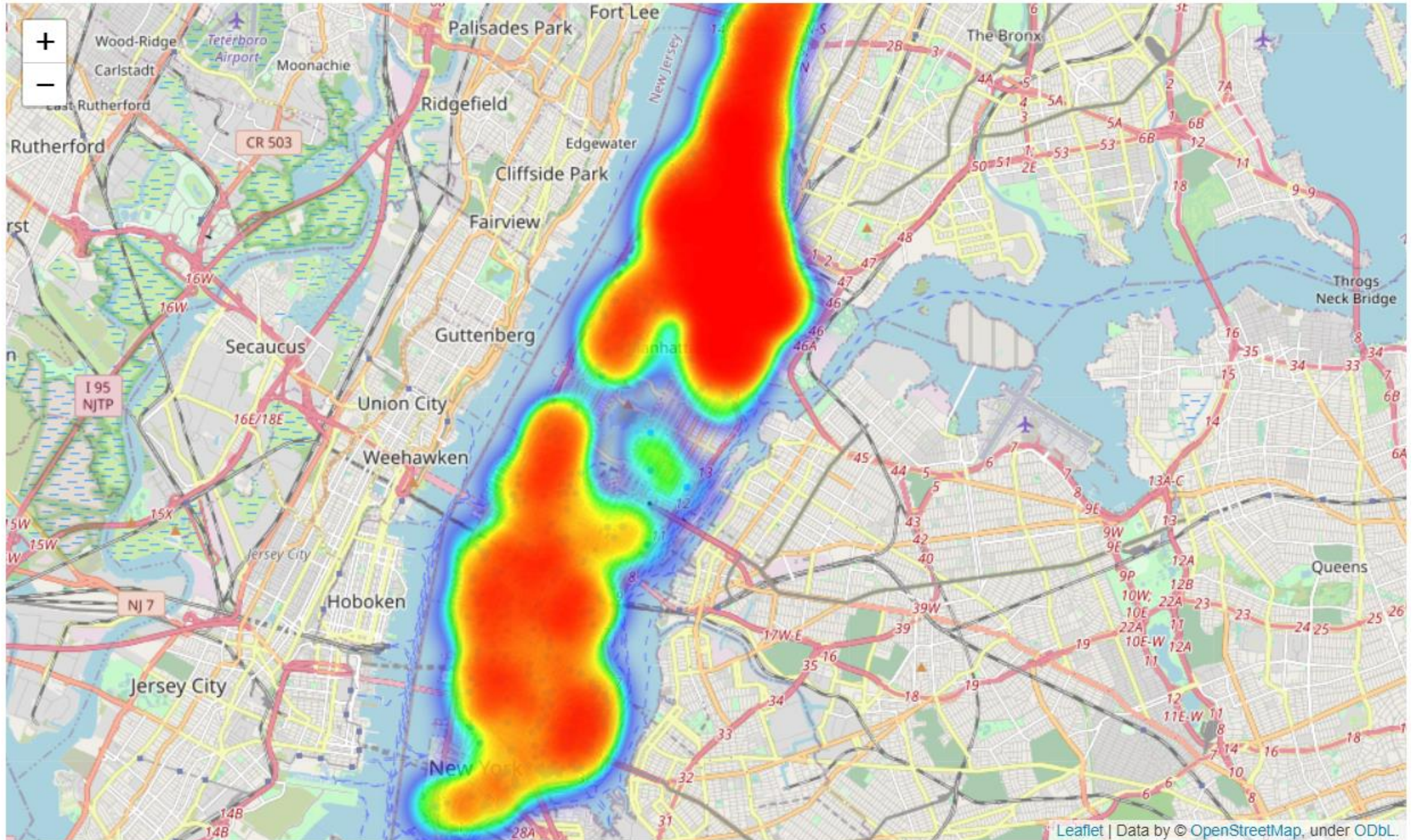
The methodology used to determine the best neighborhood is a simple one that consists of several parts:

- 1) Which neighborhood balances the number of shooting incidents per capita (%) vs population size the best?
- 2) Are there potential competitors nearby in the neighborhood that will challenge a restaurant business (use of foursquare API)?

A folium map of the locations of the different neighborhoods in Manhattan



A folium heatmap of the shooting incidents in the different neighborhoods in Manhattan



The map displays the New York City metropolitan area, including parts of New Jersey and Connecticut. Red circles of varying sizes are overlaid on the map, primarily concentrated in the Manhattan area and the surrounding regions. The circles represent data points, with their size likely indicating the magnitude of the data. The map includes labels for various boroughs and counties, as well as major highways and landmarks. The map is sourced from OpenStreetMap, as indicated by the text 'Data by © OpenStreetMap, under ODbL' in the bottom right corner.

A table of the neighborhoods in Manhattan, sorted by neighborhoods with the lowest shooting incidents per capita

	Borough	Neighborhood	Latitude	Longitude	Population	Count	Incidents per capita (%)	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Manhattan	Marble Hill	40.87655077879964	-73.91065965862981	46746	0	0.000000	Sandwich Place	Gym	Coffee Shop	Yoga Studio	Discount Store
21	Manhattan	Battery Park City	40.71193198394565	-74.01686930508617	39699	0	0.000000	Park	Hotel	Gym	Boat or Ferry	Memorial Site
8	Manhattan	Roosevelt Island	40.76215960576283	-73.94916769227953	80771	0	0.000000	Pizza Place	Scenic Lookout	Coffee Shop	Park	Gym Fitness Center
5	Manhattan	Upper East Side	40.775638573301805	-73.96050763135	61207	1	0.000016	Italian Restaurant	Bakery	Gym / Fitness Center	Juice Bar	Yoga Studio
7	Manhattan	Lenox Hill	40.76811265828733	-73.9588596881376	80771	3	0.000037	Italian Restaurant	Coffee Shop	Pizza Place	Sushi Restaurant	Cocktail Bar
6	Manhattan	Yorkville	40.775929849884875	-73.94711784471826	77942	3	0.000038	Coffee Shop	Italian Restaurant	Gym	Sushi Restaurant	Deli Bodega
13	Manhattan	Murray Hill	40.748303077252174	-73.97833207924127	50742	2	0.000039	Sandwich Place	Hotel	Coffee Shop	Steakhouse	Gym Fitness Center
25	Manhattan	Turtle Bay	40.75204236950722	-73.96770824581834	51231	4	0.000078	Café	Coffee Shop	Wine Bar	Park	Italian Restaurant
18	Manhattan	West Village	40.73443393572434	-74.00617998126812	66880	8	0.000120	Italian Restaurant	Wine Bar	Coffee Shop	American Restaurant	Jazz Club
17	Manhattan	Little Italy	40.71932379395907	-73.99730467208073	42742	6	0.000140	Spa	Chinese Restaurant	Mediterranean Restaurant	Italian Restaurant	Bakery

A table of the neighborhoods in Manhattan, sorted by neighborhoods with the largest population sizes

	Borough	Neighborhood	Latitude	Longitude	Population	Count	Incidents per capita (%)	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
9	Manhattan	Upper West Side	40.787657998534854	-73.97705923630603	132378	32	0.000242	Italian Restaurant	Bakery	Coffee Shop	Bagel Shop	Vegetarian / Vegan Restaurant
8	Manhattan	Roosevelt Island	40.76215960576283	-73.94916769227953	80771	0	0.000000	Pizza Place	Scenic Lookout	Coffee Shop	Park	Gym / Fitness Center
7	Manhattan	Lenox Hill	40.76811265828733	-73.9588596881376	80771	3	0.000037	Italian Restaurant	Coffee Shop	Pizza Place	Sushi Restaurant	Cocktail Bar
6	Manhattan	Yorkville	40.775929849884875	-73.94711784471826	77942	3	0.000038	Coffee Shop	Italian Restaurant	Gym	Sushi Restaurant	Deli / Bodega
16	Manhattan	Lower East Side	40.71780674892765	-73.98089031999291	72957	94	0.001288	Chinese Restaurant	Café	Cocktail Bar	Art Gallery	Yoga Studio
27	Manhattan	Hudson Yards	40.75665808227519	-74.00011136202637	70150	10	0.000143	Hotel	Italian Restaurant	Gym / Fitness Center	American Restaurant	Coffee Shop
14	Manhattan	Chelsea	40.744034706747975	-74.00311633472813	70150	48	0.000684	Art Gallery	Coffee Shop	Italian Restaurant	Ice Cream Shop	Hotel
18	Manhattan	West Village	40.73443393572434	-74.00617998126812	66880	8	0.000120	Italian Restaurant	Wine Bar	Coffee Shop	American Restaurant	Jazz Club
10	Manhattan	Lincoln Square	40.77352888942166	-73.98533777001262	61489	26	0.000423	Italian Restaurant	Café	Plaza	Concert Hall	Gym / Fitness Center
5	Manhattan	Upper East Side	40.775638573301805	-73.96050763135	61207	1	0.000016	Italian Restaurant	Bakery	Gym / Fitness Center	Juice Bar	Yoga Studio

Conclusions

- 1) By observation, the best neighborhood for a restaurateur to set up shop in Manhattan is Roosevelt Island. By comparing the two tables produced in the results section, Roosevelt Island has the best balance between having a large population size and a low crime of shooting (0).
- 2) However, due to the limited data available online, it can be observed that the number of features used for comparison between the neighborhoods are very limited. Given the chance, more data points and features of greater variety should be used for analysis.