Identifying an Apartment in a Manhattan, NY Neighborhood with Similar Amenities as my Current Neighborhood

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1. Introduction

1.1 Background

I am currently living in Downtown San Jose, CA within walking distance of "Dirdon Train Station". My neighborhood is full of great venues and attractions such as international cuisine, entertainment, and shopping. Recently, I received an offer to move to Manhattan, NY for a new job that I would like to accept, and I want to move to a neighborhood that offer's similar options as my current residence. For reference, Manhattan office is located at Park ave and 53rd street.

1.2 Problem

Identify an apartment in Manhattan, NY with the following criteria:
-Min. 2 bedrooms
-Monthly rent not to exceed US$7000/month
-Walking distance to a subway station (defined as <=1.0 mile, 1.6 km)
-Similar venues and attractions to my current neighborhood in San Jose, CA

1.3 Interest

The methodology, tools and strategy used in this project will be relevant for any person or people considering moving and who would like to do a deep dive on the amenities of various neighborhoods in the new location compared to their own prior to moving. This strategy can also be useful in exploring perspective neighborhoods for opening of a new business.

2. Data Acquisition and Cleaning

2.1 Data Requirements

-Geodata for current neighborhood in Downtown San Jose via Foursquare API
-List of Manhattan, NY neighborhoods with clustered venues via Foursquare API
-List of subway stations in Manhattan, NY with addresses and geodata
-List of apartments for rent in Manhattan, NY with neighborhoods, address, geodata, number of bedrooms, area size, and monthly rent.
-New job location in Manhattan for reference

2.2 Data Sources

Downtown San Jose and Manhattan, NY neighborhoods data attained via Fousquare. Lists of subway stations in Manhattan are available from wikipedia and Google maps. A list of apartments for rent was consolidated from web-scraping real estate sites for Manhattan (site 1, site 2).

2.3 Data Processing

Neighborhood maps were created using the data sourced from Foursquare, Nominatim and Folium mapping. Following web scraping of various rental websites, available apartment's geodata were found with algorithm coding and using Nominatim. Finally, Folium was used to consolidate all data into a final single map where one can visualize all details needed to make a selection of an apartment.

3. Methodology

3.1 Strategy

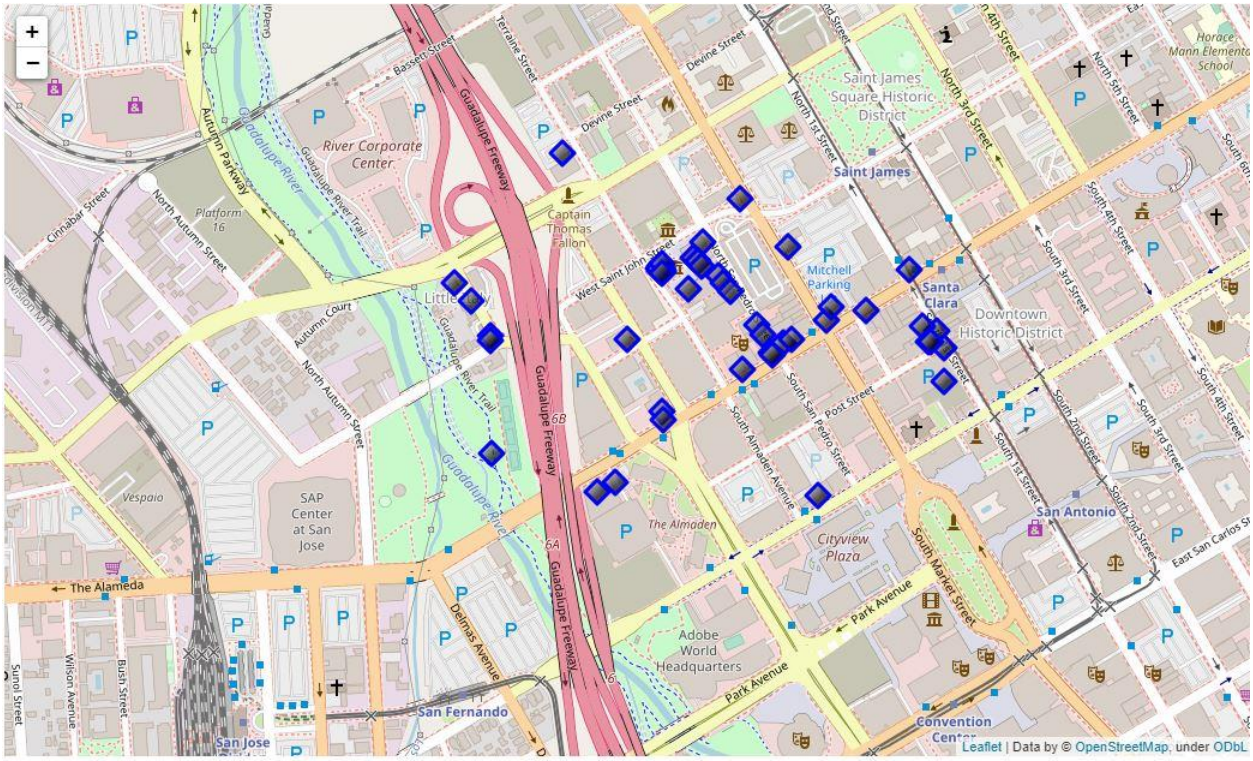
Data described in section 2.0 will be mapped and the resulting map will be used to identify potential rentals in Manhattan, NY. As described in section 2.0 data will be consolidated into a single map where details of various rental options along with clusters of neighborhood venues and attractions as well as the relative location of said rentals to subway stations will be presented. A measurement tool icon will also be provided and the popups on the map items will display rent price, location and cluster of venues and attractions as appropriate.

3.2 Tools

Web-scraping of various rental websites, wikipeida, and Google maps will be used to consolidate data-frame information. This infromation will be saved as a CSV file for ease of use and to simplify the report. Geodata was obtained by coding for the use of Nomnatim to get latitdue and longitude of subway stations and rental apartments in Manhattan, NY. Geopy_distance and Nominatim were used to establish relative distances and Seaborn graphic was used for general statistics on rental data.

4. Data Analysis

4.1 Current Neighborhood in Downtown San Jose, CA (for reference):



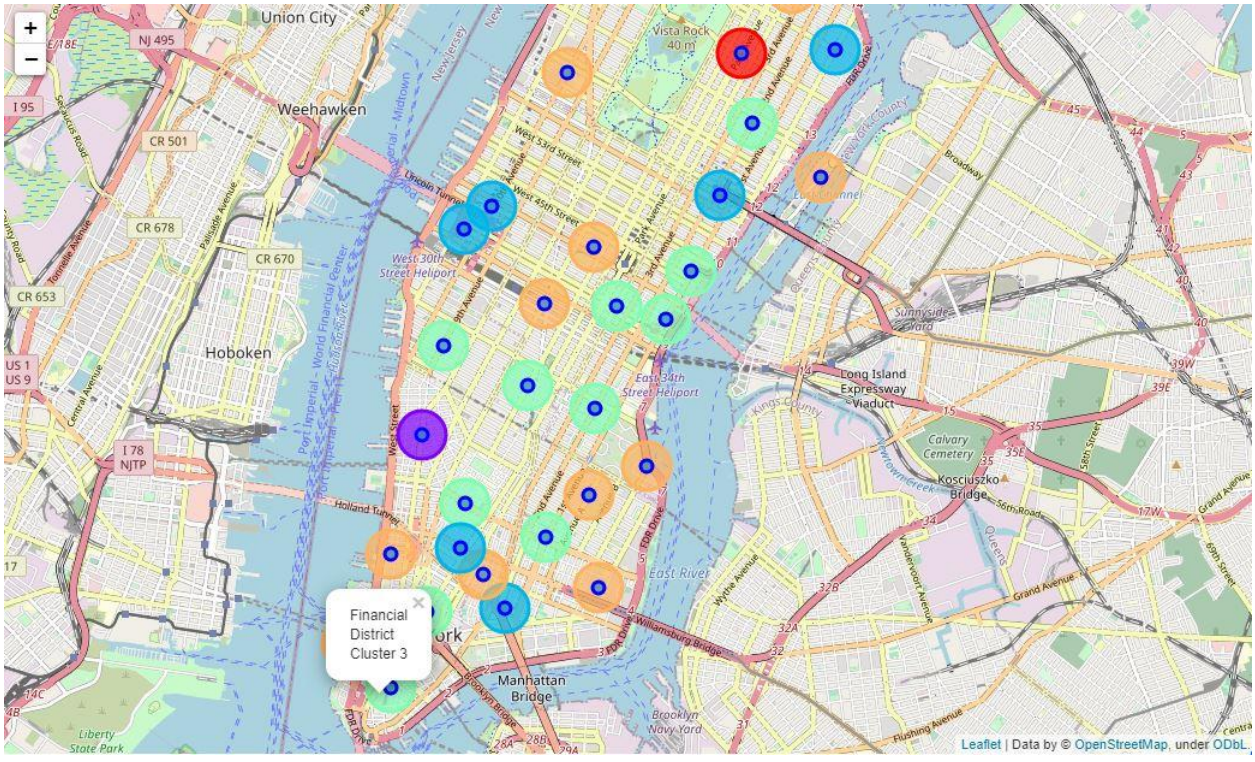
4.2 Venues Near Current Residence in Downtown San Jose, CA:

	name	categories	lat	lng
0	San Pedro Square Market	Food Court	37.336480	-121.894403
1	San Pedro Square Market Bar	Bar	37.336492	-121.894386
2	Market Beer Company	Pub	37.336333	-121.895059
3	Hedley Club	Cocktail Bar	37.334330	-121.894999
4	San Pedro Square	Plaza	37.335179	-121.893044
5	Pizza Bocca Lupo	Pizza Place	37.336517	-121.894450
6	Five Points	Cocktail Bar	37.334932	-121.893560
7	Henry's Hi-Life	BBQ Joint	37.335405	-121.898080
8	Andy's Pet Shop	Pet Store	37.335353	-121.895622
9	AC Hotel by Marriott San Jose Downtown	Hotel	37.333199	-121.896172
10	Treatbot	Ice Cream Shop	37.336402	-121.895051
11	Back A Yard Caribbean American Grill	Caribbean Restaurant	37.336683	-121.892749
12	Guadalupe River Walk	Trail	37.333744	-121.898045
13	Loteria Taco Bar	Mexican Restaurant	37.336472	-121.894372
14	Umbrella Salon	Salon / Barbershop	37.335629	-121.892059
15	Enoteca La Storia	Wine Shop	37.335342	-121.898068
16	O'Flaherty's Irish Pub	Pub	37.335568	-121.893319
17	Konjoe Burger	Burger Joint	37.336341	-121.894987
18	Chocatoo	Dessert Shop	37.336373	-121.895008
19	Voyager Craft Coffee	Coffee Shop	37.336751	-121.894285
20	Olla Cocina	Mexican Restaurant	37.335425	-121.893197

4.3 Neighborhoods Cluster Tables for Manhattan, NY (Cluster 2 shown as an example):

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Marble Hill	Coffee Shop	Discount Store	Yoga Studio	Steakhouse	Supplement Shop	Tennis Stadium	Shoe Store	Gym	Bank	Seafood Restaurant
1	Chinatown	Chinese Restaurant	Cocktail Bar	Dim Sum Restaurant	American Restaurant	Vietnamese Restaurant	Salon / Barbershop	Noodle House	Bakery	Bubble Tea Shop	Ice Cream Shop
6	Central Harlem	African Restaurant	Seafood Restaurant	French Restaurant	American Restaurant	Cosmetics Shop	Chinese Restaurant	Event Space	Liquor Store	Beer Bar	Gym / Fitness Center
9	Yorkville	Coffee Shop	Gym	Bar	Italian Restaurant	Sushi Restaurant	Pizza Place	Mexican Restaurant	Deli / Bodega	Japanese Restaurant	Pub
14	Clinton	Theater	Italian Restaurant	Coffee Shop	American Restaurant	Gym / Fitness Center	Hotel	Wine Shop	Spa	Gym	Indie Theater
23	Soho	Clothing Store	Boutique	Women's Store	Shoe Store	Men's Store	Furniture / Home Store	Italian Restaurant	Mediterranean Restaurant	Art Gallery	Design Studio
26	Morningside Heights	Coffee Shop	American Restaurant	Park	Bookstore	Pizza Place	Sandwich Place	Burger Joint	Café	Deli / Bodega	Tennis Court
34	Sutton Place	Gym / Fitness Center	Italian Restaurant	Furniture / Home Store	Indian Restaurant	Dessert Shop	American Restaurant	Bakery	Juice Bar	Boutique	Sushi Restaurant
39	Hudson Yards	Coffee Shop	Italian Restaurant	Hotel	Theater	American Restaurant	Café	Gym / Fitness Center	Thai Restaurant	Restaurant	Gym

4.4 Neighborhoods by Clusters Map for Manhattan, NY:



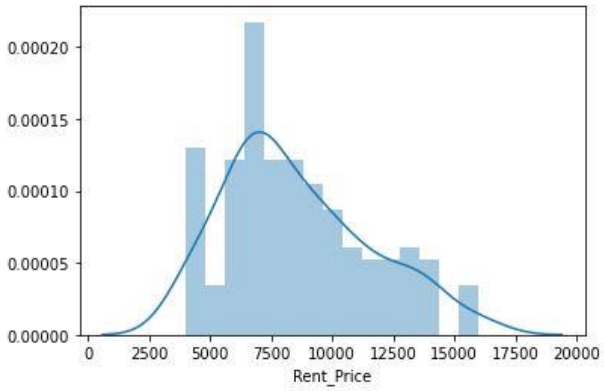
4.5 Manhattan Apts for Rent GeoData Table (Only showing the Head and Tail tables for simplicity):

	Address	Area	Price_per_ft2	Rooms	Area-ft2	Rent_Price	Lat	Long
0	West 105th Street	Upper West Side	2.94	5.0	3400	10000	40.799771	-73.966213
1	East 97th Street	Upper East Side	3.57	3.0	2100	7500	40.788585	-73.955277
2	West 105th Street	Upper West Side	1.89	4.0	2800	5300	40.799771	-73.966213
3	CARMINE ST.	West Village	3.03	2.0	1650	5000	40.730523	-74.001873
4	171 W 23RD ST.	Chelsea	3.45	2.0	1450	5000	40.744118	-73.995299

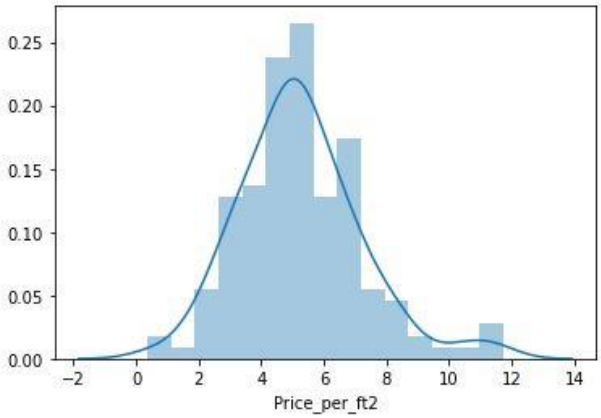
	Address	Area	Price_per_ft2	Rooms	Area-ft2	Rent_Price	Lat	Long
139	200 East 72nd Street	Rental in Lenox Hill	5.15	3.0	1700	8750	40.769465	-73.960339
140	50 Murray Street	No fee rental in Tribeca	7.11	2.0	1223	8700	40.714051	-74.009608
141	300 East 56th Street	No fee rental in Midtown East	3.87	3.0	2100	8118	40.758216	-73.965190
142	1930 Broadway	No fee rental in Central Park West	5.06	2.0	1600	8095	40.772474	-73.981901
143	33 West 9th Street	Rental in Greenwich Village	6.67	2.0	1500	10000	40.733691	-73.997323

4.6 Rental Price Statistics for Manhattan Apartments:

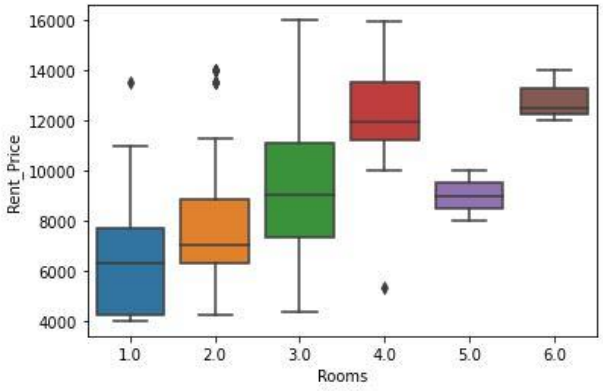
a. Rent Price Distribution:



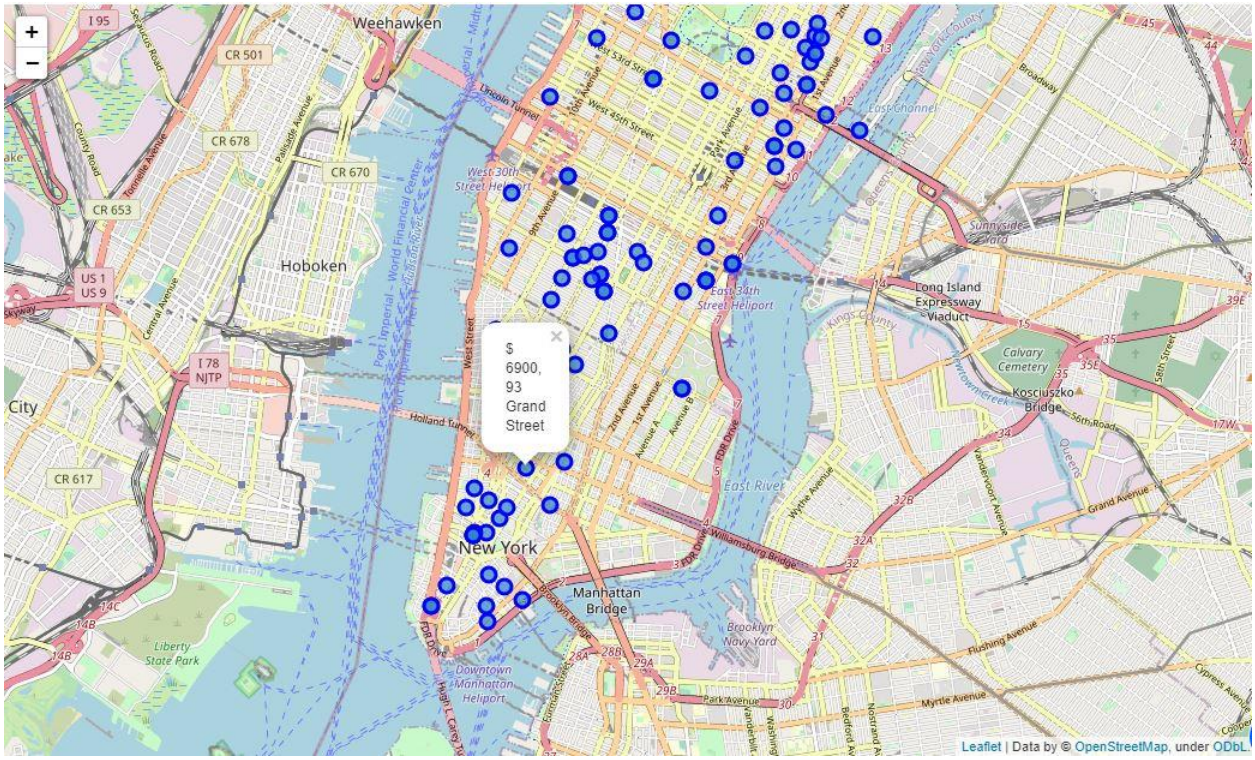
b. Rent Price per ft^2 Distribution:



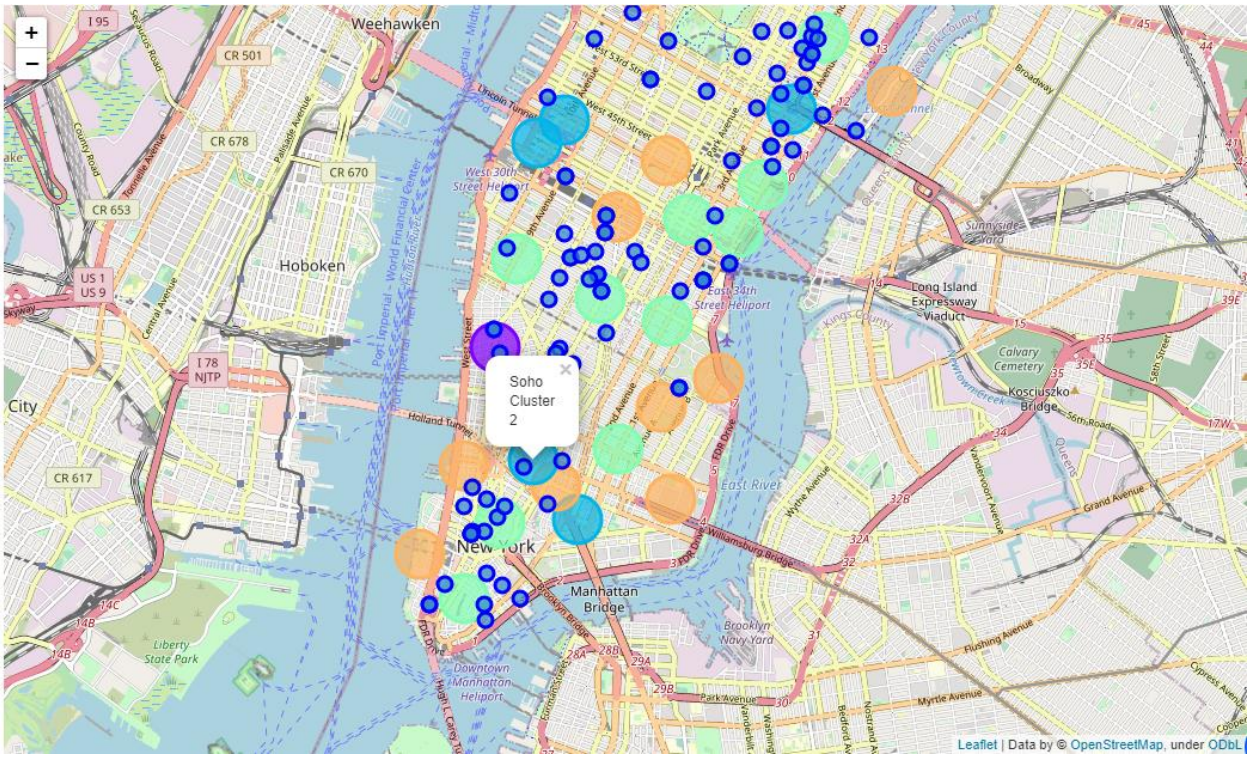
c. Rent Price vs Bedrooms:



4.7 Map of Apartments for Rent in Manhattan, NY with Monthly Rent Prices (USD$):



4.8 Map of Apartments for Rent in Manhattan, NY with Neighborhood Clusters:

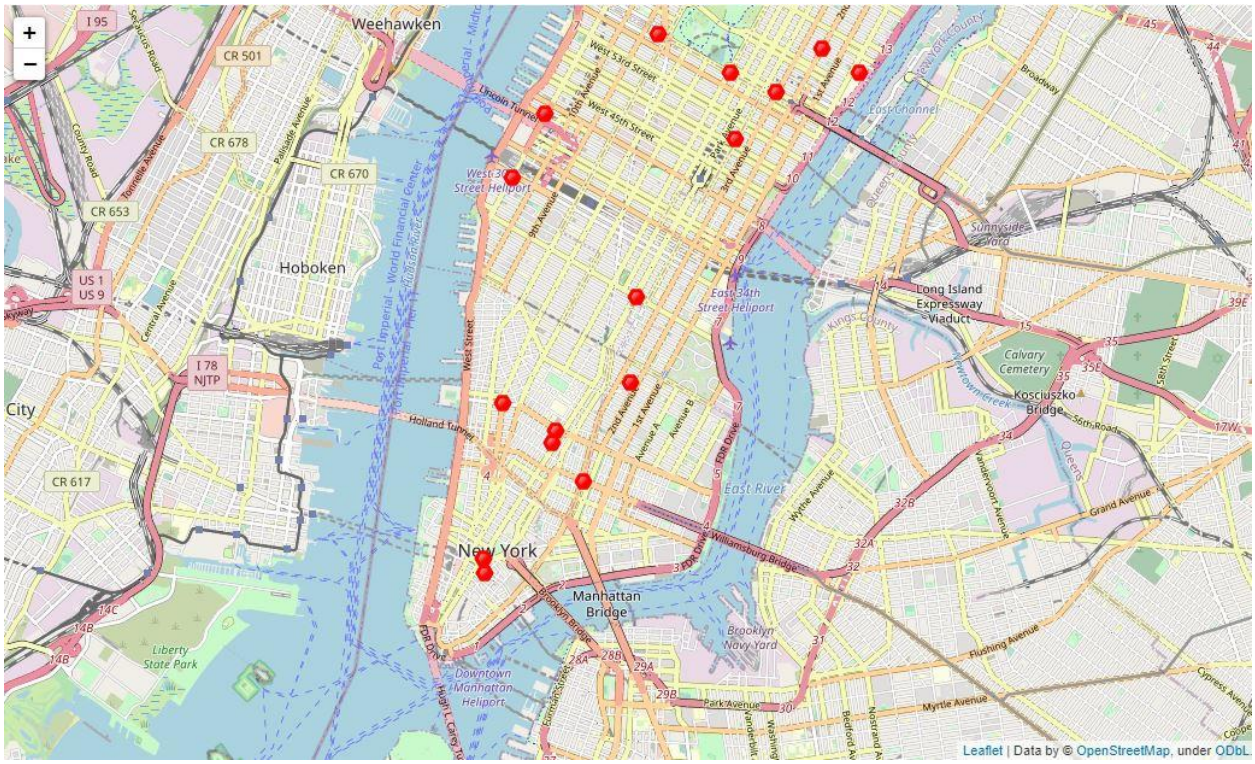


4.9 Manhattan, NY Subway Stations Geodata (for simplicity only showing Head and Tail tables):

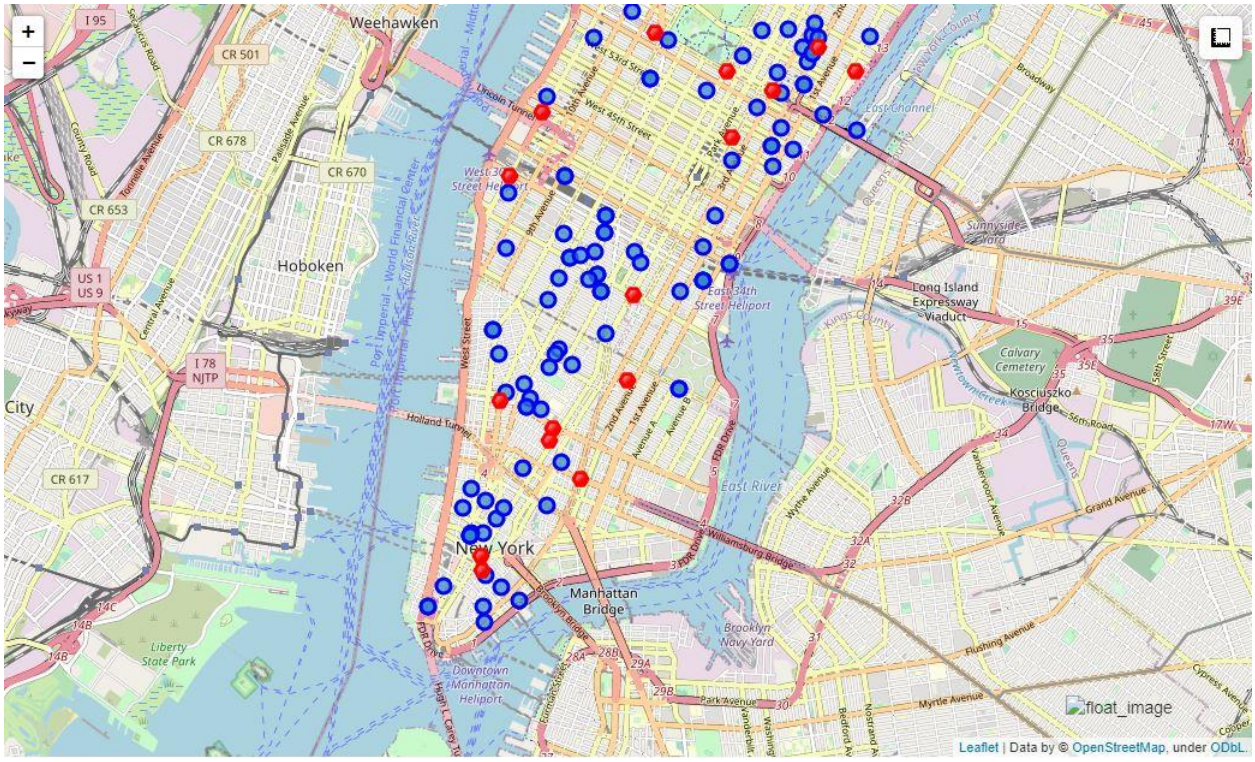
	sub_station	sub_address	lat	long
0	Dyckman Street Subway Station	170 Nagle Ave, New York, NY 10034, USA	40.861857	-73.924509
1	57 Street Subway Station	New York, NY 10106, USA	40.764250	-73.954525
2	Broad St	New York, NY 10005, USA	40.730862	-73.987156
3	175 Street Station	807 W 177th St, New York, NY 10033, USA	40.847991	-73.939785
4	5 Av and 53 St	New York, NY 10022, USA	40.764250	-73.954525

	sub_station	sub_address	lat	long
17	190 Street Subway Station	Bennett Ave, New York, NY 10040, USA	40.858113	-73.932983
18	59 St-Lexington Av Station	E 60th St, New York, NY 10065, USA	40.762259	-73.966271
19	57 Street Station	New York, NY 10019, United States	40.764250	-73.954525
20	14 Street / 8 Av	New York, NY 10014, United States	40.730862	-73.987156
21	MTA New York City	525 11th Ave, New York, NY 10018, USA	40.759809	-73.999282

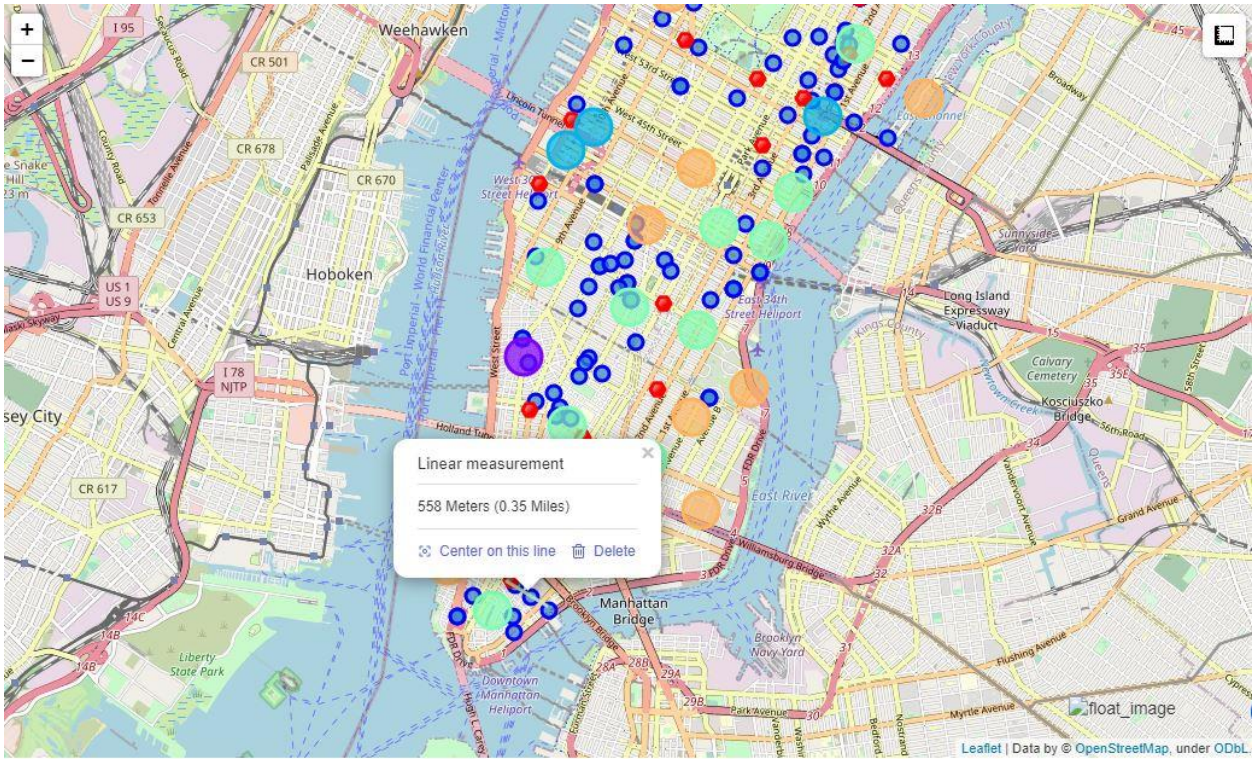
4.10 Map of Manhattan, NY Subway Stations:



4.11 Map of Manhattan, NY Apartments (Blue) and Subway Stations (Red):



4.12 Final Consolidated Map including Apartments, Neighborhood Clusters, Subway Stations and a Measurement Tool:

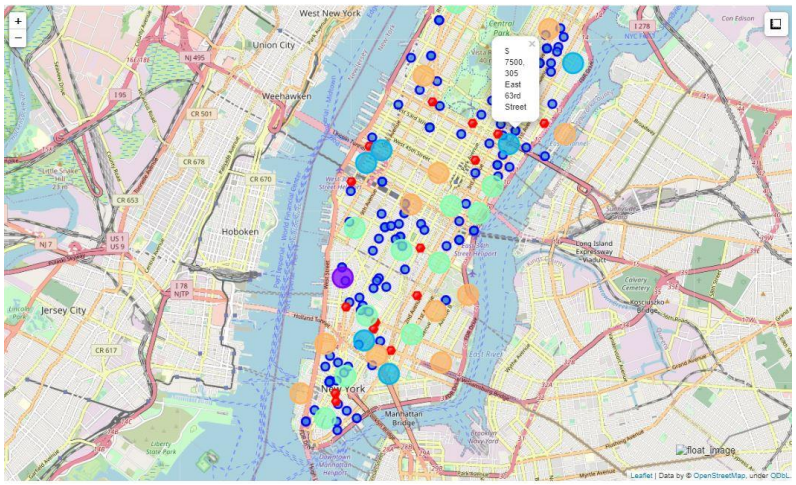


5. Results

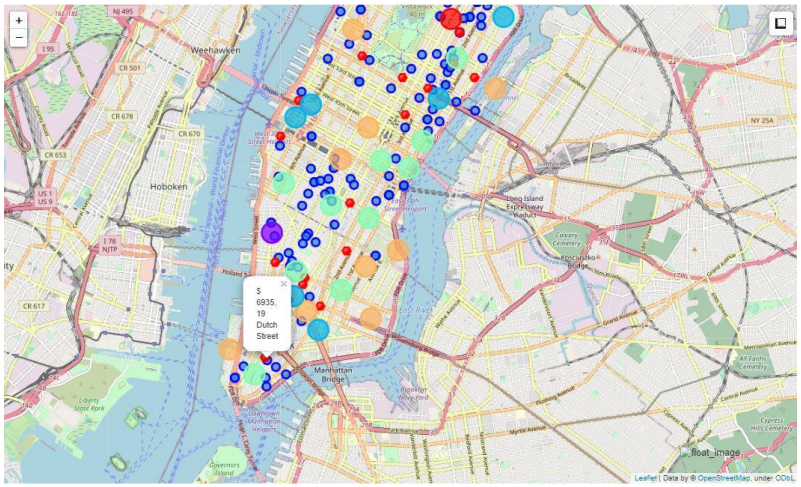
5.1 Apartment Candidates:

Using the final consolidated map I was able to identify two potential apartments that met my criteria:

a. **Apartment 1**: 305 East 63rd Street in the Sutton Place Neighborhood and near '59th street' subway station, Cluster 2, Monthly rent: $7500, walkable to work



b. **Apartment 2:** 19 Dutch Street in the Financial District Neighborhood and near ‘Fulton Street’ subway station, Cluster 3, Monthly rent $6935, would need to ride subway to work



5.2 Identifying My Preferred Neighborhood Cluster:

Using the Venue Cluster tables (see section 4.3) I was able to compare and contrast each of generated clusters to my current residence venue table. After reviewing each cluster, I decided to choose cluster 2 (blue) as an ideal neighborhood preference for me. Based off the cluster 2 venues table (see section 4.3) there are nine neighborhoods which fall under the “cluster 2” designation.

6. Discussion:

Final Apartment selection

After careful consideration, I decided to move forward with Apartment 1 for two primary reasons. First, it is near the Sutton Place neighborhood, which is my preferred cluster 2 type. Secondly, it is preferred as it is only 0.6 miles to work meaning I can walk to work every day and not have to rely on the subway transit system. The downside of Apartment 1 is that it is $500 above my preferred budget but I think the added expense is justified given its proximity to my new office and the added quality of life benefit.

Apartment 2 is more affordable and conveniently located near a subway station, but this location would require a daily commute of 40 or more minutes to work and back via the subway system. It is also near the financial district, which is a cluster 3 type neighborhood instead of my preferred cluster 2.

7. Conclusion

Although tools that are more robust are available to find apartments I found this exercise to be quite rewarding and effective. I was able to rapidly identify a suitable apartment for my needs and even though it was above my original budget I felt justified in it’s selection based off my neighborhood cluster analysis and proximity to my future office site. The code I used to perform my analysis and generate my detailed maps can be used to map and do similar

analysis for any two locations as long as GeoData is attainable. This analysis can also be useful for potential business owners who want to understand specific neighborhood dynamics before opening up a location in said neighborhood.