

The Battle of the Neighborhoods – Moving Cities

Moving Cities

Moving to a new city can be scary for some, they have grown accustomed to their surroundings, whether it be:

- The amenities
- Venues
- Access to transportation

Often people will look for similar types of neighborhoods when moving.

Scenario

Attempt to find an optimal apartment for an individual currently residing in the Uptown Residences in Toronto, Canada, looking to move to New York City, New York.

Along side the criteria of the specification of the new apartment, the location of the building must be in a similar to the neighborhood they currently reside in (Yorkville).

Current apartment in the Uptown Residences:

- 1-bedroom
- 1-bathroom
- 560 sq. ft
- \$2400 CAD monthly rent
- 280m distance to a subway station

Business Problem

In order to make the move to New York seamless, these requirements must be achieved:

- Within a neighborhood close in proximity to the Financial District.
 - Tribeca
 - Soho
 - Bowery
 - Lower East Side
- 1-bedroom
- 1-bathroom
- Maximum monthly rent of \$2300 USD
- Walking distance to a subway station
- Similar venues and amenities as Yorkville

Data Acquisition

The New York City neighborhoods and their corresponding longitudinal and latitudinal coordinates are retrieved from https://geo.nyu.edu/catalog/nyu_2451_34572.

The list of Toronto subway stations and their coordinates was retrieved from <http://scruss.com/blog/2005/12/14/toronto-subway-station-gps-locations/>.

The list of New York subway stations and their coordinates was retrieved from <https://data.cityofnewyork.us/Transportation/Subway-Stations/arq3-7z49>.

The geocoder from the geoPy library was used to generate the longitudinal and longitudinal coordinates for the residences.

Analytic Approach

Determine the top 10 frequent venues within:

- Yorkville
- Tribeca
- Soho
- Bowery
- Lower East Side

Use k means clustering to group similar neighborhoods

- Run with varying number of clusters, $k = 2, 3, \dots, N$ until Yorkville is either grouped with 1 other neighborhood or is in a cluster alone.

Examine potential apartments within selected neighborhood

- Venue distribution
- Distance to subway

k Means Clustering (k = 2)

	Borough	Latitude	Longitude	Neighborhood	X	Y	Cluster Labels	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	Yorkville	43.669493	-79.387415	Yorkville	-5.307936e+06	1.050766e+07	1	Café	Coffee Shop	Italian Restaurant	Japanese Restaurant	Sushi Restaurant	Restaurant	Indian Restaurant	Hotel	Sandwich Place	French Restaurant
1	Manhattan	40.722184	-74.000657	Soho	-5.820668e+06	9.868956e+06	1	Italian Restaurant	Clothing Store	French Restaurant	Coffee Shop	Gym	Women's Store	Bakery	Boutique	Art Gallery	Dessert Shop
2	Manhattan	40.721522	-74.010683	Tribeca	-5.820815e+06	9.870247e+06	0	Park	American Restaurant	Hotel	Spa	Coffee Shop	Italian Restaurant	Bakery	Men's Store	Sushi Restaurant	Café
3	Manhattan	40.719457	-73.994390	Bowery	-5.821109e+06	9.868135e+06	1	Hotel	Pizza Place	Shoe Store	Cocktail Bar	Sandwich Place	Rock Club	Pilates Studio	Paper / Office Supplies Store	Men's Store	Mediterranean Restaurant
4	Manhattan	40.717807	-73.980890	Lower East Side	-5.821342e+06	9.866385e+06	1	Italian Restaurant	Ice Cream Shop	Asian Restaurant	Coffee Shop	Sandwich Place	Japanese Restaurant	Pizza Place	Boutique	Mexican Restaurant	Wine Bar

k Means Clustering (k = 2)

	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	Yorkville	Café	Coffee Shop	Italian Restaurant	Japanese Restaurant	Sushi Restaurant	Restaurant	Indian Restaurant	Hotel	Sandwich Place	French Restaurant
1	Soho	Italian Restaurant	Clothing Store	French Restaurant	Coffee Shop	Gym	Women's Store	Bakery	Boutique	Art Gallery	Dessert Shop
3	Bowery	Hotel	Pizza Place	Shoe Store	Cocktail Bar	Sandwich Place	Rock Club	Pilates Studio	Paper / Office Supplies Store	Men's Store	Mediterranean Restaurant
4	Lower East Side	Italian Restaurant	Ice Cream Shop	Asian Restaurant	Coffee Shop	Sandwich Place	Japanese Restaurant	Pizza Place	Boutique	Mexican Restaurant	Wine Bar
	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
2	Tribeca	Park	American Restaurant	Hotel	Spa	Coffee Shop	Italian Restaurant	Bakery	Men's Store	Sushi Restaurant	Café

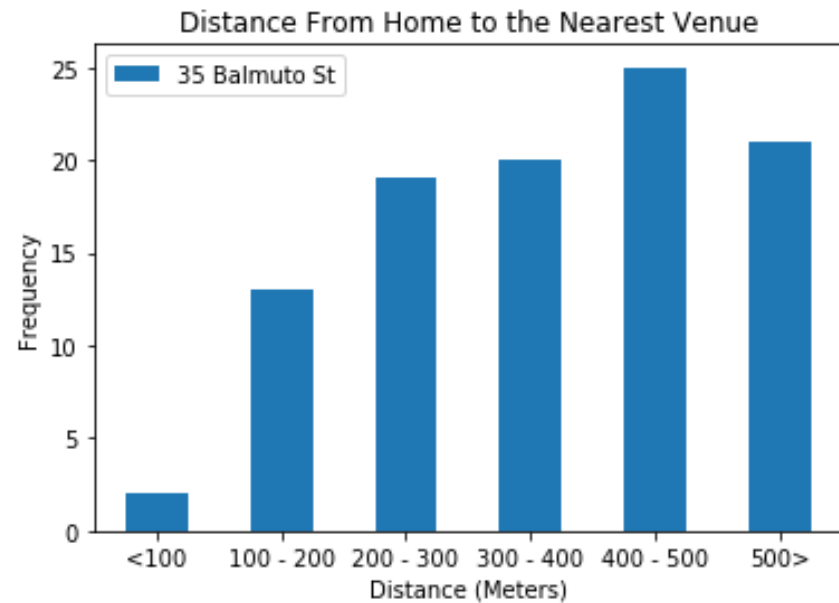
k Means Clustering (k = 3)

	Borough	Latitude	Longitude	Neighborhood	X	Y	Cluster Labels	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	Yorkville	43.669493	-79.387415	Yorkville	-5.307936e+06	1.050766e+07	0	Café	Coffee Shop	Italian Restaurant	Japanese Restaurant	Sushi Restaurant	Restaurant	Indian Restaurant	Hotel	Sandwich Place	French Restaurant
1	Manhattan	40.722184	-74.000657	Soho	-5.820668e+06	9.868956e+06	1	Italian Restaurant	Clothing Store	French Restaurant	Coffee Shop	Gym	Women's Store	Bakery	Boutique	Art Gallery	Dessert Shop
2	Manhattan	40.721522	-74.010683	Tribeca	-5.820815e+06	9.870247e+06	2	Park	American Restaurant	Hotel	Spa	Coffee Shop	Italian Restaurant	Bakery	Men's Store	Sushi Restaurant	Café
3	Manhattan	40.719457	-73.994390	Bowery	-5.821109e+06	9.868135e+06	1	Hotel	Pizza Place	Shoe Store	Cocktail Bar	Sandwich Place	Rock Club	Pilates Studio	Paper / Office Supplies Store	Men's Store	Mediterranean Restaurant
4	Manhattan	40.717807	-73.980890	Lower East Side	-5.821342e+06	9.866385e+06	1	Italian Restaurant	Ice Cream Shop	Asian Restaurant	Coffee Shop	Sandwich Place	Japanese Restaurant	Pizza Place	Boutique	Mexican Restaurant	Wine Bar

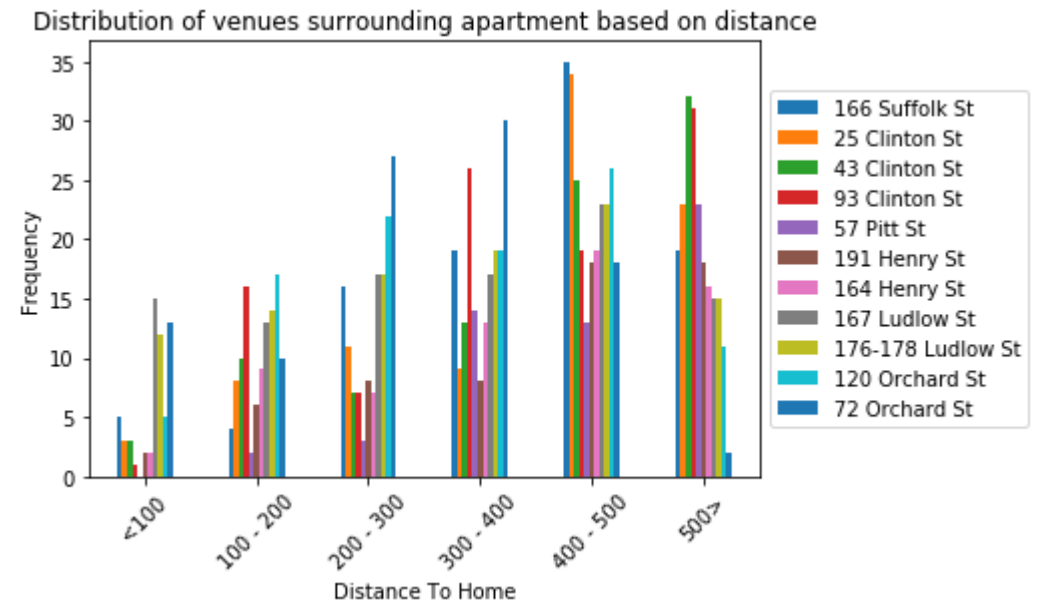
k Means Clustering (k = 3)

	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	Yorkville	Café	Coffee Shop	Italian Restaurant	Japanese Restaurant	Sushi Restaurant	Restaurant	Indian Restaurant	Hotel	Sandwich Place	French Restaurant
	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
1	Soho	Italian Restaurant	Clothing Store	French Restaurant	Coffee Shop	Gym	Women's Store	Bakery	Boutique	Art Gallery	Dessert Shop
3	Bowery	Hotel	Pizza Place	Shoe Store	Cocktail Bar	Sandwich Place	Rock Club	Pilates Studio	Paper / Office Supplies Store	Men's Store	Mediterranean Restaurant
4	Lower East Side	Italian Restaurant	Ice Cream Shop	Asian Restaurant	Coffee Shop	Sandwich Place	Japanese Restaurant	Pizza Place	Boutique	Mexican Restaurant	Wine Bar
	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
2	Tribeca	Park	American Restaurant	Hotel	Spa	Coffee Shop	Italian Restaurant	Bakery	Men's Store	Sushi Restaurant	Café

Distribution of 100 Venues

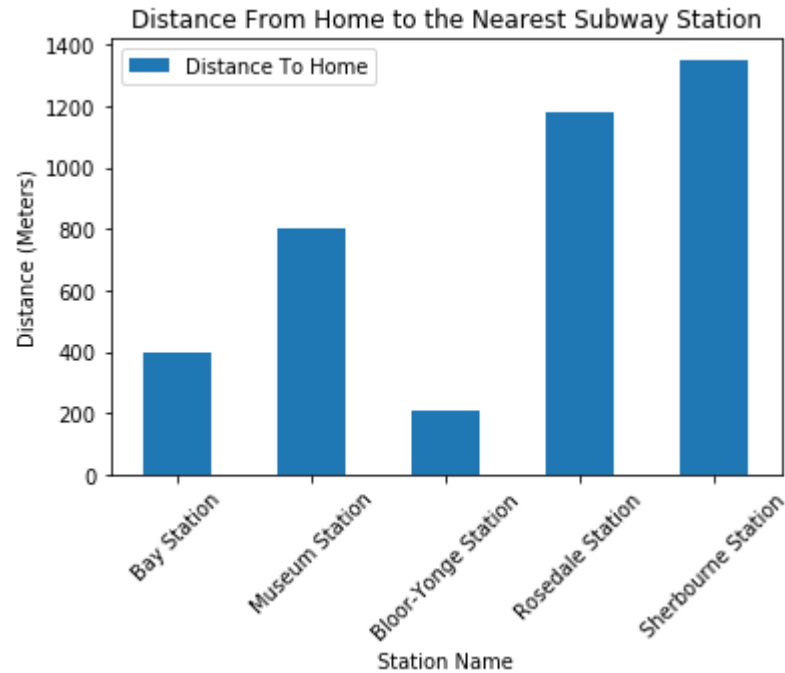


The distribution of venues with respect to the Uptown Residences.

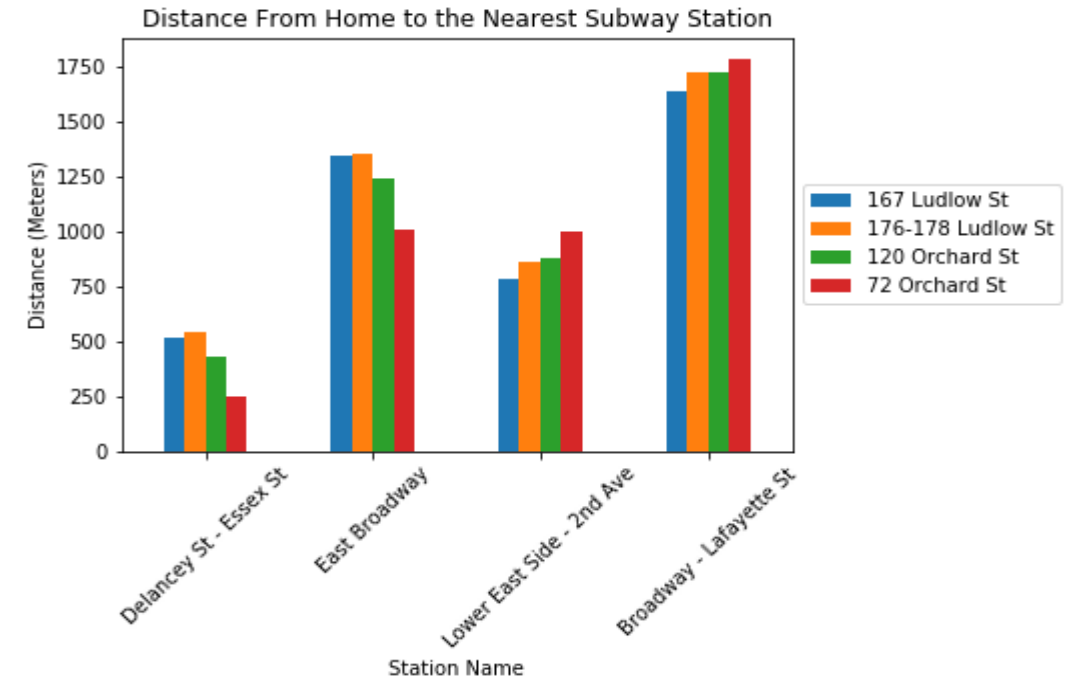


Examining the distribution of venues with respect to apartments in the Lower East Side.

Distance of Subway Stations



Distance from the varying subway stations to the Uptown Residences.



Distance from the varying subway stations to potential apartments.

Conclusion

Examined different New York City neighborhood's and determined the most similar to Yorkville.

- Using k means clustering

Compared the venue distribution of potential apartments to the Uptown Residences.

Calculated and evaluated the distance from surrounding subway stations to potential apartments.

Concluded that 72 Orchard St located in the Lower East Side best fits the requirements for the individual.