

The Battle of the Neighborhoods – Report

Introduction & Business Problem:

The City of New York, is the most populous city in the United States. It is diverse and is the financial capital of USA. It is multicultural. It provides lot of business opportunities and business friendly environment. It has attracted many different players into the market. It is a global hub of business and commerce. The city is a major center for banking and finance, retailing, world trade, transportation, tourism, real estate, new media, traditional media, advertising, legal services, accountancy, insurance, theater, fashion, and the arts in the United States. This also means that the market is highly competitive. As it is highly developed city so cost of doing business is also one of the highest. Thus, any new business venture or expansion needs to be analyzed carefully. The insights derived from analysis will give good understanding of the business environment which help in strategically targeting the market. This will help in reduction of risk. And the Return on Investment will be reasonable.

Business Problem:

The City of New York is famous for its excellent cuisine. Its food culture includes an array of international cuisines influenced by the city's immigrant history. Italian restaurant has become so popular in the United States now it seems that there is one on every corner, not only in major cities but also in smaller cities. Starting an Italian restaurant can be a great business opportunity, but you need to distinguish yourself from others to enjoy long-term success.

If you plan a real restaurant that can demand higher prices for fresh fish, delivered daily from Japan, focus on neighborhoods and outlets that already attract a sophisticated Japanese client. If you plan a cheap buffet restaurant, points to the masses looking for affordable high-traffic locations with large shopping centers and other local points of interest.

My client wants to open his business in Manhattan area, so I focus on that borough during my analysis. We define potential neighborhood based on the number of Italian restaurants which are operating right in each neighborhood. Manhattan has full potential but also is a very challenging district to open a business because of high competition. New Italian restaurant should be open in an area that inadequate neighborhood in this way the Restaurant can attract more customers. Therefore, this analysis necessary to ensure that we have enough customers and that we are not so close to other Italian restaurant.

Data:

Data 1: Neighborhood has a total of 5 boroughs and 306 neighborhoods. In order to segment the neighborhoods and explore them, we will essentially need a dataset that contains the 5 boroughs and the neighborhoods that exist in each borough as well as the latitude and longitude coordinates of each neighborhood. This dataset exists for free on the web. Link to the dataset is: https://geo.nyu.edu/catalog/nyu_2451_34572

	Borough	Neighborhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585

Data2: New York city geographical coordinates data will be utilized as input for the Foursquare API, that will be leveraged to provision venues information for each neighborhood. We will use the Foursquare API to explore neighborhoods in New York City. The below is image of the Foursquare API data.

In addition, Italian Restaurant category Id 4bf58dd8d48988d110941735 is used for retrieving data from Foursquare API.

Methodology:

In this project, I will use the basic methodology as taught in Week 3 lab.

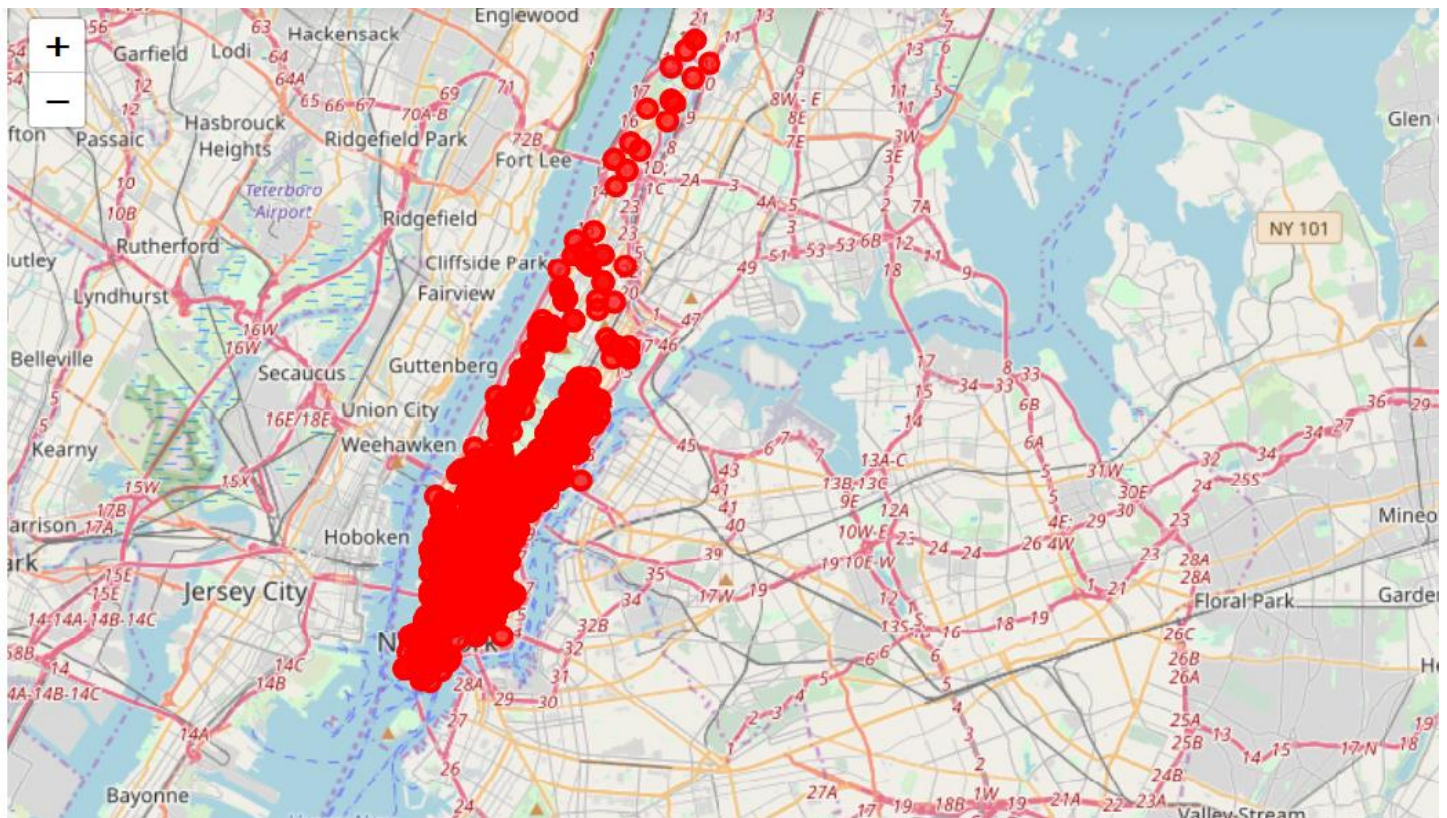
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Above, I have done convert addresses into their equivalent latitude and longitude values. Then we will use the Foursquare API to explore neighborhoods in Manhattan, New York. After that, explore function to get Italian restaurant categories in each neighborhood.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Marble Hill	40.876551	-73.91066	Arturo's	40.874412	-73.910271	Pizza Place
1	Marble Hill	40.876551	-73.91066	Broadway Pizza & Pasta	40.878822	-73.904494	Pizza Place
2	Marble Hill	40.876551	-73.91066	Patricia's of Tremont	40.882543	-73.913501	Italian Restaurant
3	Marble Hill	40.876551	-73.91066	pinocchio pizza	40.877868	-73.918948	Italian Restaurant
4	Marble Hill	40.876551	-73.91066	Nonno Tony's	40.885288	-73.909588	Italian Restaurant

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newyork_venues_italian.shape
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Italian Restaurant in Manhattan

	Neighborhood	American Restaurant	Asian Restaurant	Bakery	Café	Cocktail Bar	Coffee Shop	Deli / Bodega	Event Space	Fast Food Restaurant	Gourmet Shop	Italian Restaurant
0	Marble Hill	0	0	0	0	0	0	0	0	0	0	0
1	Marble Hill	0	0	0	0	0	0	0	0	0	0	0
2	Marble Hill	0	0	0	0	0	0	0	0	0	0	1
3	Marble Hill	0	0	0	0	0	0	0	0	0	0	1
4	Marble Hill	0	0	0	0	0	0	0	0	0	0	1

Then use this feature to group the neighborhoods into clusters K-means clustering algorithm will be use to complete this task. And also, the Folium library to visualize the neighborhoods in Manhattan and its emerging clusters.

	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
0	Marble Hill	Italian Restaurant	Pizza Place	Gourmet Shop	Asian Restaurant	Bakery	Café	Cocktail Bar	Coffee Shop	Deli / Bodega
7	East Harlem	Italian Restaurant	Pizza Place	Gourmet Shop	Asian Restaurant	Bakery	Café	Cocktail Bar	Coffee Shop	Deli / Bodega
11	Roosevelt Island	Italian Restaurant	Pizza Place	Sandwich Place	Wine Bar	Seafood Restaurant	Restaurant	Asian Restaurant	Bakery	Café
19	East Village	Italian Restaurant	Pizza Place	Wine Bar	American Restaurant	Café	Swiss Restaurant	Sandwich Place	Event Space	Asian Restaurant
27	Gramercy	Italian Restaurant	Pizza Place	Café	Gourmet Shop	Mediterranean Restaurant	New American Restaurant	Wine Bar	Pub	Sandwich Place
28	Battery Park City	Italian Restaurant	Pizza Place	Event Space	Gourmet Shop	Sandwich Place	Asian Restaurant	Bakery	Café	Cocktail Bar
29	Financial District	Italian Restaurant	Pizza Place	Event Space	Gourmet Shop	Sandwich Place	Asian Restaurant	Bakery	Café	Cocktail Bar
37	Stuyvesant Town	Italian Restaurant	Pizza Place	Asian Restaurant	Sandwich Place	Café	Gourmet Shop	Bakery	Cocktail Bar	Coffee Shop

Cluster 1:

	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
1	Chinatown	Italian Restaurant	Pizza Place	Café	Gourmet Shop	Bakery	Fast Food Restaurant	Asian Restaurant	Cocktail Bar	Coffee Shop
9	Yorkville	Italian Restaurant	Pizza Place	Wine Bar	Seafood Restaurant	Fast Food Restaurant	Asian Restaurant	Bakery	Café	Cocktail Bar
10	Lenox Hill	Italian Restaurant	Pizza Place	Café	Cocktail Bar	Mediterranean Restaurant	Wine Bar	American Restaurant	Pub	Restaurant
16	Murray Hill	Italian Restaurant	Pizza Place	American Restaurant	Gourmet Shop	Steakhouse	Mediterranean Restaurant	Deli / Bodega	Event Space	Asian Restaurant
20	Lower East Side	Italian Restaurant	Pizza Place	Fast Food Restaurant	Gourmet Shop	Asian Restaurant	Bakery	Café	Cocktail Bar	Coffee Shop
30	Carnegie Hill	Italian Restaurant	Pizza Place	Wine Bar	Restaurant	Seafood Restaurant	Fast Food Restaurant	Asian Restaurant	Bakery	Café
31	Noho	Italian Restaurant	Pizza Place	Café	Gourmet Shop	Wine Bar	Swiss Restaurant	Restaurant	Event Space	Asian Restaurant
33	Midtown South	Italian Restaurant	Pizza Place	Sandwich Place	Coffee Shop	New American Restaurant	Mediterranean Restaurant	Gourmet Shop	Event Space	Asian Restaurant
34	Sutton Place	Italian Restaurant	Pizza Place	Wine Bar	Café	Nightclub	Cocktail Bar	Mediterranean Restaurant	Sandwich Place	Seafood Restaurant
38	Flatiron	Italian Restaurant	Pizza Place	Sandwich Place	Pub	New American Restaurant	Mediterranean Restaurant	Gourmet Shop	Event Space	Asian Restaurant

Cluster 2:

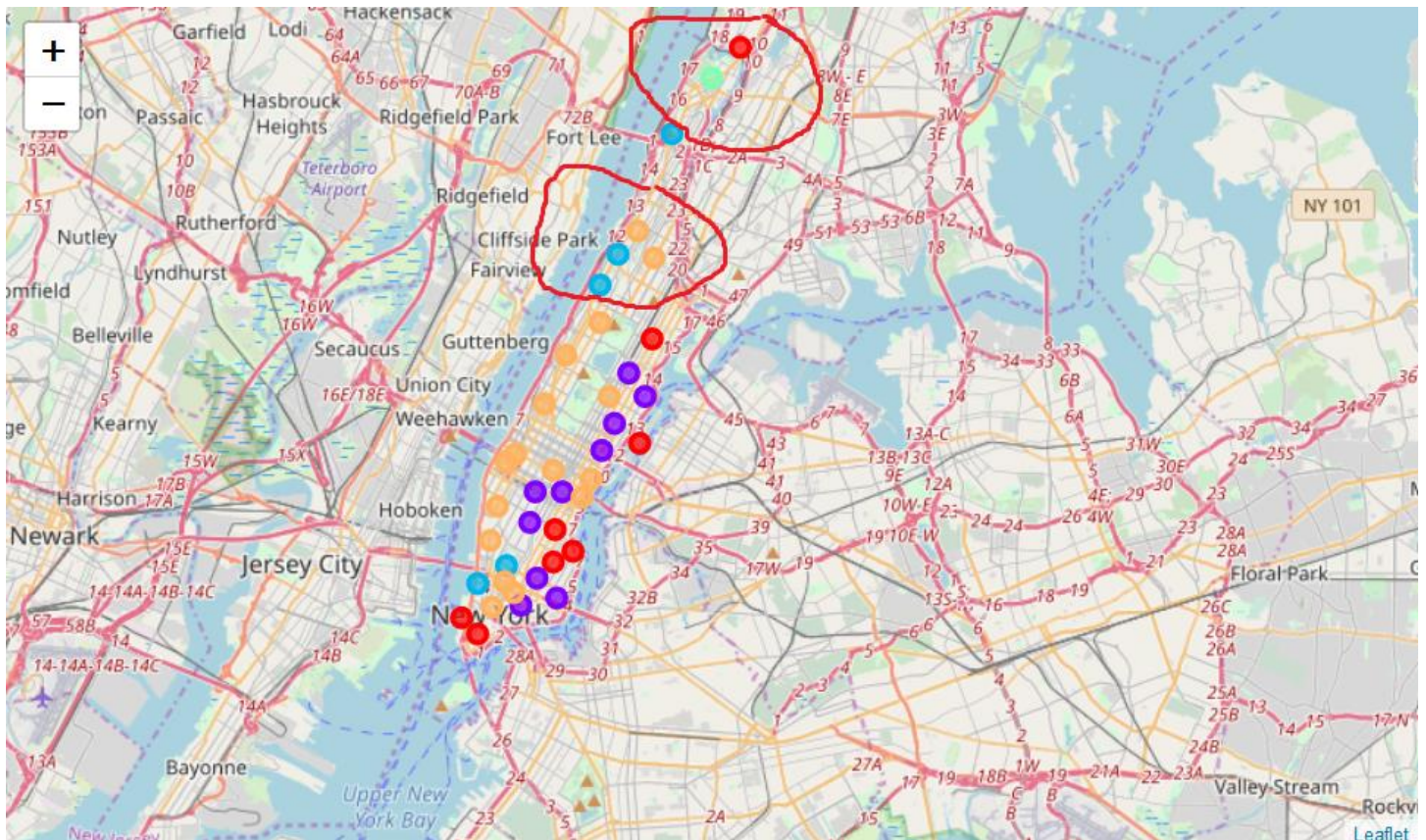
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
2	Washington Heights	Italian Restaurant	Swiss Restaurant	Asian Restaurant	Bakery	Café	Cocktail Bar	Coffee Shop	Deli / Bodega	Event Space
5	Manhattanville	Italian Restaurant	Swiss Restaurant	Asian Restaurant	Bakery	Café	Cocktail Bar	Coffee Shop	Deli / Bodega	Event Space
18	Greenwich Village	Italian Restaurant	Sandwich Place	Gourmet Shop	Pizza Place	Asian Restaurant	Bakery	Café	Cocktail Bar	Coffee Shop
21	Tribeca	Italian Restaurant	Sandwich Place	Mediterranean Restaurant	Pizza Place	Wine Bar	Restaurant	Event Space	Asian Restaurant	Bakery
26	Morningside Heights	Italian Restaurant	Pizza Place	Gourmet Shop	Asian Restaurant	Bakery	Café	Cocktail Bar	Coffee Shop	Deli / Bodega

Cluster 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
3	Inwood	Italian Restaurant	Cocktail Bar	Swiss Restaurant	Asian Restaurant	Bakery	Café	Coffee Shop	Deli / Bodega	Event Space	Fast Food Restaurant

Cluster 4:

	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
4	Hamilton Heights	Italian Restaurant	Pizza Place	Gourmet Shop	Asian Restaurant	Bakery	Café	Cocktail Bar	Coffee Shop	Deli / Bodega
6	Central Harlem	Italian Restaurant	Pizza Place	Gourmet Shop	Asian Restaurant	Bakery	Café	Cocktail Bar	Coffee Shop	Deli / Bodega
8	Upper East Side	Italian Restaurant	Pizza Place	Café	American Restaurant	Sandwich Place	Restaurant	Asian Restaurant	Bakery	Steakhouse
12	Upper West Side	Italian Restaurant	Pizza Place	Wine Bar	Seafood Restaurant	Fast Food Restaurant	Asian Restaurant	Bakery	Café	Cocktail Bar
13	Lincoln Square	Italian Restaurant	Pizza Place	Seafood Restaurant	Deli / Bodega	Gourmet Shop	Asian Restaurant	Bakery	Café	Cocktail Bar
14	Clinton	Italian Restaurant	Pizza Place	Coffee Shop	Wine Bar	Seafood Restaurant	Sandwich Place	Event Space	Asian Restaurant	Bakery
15	Midtown	Italian Restaurant	Pizza Place	Coffee Shop	Deli / Bodega	Gourmet Shop	American Restaurant	Steakhouse	Pub	Restaurant
17	Chelsea	Italian Restaurant	Pizza Place	Wine Bar	Sandwich Place	Seafood Restaurant	Fast Food Restaurant	Asian Restaurant	Bakery	Café
22	Little Italy	Italian Restaurant	Pizza Place	Café	Gourmet Shop	Wine Bar	Sandwich Place	Restaurant	Event Space	Asian Restaurant
23	Soho	Italian Restaurant	Pizza Place	Gourmet Shop	Café	Wine Bar	Sandwich Place	Restaurant	Event Space	Asian Restaurant
24	West Village	Italian Restaurant	Pizza Place	Wine Bar	Mediterranean Restaurant	Sandwich Place	Seafood Restaurant	Event Space	Asian Restaurant	Bakery
25	Manhattan Valley	Italian Restaurant	Pizza Place	Gourmet Shop	Asian Restaurant	Bakery	Café	Cocktail Bar	Coffee Shop	Deli / Bodega
32	Civic Center	Italian Restaurant	Pizza Place	Gourmet Shop	Bakery	Wine Bar	Sandwich Place	Restaurant	Event Space	Asian Restaurant
35	Turtle Bay	Italian Restaurant	Pizza Place	Wine Bar	Gourmet Shop	Steakhouse	Sandwich Place	Event Space	Asian Restaurant	Bakery
36	Tudor City	Italian Restaurant	Pizza Place	Wine Bar	Gourmet Shop	Steakhouse	Fast Food Restaurant	Asian Restaurant	Bakery	Café
39	Hudson Yards	Italian Restaurant	Pizza Place	Sandwich Place	Coffee Shop	Wine Bar	Seafood Restaurant	Restaurant	Event Space	Asian Restaurant



Based on data frame analysis above Cluster 3 (Inwood Side) and Cluster 2 (Washington Heights) areas are the best places to open a new Italian Restaurant business.

Discussion:

In this section, I would be discussing the observations I have noted and the recommendation that I can make based on the results.

This analysis is performed on limited data. This may be right or may be wrong. But if good amount of data is available there is scope to come up with better results.

- There is high competition in Midtown and Soho so it is very risky to open business in these areas.
- Central Harlem has also potential where closes to Morningside Heights area.
- It can be done more detailed analysis by adding other factors such as transportation, demographics of inhabitants.

Finally, Foursquare proved to be a good source of data but frustrating at times. Despite having a Developer account, I regularly exceeded my hourly limit locking me out for the day.

Conclusion:

Although all of the goals of this project were met there is definitely room for further improvement and development as noted below. However, the goals of the project were met and, with some more work, could easily be developed into a fully pledged application that could support the opening a business idea in an unknown location.

As per the neighborhood or restaurant type mentioned like Italian Restaurant analysis can be checked. A venue with lowest risk and competition can be identified.