

Coursera Capstone

IBM Applied Data Science Capstone

Opening a New Filipino Restaurant in New York City

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Introduction & Business Problem:

New York City is most densely populated major city in the United States. With an estimated population of 8.3 million in 2019. It is composed of five boroughs, Brooklyn, Queens, Manhattan, the Bronx, and Staten Island. In this project we will find an optimal location for stakeholders who are intrested in opening a Filipino Restaurant in one of the Boroughs of New York City. This project will take into account several aspects including restaurant density and diversity within the area. It will also include proximity to city centers.

This project will incorporate several data science techniques to find the optimal location based on several criterias. It will also list several other choices that each of which will have their advantages and disadvantages compared to the best possible location.

Target Audience of this Project

This project aims to info stakeholders who are interested in opening a Filipino Restaurant in New York City. This project is timely as New York City is one of the world financial capital and is always changing and developing. The culture in New York City is also very diverse and will need to be taken into account as target markets will change and be highly competitive.

Data

Selection Criteria for our Business Problem:

- Restaurant Density within an area
- Restaurant Diversity within an area
- Distance from city center

Data sources that will be needed for the project:

This webpage (https://geo.nyu.edu/catalog/nyu_2451_34572) contains Neighbourhood data of New York City and by using **BeautifulSoup** we were able to web scrape and extract the necessary data we need for this project. Next we used **Google Maps Geocoding API** to give us the Latitude and longitude of each neighbourhood. Lastly we used the **Foursquare API** to determine the Number and type of restaurant in an area.

Methodology

This project will focus on finding the best area to establish a Filipino restaurant in New York City with a low number of Filipino restaurants and is within a radius of 10 miles within the city center.

In first step we have collected the data of every establishment within the 10 miles of New York City center and extracted its' location and type and name. We have also identified the number of restaurants within that radius and focused our analysis on Filipino restaurants with the use of Foursquare.

Second step in our analysis will be calculation and exploration of 'restaurant density' across different neighborhoods of New York City. We will determine the frequency of each type of restaurant in the neighborhood and rank them as to which is more common in the area.

In third and final step we will be using k-means clustering on those neighborhoods we have identified and identify the most promising areas and within those created clusters. We will also present a map of all such locations but also create clusters (using k-means clustering) of those locations to identify clustered neighborhoods to better identify.

Results and Discussion

Based from our analysis it shows that although there is a great number of restaurants within the 10 mile radius of New York City, there are only a handful of Filipino Restaurants within the vicinity. Our initial analysis shows that the Highest concentration of Filipinos restaurants is in Queens Borough, Woodside Neighborhood. The second highest concentration of Filipino restaurant is in Sunnyside Gardens, Queens and East Village Manhattan.

	Neighborhood	Latitude	Longitude	Venue Name	Venue Latitude	Venue Longitude	VenueCategory
0	Carroll Gardens	40.680540	-73.994654	Fob Restaurant	40.682660	-73.993166	Filipino Restaurant
1	East Village	40.727847	-73.982226	Mama Fina's	40.728222	-73.982022	Filipino Restaurant
2	East Village	40.727847	-73.982226	Jeepney Filipino Gastropub	40.730307	-73.983617	Filipino Restaurant
3	Lower East Side	40.717807	-73.980890	Pig and Khao	40.719275	-73.984891	Filipino Restaurant
4	Gramercy	40.737210	-73.981376	Grill 21	40.735743	-73.979860	Filipino Restaurant
5	Woodside	40.746349	-73.901842	House of Inasal	40.745986	-73.898449	Filipino Restaurant
6	Woodside	40.746349	-73.901842	Krystal's Cafe	40.746233	-73.896142	Filipino Restaurant
7	Woodside	40.746349	-73.901842	Rosario's Ihawan	40.746070	-73.896083	Filipino Restaurant
8	Woodside	40.746349	-73.901842	Baby's Grill & Restaurant	40.746187	-73.896591	Filipino Restaurant
9	Rosebank	40.615305	-74.069805	Phil-Am Kusina	40.612426	-74.071455	Filipino Restaurant
10	Sunnyside Gardens	40.745652	-73.918193	Tito Rad's Grill & Restaurant	40.742477	-73.915584	Filipino Restaurant
11	Sunnyside Gardens	40.745652	-73.918193	Kabayan Authentic Filipino Cuisine	40.742483	-73.915482	Filipino Restaurant

Total number of restaurants: 1903

Total number of Filipino restaurants: 12

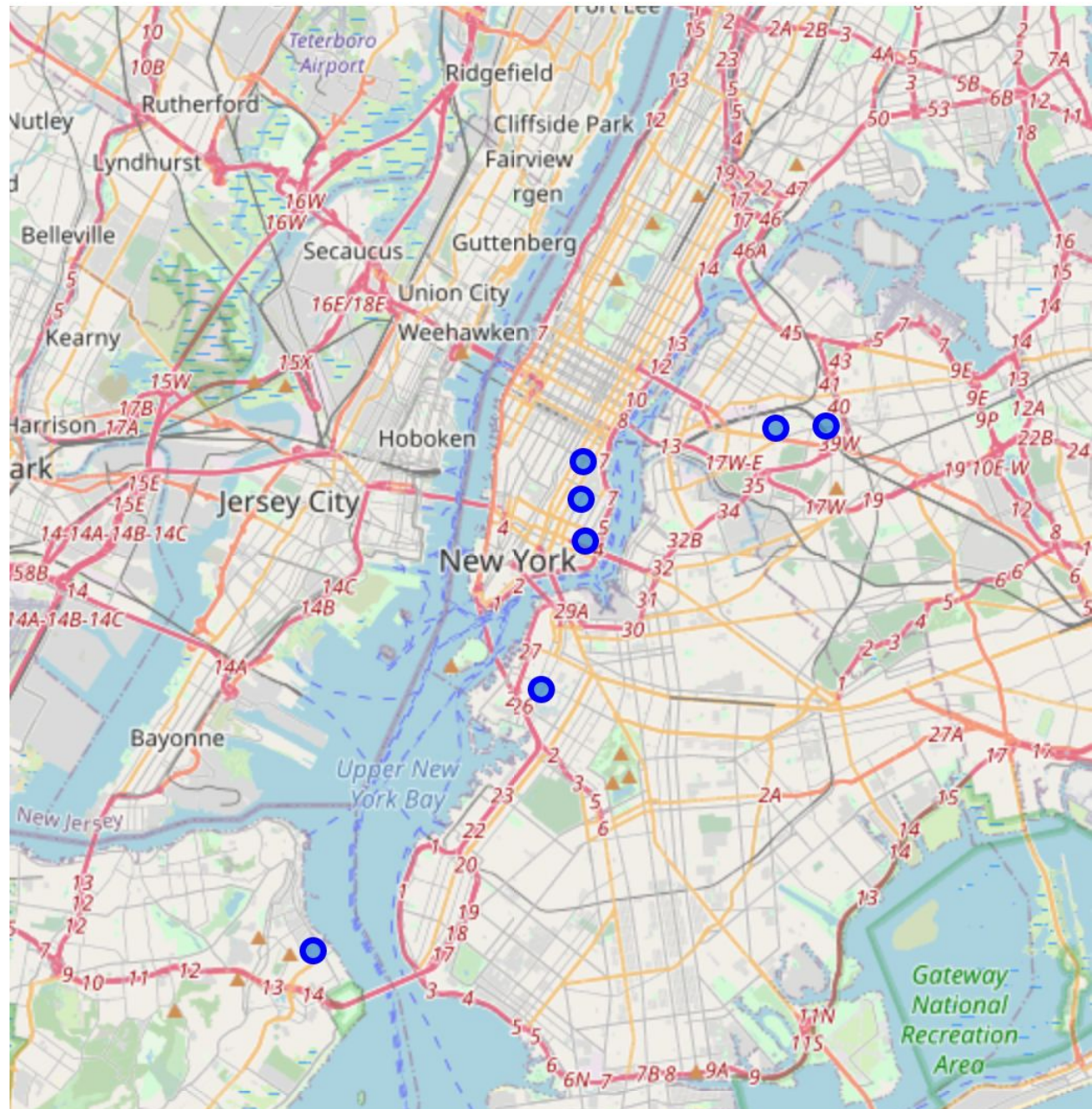
Percentage of Filipino restaurants: 0.63%

After initial review of identifying that out of 1903 restaurants and only having 12 Filipino Restaurants, we have established that only 0.63% of the total restaurants are Filipino Restaurants. Although at this point we know that there is a low density against other filipino restaurant. After clustering we have identified 5 cluster, but after further analysis, Filipino Restaurant does not often appear within the top 5 most common restaurants. We furthered our analysis by filtering our database using the neighborhoods that only

contain Filipino Restaurants and discovered that Filipino Restaurants are within clusters 0 and 2. This does not imply that those clusters 0 and 2 are actually optimal locations for a new restaurant, the Purpose of this analysis was to only provide info on areas within 10 miles of New York City but this analysis did discover that Filipino Restaurants are not abundant within the area only consisting 0.63% of the total restaurants.

	Borough	Neighborhood	Latitude	Longitude	Distance	Cluster Labels	1st Most Common Restaurant	2nd Most Common Restaurant	3rd Most Common Restaurant	4th Most Common Restaurant	5th Most Common Restaurant
28	Brooklyn	Carroll Gardens	40.680540	-73.994654	2.299783	0.0	Italian Restaurant	French Restaurant	Thai Restaurant	Sushi Restaurant	Latin American Restaurant
78	Manhattan	East Village	40.727847	-73.982226	1.627299	0.0	Mexican Restaurant	Ramen Restaurant	Japanese Restaurant	Vietnamese Restaurant	Italian Restaurant
79	Manhattan	Lower East Side	40.717807	-73.980890	1.364899	0.0	Chinese Restaurant	Ramen Restaurant	Latin American Restaurant	Japanese Restaurant	Filipino Restaurant
86	Manhattan	Gramercy	40.737210	-73.981376	2.127620	0.0	Mexican Restaurant	Italian Restaurant	American Restaurant	Thai Restaurant	Sushi Restaurant
90	Queens	Woodside	40.746349	-73.901842	5.940073	2.0	Thai Restaurant	Latin American Restaurant	Filipino Restaurant	American Restaurant	Chinese Restaurant
120	Staten Island	Rosebank	40.615305	-74.069805	7.511623	0.0	Italian Restaurant	Mexican Restaurant	Eastern European Restaurant	Filipino Restaurant	Cajun / Creole Restaurant
164	Queens	Sunnyside Gardens	40.745652	-73.918193	5.139400	0.0	Turkish Restaurant	American Restaurant	Korean Restaurant	French Restaurant	Peruvian Restaurant

Listed neighborhoods should therefor be only considered as a starting point of a much more detailed analysis on finding a suitable location for a Filipino Restaurant which has not only no nearby same categorical competition but also other factors taken into account and all other relevant conditions met.



Conclusion

The purpose of this project was to identify areas within a 10 mile radius of New York City that shows a low number of Filipino restaurants. It is evident that within that radius there is an abundance of restaurants, but the project outlines that there are only a handful of Filipino Restaurants. In order for stakeholders to find the optimal location, they must further look into the listed neighborhoods above based on specific characteristics of neighborhoods and locations in every recommended neighborhood. Stakeholders must also take into account additional factors like attractiveness of each location, foot traffic, proximity to public transport, real estate prices, socioeconomic factors and culture of neighborhood.

References:

Images:

https://www.google.com/search?q=New+york+city+picture&tbm=isch&ved=2ahUKEwjEhP6LkOXpAhUIHN8KHQCzBKcQ2-cCegQIABAA&oq=New+york+city+picture&gs_lcp=CgNpbWcQAzICCAAyAggAMgIIADICCAAyAggAMgIIADICCAAyAggAMgIIADoECAAQAzoFCAAQgwFQurQCWOBLAmDgzAJ0AHAAeACAAUelAcQDkgEBOJgBAKABAaoBC2d3cy13aXotaW1n&sclient=img&ei=pFHXXsSiC4i4_AaA5pK4Cg&bih=867&biw=1920#imgsrc=cCriB6giq2GQbM

Webpage:

https://geo.nyu.edu/catalog/nyu_2451_34572

Foursquare Developers:

<https://developer.foursquare.com/docs/>

Appendix

Cluster 0

	Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Restaurant	2nd Most Common Restaurant	3rd Most Common Restaurant	4th Most Common Restaurant	5th Most Common Restaurant
5	Hunts Point	40.809730	-73.883315	0.0	Restaurant	Spanish Restaurant	Vietnamese Restaurant	Egyptian Restaurant	Empanada Restaurant
8	Bay Ridge	40.625801	-74.030621	0.0	Italian Restaurant	Chinese Restaurant	American Restaurant	Greek Restaurant	Thai Restaurant
9	Bensonhurst	40.611009	-73.995180	0.0	Italian Restaurant	Sushi Restaurant	Russian Restaurant	Hotpot Restaurant	Shabu-Shabu Restaurant
11	Greenpoint	40.730201	-73.954241	0.0	Sushi Restaurant	Mexican Restaurant	French Restaurant	Restaurant	New American Restaurant
13	Brighton Beach	40.576825	-73.965094	0.0	Restaurant	Russian Restaurant	Eastern European Restaurant	Sushi Restaurant	Mediterranean Restaurant

Cluster 1

	Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Restaurant	2nd Most Common Restaurant	3rd Most Common Restaurant	4th Most Common Restaurant	5th Most Common Restaurant
18	East Flatbush	40.641718	-73.936103	1.0	Chinese Restaurant	Caribbean Restaurant	Vietnamese Restaurant	Egyptian Restaurant	English Restaurant
35	Starrett City	40.647589	-73.879370	1.0	American Restaurant	Caribbean Restaurant	Vietnamese Restaurant	Greek Restaurant	English Restaurant
36	Canarsie	40.635564	-73.902093	1.0	Thai Restaurant	Asian Restaurant	Caribbean Restaurant	Vietnamese Restaurant	Greek Restaurant
37	Flatlands	40.630446	-73.929113	1.0	Fast Food Restaurant	Caribbean Restaurant	Chinese Restaurant	Vietnamese Restaurant	Egyptian Restaurant
40	Coney Island	40.574293	-73.988683	1.0	Caribbean Restaurant	Vegetarian / Vegan Restaurant	Egyptian Restaurant	English Restaurant	Ethiopian Restaurant

Cluster 2

	Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Restaurant	2nd Most Common Restaurant	3rd Most Common Restaurant	4th Most Common Restaurant	5th Most Common Restaurant
1	Melrose	40.819754	-73.909422	2.0	Mexican Restaurant	Vietnamese Restaurant	Greek Restaurant	Empanada Restaurant	English Restaurant
2	Mott Haven	40.806239	-73.916100	2.0	Spanish Restaurant	Peruvian Restaurant	Latin American Restaurant	Vietnamese Restaurant	Empanada Restaurant
3	Port Morris	40.801664	-73.913221	2.0	Spanish Restaurant	Latin American Restaurant	Peruvian Restaurant	Chinese Restaurant	Restaurant
4	Longwood	40.815099	-73.895788	2.0	Latin American Restaurant	Fast Food Restaurant	Vietnamese Restaurant	Greek Restaurant	Empanada Restaurant
6	Morrisania	40.823592	-73.901506	2.0	Fast Food Restaurant	Seafood Restaurant	Vietnamese Restaurant	Eastern European Restaurant	Empanada Restaurant

Cluster 3

	Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Restaurant	2nd Most Common Restaurant	3rd Most Common Restaurant	4th Most Common Restaurant	5th Most Common Restaurant
15	Manhattan Terrace	40.614433	-73.957438	3.0	Japanese Restaurant	Greek Restaurant	Empanada Restaurant	English Restaurant	Ethiopian Restaurant
25	Bedford Stuyvesant	40.687232	-73.941785	3.0	Japanese Restaurant	New American Restaurant	Jewish Restaurant	Empanada Restaurant	English Restaurant
113	Lindenwood	40.663918	-73.849638	3.0	Japanese Restaurant	Greek Restaurant	Empanada Restaurant	English Restaurant	Ethiopian Restaurant
127	Castleton Corners	40.613336	-74.119181	3.0	Japanese Restaurant	Greek Restaurant	Empanada Restaurant	English Restaurant	Ethiopian Restaurant

Cluster 4

	Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Restaurant	2nd Most Common Restaurant	3rd Most Common Restaurant	4th Most Common Restaurant	5th Most Common Restaurant
0	High Bridge	40.836623	-73.926102	4.0	Chinese Restaurant	Seafood Restaurant	Spanish Restaurant	Latin American Restaurant	Asian Restaurant
7	Concourse	40.834284	-73.915589	4.0	Spanish Restaurant	Italian Restaurant	Chinese Restaurant	Caribbean Restaurant	Vietnamese Restaurant
12	Gravesend	40.595260	-73.973471	4.0	Italian Restaurant	Chinese Restaurant	Vietnamese Restaurant	German Restaurant	Empanada Restaurant
22	Brownsville	40.663950	-73.910235	4.0	Restaurant	Chinese Restaurant	Spanish Restaurant	Vietnamese Restaurant	Egyptian Restaurant
45	Marine Park	40.609748	-73.931344	4.0	Chinese Restaurant	Vietnamese Restaurant	Eastern European Restaurant	Empanada Restaurant	English Restaurant