

# Restaurants in New York City

IBM Data Science Capstone Final Project

# Introduction

- New York City is one of the most popular city in the United State with a population of 8,398,748 distributed over about 302.6 square miles. It is the most densely popular major city. New York City's food culture inspired by their immigrant history; from central, eastern European to Asian immigrants who have brought different authentic cuisines into the city. There aren't just traditional restaurants but thousands of mobile food vendors which is what also makes New York City so famous. So, if someone is looking to open a restaurant in New York, where should they open it to minimize the competition but maximize the profit? The goal is to locate and recommend to the client which neighborhood of New York city will be the best choice to start a restaurant as well as to understand the rationale of the recommendations made.



# Data

- Data 1 - Foursquare API

- I will use the Foursquare API to explore neighborhoods in New York City. I will need a dataset that contains the 5 boroughs, the neighborhoods, and the latitude and longitude coordinates of each neighborhood:  
[https://geo.nyu.edu/catalog/nyu\\_2451\\_34572](https://geo.nyu.edu/catalog/nyu_2451_34572)

- Data 2 - Wikipedia

- I would also use the data from below to study the population of New York City and the different cuisine that is offered in the city. [https://en.wikipedia.org/wiki/New\\_York\\_City](https://en.wikipedia.org/wiki/New_York_City)  
[https://en.wikipedia.org/wiki/Cuisine\\_of\\_New\\_York\\_City](https://en.wikipedia.org/wiki/Cuisine_of_New_York_City)

- Data 3 - Foursquare API

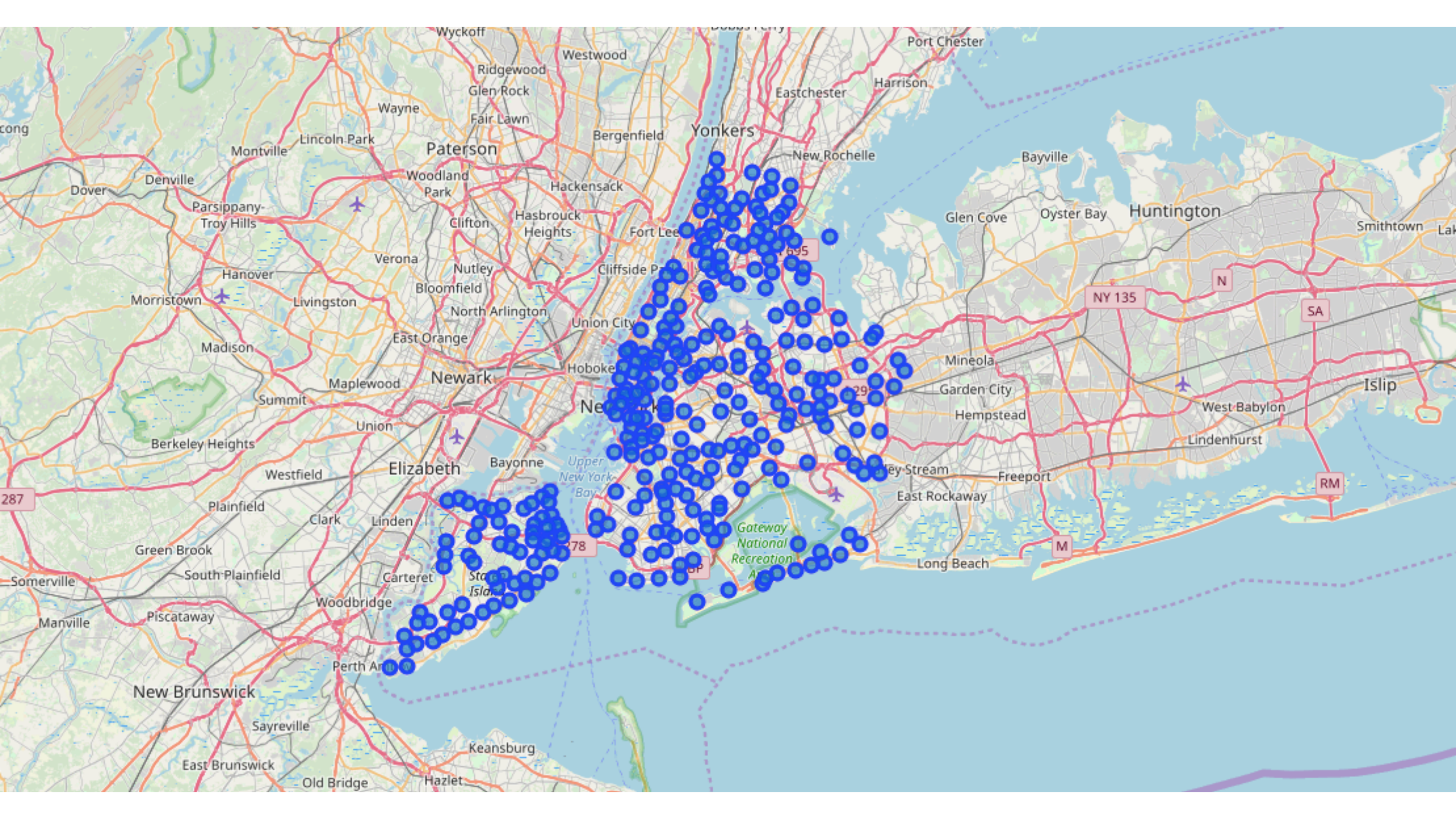
- I will again use Foursquare API to explore different venues information for each neighborhood.

# Methodology

- New York City neighborhood has a total of 5 boroughs and 306 neighborhoods. In this project, the first part is the clustering of Manhattan and Brooklyn. The second part is the Bronx, Queens, and Staten Island.
- We first load and explore the data from a json file that has with all the New York City geographical coordinate data. Then transfer the data of nested python dictionaries into a pandas data frame. The data frame contains the geographical coordinate of NYC neighborhoods and will be used to get the venue's data from Foursquare. Lastly, we used geopy and folium libraries to create a map of NYC with neighborhoods superimposed on top.
- The Foursquare API will help to explore more about NYC. Using the explore function, it will list the most common venue categories in each neighborhood. I set the limit to 5. It listed as the first common venue to the 5th common venue. We are going to use the data to analyze and decide what kind of restruarnat should be open in each different neighborhood.







# Results

The result of the table has shown the top 5 most common venues in each neighborhood. Given this data, we can apply it to our analysis. The table is shown below.

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Allerton	Pizza Place	Deli / Bodega	Chinese Restaurant	Intersection	Breakfast Spot
1	Annadale	American Restaurant	Pizza Place	Train Station	Dance Studio	Sports Bar
2	Arden Heights	Pizza Place	Deli / Bodega	Pharmacy	Coffee Shop	Home Service
3	Arlington	Bus Stop	Deli / Bodega	American Restaurant	Business Service	Coffee Shop
4	Arrochar	Italian Restaurant	Deli / Bodega	Bus Stop	Pizza Place	Athletics & Sports
5	Arverne	Surf Spot	Metro Station	Sandwich Place	Board Shop	Playground
6	Astoria	Bar	Middle Eastern Restaurant	Hookah Bar	Greek Restaurant	Seafood Restaurant
7	Astoria Heights	Italian Restaurant	Pizza Place	Bus Station	Food	Supermarket
8	Auburndale	Italian Restaurant	Athletics & Sports	Discount Store	Pharmacy	Pet Store
9	Bath Beach	Pharmacy	Chinese Restaurant	Italian Restaurant	Sushi Restaurant	Fast Food Restaurant
10	Battery Park City	Park	Coffee Shop	Hotel	Women's Store	Shopping Mall
11	Bay Ridge	Pizza Place	Italian Restaurant	Spa	American Restaurant	Bar
12	Bay Terrace	Clothing Store	Supermarket	Donut Shop	Cosmetics Shop	Shoe Store
13	Baychester	Donut Shop	Fried Chicken Joint	Discount Store	Gym / Fitness Center	Electronics Store
14	Bayside	Bar	Indian Restaurant	American Restaurant	Sushi Restaurant	Greek Restaurant
15	Bayswater	Playground	Park	Field	Ethiopian Restaurant	Event Service
16	Bedford Park	Diner	Mexican Restaurant	Pizza Place	Chinese Restaurant	Deli / Bodega
17	Bedford Stuyvesant	Bar	Deli / Bodega	Coffee Shop	Café	Pizza Place
18	Beechhurst	Chinese Restaurant	Italian Restaurant	Supermarket	Boutique	Convenience Store



The second table has shown that the most common venue in NYC is the Italian restaurant, Pizza, and Bar.

	Neighborhood	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
1st Most Common Venue					
Italian Restaurant	34	34	34	34	34
Pizza Place	29	29	29	29	29
Bar	16	16	16	16	16
Deli / Bodega	14	14	14	14	14
Park	12	12	12	12	12
Donut Shop	11	11	11	11	11
Pharmacy	11	11	11	11	11
Bus Stop	9	9	9	9	9
Chinese Restaurant	9	9	9	9	9
Beach	8	8	8	8	8
Bus Station	8	8	8	8	8
Coffee Shop	8	8	8	8	8
Bank	7	7	7	7	7
Latin American Restaurant	7	7	7	7	7
Caribbean Restaurant	6	6	6	6	6
Grocery Store	5	5	5	5	5
Hotel	5	5	5	5	5
Bakery	4	4	4	4	4



## Discussion

- To stand out in a city, it is helpful to understand what is the trend and what are they missing. We want to minimize competition between similar venues. So, we are going to use the data to help us out. Given that NYC top 10 restaurant venue is Italian, Pizza, Bar, Deli, Donut shop, Chinese Restaurant, Coffee shop, Latin American, and the Caribbean. We can conclude that NYC is missing a variety of Asian restaurants. Therefore, if you want to open a restaurant in NYC, I would recommend trying out for different Asian cuisines such as Korean, Japanese, Vietnamese, or Thai.

## Conclusion

- The data that I used has a little bit of history and is very limited. So my analysis might be inconsistent. As one of the most popular cities in the United State. I am surprised there is very little Asian restaurant choice that is given. Of course, I am not surprised about the Italian reautrant, pizza, bar, donut and deli shop as the top 5 choices as NYC is known for this type of food. I think if I can assess more recent data, it will help me with the research.