

Explore the Chinese Restaurants in the City of New York

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1. Introduction

The city of New York is the most populous city and the most densely populated major city in the United States. It is composed of five boroughs, including Brooklyn, Queens, Manhattan, the Bronx, and Staten Island. Throughout the history, New York City has been a major port of entry for immigrants into the United States, leading itself to be a large and ethnically diverse metropolis, as well as the cultural capital of the world. The Chinese population has constituted the fastest-growing nationality in New York States. In 2015, the estimated 812,410 individuals of new Chinese immigrants moved into New York City and its surrounding areas. In addition, New York City attracts approximately 12 million foreign visitors in 2017. The highest numbers of foreign visitors are from the United Kingdom, Canada, Brazil, and China. With many Chinese American population and visitors from China, Chinese food becomes one of the most popular food categories in New York City.

In this project, we are going to explore and visualize the Chinese restaurants in New York City. The following questions are concerned:

- How about the location distribution of the Chinese restaurant?
- Where should I go to enjoy the best Chinese restaurant?
- Where is a suitable location if someone wants to open a new Chinese restaurant?

2. Data sources

In order to answer the abovementioned three questions, I need the following data from their sources:

- New York City data containing the neighborhoods and boroughs, latitudes, and longitudes will be obtained from the data source: https://cocl.us/new_york_dataset
- New York City data containing neighborhood boundaries will be obtained from the data source: <https://data.cityofnewyork.us/City-Government/Borough-Boundaries/tqmj-j8zm>
- The locations and quality of Chinese restaurants will be obtained via the FourSquare API utilized via the Request library in Python.

3. Approach

I started from collecting the data of New York City from https://cocl.us/new_york_dataset, such as the information of boroughs, neighborhoods, and their corresponding latitude and longitude, and then converted the downloaded data into a dataframe for the following analysis. We could understand the neighborhoods distribution per borough in New York City from it. Here is a head of the New York City data.

	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

The next step is to find all the Chinese restaurants in New York City through FourSquare API. The head of as-acquired results are shown below. I further analyze the distribution of Chinese restaurants per borough or neighborhood using the “groupby” function. The results here could help me decide where to open a new Chinese restaurant.

	Borough	Neighborhood	ID	Name
0	Bronx	Wakefield	4edbac4e775bcc53fc0ed5f8	Hong Kong China King
1	Bronx	Fieldston	4cc4d337be40a35d390b814c	Lee's Chinese Kitchen
2	Bronx	Pelham Parkway	4b9d6b45f964a52078ab36e3	Mr. Q's Chinese Restaurant
3	Bronx	Pelham Parkway	4e4cf8c9bd413c4cc66da6c3	Hong Kong Restaurant
4	Bronx	City Island	4bfc652bf14fa593c1f5c9d4	City Island Chinese Resturant

Then I want to know the likes, rating and tips of each restaurant. FourSquare API is also used here. The head of this “rating information” are listed below. By sorting the data by rating, I could determine where to go if I want to have the best Chinese food in New York City.

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Bronx	Wakefield	0	0	0	0.0	0
1	Bronx	Fieldston	0	0	0	0.0	0
2	Bronx	Pelham Parkway	4b9d6b45f964a52078ab36e3	Mr. Q's Chinese Restaurant	9	7.7	10
3	Bronx	Pelham Parkway	0	0	0	0.0	0
4	Bronx	City Island	4bfc652bf14fa593c1f5c9d4	City Island Chinese Resturant	6	6.3	4

In addition, the average rating of Chinese restaurant in each borough or neighborhood could be estimated, the head of which are shown below. Further segment, cluster and visualize the data could enable me to pick up a good location to enjoy higher-rated Chinese food in the living area.

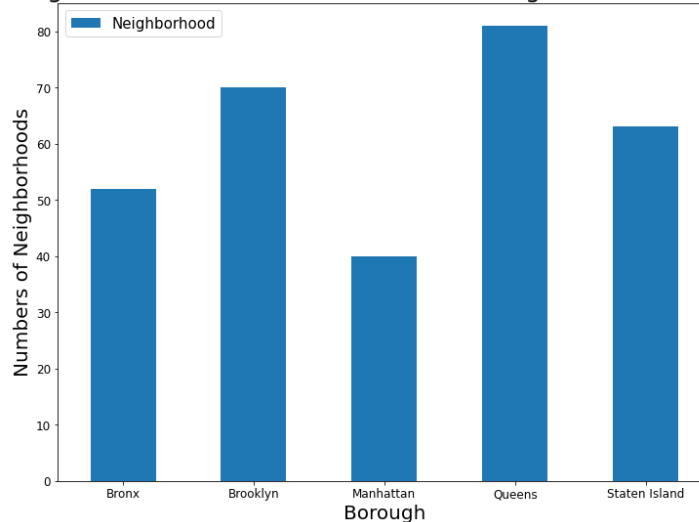
	Borough	Average Rating
2	Manhattan	8.490476
3	Queens	5.437778
1	Brooklyn	5.305882
0	Bronx	3.603448
4	Staten Island	3.523810

	Neighborhood	Average Rating
131	South Side	9.0
85	Lower East Side	9.0
102	North Side	9.0
149	Windsor Terrace	9.0
50	Flatiron	8.9

4. Results

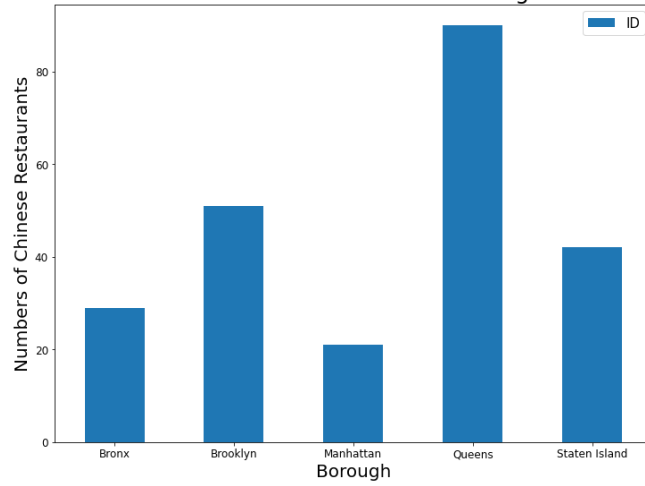
- From the New York Data, New York has 306 neighborhoods in 5 boroughs of Bronx, Brooklyn, Manhattan, Queens, and Staten Island. As shown below, Queens has the largest number of neighborhoods, while Manhattan has the least.

Neighborhoods distribution for each borough in New York City

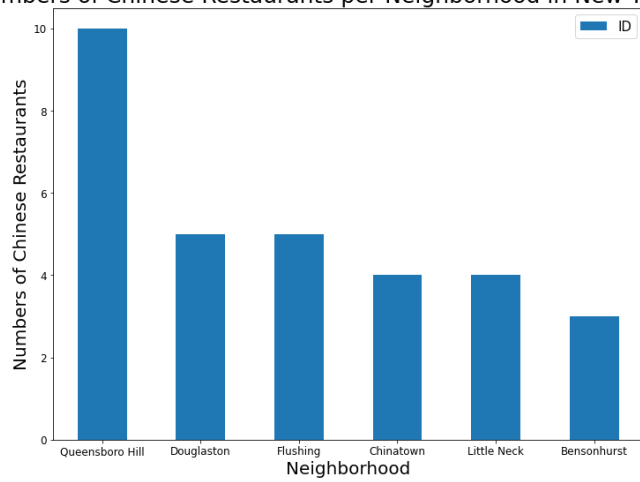


- Through the FourSquare API, 233 Chinese restaurants are found in New York City. The borough of Queens has the largest number of Chinese restaurants among all five boroughs, while Manhattan has the least. The neighborhood of Queensboro Hill located in Queens has 10 Chinese restaurants, the largest number in all neighborhoods of New York City.

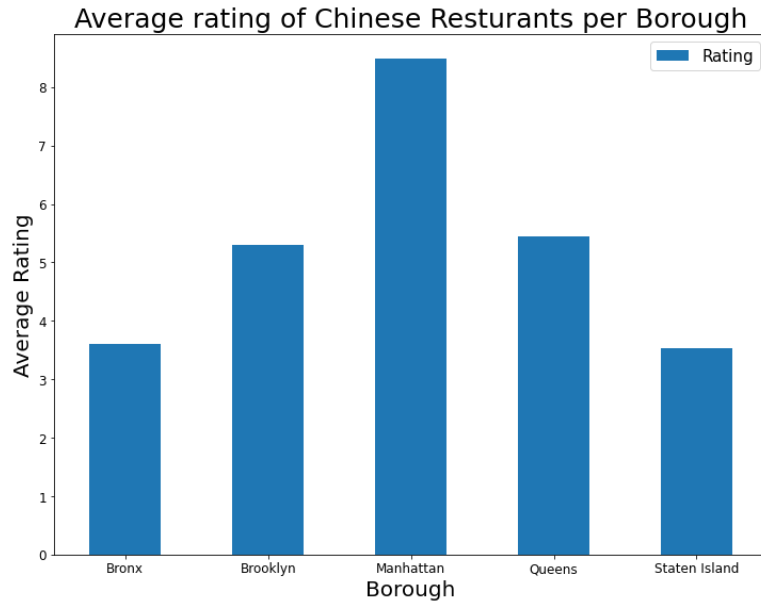
Numbers of Chinese Restaurants for Each Borough in New York City



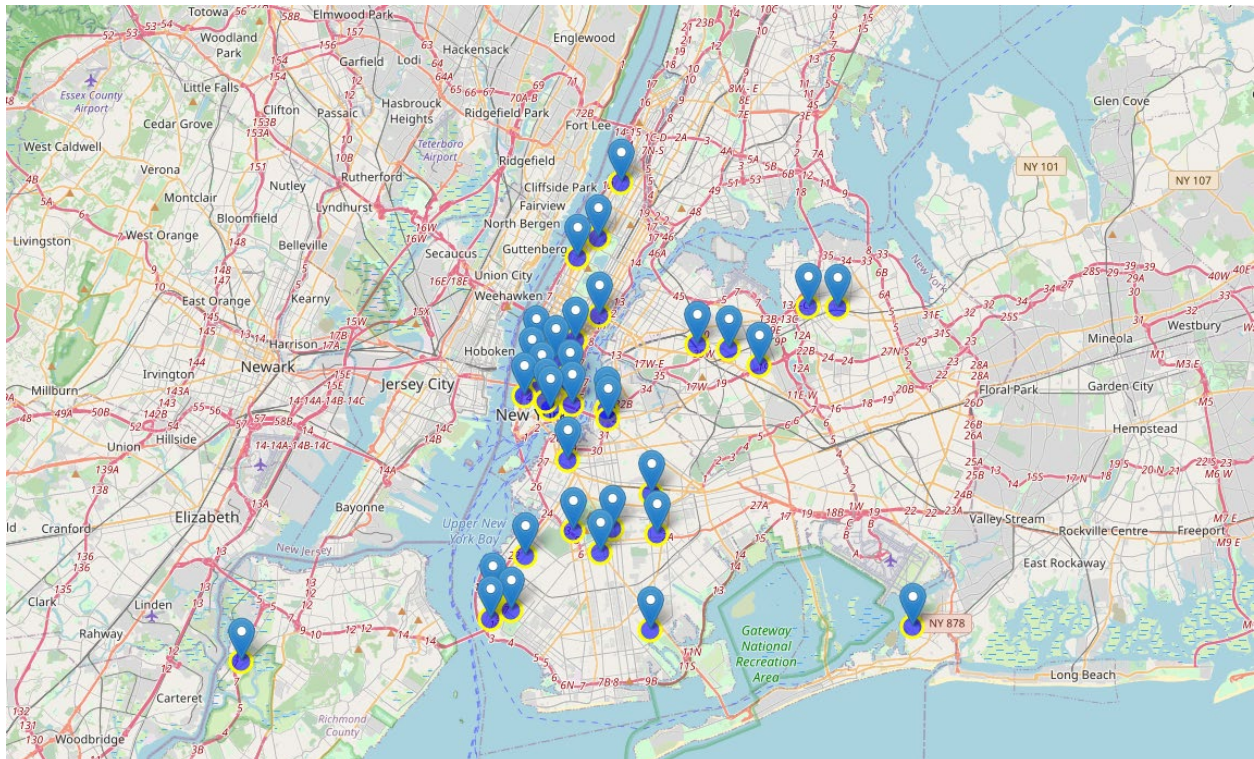
Numbers of Chinese Restaurants per Neighborhood in New York City



Although Manhattan has the least number of Chinese restaurants, the Chinese restaurants in Manhattan has the highest average rating.



The neighborhood of South Side in Brooklyn, Lower East Side in Manhattan and North Side in Brooklyn are the neighborhoods that has the best average rating of Chinese restaurants. The map below shows the distribution of Chinese restaurants with a rating of over 8.0.



5. Discussion

- New York has 306 neighborhoods distributed in 5 boroughs of Bronx, Brooklyn, Manhattan, Queens, and Staten Island. Among them, the borough of Queens has the largest number of neighborhoods, while the borough of Manhattan has the least.
- New York City has 233 Chinese restaurants in total. The borough of Queens has the largest number of Chinese restaurants among all five boroughs, while Manhattan has the least.
- Queensboro Hill (Queens), Douglaston (Queens), Flushing (Queens), Chinatown (Manhattan), Little Neck (Queens), and Bensonhurst (Brooklyn) have the most Chinese restaurants in all 306 neighborhoods across the NYC.
- The Chinese restaurants in Manhattan has the highest average rating, even though Manhattan has the least number of Chinese restaurants.
- The neighborhood of South Side in Brooklyn, Lower East Side in Manhattan and North Side in Brooklyn are the neighborhoods that has the best average rating of Chinese restaurants.

6. Conclusion

233 Chinese restaurants are distributed in New York City. Among the five boroughs of Bronx, Brooklyn, Manhattan, Queens, and Staten Island in NYC, Queens has the largest number of Chinese restaurants. The neighborhood of Queensboro Hill located in Queens is the neighborhood in all of NYC with the most Chinese restaurants. Although Manhattan has the least number of Chinese restaurants, it has the best rated Chinese restaurants on average. I will go to the neighborhood of South Side in Brooklyn, Lower East Side in Manhattan, North Side in Brooklyn, and Windsor Terrace in Brooklyn to enjoy the Chinese restaurant, as they are the top four neighborhoods that have the best average rating of Chinese restaurants. Moreover, Manhattan will be a preferred choice if I want to open a new Chinese restaurant. The competition with other Chinese restaurants will be easier in Manhattan than other boroughs.

The above analysis relies on the accuracy and adequacy of FourSquare data. We need to incorporate data from other external databases for further more comprehensive analysis.