

The Battle of Neighbourhoods

Introduction

New York is the most populous city in the United States. It is often described as the cultural, financial and media capital of the world. New York is comprised of five Boroughs namely Manhattan, Brooklyn, Queens, Bronx and State Island. Each Borough is further subdivided into its own Neighbourhoods.

New York is home to the largest Chinese population outside Asia. The increase in immigration and the accompanying growth in the Chinese population continue to be fuelled by New York's status as a global city, extensive mass transit system and its enormous economic marketplace.

New York City is home to various cuisines representing different ethnic groups that have immigrated to the US over time. New York City was also the founding city of New York Restaurant Week which has spread around the world due to the discounted prices. Food being a basic necessity, in a densely populated city like New York, there is always scope for different cuisines. There is a huge market potential in the restaurant business there.

Business Problem

Though New York City is thickly populated with Chinese, the distribution of the people or the restaurants are not uniform across the city. The problem, which this project tries to solve can be looked from two perspectives, i.e. from a consumer's point of view and a business man's point of view. The problems that will be addressed in this project are:

1. Which Boroughs are suitable for a Chinese immigrant in New York?
2. Which are the neighbourhoods with the greatest number of Chinese restaurants in New York?
3. Where can you get the best Chinese cuisine in New York?
4. Which are the potential markets for Chinese restaurants in New York?
5. In which all areas are the Chinese restaurant market saturated in New York?

The project aims to find answers to the above questions graphically using various plots and charts wherever possible.

Data

The project will make use of public datasets available in the internet. The various types of data required for this project are:

- The New York Boroughs and Neighbourhoods data along with their coordinates.
 - Data Source: https://cocl.us/new_york_dataset
 - Description: This data source contains latitude and longitude information if each neighbourhood.
- Chinese restaurants in a given location.
 - Data Source: Foursquare API
 - Description: The Foursquare explore API gives all the venues within a specified radius.
- Information regarding a particular restaurant.
 - Data Source: Foursquare API
 - Description: The Foursquare venues API gives the details regarding the rating and reviews of a specified venue.
- GeoSpace data.
 - Data Source: [https://data.c https://data.cityofnewyork.us/City-Government/Borough-Boundaries/tqmj-j8zm](https://data.cityofnewyork.us/City-Government/Borough-Boundaries/tqmj-j8zm)
 - Description: The Borough boundaries can be plotted in using this dataset in a choropleth map
- Python libraries Pandas and NumPy are used for data manipulations.
- Python libraries Folium and Matplotlib are used for data visualization.

Methodology

1. The entire New York neighborhoods along with the borough they belong, latitude and longitude are extracted from the open dataset https://cocl.us/new_york_dataset and stored in a pandas data frame.
2. The distribution of neighborhoods in each borough can be visualized using a bar chart.
3. Foursquare *explore* API is used to fetch all the Chinese restaurants in each neighborhood.

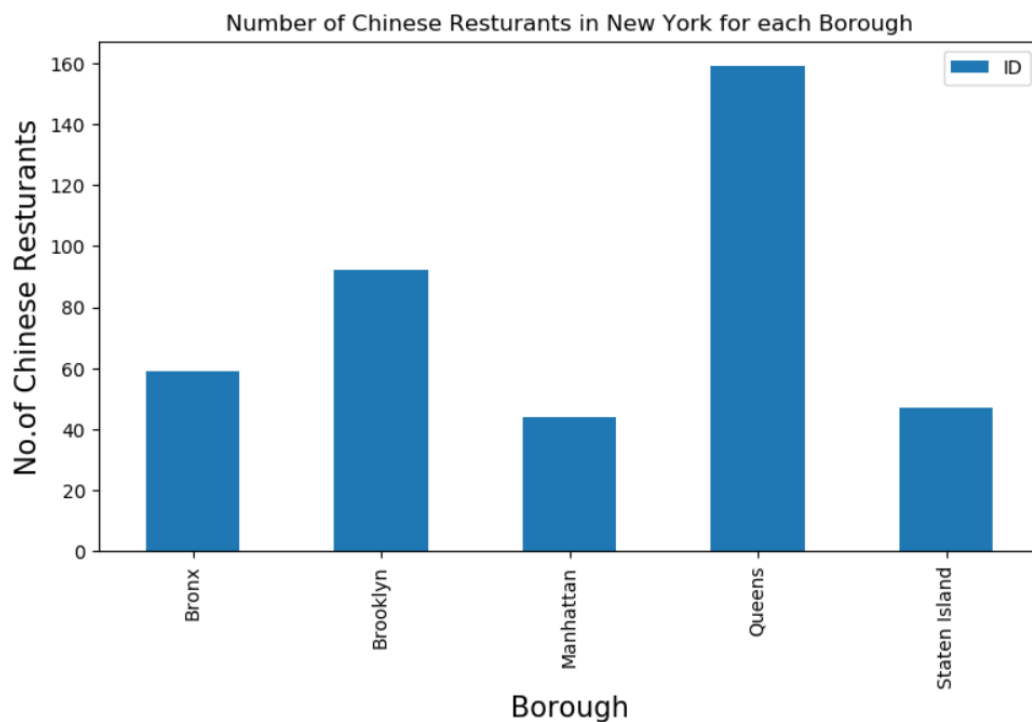
4. For each restaurant, corresponding ratings and reviews are fetched using the Foursquare *venue* API.

5. Each of the data fetched above are stored in Pandas data frame which makes complex computations and analysis easy. Different analysis is performed to come up with various visualizations to answer questions like most popular restaurant, region with most restaurants, among others.

Results

1. The Queens has the highest number of neighbourhoods while Manhattan has the least.

2. There are 401 Chinese restaurants in the city of New York. Out of this, the highest number of restaurants are found in Queens while Manhattan has the lowest number.



3. Flushing neighbourhood has the highest number of Chinese restaurants (14) followed by Queensboro Hill and Fresh Meadows.



4. The Chinese restaurant with the maximum likes and tips can be found in Chelsea, Manhattan.

```
# Restaurant with the maximum Likes  
chinese_rest_stats_ny.iloc[chinese_rest_stats_ny['Likes'].idxmax()]
```

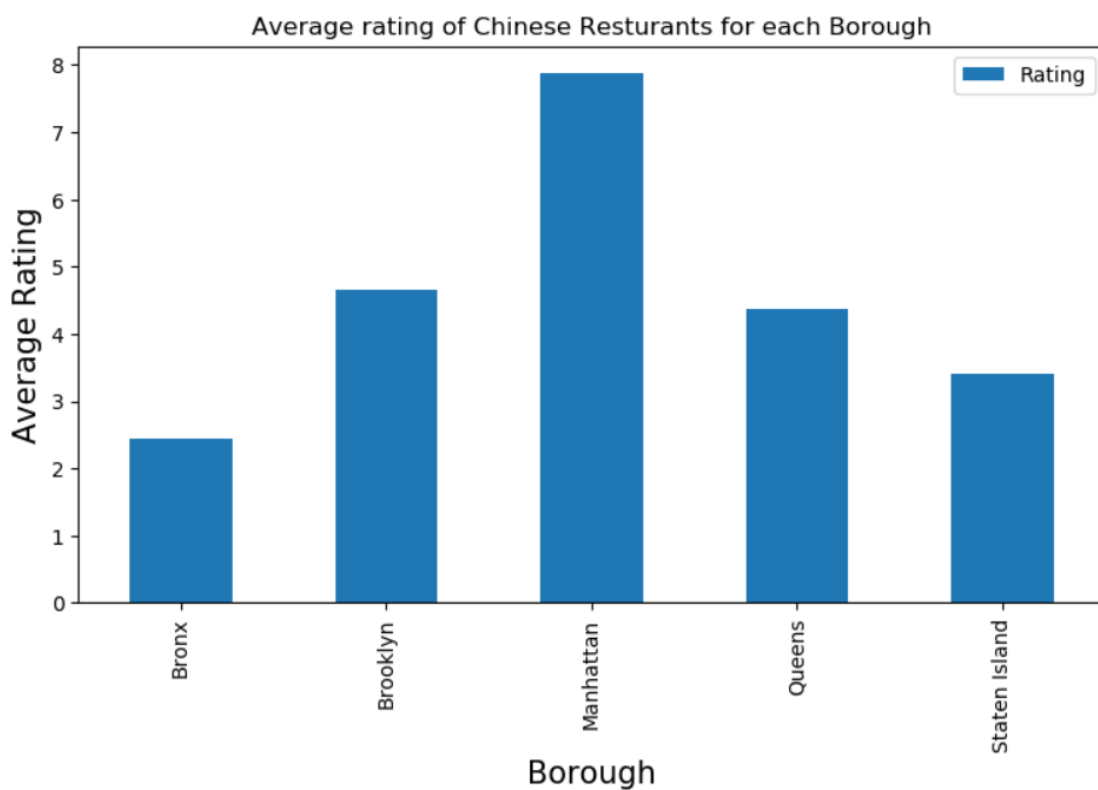
```
Borough      Manhattan  
Neighborhood  Chelsea  
ID            44e9b421f964a520a5371fe3  
Name          Buddakan  
Likes         1487  
Rating        8.8  
Tips          521  
Name: 146, dtype: object
```

5. The Chinese restaurant with the maximum rating can be found in Lower East Side, Manhattan.

```
# Restaurant with the maximum rating  
chinese_rest_stats_ny.iloc[chinese_rest_stats_ny['Rating'].idxmax()]
```

```
Borough      Manhattan  
Neighborhood  Lower East Side  
ID            5b380f649deb7d00399fdf9d  
Name          Kings County Imperial  
Likes         67  
Rating        9.2  
Tips         10  
Name: 147, dtype: object
```

6. Manhattan is the borough with the highest average rating for Chinese restaurants while Bronx is the least.

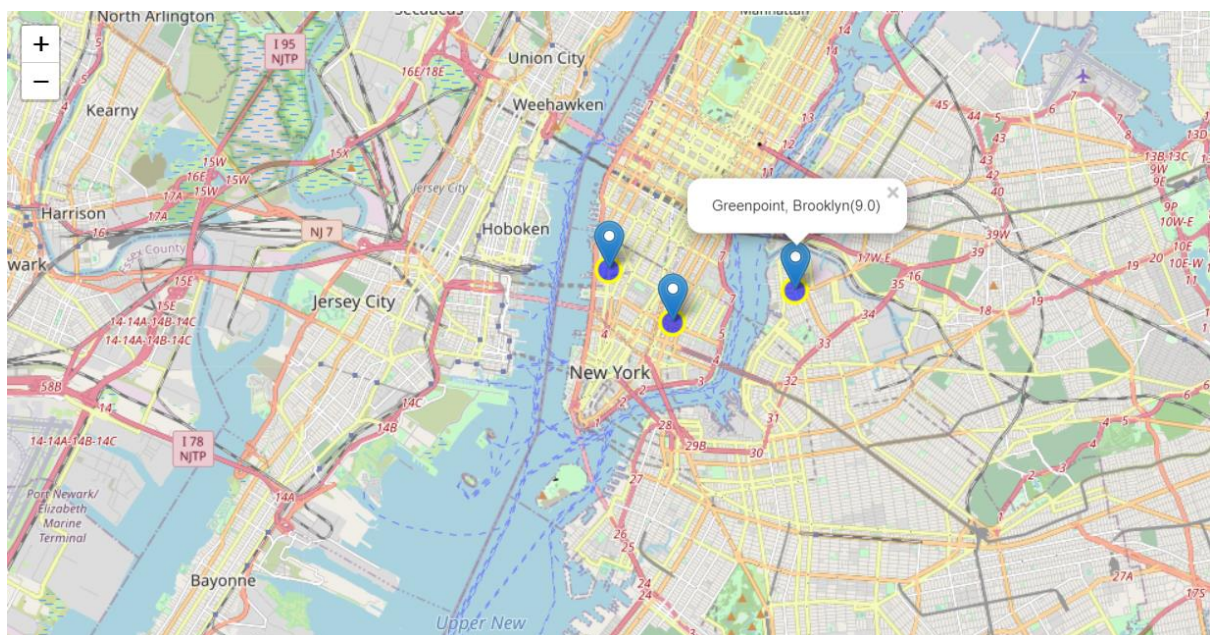


7. The neighbourhoods with higher average ratings are as follows:

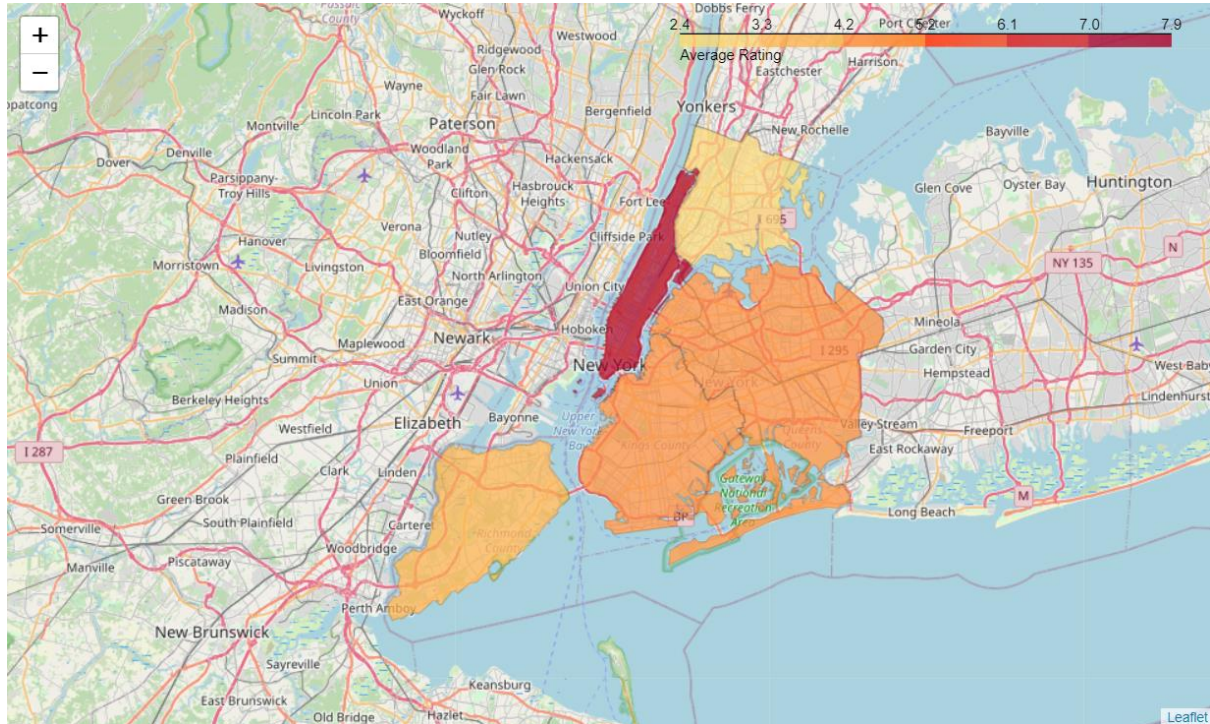
	Neighborhood	Average Rating
127	Noho	9.20
186	West Village	9.00
76	Greenpoint	9.00
129	North Side	8.90
102	Lower East Side	8.85
30	Chelsea	8.80
115	Midtown	8.80
116	Midtown South	8.80
123	Murray Hill	8.80
161	Rugby	8.70

8. Top three Chinese restaurants in terms of rating can be visualized on the map.

	Neighborhood	Average Rating
76	Greenpoint	9.0
127	Noho	9.2
186	West Village	9.0



9. A choropleth map can be constructed to visualize how the average rating of Chinese restaurants are across the New York City.



Discussion

From a consumer's point of view, the average rating of Chinese restaurants in Manhattan is higher than all the other boroughs. For all those who prefer quality Chinese food, restaurants in Manhattan will be the place to go.

From a business perspective, Manhattan has the lowest number of Chinese restaurants amongst all the other boroughs. The tips are highest for restaurants in Manhattan, which implies that people tend to restaurants in these areas more often than other boroughs. Both these factors make Manhattan a potential place to open up a Chinese restaurant. The population density of Manhattan might also play a role in this.

Bronx and Staten Island are other two potential Chinese restaurant market, Whereas the Chinese market tend to be saturated in the Queens borough.

Conclusion

The type of analysis done in this project can be useful for multiple stakeholders.

Immigration to US, especially New York city is in an increasing trend. It is important to find the right place to settle in based on various personal preferences in which restaurants with preferred cuisine might also play a role. It is also important for the business community to come up with new outlets to satisfy the growing need, thereby capitalising in the process.

So, a good and meaningful analysis before any decision (business or otherwise) can make all the stakeholders happy.