Data Science Report

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1 Introduction

The City of New York, is the most popular city in the United States, which is also the financial capital of USA with a level of diversity multicultural atmosphere. NYC is famous for its business friendly environment and provides lots of business oppourtunities. Therefore, many players from different places are welcome to join 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, which means the market could be highly competitive in any field, including restaurants. As one of the highly developed city, the cost of doing business could be one of the highest. Thus, any new business venture or expansion needs to be analysed 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. The City of New York is famous for its excelllent food. cantonese food is attractive to people from different background, and has been part of the city's immigrant history for more than a century. Cantonese restaurants have become so popular in the United States not just in China town but also elsewhere in the major and small cities, and even could be found on every corner. Therefore, Starting a cantonese restaurant can be a great business opportunity, but you need to make a plans with details in order to distinguish yourself from others for a long-term success.

2 Data

The dataset is free online whose link is $https://geo.nyu.edu/catalog/nyu_245134572$. In this dataset, all location information(longtitude and latitude) of each neighborhood is written down. Venues information for each neighborhood is obtained from Foursquare API by category ID 52af3a7c3cf9994f4e043bed for Cantonese food.

	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

3 Methodology

K-means method learnt in week 3 lab is applied as basic methodology. First, the address information is obatined by .json file. Then these information is used for searching venues in Foursquare API through custom-built function. Finally details information of cantoneses restaurant in each neighbourhood is merged together for further machine learning. K-means clustering algorithm is applied to classify and later visualized by Folium.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Bay Ridge	40.625801	-74.030621	Szechuan Delight	40.618908	-74.021592	Cantonese Restaurant
1	Bensonhurst	40.611009	-73.995180	香港地New Forest Cafe	40.614453	-74.000350	Cantonese Restaurant
2	Bensonhurst	40.611009	-73.995180	Farmers Restaurant	40.608682	-74.005065	Cantonese Restaurant
3	Bensonhurst	40.611009	-73.995180	18 Stars Kitchen Inc 煌都食坊	40.607367	-74.002145	Cantonese Restaurant
4	Bensonhurst	40.611009	-73.995180	Golden Bay Restaurant	40.602534	-73.995032	Cantonese Restaurant

	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
0	Auburndale	Chinese Restaurant	Cantonese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Cha Chaan Teng
1	Bath Beach	Cantonese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Chinese Restaurant	Cha Chaan Teng
2	Bay Ridge	Cantonese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Chinese Restaurant	Cha Chaan Teng
3	Bensonhurst	Cantonese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Chinese Restaurant	Cha Chaan Teng
4	Chelsea	Cantonese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Chinese Restaurant	Cha Chaan Teng

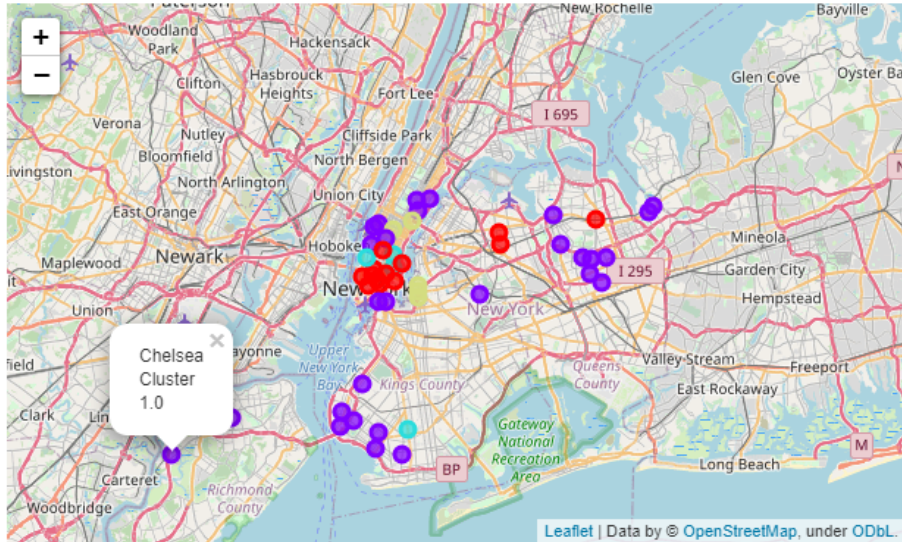|	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue
11	Chinatown	Cantonese Restaurant	Chinese Restaurant	Dim Sum Restaurant	Cha Chaan Teng	Seafood Restaurant	Noodle House	Dumpling Restaurant	Asian Restaurant
18	Greenwich Village	Chinese Restaurant	Cantonese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Cha Chaan Teng	Asian Restaurant
20	Lower East Side	Cantonese Restaurant	Chinese Restaurant	Asian Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Cha Chaan Teng
21	Tribeca	Chinese Restaurant	Cantonese Restaurant	Cha Chaan Teng	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Asian Restaurant
22	Little Italy	Cantonese Restaurant	Chinese Restaurant	Dim Sum Restaurant	Cha Chaan Teng	Seafood Restaurant	Noodle House	Dumpling Restaurant	Asian Restaurant

4 Results

hborhood	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
Bay Ridge	Cantonese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Chinese Restaurant	Cha Chaan Teng	Asian Restaurant
ensonhurst	Cantonese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Chinese Restaurant	Cha Chaan Teng	Asian Restaurant
unset Park	Cantonese Restaurant	Dim Sum Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Chinese Restaurant	Cha Chaan Teng	Asian Restaurant
Gravesend	Cantonese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Chinese Restaurant	Cha Chaan Teng	Asian Restaurant
ath Beach	Cantonese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Chinese Restaurant	Cha Chaan Teng	Asian Restaurant
er Heights	Cantonese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Chinese Restaurant	Cha Chaan Teng	Asian Restaurant
t Hamilton	Cantonese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Chinese Restaurant	Cha Chaan Teng	Asian Restaurant
Jpper East Side	Cantonese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Chinese Restaurant	Cha Chaan Teng	Asian Restaurant

borhood	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
Ocean Parkway	Chinese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Cha Chaan Teng	Cantonese Restaurant	Asian Restaurant
st Village	Chinese Restaurant	Asian Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Cha Chaan Teng	Cantonese Restaurant
st Village	Chinese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Cha Chaan Teng	Cantonese Restaurant	Asian Restaurant
Gramercy	Chinese Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Dim Sum Restaurant	Cha Chaan Teng	Cantonese Restaurant	Asian Restaurant

ghborhood	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
Villiamsburg	Dim Sum Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Chinese Restaurant	Cha Chaan Teng	Cantonese Restaurant	Asian Restaurant
North Side	Dim Sum Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Chinese Restaurant	Cha Chaan Teng	Cantonese Restaurant	Asian Restaurant
South Side	Dim Sum Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Chinese Restaurant	Cha Chaan Teng	Cantonese Restaurant	Asian Restaurant
Midtown	Dim Sum Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Chinese Restaurant	Cha Chaan Teng	Cantonese Restaurant	Asian Restaurant
Sutton Place	Dim Sum Restaurant	Seafood Restaurant	Noodle House	Dumpling Restaurant	Chinese Restaurant	Cha Chaan Teng	Cantonese Restaurant	Asian Restaurant

5 Discussion

Based on results shown above. Area classified as label 1 could be a good option as they are much less condensed. The competition is so dramatic around China town so it's not wise to run Cantonese restaurant business here. Far away from city, like Chelsea could be a option. However, transportation, inhabitants and populations should be considered for further strategic decision

6   conclusion

Although there is still room to improve if more factors like deliver cost, populaiton density and so on could be taken into consideration. The results and discussion shown above is not a too-off guidance for investors who are interested in running Cantonese restaurant.