IBM Data Science Professional Specialization Capstone Final Report

The Battle of the Neighbourhood:

Restaurant launch in a competitive market

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1. Introduction & Business Problems:

Introduction:

The City of New York, usually known as New York City (NYC), or New York (NY), is the most populous city in the United States. With an estimated population of 8,398,748 distributed over a land area of approximately 302.6 square miles. It is the largest and most influential American metropolis, encompassing Manhattan and Staten islands, the western sections of Long Island, and a small portion of the New York state mainland to the north of Manhattan. New York City is in reality a collection of many neighbourhoods scattered among the city's five boroughs—Manhattan, Brooklyn, the Bronx, Queens, and Staten Island—each exhibiting its own lifestyle. Due to residence of many life styles, there is a high scope for setting up a restaurant in this location.

With such a diverse population and culture, New York City has through a wide range of cuisines and restaurants that can cater to varying price points. In this project, our business is a restaurant that creates homemade Mexican food that welcomes influences from various Latino cultures.

This project will be a start up project as the clients are new to this. As this is their very first attempt at a business venture, they have requested insight on several issues. This process would also be beneficial for anyone who wants to start a new business in New York City or any other major city.

Business Problems:

1. How much competition will they face with the restaurants in the same area?
2. Which neighborhood might have a supportive demographic to help sustain business?
3. Where would the restaurant find the space to distinguish themselves from the numerous competition and maximize income?
4. How will it tackle the compitirion going on in the entrepreneurship in management of restaurants?

2. Data Acquisition and Preparation

The New York City have a total of 5 boroughs and 306 neighborhoods. In order to segment the neighborhoods and explore them, I have created a dataset that contains the 5 boroughs and the neighborhoods that exist in each borough as well as the the latitude and longitude coordinates of each neighbourhood

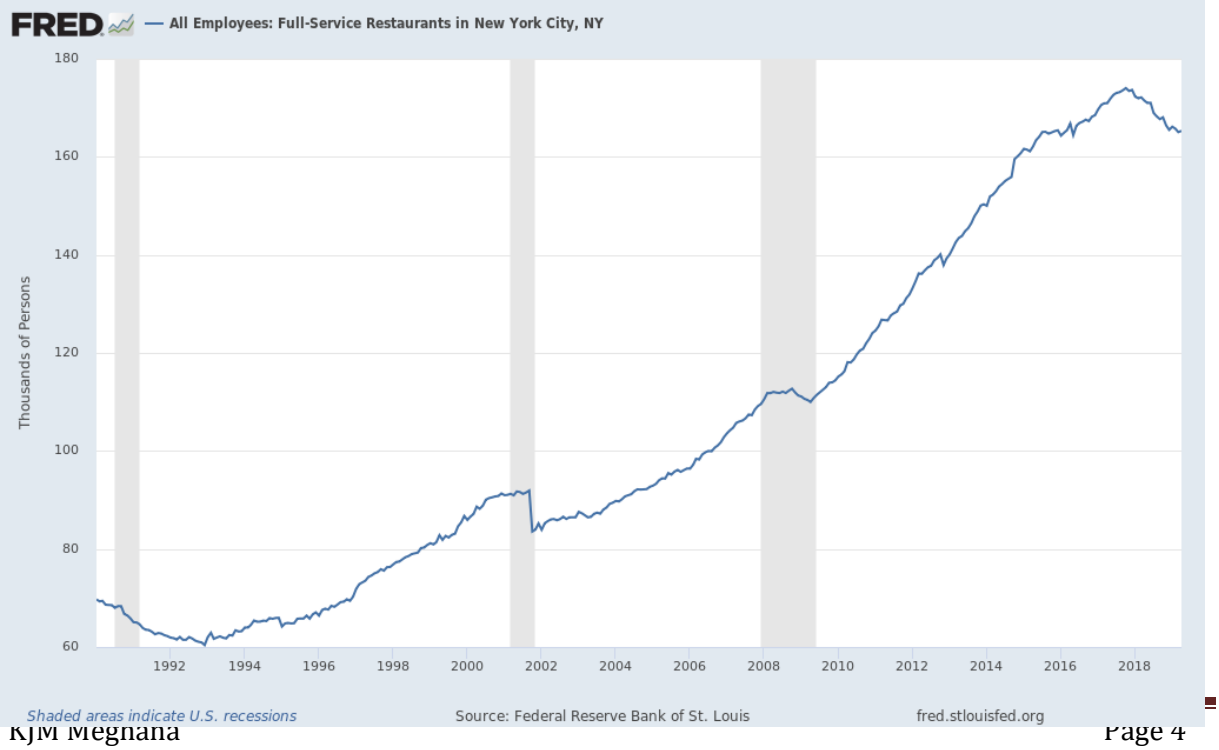
New York City's MOIA Annual Report 2018 was used to examine possible target demographics and extrapolate which backgrounds that might show the most interest. As for any business, having a clientele lays the foundation for progressing towards a bountiful economic future.

Link to the dataset:

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

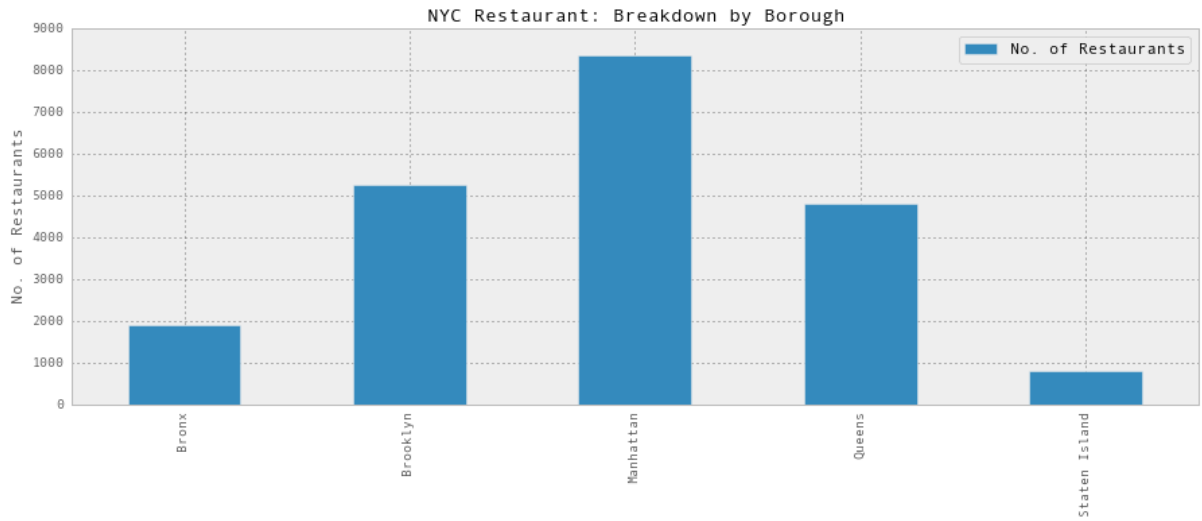
https://cocl.us/new_york_dataset

Restaurant up comings in NYC:



Country of origin for NYC immigrants	Number	% of all foreign-born
Dominican Republic	422,244	13.5%
China	318,581	10.2%
Mexico	183,197	5.8%
Jamaica	176,718	5.6%
Guyana	136,760	4.4%
Ecuador	129,693	4.1%
Haiti	88,383	2.8%
Trinidad & Tobago	83,222	2.7%
Bangladesh	80,448	2.6%
India	76,424	2.4%

Through the MOIA's report, we can find the top ten countries of origin for



foreign born city residents (Table 1) and use them to based several assertions on. However from this report it is important to remember that we cannot precisely confirm the distribution of these residents and their subsequent families in exact neighborhoods. The closest data found supporting any form of distribution of ethnicity in local neighborhoods from www.staisticalaltas.com, which collects it data from the U.S. Census, which show some form of local

distribution through a point of deviation as compared to Washington Heights, a New York City neighbourhood.

Foursquare's services were used to explore and examine New York City's numerous neighborhoods. Foursquare data was also deployed to parse out Venues, User tips, Feedback, location and Ratings of Neighboring restaurants that would be eventual competition. As seen below in Figure.

	name	categories	address	cc	city	country	crossStreet	distance	formattedAddress
0	Chipotle Mexican Grill	Mexican Restaurant	111 Fulton St	US	New York	United States	at William St	333	[111 Fulton St (at William St), New York, NY 1...
1	Mad Dog & Beans Mexican Cantina	Mexican Restaurant	83 Pearl St	US	New York	United States	at Stone St	1010	[83 Pearl St (at Stone St), New York, NY 10004...
2	Chipotle Mexican Grill	Mexican Restaurant	2 Broadway Frnt 4	US	New York	United States	btwn Beaver & Stone St	1045	[2 Broadway Frnt 4 (btwn Beaver & Stone St), N...
3	Chipotle Mexican Grill	Burrito Place	625 Broadway	US	New York	United States	btwn Bleecker & Houston St	1688	[625 Broadway (btwn Bleecker & Houston St), Ne...
4	Chipotle Mexican Grill	Mexican Restaurant	200 Varick St Frnt B	US	New York	United States	Varick between Houston & King	1732	[200 Varick St Frnt B (Varick between Houston ...

3. Methodology:

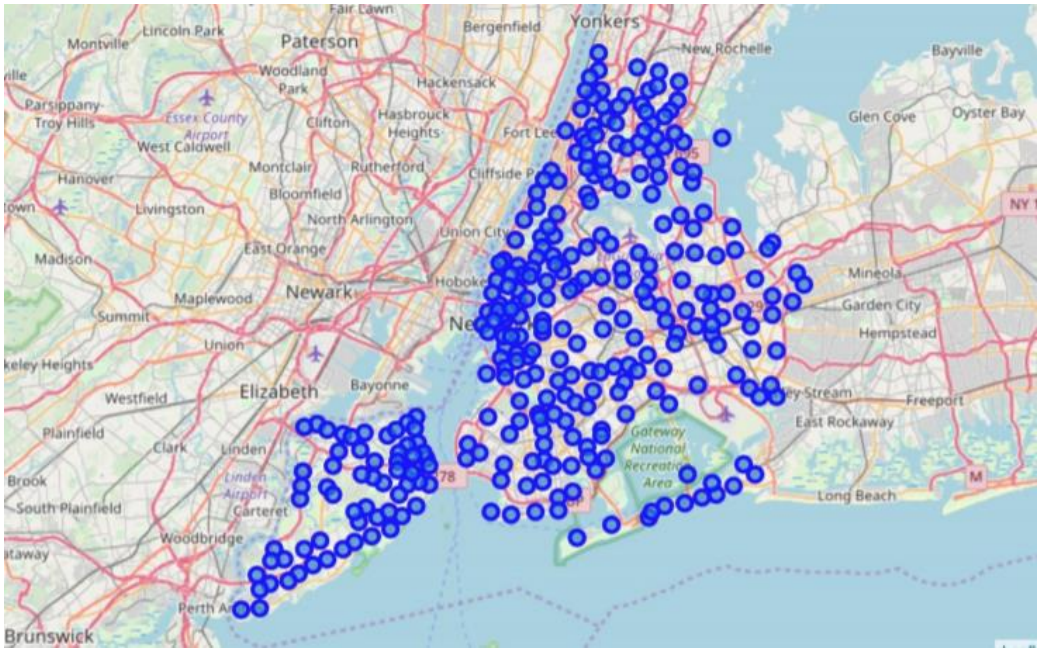
Finding the co ordinates of NYC downtown area (Python code):

```
In [10]: address = 'New York City, NY'

         geolocator = Nominatim(user_agent="ny_explorer")
         location = geolocator.geocode(address)
         latitude = location.latitude
         longitude = location.longitude
         print('The geograpical coordinate of New York City are {}, {}.'.format(latitude, longitude))

         The geograpical coordinate of New York City are 40.7127281, -74.0060152.
```

From these coordinates we can define our prospective neighborhoods of New York City using latitude and longitude with our JSON file



4. Results:

With this parameter set, Foursquare's API was used to overlay similar restaurants with similar qualities of the perspective restaurant. Mexican restaurants with a relative close proximity to the downtown area. While using Foursquare, related Mexican restaurants were gathered in a 16000 meter radius (~10 miles) The red circle denotes the downtown area, while blue circles denotes Mexican restaurants. This segmentation was set with a limit of 60 however only 50 were returned in the request . In terms of the boroughs, the radius affected 3 boroughs; Manhattan, Brooklyn and Queens. As per Figure 4, Manhattan holds the most values, then Brooklyn and one outliner in Queens. It is important to remember that these restaurants were selected through the radius and restaurants committed to Foursquare's API. There could be more related restaurants outside the scope of these parameters.

```
In [49]: dataframe_filtered.name
Out[49]: 0                          Chipotle Mexican Grill
         1                Mad Dog & Beans Mexican Cantina
         2                          Chipotle Mexican Grill
         3                          Chipotle Mexican Grill
         4                          Chipotle Mexican Grill
         5                   Dahlia's Mexican Restaurant
         6                          Chipotle Mexican Grill
         7                          Chipotle Mexican Grill
         8                          Órale! Mexican Kitchen
         9                          Chipotle Mexican Grill
         10                         Chipotle Mexican Grill
         11                         Chipotle Mexican Grill
         12                         Chipotle Mexican Grill
         13                         Chipotle Mexican Grill
         14                         Chipotle Mexican Grill
         15                         Chipotle Mexican Grill
         16       Sinigual Contemporary Mexican Cuisine
         17                             QDOBA Mexican Eats
         18                         Chipotle Mexican Grill
         19                         Chipotle Mexican Grill
         20                         Chipotle Mexican Grill
         21                         Chipotle Mexican Grill
         22                             QDOBA Mexican Eats
         23                         Chipotle Mexican Grill
         24               Zaragoza Mexican Deli-Grocery
         25                         Chipotle Mexican Grill
         26               Panchito's Mexican Restaurant
         27                         Chipotle Mexican Grill
         28                         Chipotle Mexican Grill
         29                  La Sirena Mexican Folk Art
         30                         Chipotle Mexican Grill
```

Figure 5

```
dataframe_filtered.shape
]: (50, 16)
```

The possibilities are show in the map below. From the reported data, we can see that the first snapshot of data is dominated by restaurant chains. Namely, Chipotle Mexican Grill and QDOBA Mexican Eats. This could prove a special business angle for our clients, Homemade food vs Fast-food.

The restaurant will be close to the city center while being offered an opportunity where their restaurant can emerge among the local competition. From this assertion, West Brooklyn satisfies these requirements as it provides direct links back to the downtown area via bridges.

5. Conclusion:

West Brooklyn appears to be the best starting location. It is close to the city center with direct access to the downtown area via two bridges. The only substantial competition was with Guadalupana Mexican Bakery with a rating of 8.3/10

```
result = requests.get(url).json()
try:
    print(result['response']['venue']['rating'])
except:
    print('This venue has not been rated yet.')
```

```
8.3
```

Lastly, a base demographic of Latinos were found in New York City. 4 out of 10 top immigrants, mainly from Guyana, Mexico, Dominion Republic, and Ecuador.

Eventhough, it may still be a comfort to the restaurant.

6. Discussion:

There is high competition in Manhattan, so it would be considered very risky to setup there.

Since the information is gathered only through foursquare, it might be a unsupervised process.

Accuracies of models are subjected to change depending on opening/closures of other restaurants.

The model can be used for a start up which an average accuracy count. This model wont be treated as a totally trustable one.

Since there is a lot of competition going on the surrounding areas, this cannot assure income hikes.

Not only this, we should also consider the amount of rent, the traffic, the prices etc before setting up. This can complete the set up considerably.