

# Coursera Capstone Project The Battle of the Neighborhoods

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## Introduction

New York has more than 26.000 restaurants. There is a high demand but also a huge competition. In which kind of restaurant to invest can be a tough decision. In this analysis I will show as a case study for a specific part of New York, the Bronx, the best kind of restaurant to invest in the matter of location.

## Business Problem

Imagine you are a bank and you have to decide where to invest the money. You are responsible for restaurant businesses who seek for a loan from your bank. You have to decide how risky the investment is and if the concept of the customer is convincing. One big factor to decide if it is worth to invest in a restaurant is to look where the restaurant will be located. Is it a promising place? Will there be a lot of competition? Which kind of restaurant (chinese, american, spanish etc.) is already enough represented in the market? Where could be a niche for a new restaurant?

## Target Audience

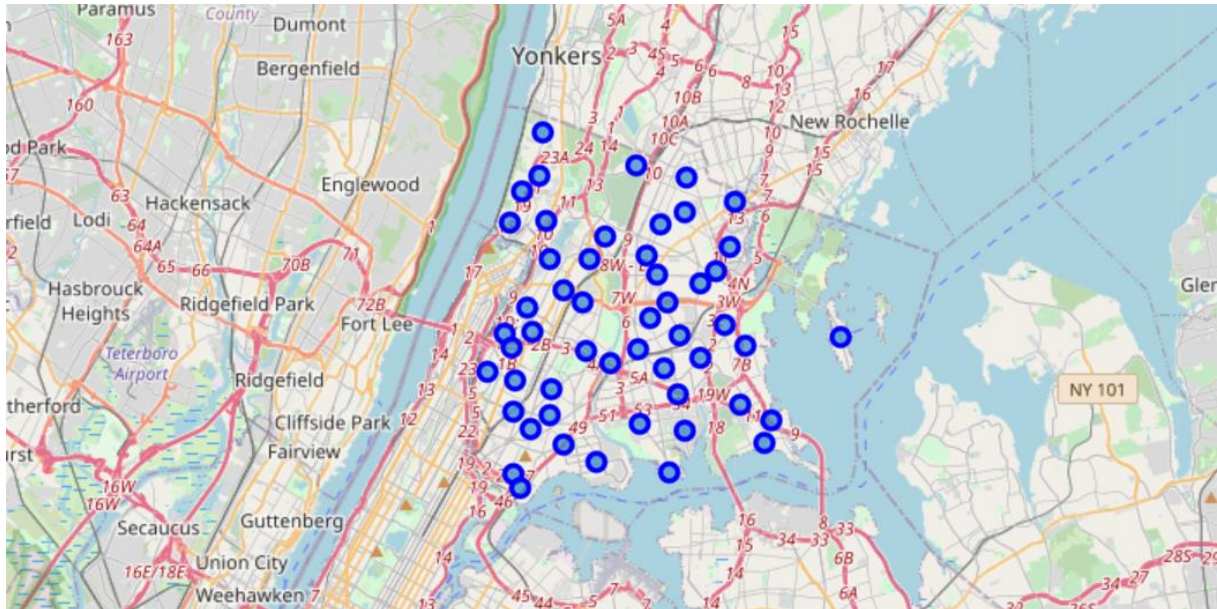
The audience of this report consists in investors and lenders who are specialized in the restaurant business. The analysis can help them to determine the factor location if they have to decide if a concept of a potential borrower is convincing or not.

# Data

- Data about the New York neighborhood will be the key to explore, segment and cluster the location regarding the best location for a restaurant. We will focus our analysis on the Bronx and its parts.
- To access the data I will use a json file "[https://cocl.us/new\\_york\\_dataset](https://cocl.us/new_york_dataset)" which contains all the existing neighborhoods of New York which gives us not only the names of the specific parts and sub parts of New York but also delivers necessary coordinates.
- After that I need to access the location information provider foursquare.com to explore the various types restaurant venues in the Bronx.
- I will use clustering techniques such as K-Clustering to segment the cluster of the neighborhoods and see the similarities and dissimilarities of the locations regarding the restaurant business.
- I will be able with all the techniques and data to give a profound recommendation about the factor of location when it comes to possible loans to restaurant founders in the Bronx and find out which kind of restaurants have the best chances due to less competition.

## Methodology

After accessing the New York Location data, I extracted only the data for the Bronx Neighborhood. I visualized the Bronx and its subparts:



In this way, we get an impression about the situation and where possible Restaurants could be founded.

In a next step I accessed all the venues which are in the Bronx from the platform foursquare.

(1216, 7)

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Wakefield	40.894705	-73.847201	Lollipops Gelato	40.894123	-73.845892	Dessert Shop
1	Wakefield	40.894705	-73.847201	Carvel Ice Cream	40.890487	-73.848568	Ice Cream Shop
2	Wakefield	40.894705	-73.847201	Walgreens	40.896528	-73.844700	Pharmacy
3	Wakefield	40.894705	-73.847201	Rite Aid	40.896649	-73.844846	Pharmacy
4	Wakefield	40.894705	-73.847201	Dunkin'	40.890459	-73.849089	Donut Shop

It was found out that in the Bronx, 1216 venues are existing. But since we don't need to know about all the different businesses, I extracted only the Restaurant businesses,ho are existing to this time:

(256, 6)

	index	Neighborhood	Venue	Venue Latitude	Venue Longitude	Category
0	16	Co-op City	Arby's	40.870411	-73.828606	Fast Food Restaurant
1	17	Co-op City	Townhouse Restaurant	40.876086	-73.828868	Restaurant
2	20	Co-op City	Guang Hui Chinese Restaurant	40.876651	-73.829092	Chinese Restaurant
3	24	Eastchester	Fish & Ting	40.885656	-73.829197	Caribbean Restaurant
4	28	Eastchester	Dyre Fish Market	40.889318	-73.831453	Seafood Restaurant
...	...	...	...	...	...	...
251	1202	Kingsbridge Heights	La Catrina	40.869960	-73.903956	Mexican Restaurant
252	1206	Kingsbridge Heights	New No. 1 Chinese Restaurnt	40.868266	-73.899965	Chinese Restaurant
253	1211	Kingsbridge Heights	New Yung Hong Chinese Restaurant	40.873272	-73.905128	Chinese Restaurant
254	1212	Kingsbridge Heights	Caridad Spanish Restaurant	40.871832	-73.906700	Spanish Restaurant
255	1213	Kingsbridge Heights	King's Farm	40.867376	-73.897498	Restaurant

We conclude that there are 256 Restaurants in the Bronx. But all these Restaurants are of different kind. When we have to decide in which Restaurant to invest, it is important to know against how man other competitors with a similar business model a newcomer has to compete. So we list the number of unique restaurant kinds:

There are 30 uniques categories.

We can list what kind of restaurant these are.

```
[29]: bronx_venues.Category.unique()
```

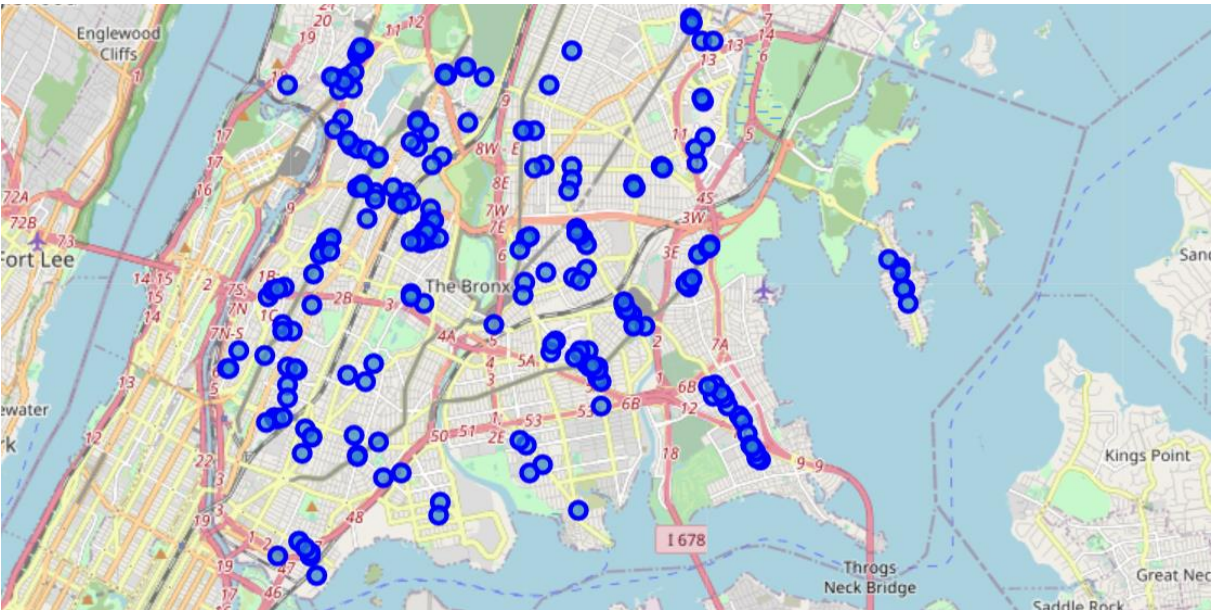
```
[29]: array(['Fast Food Restaurant', 'Restaurant', 'Chinese Restaurant',  
        'Caribbean Restaurant', 'Seafood Restaurant',  
        'Latin American Restaurant', 'Spanish Restaurant',  
        'Mexican Restaurant', 'Vegetarian / Vegan Restaurant',  
        'Italian Restaurant', 'Indian Restaurant', 'American Restaurant',  
        'Sushi Restaurant', 'French Restaurant', 'African Restaurant',  
        'Greek Restaurant', 'Paella Restaurant', 'Asian Restaurant',  
        'Peruvian Restaurant', 'South American Restaurant',  
        'South Indian Restaurant', 'Southern / Soul Food Restaurant',  
        'Middle Eastern Restaurant', 'Arepa Restaurant',  
        'Eastern European Restaurant', 'Japanese Restaurant',  
        'Mediterranean Restaurant', 'Thai Restaurant',  
        'Comfort Food Restaurant', 'Vietnamese Restaurant'], dtype=object)
```

There are 30 different kinds of Restaurants in the Bronx. Now we want to see how man of each of them is present:

Chinese Restaurant	41
Italian Restaurant	40
Fast Food Restaurant	28
Spanish Restaurant	28
Mexican Restaurant	25
Latin American Restaurant	20
Caribbean Restaurant	14
American Restaurant	13
Asian Restaurant	7
Restaurant	7
Seafood Restaurant	6
Indian Restaurant	3
Peruvian Restaurant	2
African Restaurant	2
Eastern European Restaurant	2
Sushi Restaurant	2
Japanese Restaurant	2
Thai Restaurant	2
Southern / Soul Food Restaurant	1
Vietnamese Restaurant	1
South Indian Restaurant	1

We see that Chinese and Italian Restaurants are highly popular. If we would additionally make a demand analysis, then we could maybe find out if there is still space for a new competitor or we could find out if a special Restaurant is too less represented considering the potential demand. But here we focus purely on the location and the numbers of competitors.

At next we want to visualize where the Restaurants in the Bronx are concentrated and we see of course that specific streets very well served which has to do with certain infrastructure conditions and accessibility by the people.

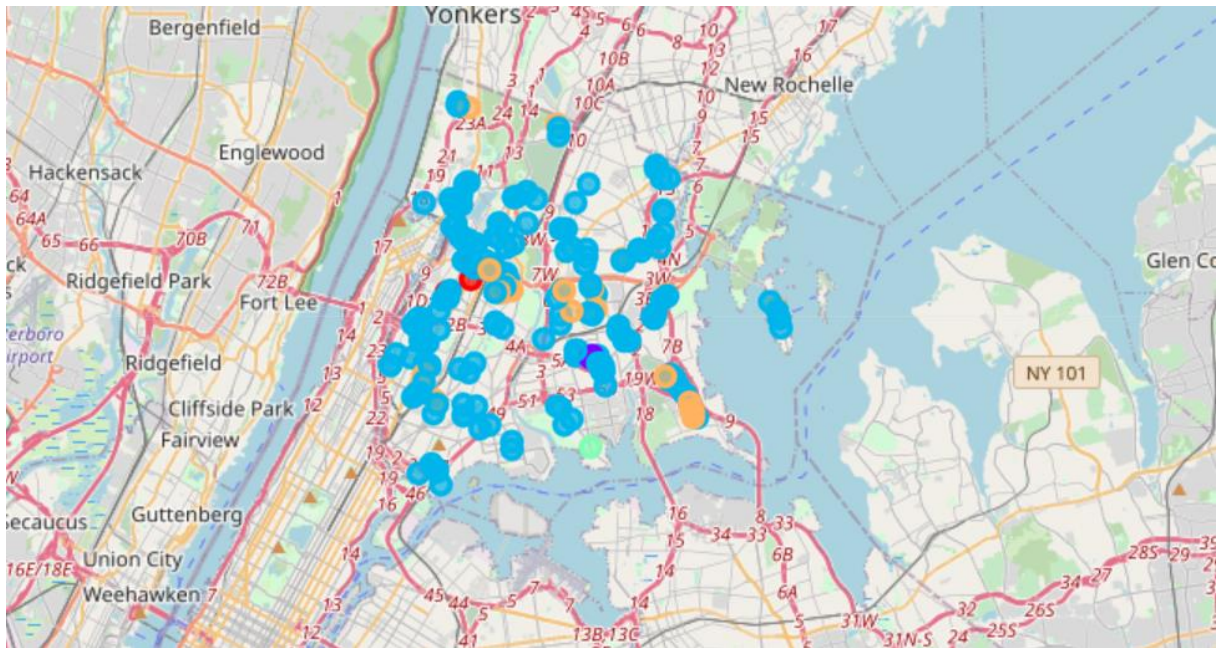


Which Restaurants are in which sub parts of the Bronx the most popular ones:

	Category	1st Most Common Neighborhood	2nd Most Common Neighborhood	3rd Most Common Neighborhood	4th Most Common Neighborhood	5th Most Common Neighborhood	6th Most Common Neighborhood	7th Most Common Neighborhood
0	African Restaurant	University Heights	Fordham	Woodlawn	Concourse Village	Longwood	Kingsbridge Heights	Kingsbridge
1	American Restaurant	Schuylerville	Parkchester	Woodlawn	Belmont	City Island	Edgewater Park	Fordham
2	Arepa Restaurant	Morris Park	East Tremont	Melrose	Longwood	Kingsbridge Heights	Kingsbridge	Hunts Point
3	Asian Restaurant	Pelham Bay	Westchester Square	High Bridge	Throgs Neck	Edgewater Park	Schuylerville	Parkchester
4	Caribbean Restaurant	Eastchester	Williamsbridge	Olinville	Kingsbridge	Unionport	Fordham	Claremont Village

And finally, we made a colour cluster to identify easily which kind of restaurants are represented in which area. In that way we can see where a possible restaurant would have the most competition and we have another factor we can consider when we decide which new restaurant is worth and less risky to invest in:





## Results

256 Restaurants of 30 different kinds could be found. Clustering showed a high concentration of Italian and Chinese restaurants around the main streets.

## Discussion

The extraction of the Restaurant data for the Bronx could give us a clear inside in how many restaurants are present in the Bronx, which kind of Restaurants are there and how many of them are around. With a cluster of these different restaurants we could see where there is a possible niche. Together with a demand analysis, this location survey could give us very valuable information about the question where to invest in a new restaurant in the Bronx and which of the possible customers of our bank can be served with less risk.

## Conclusion

I would especially recommend to focus on niche restaurants which don't have a high concentration in main areas of the Bronx.