

# Battle of Neighborhoods

## Capstone Project / IBM Data Science

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### Introduction

This capstone project explores the best locations for pizzerias throughout the city of New York. With an estimated 2018 population of 8,398,748 distributed over about 302.6 square miles (784 km<sup>2</sup>), New York is also the most densely populated major city in the United States. And the city's population is constantly growing. Therefore the need to find and enjoy perfect pizza is on the rise. This report explores which neighborhoods and boroughs of New York City have the most as well as the best pizzerias. Additionally, I will attempt to answer the questions:

- "Where should I open a new pizzeria?"
- "Where should I stay if I want great pizza?"

These questions were put to me by my boss, who loves pizza, but is very demanding of it, so he wants to open a new nice pizzeria in New York. I promised to help him in these matters.

### Data

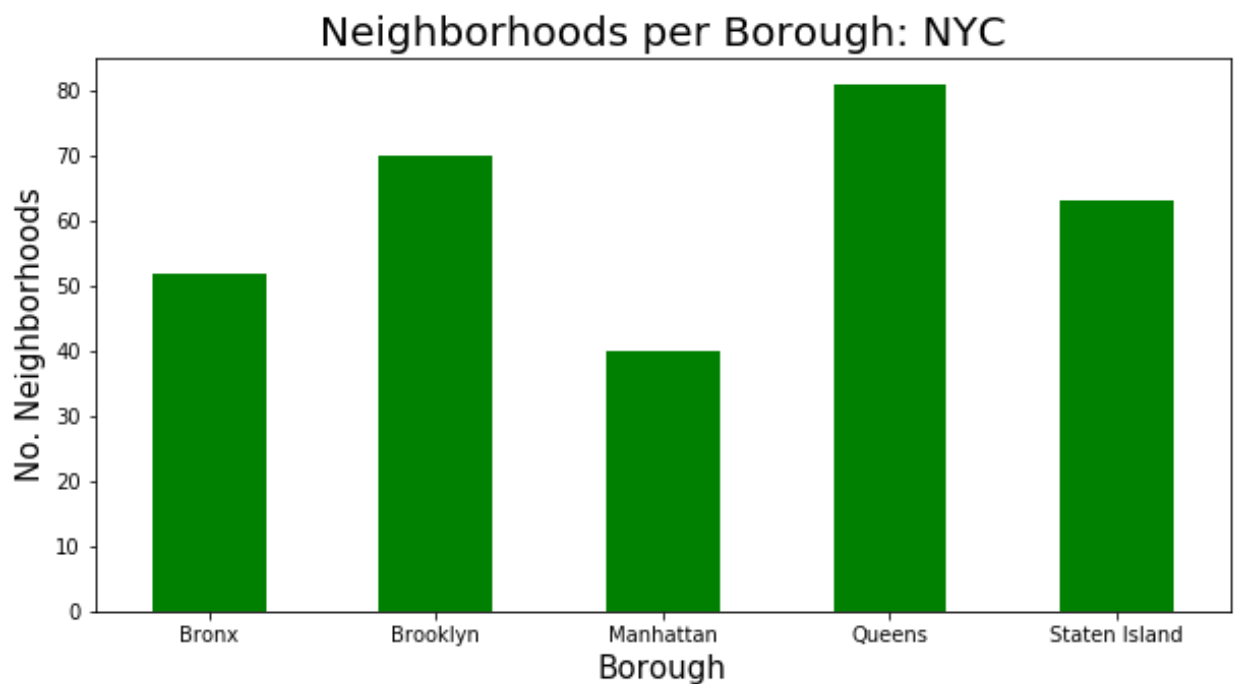
- In order to answer the above questions, data on New York City neighborhoods, boroughs to include boundaries, latitude, longitude, pizzeria, and pizzeri ratings and tips are required.
- New York City data containing the neighborhoods and boroughs, latitudes, and longitudes will be obtained from the data source: [https://cocl.us/new\\_york\\_dataset](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>
- All data related to locations and quality of pizzerias will be obtained via the FourSquare API utilized via the Request library in Python.

### Methodology

- Data will be collected from ([https://cocl.us/new\\_york\\_dataset](https://cocl.us/new_york_dataset)) and cleaned and processed into a dataframe.
- FourSquare be used to locate all venues and then filtered by Pizzerias. Ratings, tips, and likes by users will be counted and added to the dataframe.
- Data will be sorted based on rankings
- Finally, the data be will be visually assessed using graphing from various Python libraries.

### Results

We can see below that Manhattan has the least number of neighborhoods in all five boroughs.



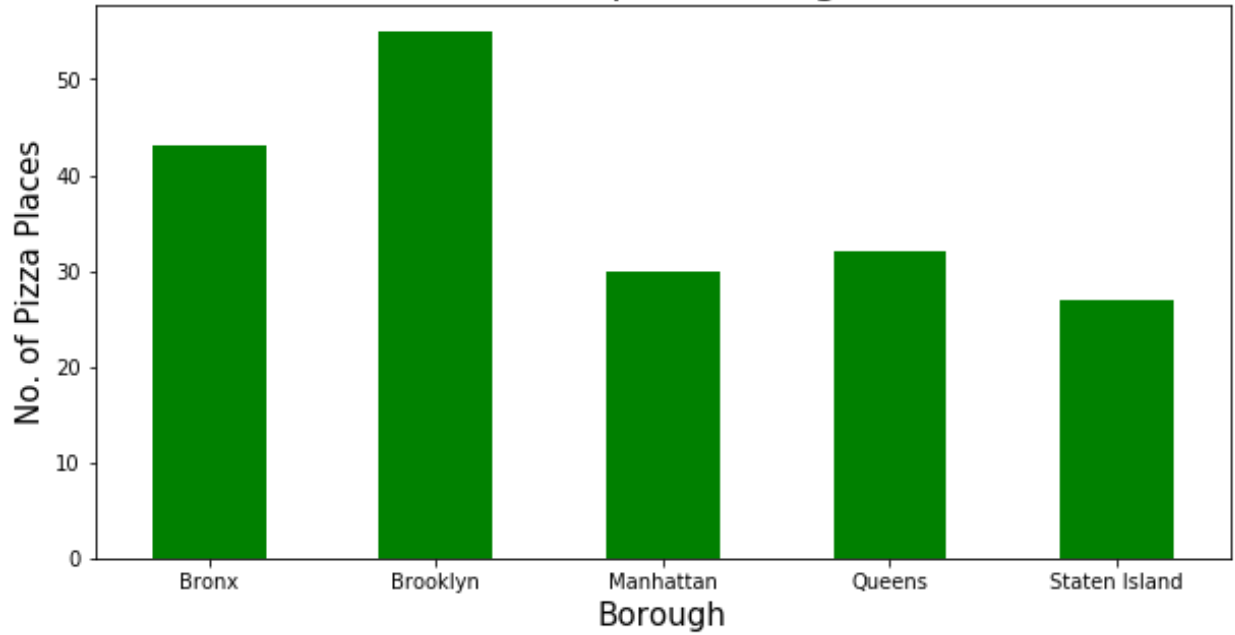
Analyzing further and see how many pizzerias there are in each neighborhood and burough and graph the results.

	Borough	Neighborhood	ID	Name
0	Bronx	Co-op City	4d2cfa5cad25224bbbc5fb8f	Capri II Pizza
1	Bronx	Kingsbridge	502bd9a6e4b0bea49203e0aa	Little Caesars Pizza
2	Bronx	Kingsbridge	4b4fbdb5f964a520811327e3	Domino's Pizza
3	Bronx	Kingsbridge	4f21c904e4b0831873dc6256	Tony & Cyndi's Pizzeria & Restaurants
4	Manhattan	Marble Hill	4b4429abf964a52037f225e3	Arturo's

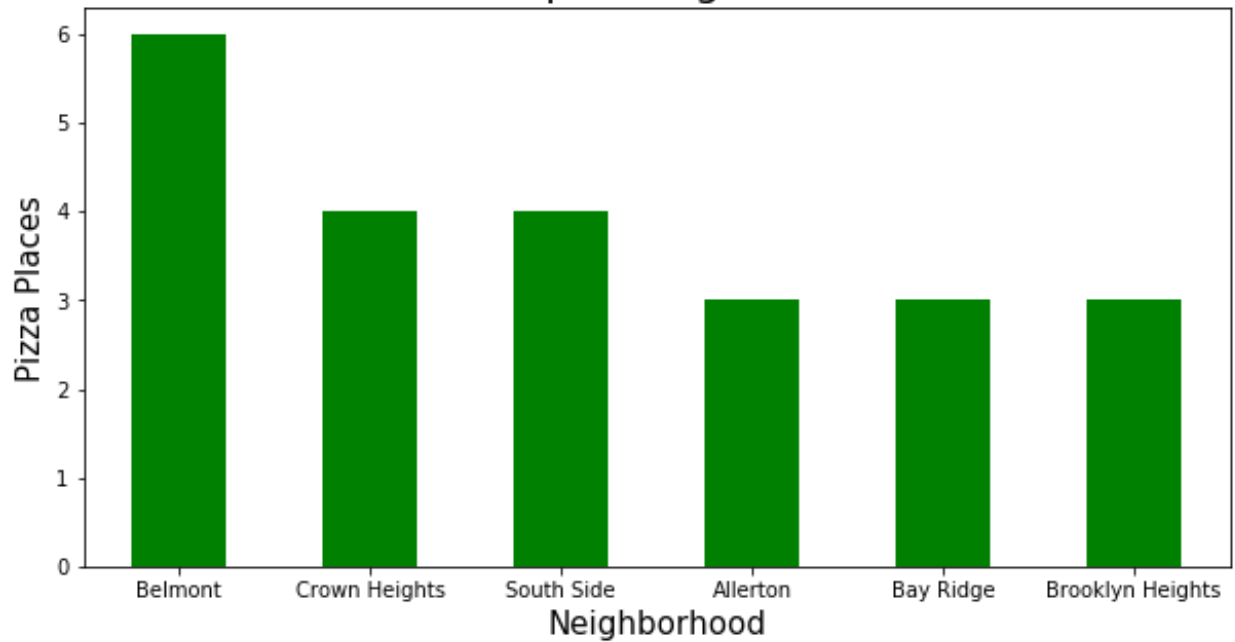
Unnamed: 0	Borough	Neighborhood	ID	Name
182	182	Bronx Kingsbridge Heights	4c4f92763a6f2d7f79351076	emilio's Pizza
183	183	Bronx Kingsbridge Heights	52f5553d11d2e2288f60a8f1	Little Caesars Pizza
184	184	Bronx Kingsbridge Heights	4d9fc532e8a6721ec2c429a5	Little Ceasars
185	185	Brooklyn Erasmus	4d41f0bfaed776ebb2a56997	Domino's Pizza
186	186	Brooklyn Erasmus	4cc4d4cb38aaa093f5801562	Little Ceasars

As we continue our analysis, we see below that Brooklyn have the highest number if pizzerias. Additionally, we see how many pizzerias the top 6 neighborhoods have. The neighborhood of Belmont has the highest number of pizzerias in all of NYC and is actually located in the burough of Bronx vice Manhattan.

### Pizza Places per Borough: NYC



### Pizza Places per Neighborhood: NYC

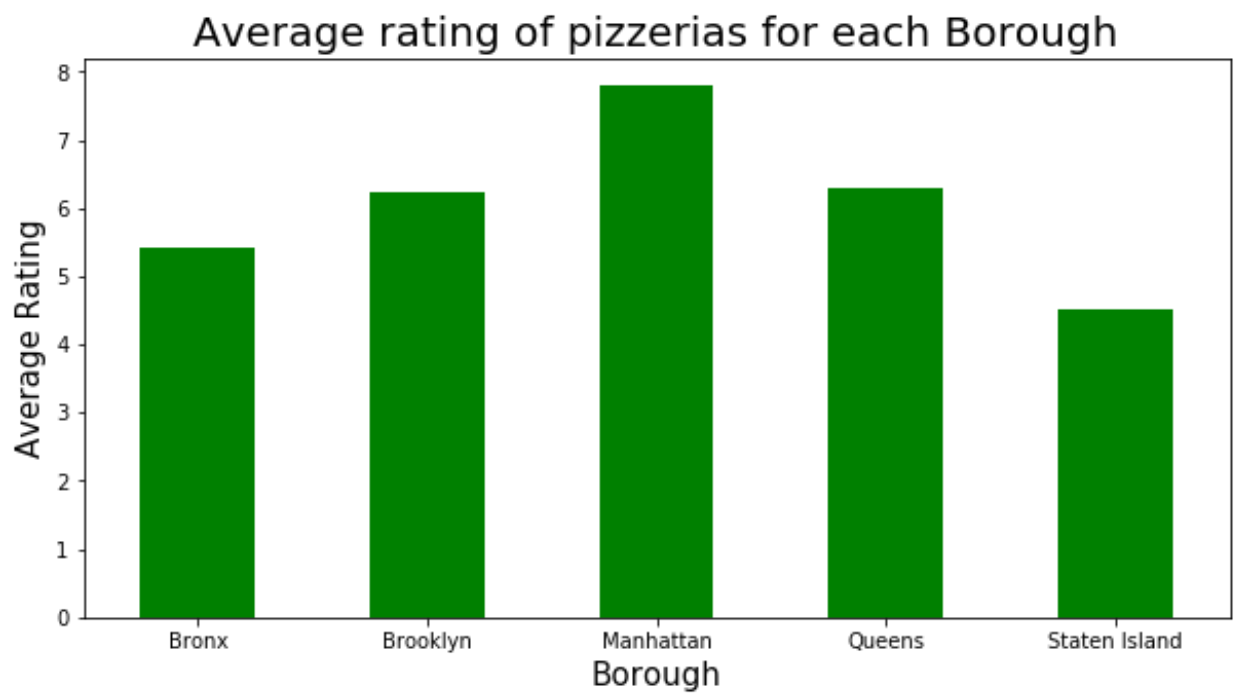


	Borough	Neighborhood	ID	Name
25	Bronx	Belmont	4aee1220f964a520ced121e3	Full Moon Pizzeria
26	Bronx	Belmont	4aabd3e6f964a5204a5a20e3	Zero Otto Nove
27	Bronx	Belmont	4b140a90f964a520489c23e3	Bellini's Pizza
28	Bronx	Belmont	4b97fc62f964a5202a2435e3	Tony & Tina's Pizza
29	Bronx	Belmont	4b180daaf964a52024cc23e3	University Pizza & Restaurant
30	Bronx	Belmont	4c2b699457a9c9b625d4f567	Ivana's Pizzeria

	Unnamed: 0	Likes	Rating	Tips
<b>count</b>	187.000000	187.000000	187.000000	187.000000
<b>mean</b>	93.000000	61.320856	6.054545	20.262032
<b>std</b>	54.126395	193.166216	2.992323	58.020490
<b>min</b>	0.000000	0.000000	0.000000	0.000000
<b>25%</b>	46.500000	2.000000	6.100000	2.000000
<b>50%</b>	93.000000	9.000000	7.100000	5.000000
<b>75%</b>	139.500000	27.500000	8.000000	13.500000
<b>max</b>	186.000000	1262.000000	9.300000	596.000000

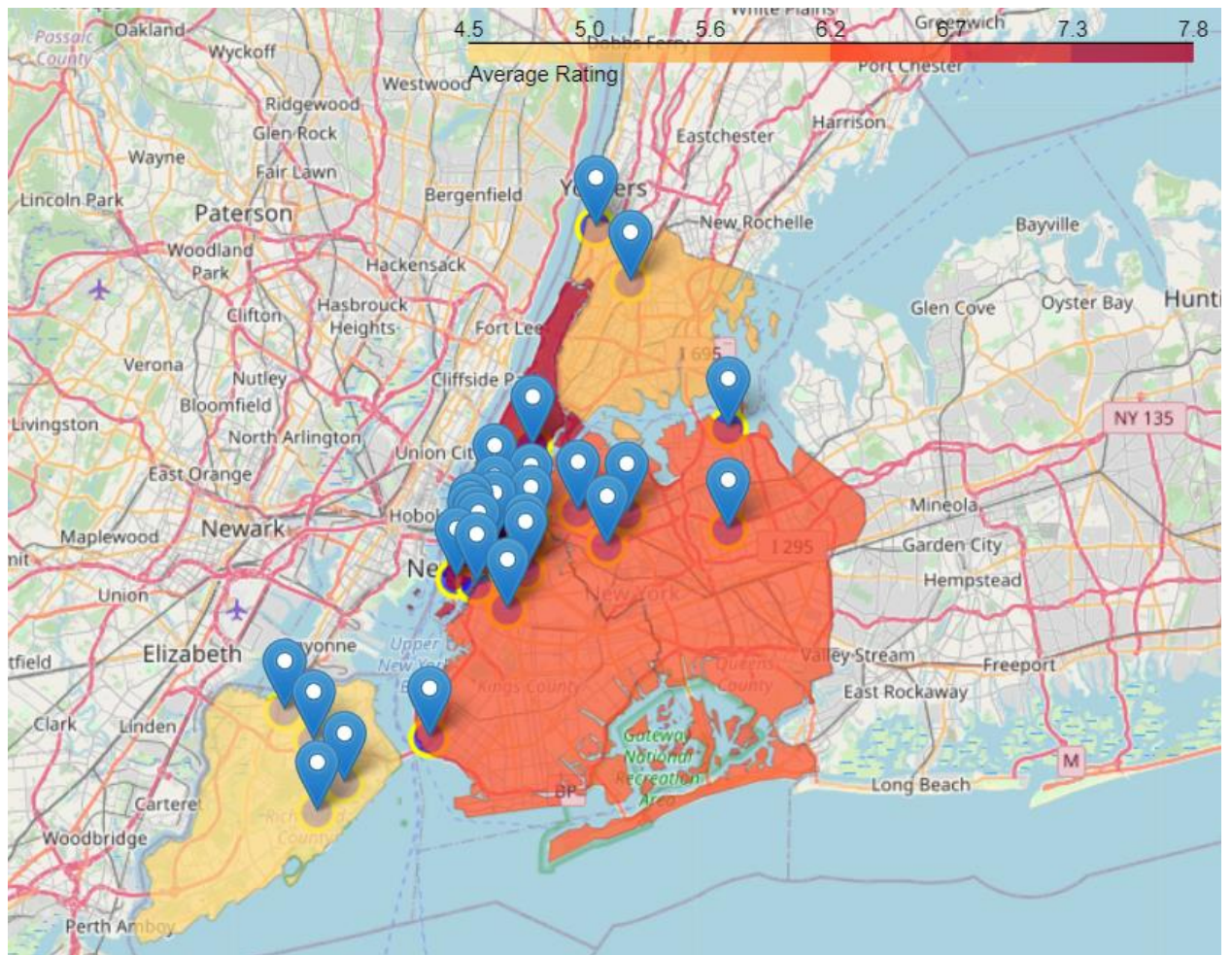
	Neighborhood	Average Rating
<b>35</b>	Elmhurst	9.3
<b>94</b>	Soho	9.1
<b>13</b>	Carnegie Hill	9.1
<b>76</b>	North Side	8.9
<b>34</b>	Elm Park	8.9
<b>50</b>	Greenwich Village	8.8
<b>18</b>	Chinatown	8.8
<b>39</b>	Financial District	8.7
<b>41</b>	Fort Greene	8.6
<b>96</b>	South Side	8.6

	Borough	Average Rating
<b>2</b>	Manhattan	7.803333
<b>3</b>	Queens	6.281250
<b>1</b>	Brooklyn	6.223636
<b>0</b>	Bronx	5.411628
<b>4</b>	Staten Island	4.522222



	Neighborhood	Average Rating
13	Carnegie Hill	9.1
35	Elmhurst	9.3
94	Soho	9.1

	Borough	Neighborhood	Latitude	Longitude	Average Rating
0	Manhattan	Carnegie Hill	40.782683	-73.953256	9.1
1	Queens	Elmhurst	40.744049	-73.881656	9.3
2	Manhattan	Soho	40.722184	-74.000657	9.1



	Unnamed: 0	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
103	103	Manhattan	Little Italy	55ea9f4d498ed46db0383483	Champion Pizza	1262.0	9.1	149.0
105	105	Manhattan	Soho	55ea9f4d498ed46db0383483	Champion Pizza	1262.0	9.1	149.0
173	173	Brooklyn	Fulton Ferry	50ca6337e4b04e1f3135689c	Juliana's Pizza	1010.0	8.9	314.0
174	174	Brooklyn	Fulton Ferry	3fd66200f964a520e9e81ee3	Grimaldi's Pizzeria	1132.0	7.6	596.0

## Results / Conclusion

Manhattan and Queens have the best rated pizzerias on average. Queens and The Bronx have the least amount of pizzerias per borough. However, of note, Belmont of The Bronx is the neighborhood in all of NYC with the most pizzerias. Despite Manhattan having the least number of neighborhoods in all five boroughs, it has the most pizzerias.

Based on this information, I would state that Manhattan and Queens are the best locations for pizzeria in NYC. To have the best shot of success, I would open a pizzeria in Queens. Queens has multiple neighborhoods with average ratings exceeding 8.0 of a scale of 1.0 to 10.0 and has the least number of pizzerias making competition easier than in other boroughs. Finally, I would go to Champion Pizza in Manhattan for the best pizza based on 1262 likes.

As a final note, all of the above analysis is depended on the adequacy and accuracy of Four Square data. A more comprehensive analysis and future work would need to incorporate data from other external databases.