

# The Battle of Neighborhoods

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WHERE TO OPEN AN ICE CREAM SHOP IN NEW YORK CITY?

# Introduction

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- New York City has a big offer in terms of food establishments
- Is very competitive
- NYC has 5 boroughs and 306 neighborhoods
- Which is the best neighborhood to open an ice cream shop?
  - Cannot have already a place of the same kind
  - Needs to be near a recreation place with a high flux of people (e.g park, playground)

# Data

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- Get the latitude and longitude coordinates of each of the 306 neighborhoods the 5 boroughs of New York City from [https://geo.nyu.edu/catalog/nyu\\_2451\\_34572](https://geo.nyu.edu/catalog/nyu_2451_34572).
- Use the Foursquare API to find venues for each neighborhood using the coordinates from the link above.

	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

# Methodology

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- 100 venues within a radius of 500 meters per each neighborhood
- Venues categories of interest: "Ice Cream Shop", "Park" and "Playground". Others are excluded.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Wakefield	40.894705	-73.847201	Carvel Ice Cream	40.890487	-73.848568	Ice Cream Shop
1	Co-op City	40.874294	-73.829939	Baskin-Robbins	40.870045	-73.829578	Ice Cream Shop
2	Co-op City	40.874294	-73.829939	The Park	40.877645	-73.830836	Park
3	Riverdale	40.890834	-73.912585	Bell Tower Park	40.889178	-73.908331	Park
4	Riverdale	40.890834	-73.912585	Seton Park	40.887914	-73.916113	Park
5	Riverdale	40.890834	-73.912585	Spuyten Duyvil Playground	40.887227	-73.916058	Playground
6	Kingsbridge	40.881687	-73.902818	Carvel Ice Cream	40.883657	-73.901655	Ice Cream Shop
7	Marble Hill	40.876551	-73.910660	Baskin-Robbins	40.877149	-73.906658	Ice Cream Shop
8	Woodlawn	40.898273	-73.867315	Muskrat Cove	40.896615	-73.862446	Park
9	Woodlawn	40.898273	-73.867315	Woodlawn Playground	40.899877	-73.872243	Playground

# Methodology

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- The venues categories were one hot encoded and were grouped by neighborhood.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Ice Cream Shop	Park	Playground
0	Annadale	40.538114	-74.178549	0.0	1.0	0.0
1	Arverne	40.589144	-73.791992	0.0	0.0	1.0
2	Astoria	40.768509	-73.915654	1.0	0.0	0.0
3	Astoria Heights	40.770317	-73.894680	0.0	0.0	1.0
4	Bath Beach	40.599519	-73.998752	0.5	0.5	0.0

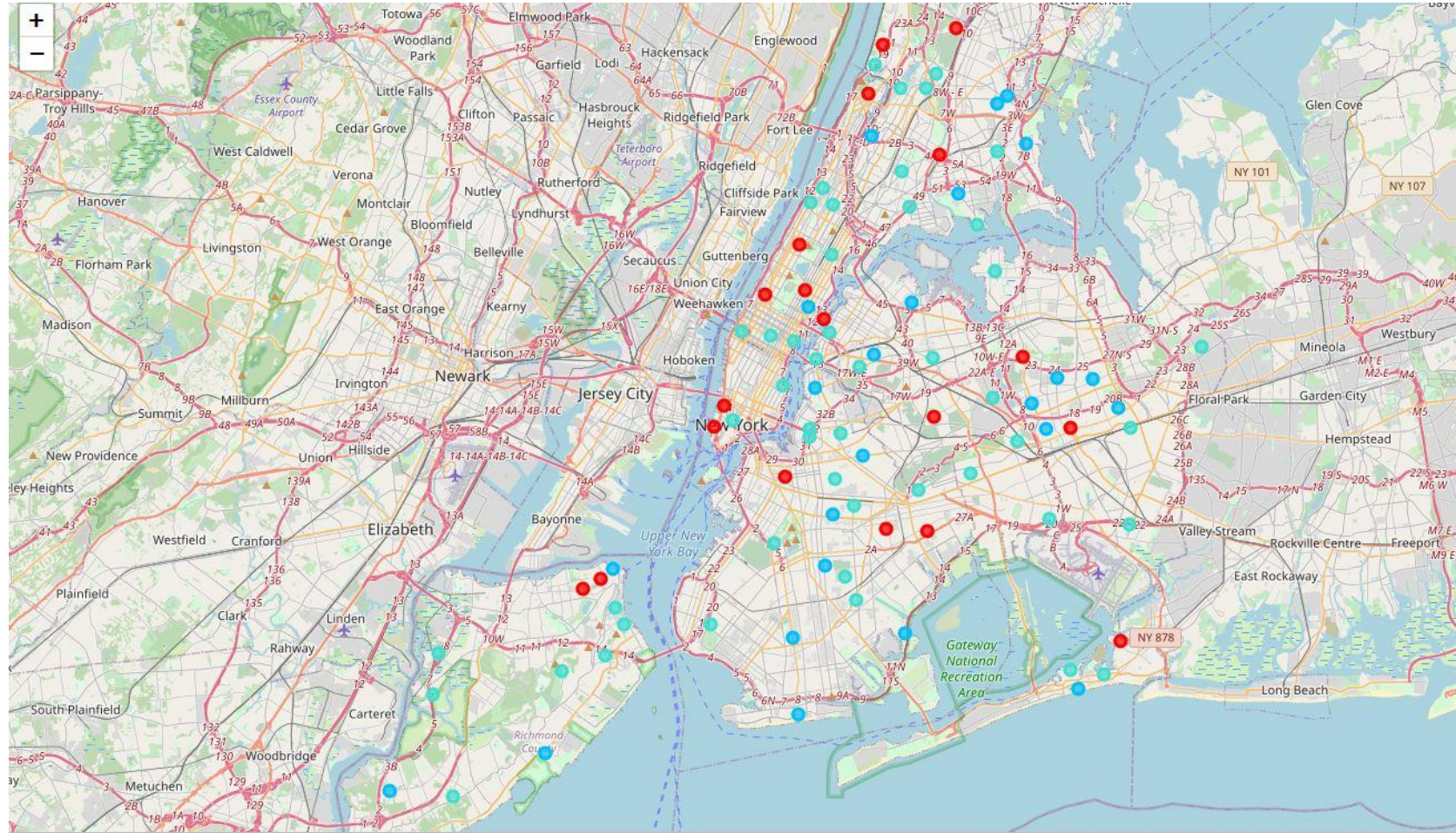
- Exclude neighborhoods that already have an ice cream shop.
- Final data: neighborhoods without an Ice Cream Shop but that have a park or a playground, or both.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Park	Playground
0	Annadale	40.538114	-74.178549	1.00	0.00
1	Arverne	40.589144	-73.791992	0.00	1.00
2	Astoria Heights	40.770317	-73.894680	0.00	1.00
3	Battery Park City	40.711932	-74.016869	0.75	0.25
4	Baychester	40.866858	-73.835798	0.00	1.00



# Methodology

- k-means algorithm to cluster the neighborhoods in 3 clusters.
- neighborhoods with park
- neighborhoods with playgrounds
- neighborhoods with park and playground
- Plot clusters in the city map.



# Results

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- **Cluster 0** (turquoise): neighborhoods with **parks** (5 first)

	Neighborhood	Cluster Labels	Park	Playground
0	Annadale	0	1.0	0.0
1	Bedford Park	0	1.0	0.0
2	Bedford Stuyvesant	0	1.0	0.0
3	Bloomfield	0	1.0	0.0
4	Central Harlem	0	1.0	0.0

- **Cluster 1** (blue): neighborhoods with **playgrounds** (5 first)

	Neighborhood	Cluster Labels	Park	Playground
0	Arverne	1	0.0	1.0
1	Astoria Heights	1	0.0	1.0
2	Baychester	1	0.0	1.0
3	Bergen Beach	1	0.0	1.0
4	Briarwood	1	0.0	1.0

# Results

- Cluster 2 (red): neighborhoods with parks and playgrounds

	Neighborhood	Cluster Labels	Park	Playground
0	Battery Park City	2	0.750000	0.250000
1	Bayswater	2	0.500000	0.500000
2	Brownsville	2	0.666667	0.333333
3	Fort Greene	2	0.333333	0.666667
4	Inwood	2	0.666667	0.333333
5	Jamaica Hills	2	0.500000	0.500000
6	Lincoln Square	2	0.500000	0.500000
7	Manhattan Valley	2	0.500000	0.500000
8	Middle Village	2	0.500000	0.500000
9	New Brighton	2	0.666667	0.333333
10	New Lots	2	0.500000	0.500000
11	Queensboro Hill	2	0.500000	0.500000
12	Randall Manor	2	0.500000	0.500000
13	Riverdale	2	0.666667	0.333333
14	Roosevelt Island	2	0.666667	0.333333
15	Tribeca	2	0.714286	0.285714
16	Upper East Side	2	0.500000	0.500000
17	West Farms	2	0.500000	0.500000
18	Woodlawn	2	0.333333	0.666667



# Discussion

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- Neighborhoods were clustered in 3 clusters, as expected.
- More interesting neighborhoods are those which have both parks and playgrounds (red in the map).
- Manhattan seems to be the borough with more neighborhoods with the selected characteristics.

# Conclusion

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- There are **19 neighborhoods** in New York City where **an ice cream shop** can be **open**.
- Further studies:
  - excluding neighborhoods with desserts shops already
  - selecting the neighborhoods considering the number of recreation places.