



# BATTLE OF NEIGHBORHOODS



# Agenda

- Introduction
- Business Problem
- Data
- Methodology
- Results
- Discussion
- Conclusion

# Introduction

- New York is one of the largest and well-known cities in US and across the world. It has become top choices for local and foreign communities for housing, job employment, education, shopping and tourism.

## Business Problem

- The objective of this project is to study and analyze Queens and Brooklyn neighborhoods of separately and group them into similar clusters and, to analyze those clusters to gather meaningful information. That information can be used to find out similarities and dissimilarities between two boroughs Queens and Brooklyn. Therefore, people can make better decision between the two boroughs.

# Data

- Download the New York City data from server:  
[https://cocl.us/new\\_york\\_dataset](https://cocl.us/new_york_dataset).
- Transfer the data into pandas frame.
- Use Geopy to get the latitude and the longitude coordinates of all the neighborhoods of New York.
- Map the neighborhoods using Folium.
- Use Foursquare API to get some information about venues around the neighborhoods.
- At last, focusing on to find similarities and dissimilarities between two boroughs use machine learning technique, “Clustering” to segment the neighborhoods.

# Methodology

- Create panda dataframe



Queens

|   | Borough | Neighborhood    | Latitude  | Longitude  |
|---|---------|-----------------|-----------|------------|
| 0 | Queens  | Astoria         | 40.768509 | -73.915654 |
| 1 | Queens  | Woodside        | 40.746349 | -73.901842 |
| 2 | Queens  | Jackson Heights | 40.751981 | -73.882821 |
| 3 | Queens  | Elmhurst        | 40.744049 | -73.881656 |
| 4 | Queens  | Howard Beach    | 40.654225 | -73.838138 |



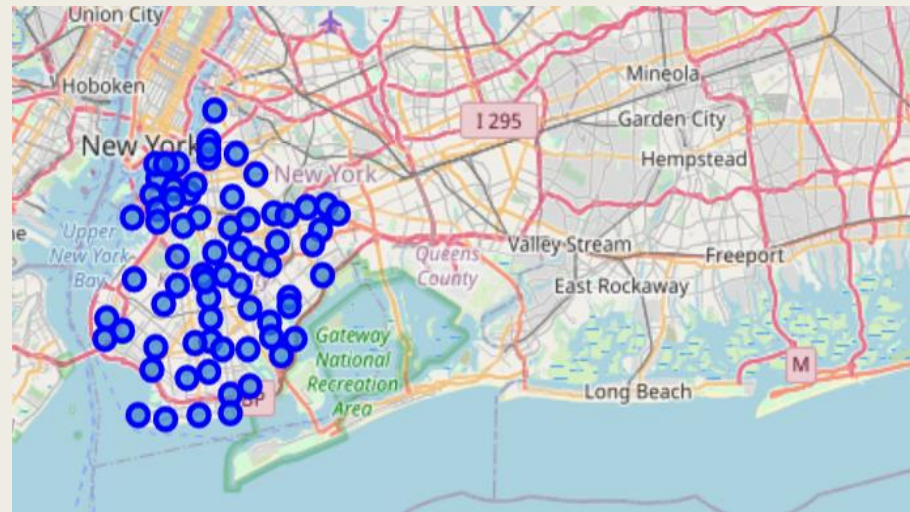
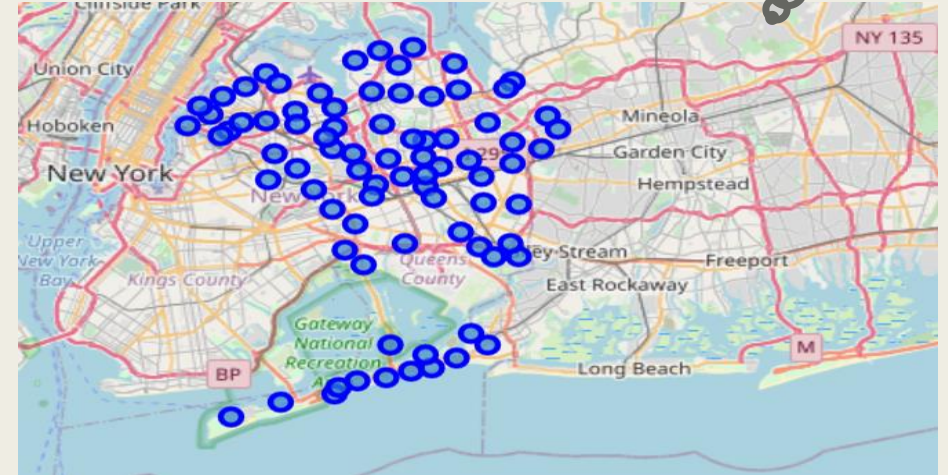
Brooklyn

|   | Borough  | Neighborhood | Latitude  | Longitude  |
|---|----------|--------------|-----------|------------|
| 0 | Brooklyn | Bay Ridge    | 40.625801 | -74.030621 |
| 1 | Brooklyn | Bensonhurst  | 40.611009 | -73.995180 |
| 2 | Brooklyn | Sunset Park  | 40.645103 | -74.010316 |
| 3 | Brooklyn | Greenpoint   | 40.730201 | -73.954241 |
| 4 | Brooklyn | Gravesend    | 40.595260 | -73.973471 |

# Methodology

- Generate a map and visualize geographic details of New York and its two boroughs.

Queens



Brooklyn

# Methodology

- Utilize FourSquare API to explore the neighborhoods of Queens and Brooklyn.

|   | Neighborhood | Neighborhood Latitude | Neighborhood Longitude | Venue            | Venue Latitude | Venue Longitude | Venue Category       |
|---|--------------|-----------------------|------------------------|------------------|----------------|-----------------|----------------------|
| 0 | Astoria      | 40.768509             | -73.915654             | Favela Grill     | 40.767348      | -73.917897      | Brazilian Restaurant |
| 1 | Astoria      | 40.768509             | -73.915654             | Orange Blossom   | 40.769856      | -73.917012      | Gourmet Shop         |
| 2 | Astoria      | 40.768509             | -73.915654             | Titan Foods Inc. | 40.769198      | -73.919253      | Gourmet Shop         |
| 3 | Astoria      | 40.768509             | -73.915654             | CrossFit Queens  | 40.769404      | -73.918977      | Gym                  |
| 4 | Astoria      | 40.768509             | -73.915654             | Off The Hook     | 40.767200      | -73.918104      | Seafood Restaurant   |

Queens

|   | Neighborhood | Neighborhood Latitude | Neighborhood Longitude | Venue                       | Venue Latitude | Venue Longitude | Venue Category |
|---|--------------|-----------------------|------------------------|-----------------------------|----------------|-----------------|----------------|
| 0 | Bay Ridge    | 40.625801             | -74.030621             | Pilo Arts Day Spa and Salon | 40.624748      | -74.030591      | Spa            |
| 1 | Bay Ridge    | 40.625801             | -74.030621             | Bagel Boy                   | 40.627896      | -74.029335      | Bagel Shop     |
| 2 | Bay Ridge    | 40.625801             | -74.030621             | Leo's Casa Calamari         | 40.624200      | -74.030931      | Pizza Place    |
| 3 | Bay Ridge    | 40.625801             | -74.030621             | Pegasus Cafe                | 40.623168      | -74.031186      | Breakfast Spot |
| 4 | Bay Ridge    | 40.625801             | -74.030621             | The Bookmark Shoppe         | 40.624577      | -74.030562      | Bookstore      |

Brooklyn



# Methodology

- Use One Hot Encoding, use the neighborhood to group data, and find out the top ten venues present in each neighborhood in Queens.

|   | 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 | 9th Most Common Venue | 10th Most Common Venue |
|---|-----------------|-----------------------|---------------------------|-----------------------|-----------------------|------------------------|-----------------------|--------------------------|-----------------------|-----------------------|------------------------|
| 0 | Arverne         | Surf Spot             | Sandwich Place            | Metro Station         | Thai Restaurant       | Bus Stop               | Beach                 | Coffee Shop              | Donut Shop            | Board Shop            | Playground             |
| 1 | Astoria         | Bar                   | Middle Eastern Restaurant | Hookah Bar            | Greek Restaurant      | Deli / Bodega          | Indian Restaurant     | Mediterranean Restaurant | Seafood Restaurant    | Bakery                | Food Truck             |
| 2 | Astoria Heights | Playground            | Italian Restaurant        | Plaza                 | Bus Station           | Bowling Alley          | Supermarket           | Liquor Store             | Burger Joint          | Bakery                | Food                   |
| 3 | Auburndale      | Miscellaneous Shop    | Discount Store            | Supermarket           | Korean Restaurant     | Furniture / Home Store | Fast Food Restaurant  | Gymnastics Gym           | Toy / Game Store      | Athletics & Sports    | Train                  |
| 4 | Bay Terrace     | Clothing Store        | Women's Store             | Kids Store            | Lingerie Store        | Mobile Phone Shop      | Shoe Store            | American Restaurant      | Donut Shop            | Cosmetics Shop        | Coffee Shop            |



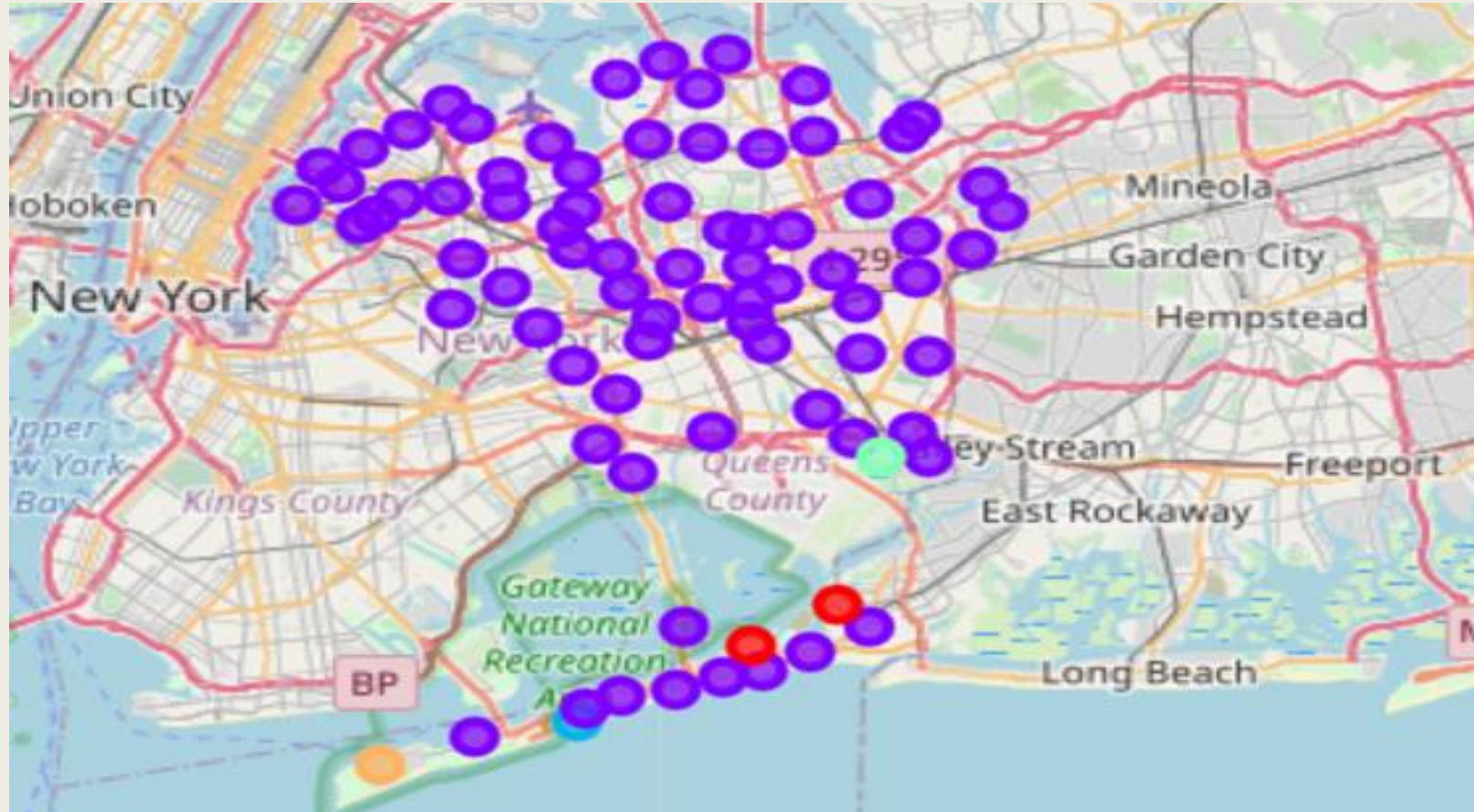
# Methodology

- Use One Hot Encoding, use the neighborhood to group data, and find out the top ten venues present in each neighborhood in Brooklyn.

|   | 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 | 9th Most Common Venue  | 10th Most Common Venue   |
|---|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------------|-----------------------|------------------------|--------------------------|
| 0 | Bath Beach         | Chinese Restaurant    | Pharmacy              | Gas Station           | Bubble Tea Shop       | Fast Food Restaurant  | Italian Restaurant    | Sushi Restaurant        | Check Cashing Service | Surf Spot              | Bike Rental / Bike Share |
| 1 | Bay Ridge          | Spa                   | Italian Restaurant    | Pizza Place           | Grocery Store         | American Restaurant   | Greek Restaurant      | Chinese Restaurant      | Bar                   | Ice Cream Shop         | Bagel Shop               |
| 2 | Bedford Stuyvesant | Deli / Bodega         | Coffee Shop           | Bar                   | Café                  | Pizza Place           | Tiki Bar              | New American Restaurant | Gift Shop             | Gourmet Shop           | Juice Bar                |
| 3 | Bensonhurst        | Chinese Restaurant    | Ice Cream Shop        | Italian Restaurant    | Donut Shop            | Sushi Restaurant      | Pizza Place           | Bridal Shop             | Coffee Shop           | Shabu-Shabu Restaurant | Flower Shop              |
| 4 | Bergen Beach       | Harbor / Marina       | Athletics & Sports    | Other Repair Shop     | Playground            | Donut Shop            | Baseball Field        | Women's Store           | Factory               | Falafel Restaurant     | Farm                     |

# Results

- Use the matplotlib and folium packages to visualize the clusters on a map of Queens.



# Results

- 5 clusters in Queens.

|    | 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 | 9th Most Common Venue | 10th Most Common Venue |
|----|--------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| 63 | Somerville   | Park                  | Women's Store         | Fast Food Restaurant  | Empanada Restaurant   | Event Space           | Falafel Restaurant    | Farm                  | Farmers Market        | Filipino Restaurant   | Egyptian Restaurant    |
| 79 | Bayswater    | Park                  | Playground            | Women's Store         | Fast Food Restaurant  | Empanada Restaurant   | Event Space           | Falafel Restaurant    | Farm                  | Farmers Market        | Filipino 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    | 8th Most Common Venue | 9th Most Common Venue | 10th Common Venue |
|---|-----------------|---------------------------|---------------------------|---------------------------|---------------------------|-----------------------|-----------------------|--------------------------|-----------------------|-----------------------|-------------------|
| 0 | Astoria         | Bar                       | Middle Eastern Restaurant | Hookah Bar                | Greek Restaurant          | Deli / Bodega         | Indian Restaurant     | Mediterranean Restaurant | Seafood Restaurant    | Bakery                | Food              |
| 1 | Woodside        | Thai Restaurant           | Grocery Store             | Filipino Restaurant       | Latin American Restaurant | Bakery                | American Restaurant   | Pub                      | Donut Shop            | Bar                   | Ice Cr Shop       |
| 2 | Jackson Heights | Latin American Restaurant | Peruvian Restaurant       | South American Restaurant | Bakery                    | Mexican Restaurant    | Thai Restaurant       | Mobile Phone Shop        | Pizza Place           | Spanish Restaurant    | Empa Resta        |

# Results

## ■ 5 clusters in Queens.

|    | 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 | 9th Most Common Venue | 10th Most Common Venue |
|----|--------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| 50 | Neponsit     | Beach                 | Women's Store         | Filipino Restaurant   | Event Space           | Falafel Restaurant    | Farm                  | Farmers Market        | Fast Food Restaurant  | Fish & Chips Shop     | French Restaurant      |

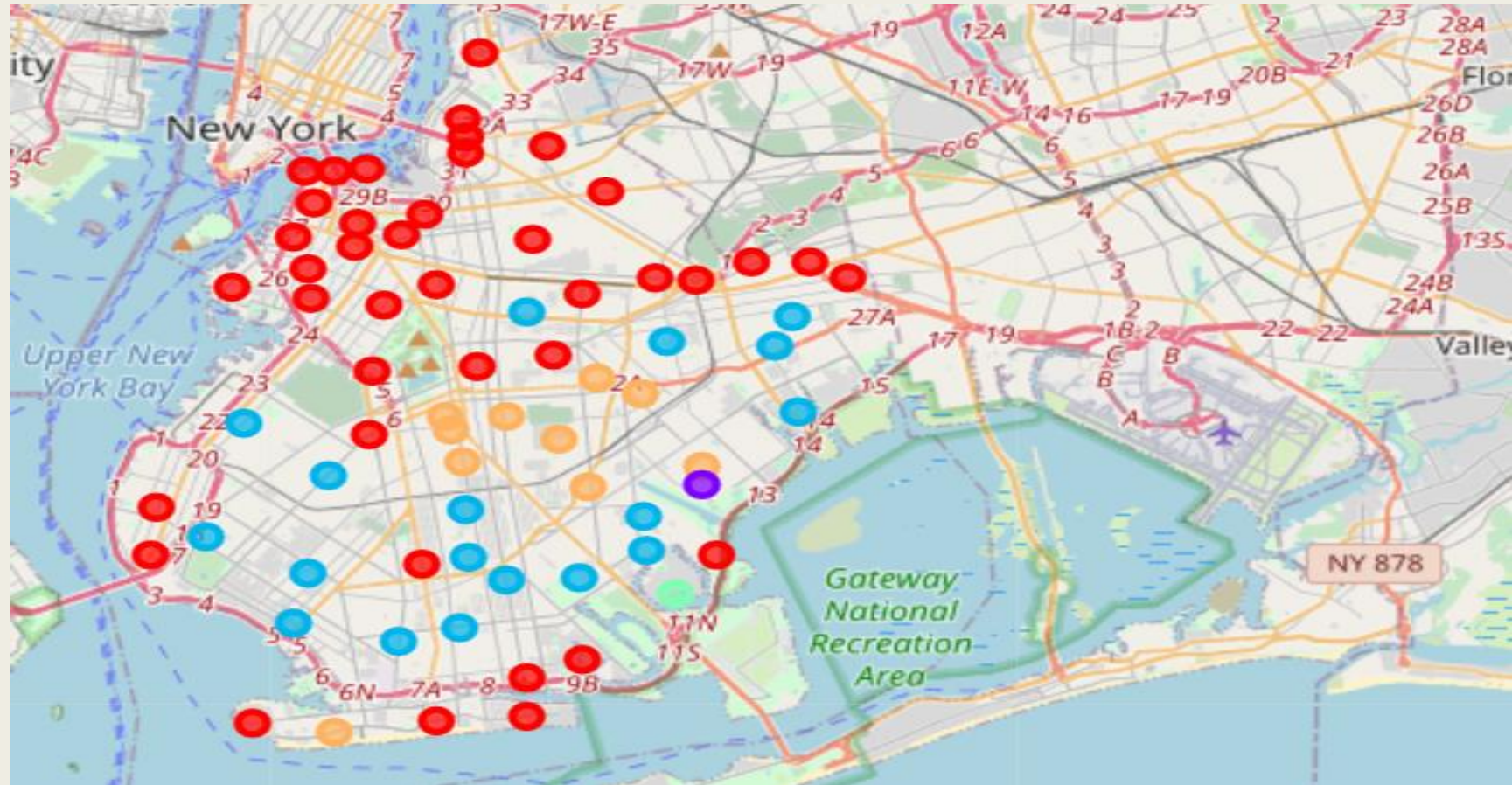
|    | Neighborhood | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue | 8th Most Common Venue | 9th Most Common Venue | 10th Most Common Venue |
|----|--------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| 64 | Brookville   | Deli / Bodega         | Women's Store         | Fish & Chips Shop     | Event Space           | Falafel Restaurant    | Farm                  | Farmers Market        | Fast Food Restaurant  | Filipino Restaurant   | Fish Market            |

|    | 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 | 9th Most Common Venue | 10th Most Common Venue |
|----|--------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| 43 | Breezy Point | Monument / Landmark   | Trail                 | Bus Stop              | Beach                 | Women's Store         | Filipino Restaurant   | Falafel Restaurant    | Farm                  | Farmers Market        | Fast Food Restaurant   |



# Results

- Use the matplotlib and folium packages to visualize the clusters on a map of Brooklyn.



# Results

## ■ 5 clusters in Brooklyn.

|   | 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 | 9th Most Common Venue | 10th Most Common Venue |
|---|----------------|-----------------------|-----------------------|-----------------------|-----------------------------|-----------------------|-----------------------|------------------------|-----------------------|-----------------------|------------------------|
| 0 | Bay Ridge      | Spa                   | Italian Restaurant    | Pizza Place           | Grocery Store               | American Restaurant   | Greek Restaurant      | Chinese Restaurant     | Bar                   | Ice Cream Shop        | Bagel Shop             |
| 3 | Greenpoint     | Bar                   | Pizza Place           | Coffee Shop           | Cocktail Bar                | Yoga Studio           | Grocery Store         | Thrift / Vintage Store | Sushi Restaurant      | Bakery                | Café                   |
| 5 | Brighton Beach | Beach                 | Restaurant            | Russian Restaurant    | Eastern European Restaurant | Sushi Restaurant      | Gourmet Shop          | Mobile Phone Shop      | Bank                  | Bakery                | Taco Place             |

|    | 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 | 9th Most Common Venue | 10th Most Common Venue |
|----|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| 59 | Paerdegat Basin | Asian Restaurant      | Moving Target         | Food                  | Auto Garage           | Harbor / Marina       | Women's Store         | Falafel Restaurant    | Farm                  | Farmers Market        | Fast Food 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 | 8th Most Common Venue | 9th Most Common Venue | 10th Most Common Venue |
|----|--------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| 30 | Mill Island  | Other Repair Shop     | Pool                  | Women's Store         | Field                 | Factory               | Falafel Restaurant    | Farm                  | Farmers Market        | Fast Food Restaurant  | Filipino Restaurant    |

# Results

- 5 clusters in Brooklyn.

|   | 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 | 9th Most Common Venue  | 10th Most Common Venue |
|---|--------------|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|
| 1 | Bensonhurst  | Chinese Restaurant        | Ice Cream Shop        | Italian Restaurant    | Donut Shop            | Sushi Restaurant      | Pizza Place           | Bridal Shop           | Coffee Shop           | Shabu-Shabu Restaurant | Flower Shop            |
| 2 | Sunset Park  | Latin American Restaurant | Bakery                | Bank                  | Pizza Place           | Mexican Restaurant    | Pharmacy              | Deli / Bodega         | Fried Chicken Joint   | Mobile Phone Shop      | Gym                    |
| 4 | Gravesend    | Pizza Place               | Bakery                | Chinese Restaurant    | Bus Station           | Martial Arts Dojo     | Lounge                | Hookah Bar            | Diner                 | Pharmacy               | Donut Shop             |

|    | 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 | 9th Most Common Venue | 10th Most Common Venue |
|----|---------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|-----------------------|-----------------------|------------------------|
| 8  | Flatbush      | Coffee Shop           | Deli / Bodega         | Mexican Restaurant    | Caribbean Restaurant  | Bank                  | Plaza                 | Middle Eastern Restaurant | Lounge                | Liquor Store          | Sandwich Place         |
| 10 | East Flatbush | Pharmacy              | Wine Shop             | Print Shop            | Caribbean Restaurant  | Department Store      | Food & Drink Shop     | Hardware Store            | Supermarket           | Chinese Restaurant    | Fast Food Restaurant   |
| 28 | Canarsie      | Gym                   | Asian Restaurant      | Chinese Restaurant    | Caribbean Restaurant  | Food                  | Flower Shop           | Fish Market               | Fish & Chips Shop     | Filipino Restaurant   | Event Service          |



# Discussion

- After clustering the data of the respective neighborhoods, both Boroughs have venues which can be explored and attract people. The neighborhoods are much similar in features like food places, clubs, gyms, parks, shops etc. We can see that both boroughs has varieties of stores and places for convenience and leisure in life.
- Another observation is both boroughs have a variety of cuisines, Asian, Middle Eastern, Mexico, Italian, etc., which indicating a lot diversities in the neighborhoods.
- As far as concern to dissimilarity, it differs in terms of some unique places like landmark and monuments which we did not see any of historical places in Brooklyn neighborhoods. Maybe Brooklyn is more newly developed than Queens and has a shorter history.

# Conclusion

- Queens and Brooklyn neighborhoods have more like similar venues. As we know that every place is unique in its own way, so that argument is present in both neighborhoods. The dissimilarity exists in terms of some different venues and facilities but not on a larger extent.