



The Battle of the Neighborhoods

BROOKLYN EDITION



Introduction

Background


- ▶ Your friend is considering opening a coffee shop in the Brooklyn borough of New York City, NY.
- ▶ They are requesting help selecting a neighborhood to open their shop in to be successful.
- ▶ They have asked for your assistance with your expertise in data analytics with Python to help them select a location for an increased likelihood of success.

Problem

- ▶ You need to select a neighborhood to recommend your friend open the coffee shop in.
- ▶ You should employ data analytics with Python to select the optimal neighborhood for the coffee shop based on neighborhood segmenting and clustering as well as analysis of the types of venues in the neighborhood.

Interest

- ▶ Target Audience: Your friend who is opening the coffee shop as well as any investors or stakeholders involved in the opening of the coffee shop.
- ▶ This presentation will provide a recommendation for the neighborhood to open the coffee shop in as well as provide the documentation of the data analysis performed to inform the recommendation.
- ▶ Who Will Care About It: Your friend, investors, and stakeholders because it can make them confident that they are making a data informed decision optimizing their success



Data Acquisition and Cleaning

Data Sources


- ▶ We will use the dataset of New York City neighborhoods and boroughs at the following link of data collected and stored as a shapefile by NYU.
- ▶ https://geo.nyu.edu/catalog/nyu_2451_34572

Data Cleaning

- ▶ The data is extracted from the url and then looped to create a data frame from the features key filling in one row at a time.
- ▶ This transforms the data into a workable form for analysis in with Pandas in Python.
- ▶ Then, the data frame is sliced to create a new data frame only including Brooklyn's data.
- ▶ Next, Foursquare API is utilized to access venue data regarding the neighborhoods in Brooklyn.
- ▶ The original dataset is utilized to develop a json Folium map in combination with the Foursquare data to cluster the venues and determine the most common venue in each cluster.

Features Selection

- ▶ This dataset consists of the 306 neighborhoods in New York City including the neighborhood name, borough, latitude, longitude, geometry type, and annotation.
- ▶ We can extract each neighborhood including the neighborhood name, borough, latitude, and longitude into a Pandas data frame.
- ▶ This data will allow for the neighborhoods to be plotted on the map and grouped by borough.
- ▶ Then, we will filter the dataset and data frame to only include the Brooklyn borough.
- ▶ This resultant dataset and data frame can be utilized with the Foursquare data of venues to analyze each neighborhood and make a recommendation.



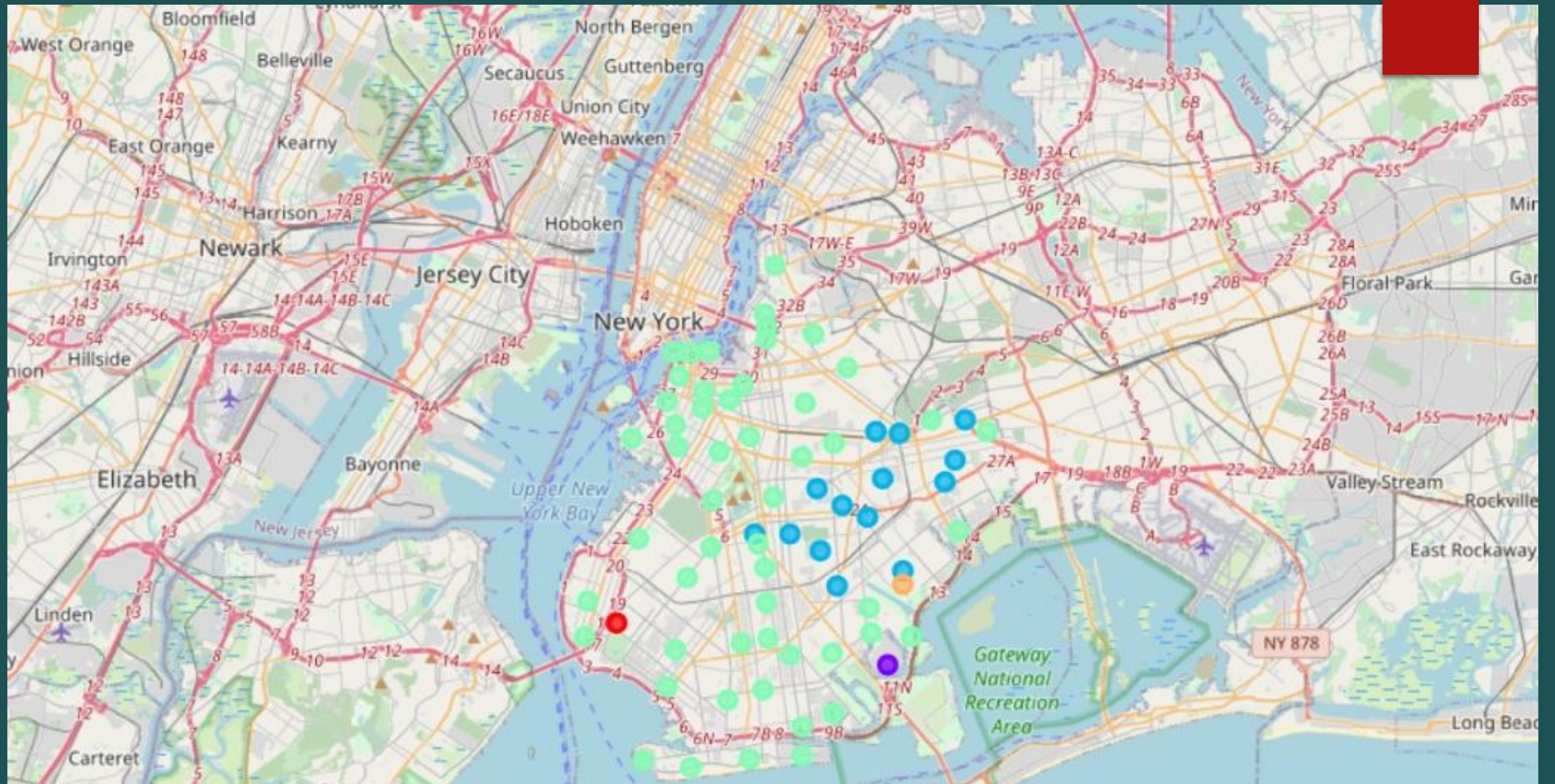
Exploratory Data Analysis Methodology

Foursquare Venue Data

- ▶ First, the Foursquare data of the venues in Brooklyn can be imported and analyzed to determine the number of unique venues in the borough.
- ▶ Then, the groupby method can be applied to determine the frequency of the occurrence of each type of venue in each neighborhood.
- ▶ This allows you to determine the top five and ten most frequently occurring venue types for each neighborhood.
- ▶ With this, you can determine the most frequent types of venues in each neighborhood and begin to gain perspective regarding the characteristics of the neighborhood.

K-Means Clustering

- ▶ Next, k-means clustering is utilized to cluster the neighborhoods in Brooklyn into five groups.
- ▶ Then, the clustered neighborhoods are color coded on the map below with the colors light green, red, blue, orange, and purple.
- ▶ The following colors represent each cluster:
 - ▶ Cluster 1 - red dot
 - ▶ Cluster 2 - purple dot
 - ▶ Cluster 3 - blue dots
 - ▶ Cluster 4 - green dots
 - ▶ Cluster 5 -orange dot.



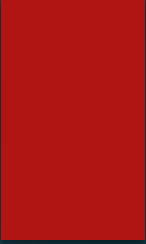
Top Ten Venues for Each Cluster

- ▶ Then, data frames were constructed for each neighborhood cluster regarding the top ten most frequent venue types in each cluster.
- ▶ This will allow for the revelation of the trends in the neighborhood to determine where a coffee shop will likely do well.

Results

Results

- ▶ The following slides of results contains a summary of the neighborhoods and the top ten venue types in each neighborhood for each cluster.
- ▶ These resultant data frames can be utilized to observe commonalities in the clusters to determine the optimal neighborhood to open a coffee shop in Brooklyn.



Cluster 1:

Neighborhood Dyker Heights	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
	Park	Golf Course	Bagel Shop	Cosmetics Shop	Burger Joint	Food Truck	Food Stand	Food Court	Food & Drink Shop	Food

Cluster 2:

Neighborhood Mill Island	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
	Pool	Women's Store	Flea Market	Field	Filipino Restaurant	Fish & Chips Shop	Fish Market	Fishing Spot	Fishing Store	Flower Shop

Cluster 3:

Neighborhood East Flatbush Brownsville Cypress Hills East New York Canarsie Flatlands Ocean Hill Prospect Park South Wingate Rugby Remsen Village New Lots Broadway Junction Erasmus	1st Most Common Venue Moving Target Restaurant	2nd Most Common Venue Supermarket Fried Chicken Joint	3rd Most Common Venue Fast Food Restaurant Pool	4th Most Common Venue Caribbean Restaurant Spanish Restaurant	5th Most Common Venue Park Farmers Market	6th Most Common Venue Pharmacy Chinese Restaurant	7th Most Common Venue Chinese Restaurant Park	8th Most Common Venue Liquor Store Performing Arts Venue	9th Most Common Venue Food & Drink Shop Trail	10th Most Common Venue Department Store Convenience Store
	Latin American Restaurant	Fast Food Restaurant	Spanish Restaurant	Ice Cream Shop	Fried Chicken Joint	Donut Shop	Gas Station	Baseball Field	Seafood Restaurant	Bank
	Chinese Restaurant	Gym	Grocery Store	Caribbean Restaurant	Music Venue	Salon / Barbershop	Gym	Metro Station	Event Service	Chinese Restaurant
	Pharmacy	Fried Chicken Joint	Fast Food Restaurant	Deli / Bodega	Food	Caribbean Restaurant	Thai Restaurant	Asian Restaurant	Fishing Spot	Filipino Restaurant
	Deli / Bodega	Fried Chicken Joint	Southern / Soul Food Restaurant	Bakery	Nightclub	Paper / Office Supplies Store	Bar	Park	Lounge	Video Store
	Caribbean Restaurant	Pizza Place	Grocery Store	Mobile Phone Shop	Playground	Pizza Place	Donut Shop	Pharmacy	Coffee Shop	Cocktail Bar
	Fried Chicken Joint	Donut Shop	Bakery	Caribbean Restaurant	Fast Food Restaurant	Latin American Restaurant	Donut Shop	Clothing Store	Kids Store	Fried Chicken Joint
	Grocery Store	Deli / Bodega	Bank	Caribbean Restaurant	Other Great Outdoors	Fish & Chips Shop	Field	Fast Food Restaurant	Liquor Store	Bus Station
	Caribbean Restaurant	Fast Food Restaurant	Deli / Bodega	Gym	Fried Chicken Joint	Mobile Phone Shop	Salon / Barbershop	Chinese Restaurant	Seafood Restaurant	Gas Station
	Fried Chicken Joint	Pizza Place	Bus Stop	Breakfast Spot	Donut Shop	Rental Service	Pharmacy	Salad Place	Sandwich Place	Fish Market
	Fried Chicken Joint	Donut Shop	Diner	Bakery	Chinese Restaurant	Salon / Barbershop	Grocery Store	Metro Station	Park	Bank
	Caribbean Restaurant	Yoga Studio	Convenience Store	Bus Line	Recording Studio	Sandwich Place	Caribbean Restaurant	Nightclub	Burger Joint	Gas Station
					Food Truck	Mobile Phone Shop	Furniture / Home Store	Chinese Restaurant	School	Sandwich Place

Cluster 4:

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
Bay Ridge	Italian Restaurant	Pizza Place	Spa	Bagel Shop	American Restaurant	Greek Restaurant	Bar	Chinese Restaurant	Café	Sandwich Place
Bensonhurst	Donut Shop	Ice Cream Shop	Pizza Place	Park	Chinese Restaurant	Italian Restaurant	Sushi Restaurant	Grocery Store	Cosmetics Shop	Coffee Shop
Sunset Park	Pizza Place	Bank	Latin American Restaurant	Mexican Restaurant	Mobile Phone Shop	Bakery	Fried Chicken Joint	Pharmacy	Gym	Sandwich Place
Greenpoint	Bar	Pizza Place	Coffee Shop	Cocktail Bar	Yoga Studio	Mexican Restaurant	French Restaurant	Sushi Restaurant	Bakery	Furniture / Home Store
Gravesend	Bakery	Metro Station	Lounge	Beach	Italian Restaurant	Pharmacy	Bar	Sporting Goods Shop	Cosmetics Shop	Martial Arts School
Brighton Beach	Russian Restaurant	Eastern European Restaurant	Restaurant	Sandwich Place	Gourmet Shop	Sushi Restaurant	Bank	Mobile Phone Shop	Non-Profit	Mediterranean Restaurant
Sheepshead Bay	Dessert Shop	Turkish Restaurant	Harbor / Marina	Donut Shop	Yoga Studio	Playground	Chinese Restaurant	Russian Restaurant	Restaurant	Creperie
Manhattan Terrace	Ice Cream Shop	Pizza Place	Grocery Store	Caribbean Restaurant	Bus Station	Bagel Shop	Coffee Shop	Steakhouse	Convenience Store	Cosmetics Shop
Flatbush	Chinese Restaurant	Deli / Bodega	Mexican Restaurant	Bagel Shop	Juice Bar	Coffee Shop	Pharmacy	Bank	Middle Eastern Restaurant	Sandwich Place
Crown Heights	Pizza Place	Café	Museum	Ice Cream Shop	Fried Chicken Joint	Bakery	Deli / Bodega	Pharmacy	Coffee Shop	Salon / Barbershop
Kensington	Grocery Store	Thai Restaurant	Restaurant	Diner	Sandwich Place	Pizza Place	Mobile Phone Shop	Mexican Restaurant	Nail Salon	Spa
Windsor Terrace	Café	Plaza	Grocery Store	Bakery	Park	Deli / Bodega	Middle Eastern Restaurant	Bagel Shop	Chinese Restaurant	Bookstore
Prospect Heights	Bar	Mexican Restaurant	Wine Shop	Cocktail Bar	Thai Restaurant	Cocktail Bar	Restaurant	Ice Cream Shop	Coffee Shop	Beer Bar
Williamsburg	Pizza Place	Bar	Coffee Shop	Bagel Shop	Breakfast Spot	Latin American Restaurant	Tapas Restaurant	Taco Place	Liquor Store	Lounge
Bushwick	Bar	Deli / Bodega	Mexican Restaurant	Coffee Shop	Discount Store	Bakery	Thrift / Vintage Store	Café	Pizza Place	Vegetarian / Vegan Restaurant
Bedford Stuyvesant	Coffee Shop	Café	Pizza Place	Bar	Deli / Bodega	Gift Shop	Gourmet Shop	Grocery Store	Boutique	Park
Brooklyn Heights	Yoga Studio	Deli / Bodega	Park	Pizza Place	Gym	Italian Restaurant	Coffee Shop	Cosmetics Shop	Bakery	Middle Eastern Restaurant
Cobble Hill	Cocktail Bar	Coffee Shop	Playground	Pizza Place	Bar	Deli / Bodega	Yoga Studio	Italian Restaurant	Ice Cream Shop	Thai Restaurant
Carroll Gardens	Italian Restaurant	Coffee Shop	Bakery	Pizza Place	Cocktail Bar	Spa	Wine Shop	Bar	Grocery Store	Bagel Shop
Red Hook	Art Gallery	Seafood Restaurant	Park	Bar	Wine Shop	Ice Cream Shop	American Restaurant	Pizza Place	Farm	Art Gallery
Gowanus	Bar	Italian Restaurant	Furniture / Home Store	Pizza Place	Wine Shop	Playground	Chinese Restaurant	Gym / Fitness Center	Coffee Shop	Opera House
Fort Greene	Flower Shop	Wine Shop	Italian Restaurant	Pizza Place	Playground	French Restaurant	Cocktail Bar	Coffee Shop	Theater	Mexican Restaurant
Park Slope	Coffee Shop	Burger Joint	Bagel Shop	Pizza Place	Bookstore	Spa	Pub	Bakery	Pet Store	Donut Shop
Starrett City	Bus Station	Shopping Mall	Pharmacy	Caribbean Restaurant	Gym Pool	River	Supermarket	Chinese Restaurant	Bus Stop	Food Stand
Manhattan Beach	Café	Bus Stop	Playground	Sandwich Place	Food	Beach	Beach	Food & Drink Shop	Food Court	Music Venue
Coney Island	Baseball Stadium	Cosmetics Shop	Monument / Landmark	Brewery	Food Court	Skating Rink	Caribbean Restaurant	Fast Food Restaurant	Theme Park Ride / Attraction	Burger Joint
Bath Beach	Italian Restaurant	Gas Station	Pharmacy	Bubble Tea Shop	Cantonesse Restaurant	Donut Shop	Sushi Restaurant	Café	Chinese Restaurant	Coffee Shop
Borough Park	Bank	Pizza Place	Fast Food Restaurant	Pharmacy	Deli / Bodega	Bakery	Chinese Restaurant	Event Space	Restaurant	Restaurant
Gerritsen Beach	Pizza Place	Bar	Department Store	Bagel Shop	Harbor / Marina	Grocery Store	Gas Station	Basketball Court	Deli / Bodega	Yoga Studio
Marine Park	Ice Cream Shop	Athletics & Sports	Soccer Field	Chinese Restaurant	Gym	Baseball Field	Park	Fish & Chips Shop	Pizza Place	Fishing Store
Clinton Hill	Italian Restaurant	Pizza Place	Thai Restaurant	Wine Shop	Mexican Restaurant	Deli / Bodega	Japanese Restaurant	Restaurant	Indian Restaurant	Food Stand
Sea Gate	Spa	Beach	American Restaurant	Bus Station	Flower Shop	Sandwich Place	Grocery Store	Fish Market	Fishing Spot	Grocery Store
Downtown	Burger Joint	Coffee Shop	Pizza Place	Chinese Restaurant	Bar	French Restaurant	Arts & Crafts Store	Arts & Crafts Store	Cocktail Bar	Discount Store
Boerum Hill	Dance Studio	Coffee Shop	Bar	Bakery	Furniture / Home Store	Ice Cream Shop	Chinese Restaurant	Sandwich Place	Gym / Fitness Center	Bus Line
Prospect Lefferts Gardens	Café	Bakery	Deli / Bodega	Pizza Place	Caribbean Restaurant	Sandwich Place	Spanish Restaurant	Indian Restaurant	Sushi Restaurant	Fish Market
City Line	Donut Shop	Pizza Place	Liquor Store	Grocery Store	Bakery	Spanish Restaurant	-	Fried Chicken Joint	South American Restaurant	Fish Market
Bergen Beach	Harbor / Marina	Athletics & Sports	Baseball Field	Playground	Hockey Field	Women's Store	Field	Filipino Restaurant	Fish & Chips Shop	Shopping Mall
Midwood	Pizza Place	Ice Cream Shop	Convenience Store	Bakery	Candy Store	Video Game Store	Pharmacy	Filipino Restaurant	Fish & Chips Shop	Gym / Fitness Center
Georgetown	Bank	Pharmacy	Breakfast Spot	Donut Shop	Miscellaneous Shop	Shipping Store	Frozen Yogurt Shop	Mexican Restaurant	Burger Joint	French Restaurant
East Williamsburg	Bar	Deli / Bodega	Bakery	Cocktail Bar	Coffee Shop	Concert Hall	Mexican Restaurant	Music Venue	Café	South American Restaurant
North Side	Coffee Shop	Pizza Place	Wine Bar	Yoga Studio	Bar	American Restaurant	Bakery	Juice Bar	Korean Restaurant	Liquor Store
South Side	Coffee Shop	Bar	Pizza Place	Wine Bar	American Restaurant	Chinese Restaurant	Yoga Studio	Breakfast Spot	Sushi Restaurant	Pharmacy
Ocean Parkway	Coffee Shop	Sushi Restaurant	Playground	Bakery	Food	Steakhouse	General Entertainment	Sake Bar	Gift Shop	Japanese Restaurant
Fort Hamilton	Pizza Place	Pizza Place	Italian Restaurant	Chinese Restaurant	Sandwich Place	Bus Stop	Gym / Fitness Center	Donut Shop	Steakhouse	Liquor Store
Ditmas Park	Deli / Bodega	Deli / Bodega	Food Truck	Burger Joint	Pizza Place	Kids Store	Caribbean Restaurant	Donut Shop	Health Food Store	Bakery
Mill Basin	Chinese Restaurant	Beach	Pizza Place	Bank	Bagel Shop	Frozen Yogurt Shop	Breakfast Spot	Sushi Restaurant	Gift Shop	Scenic Lookout
Fulton Ferry	Chinese Restaurant	American Restaurant	Scenic Lookout	Coffee Shop	Café	Bridge	Ice Cream Shop	Pizza Place	Roof Deck	Liquor Store
Vinegar Hill	Park	Coffee Shop	Café	Art Gallery	Entertainment Service	Bike Rental / Bike Share	Bookstore	Latin American Restaurant	Sandwich Place	Bookstore
Weeksville	Food Truck	Juice Bar	Café	Gas Station	Chinese Restaurant	Grocery Store	Cocktail Bar	Lounge	Park	Metro Station
Dumbo	Discount Store	Coffee Shop	Bakery	Scenic Lookout	Yoga Studio	Ice Cream Shop	Italian Restaurant	Gym	Café	Flower Shop
Homecrest	Park	Donut Shop	Grocery Store	Mexican Restaurant	Chinese Restaurant	Sandwich Place	Sushi Restaurant	Pizza Place	Restaurant	
Highland Park	Bank	Grocery Store	Pizza Place	Latin American Restaurant	Cosmetics Shop	Park	Tennis Court	Liquor Store	Gym / Fitness Center	
Madison	Deli / Bodega	Dessert Shop	Italian Restaurant	Pizza Place	Restaurant	Pilates Studio	Deli / Bodega	Food & Drink Shop	Food	

Cluster 5:

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
Paerdegat Basin	Food	Asian Restaurant	Deli / Bodega	Business Service	Filipino Restaurant	Fish & Chips Shop	Fish Market	Fishing Spot	Fishing Store	Flea Market



Discussion

Observations

- ▶ Based on the analysis of the results, you can observe trends in the types of venues that are successful in each cluster.
- ▶ The number of neighborhoods contained in each cluster as well as the most common venues are listed in the table at right.

Cluster #	Number of Neighborhoods Included	Most Common Venue Types
Cluster 1	1 neighborhood	Park
Cluster 2	1 neighborhood	Pool
Cluster 3	14 neighborhoods	Various types of restaurants including Latin American, fast food, Chinese, Fried Chicken, and a Caribbean restaurant.
Cluster 4	53 neighborhoods	Various restaurants including Italian restaurants, pizza places, Chinese restaurants, cafes, delis/bodegas, and a few coffee shops
Cluster 5	1 neighborhood	Food

Observations (continued)

- ▶ Cluster 1, 2, and 5 :only one neighborhood and thus do not allow us to develop strong observations.
- ▶ Cluster 3:
 - ▶ Consists of 14 neighborhoods
 - ▶ The most common venue type in these neighborhoods are various types of restaurants including Latin American, fast food, Chinese, Fried Chicken, and a Caribbean restaurant.
 - ▶ These types of restaurants that are not similar to a coffee shop.
- ▶ Cluster 4:
 - ▶ Consists of 53 neighborhoods
 - ▶ The most common venue type in these neighborhoods are various types of restaurants including Italian restaurants, pizza places, Chinese restaurants, cafes, delis/bodegas, and a few coffee shops.
 - ▶ This demonstrates that restaurants of varying levels of scale and price have been successful in these neighborhoods.
 - ▶ Additionally, coffee shops are the most common venue in some clusters, but the majority of neighborhoods are not overrun with coffee shops illustrating room for development.

Recommendations

- ▶ I would recommend that the coffee shop be opened in one of the Brooklyn neighborhoods in cluster 4 where coffee shops are not one of the most common venues.
 - ▶ These neighborhoods include Bay Ridge, Sunset Park, Gravesend, Brighton Beach, Sheephead Bay, Kensington, Winsor Terrace, Prospect Heights, Red Hook, Starrett City, Manhattan Beach, Coney Island, Bath Beach, Gerritsen Beach, Marine Park, Clinton Hill, Sea Gate, Prospect Lefferts Gardens, City Line, Bergen Beach, Midwood, Georgetown, Ocean Parkway, Fort Hamilton, Ditmas Park, Mill Basin, Weeksville, Dumbo, Homecrest, Highland Park, and Madison.
- ▶ These neighborhoods are included in the cluster where restaurants of various scales and price values have been successful and are not overly populated by coffee shops providing the opportunity for success.

Conclusion

- ▶ In this study, I have analyzed data regarding the venues in each neighborhood in Brooklyn as well as their geographic location to determine the optimal neighborhood to open a coffee shop in.
- ▶ The neighborhoods were clustered based on their geographic location and the venue data was analyzed to reveal trends in the types of venues that are successful in each cluster of neighborhoods.
- ▶ Based on this analysis, I recommend that the coffee shop be opened in one of the neighborhoods in cluster 4 where coffee shops are not already one of the most common venues.
 - ▶ These neighborhoods include Bay Ridge, Sunset Park, Gravesend, Brighton Beach, Sheepshead Bay, Kensington, Winsor Terrace, Prospect Heights, Red Hook, Starrett City, Manhattan Beach, Coney Island, Bath Beach, Gerritsen Beach, Marine Park, Clinton Hill, Sea Gate, Prospect Lefferts Gardens, City Line, Bergen Beach, Midwood, Georgetown, Ocean Parkway, Fort Hamilton, Ditmas Park, Mill Basin, Weeksville, Dumbo, Homecrest, Highland Park, and Madison.

Future Direction

- ▶ Future study and closer analysis can be performed on the neighborhoods within cluster 4 to determine the single optimal neighborhood to open the coffee shop in.