Finding out the best neighbors for delivery company to send DMs

Problems and Background

- The client is a bike rental company in Manhattan, NYC.
- They are facing a business difficulties because of emerging City Bike, a privately owned public bicycle sharing system serving New York City.
- The company decided to change their business and start a delivery company.
- The company wants to send DMs to possible customers.
- Due to a limited budget, the company wants to know which areas to send DMs.

Data

To conduct this project, I used the following data.

1) Zip code

To send DMs, the data with zip code is easy to work with for the client. In this project, I used zip code data.

Data source: https://www.zipdatamaps.com/zipcodes-new-york-ny

2)Latitude and Longitude Data

To work with Foursquare, this project needs latitude and longitude data. By using this data, we can plot each zip code on map.

Data source: https://public.opendatasoft.com/explore/dataset/us-zip-code-latitude-and-longitude/download/?format=csv&refine.state=NY&timezone=America/New_York&lang=en&use_labels_for_header=true&csv_separator=%3B

3)Venue Data

To see which type of food-related business is common in each area, I used foursquare developer API to get venue data.

4)Population Data

In Manhattan, each area is different. Some areas are mainly for business buildings. Other areas are mainly for residential buildings. The population data will be one of the good data to deeply understand each area's characteristics.

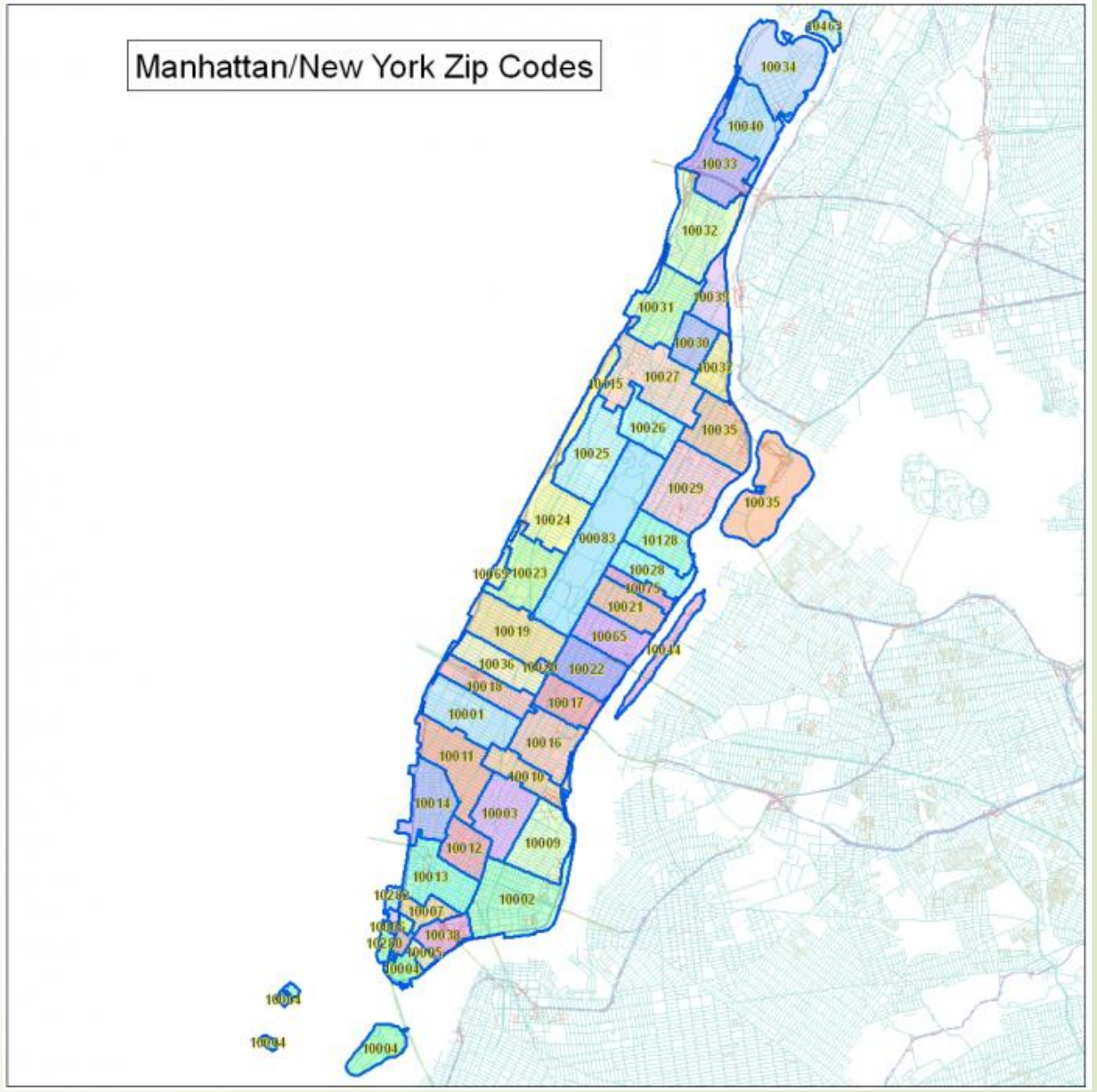
Data source: https://www.zipdatamaps.com/zipcodes-new-york-ny

Manhattan

For this project, every zip codes in Manhattan is included.

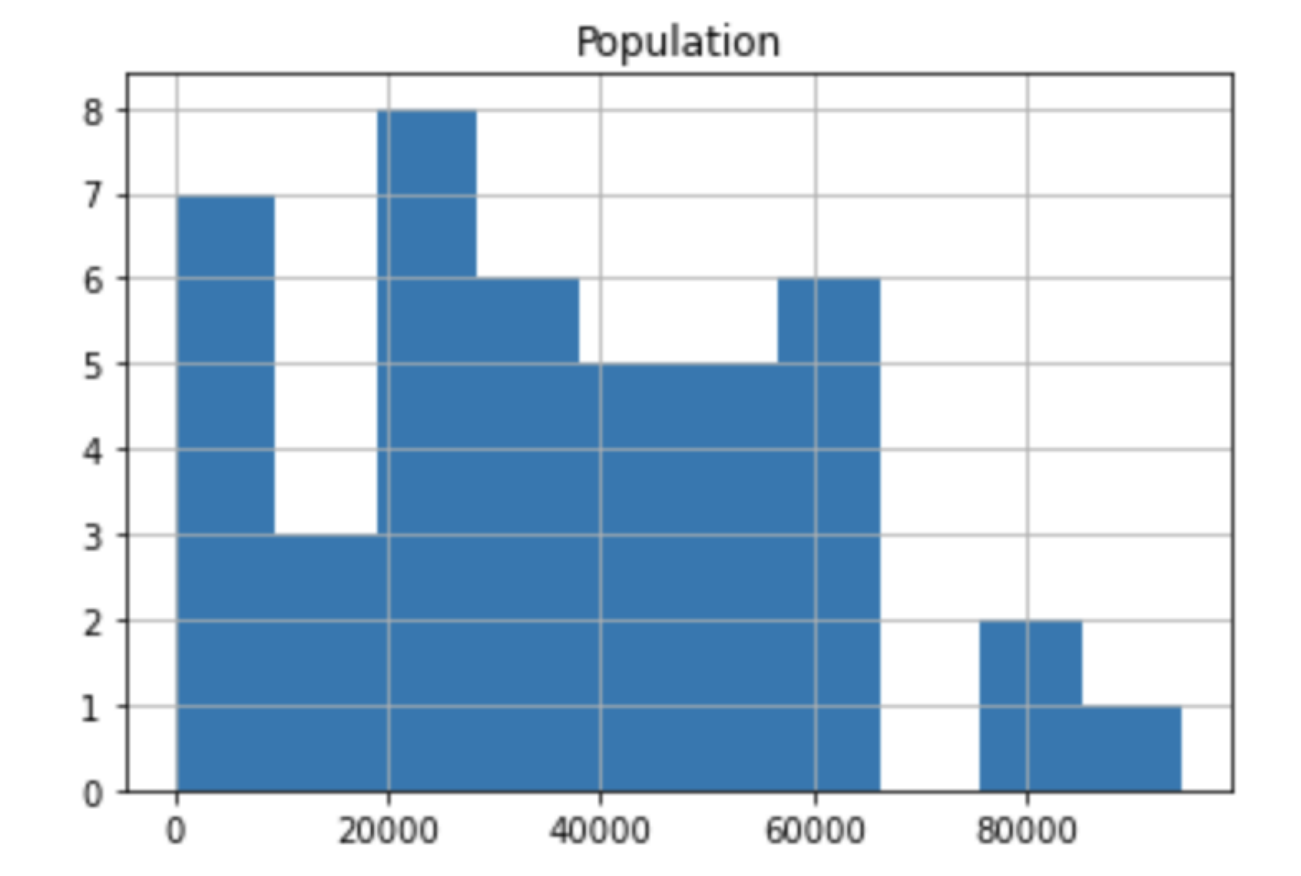
The number of zip codes: 47
The number of population: 1,565,608

The mix of residential areas and business areas.



Population by Zip Code

Population
0 – 20,000 : 10 areas
20,000 – 60,000 : 27 areas
60,000 - : 6 areas



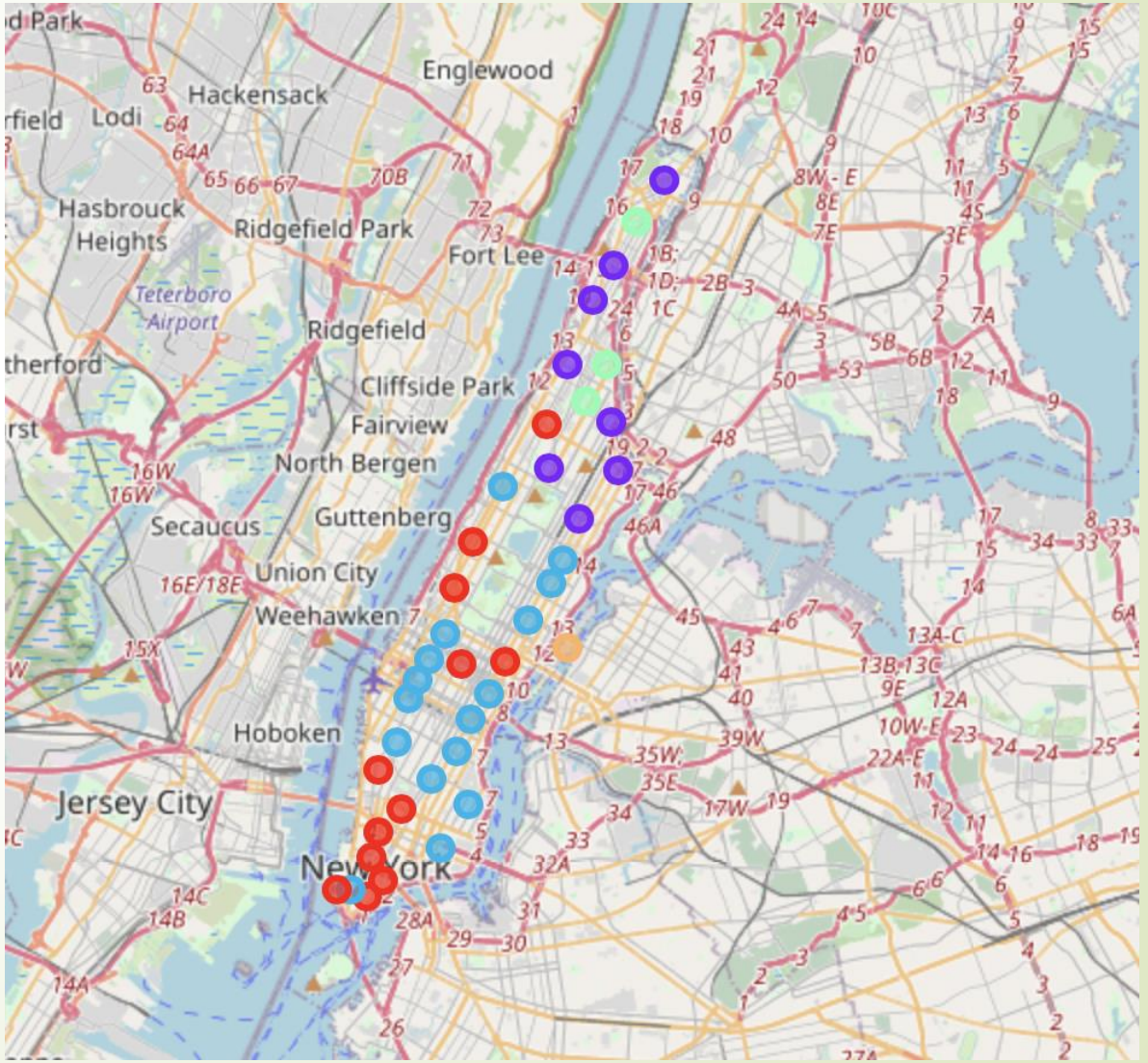
Methodology (Clustering)

How to cluster

- By using Foursquare venue data, exploring each zip code area and finding out what types of food-related businesses are common.
- K = 5
- Due to the free account of Foursquare, up to 100 data for each zip code is utilized.
- For this project, the venues that are categorized as food business are obtained from Foursquare.

Clustering Result

- Cluster 0 : 12 zip codes
- Cluster 1 : 8 zip codes
- Cluster 2 : 16 zip codes
- Cluster 3 : 3 zip codes
- Cluster 4 : 1 zip code



Cluster 0 (Population : 33,7937)

ZIP Code	Population	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
10005	7135	Salad Place	American Restaurant	Food Truck	Pizza Place	Mexican Restaurant
10007	6988	Sandwich Place	Italian Restaurant	Deli / Bodega	Food Truck	Sushi Restaurant
10012	24090	Italian Restaurant	Café	American Restaurant	Sushi Restaurant	French Restaurant
10013	27700	Italian Restaurant	American Restaurant	French Restaurant	Café	Deli / Bodega
10014	31959	Italian Restaurant	American Restaurant	New American Restaurant	Café	French Restaurant
10020	0	Steakhouse	Italian Restaurant	American Restaurant	French Restaurant	Sandwich Place
10022	31924	Italian Restaurant	French Restaurant	American Restaurant	Bakery	Steakhouse
10023	60998	Italian Restaurant	Café	Food Truck	Pizza Place	American Restaurant
10024	59283	Italian Restaurant	Café	Indian Restaurant	American Restaurant	Mediterranean Restaurant
10027	59707	Seafood Restaurant	Italian Restaurant	Chinese Restaurant	Deli / Bodega	Café
10038	20300	Italian Restaurant	Sandwich Place	Café	Donut Shop	Pizza Place
10280	7853	Food Truck	Pizza Place	Sandwich Place	Chinese Restaurant	American Restaurant

- it is the mixture of residential areas and business areas (less population).
- Italian restaurant and American restaurant are common.

It is the good area to send DMs.

Cluster 1 (Population : 36,7994)

ZIP Code	Population	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
10026	34003	Deli / Bodega	African Restaurant	Caribbean Restaurant	Café	Seafood Restaurant
10029	76003	Deli / Bodega	Mexican Restaurant	Pizza Place	Thai Restaurant	Café
10031	56438	Deli / Bodega	Pizza Place	Mexican Restaurant	Chinese Restaurant	Caribbean Restaurant
10032	57331	Pizza Place	Bakery	Mexican Restaurant	Chinese Restaurant	Latin American Restaurant
10033	53926	Deli / Bodega	Bakery	Spanish Restaurant	Pizza Place	Chinese Restaurant
10034	38908	Restaurant	Deli / Bodega	Pizza Place	Mexican Restaurant	Café
10035	33969	Deli / Bodega	Pizza Place	Chinese Restaurant	American Restaurant	Fast Food Restaurant
10037	17416	Café	Latin American Restaurant	Southern / Soul Food Restaurant	Cafeteria	Burger Joint

- Deli/Bodega is the most common.
- Residential are.

It is not the good area to send DMs.

Cluster 2 (Population : 69,3105)

ZIP Code	Population	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
10001	21102	Salad Place	Café	Burger Joint	Deli / Bodega	American Restaurant
10002	81410	Mexican Restaurant	Asian Restaurant	Pizza Place	Bakery	Ramen Restaurant
10003	56024	Japanese Restaurant	Mediterranean Restaurant	Pizza Place	Sushi Restaurant	Chinese Restaurant
10006	3011	Pizza Place	Mexican Restaurant	American Restaurant	Steakhouse	Café
10009	61347	Mexican Restaurant	Pizza Place	Italian Restaurant	Korean Restaurant	Vegetarian / Vegan Restaurant
10010	31834	Indian Restaurant	Italian Restaurant	Bagel Shop	Pizza Place	American Restaurant
10011	50984	American Restaurant	Italian Restaurant	Sushi Restaurant	Bakery	Mexican Restaurant
10016	54183	Italian Restaurant	Mexican Restaurant	Deli / Bodega	Sandwich Place	Greek Restaurant
10017	16575	Japanese Restaurant	Italian Restaurant	Seafood Restaurant	Sushi Restaurant	Deli / Bodega
10018	5229	American Restaurant	Italian Restaurant	Pizza Place	Thai Restaurant	Sandwich Place
10019	42870	Italian Restaurant	Mexican Restaurant	Pizza Place	Sandwich Place	Thai Restaurant
10021	43631	Italian Restaurant	Pizza Place	Burger Joint	Café	Sushi Restaurant
10025	94600	Mexican Restaurant	Pizza Place	Indian Restaurant	Thai Restaurant	Latin American Restaurant
10028	45141	Italian Restaurant	Sushi Restaurant	Mexican Restaurant	Bakery	Thai Restaurant
10036	24711	Italian Restaurant	Mexican Restaurant	Pizza Place	Sandwich Place	Thai Restaurant
10128	60453	Pizza Place	Italian Restaurant	Café	Sushi Restaurant	Deli / Bodega

- Like Cluster 0, residential and business areas
- Deli/Bodega is not common. Mexican, Japanese, American, Pizza restaurants are common. This is the ideal group for the client.

It is the good area to send DMs.

Cluster 3 (Population : 93,413)

ZIP Code	Population	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
10030	26999	Deli / Bodega	Southern / Soul Food Restaurant	Pizza Place	Chinese Restaurant	Sandwich Place
10039	24527	Deli / Bodega	Chinese Restaurant	Caribbean Restaurant	Indian Restaurant	Pizza Place
10040	41905	Deli / Bodega	Pizza Place	Chinese Restaurant	Seafood Restaurant	Donut Shop

- Deli/Bodega is the most common
- Other than Deli/Bodega, other common venues are diverse in terms of food compared to other clusters.
- Residential area

It is not the good area to send DMs.

Cluster 4 (Population : 11,661)

ZIP Code	Population	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
10044	11661	Deli / Bodega	Kosher Restaurant	Restaurant	Sandwich Place	Pizza Place

- the smallest group.
- Deli/Bodega is the most common venue and Kosher Restaurant is the second.

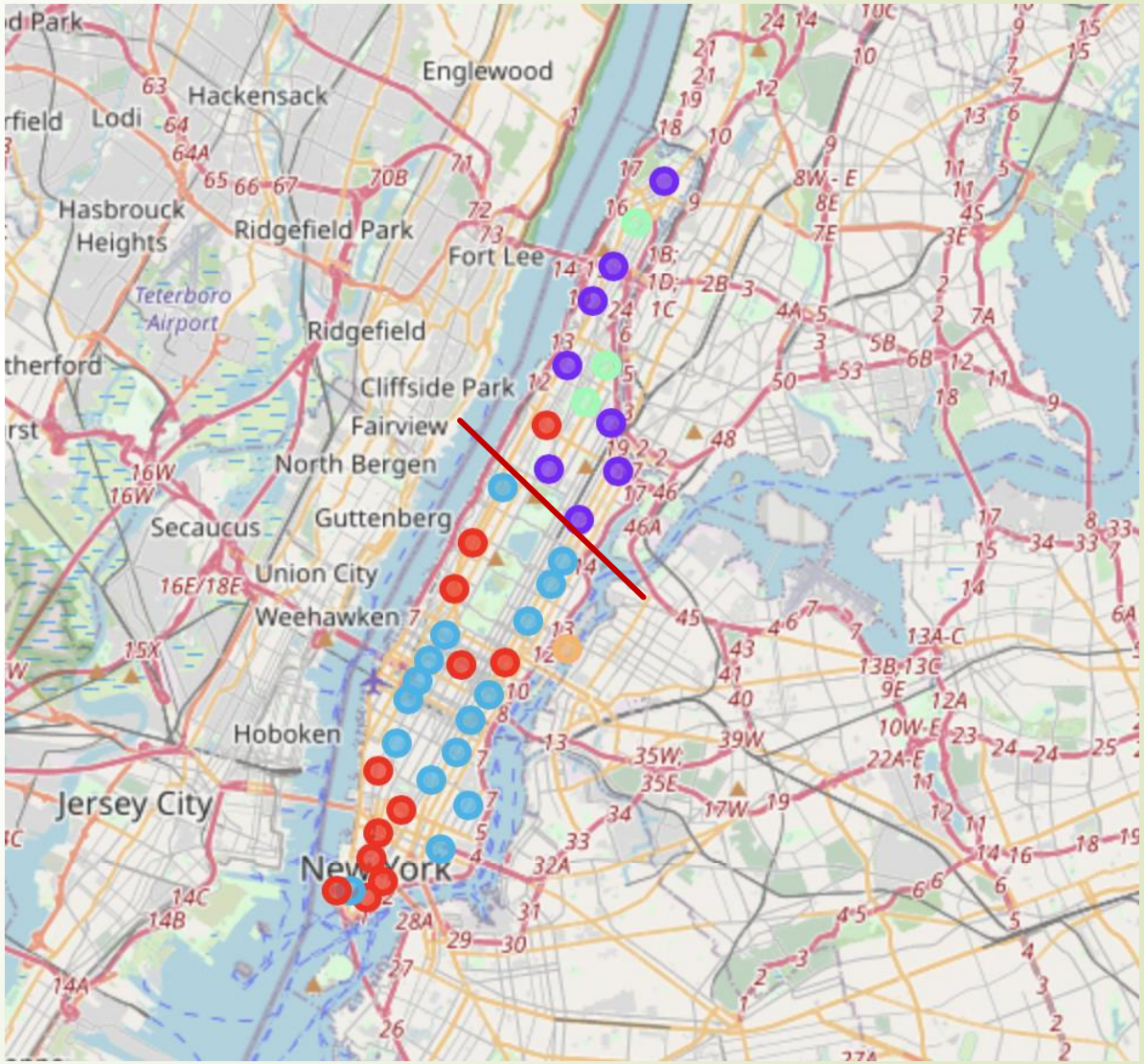
It is not the good area to send DMs.

Recommendation

Based on the clustering results, upper Manhattan areas are not good to send DMs because the most common venue is Deli/Bodega.

For cluster 0 and 2 areas, restaurants such as Italian, American, Japanese, and Mexican are common.

60% of the population in Manhattan is from cluster 0 and 2. So there might be high demands for the delivery business.



Reference

There is no relationship between the number of populations and the number of venues.