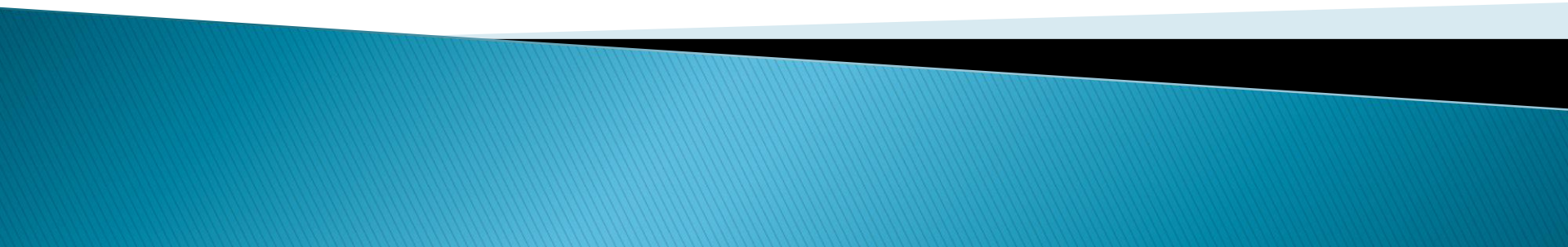# The Battle of Neighbourhoods — Mumbai vs. New York

Finding similar neighborhoods between the two cities

Working professionals shuttling between Mumbai and New York need to know how similar the two cities are

- Compare the neighbourhoods of the two cities of Mumbai and NYC and determine how similar or dissimilar they are in terms of availability food options such as restaurants and other entertainment options.

Data Sources

1. List of neighbourhoods in Mumbai with coordinates

   This Mumbai Neighbourhoods page provides details about Mumbai neighbourhoods data along with coordinates.

2. List of neighbourhoods in NYC with coordinates

   This New Your Neighbourhoods page provides details about NYC neighbourhoods data along with coordinates.

3. Details of popular food and entertainment options, with user ratings, in the neighbourhoods

   This Foursquare API can be used to get detailed information about food and entertainment venues in various geolocations all around the world, including Mumbai and NYC neighbourhoods.

For example: We can get information such as restaurants serving 'Indian' food along with the User ratings about neighbourhoods using the Foursquare API.

Data Cleaning

- The data types of latitude and longitude were changed to float for ease of processing via the Foursquare API.

- Incorrect Latitudes and Longitudes of a few neighbourhoods had to be manually corrected

- NAs were removed from the data after embellishment with the venues data from the Foursquare API

Feature Selection

A rich collection of features was selected from the Foursquare API as follows:

- 'Neighbourhood'
- 'Location'
- 'Latitude'
- 'Longitude'
- 'VenueName'
- 'VenueLatitude'
- 'VenueLongitude'
- 'VenueCategory'

Feature Engineering

The 176 unique venue categories (for Mumbai) were converted into features using one-hot-encoding

Here are the top venue categories for Mumbai:

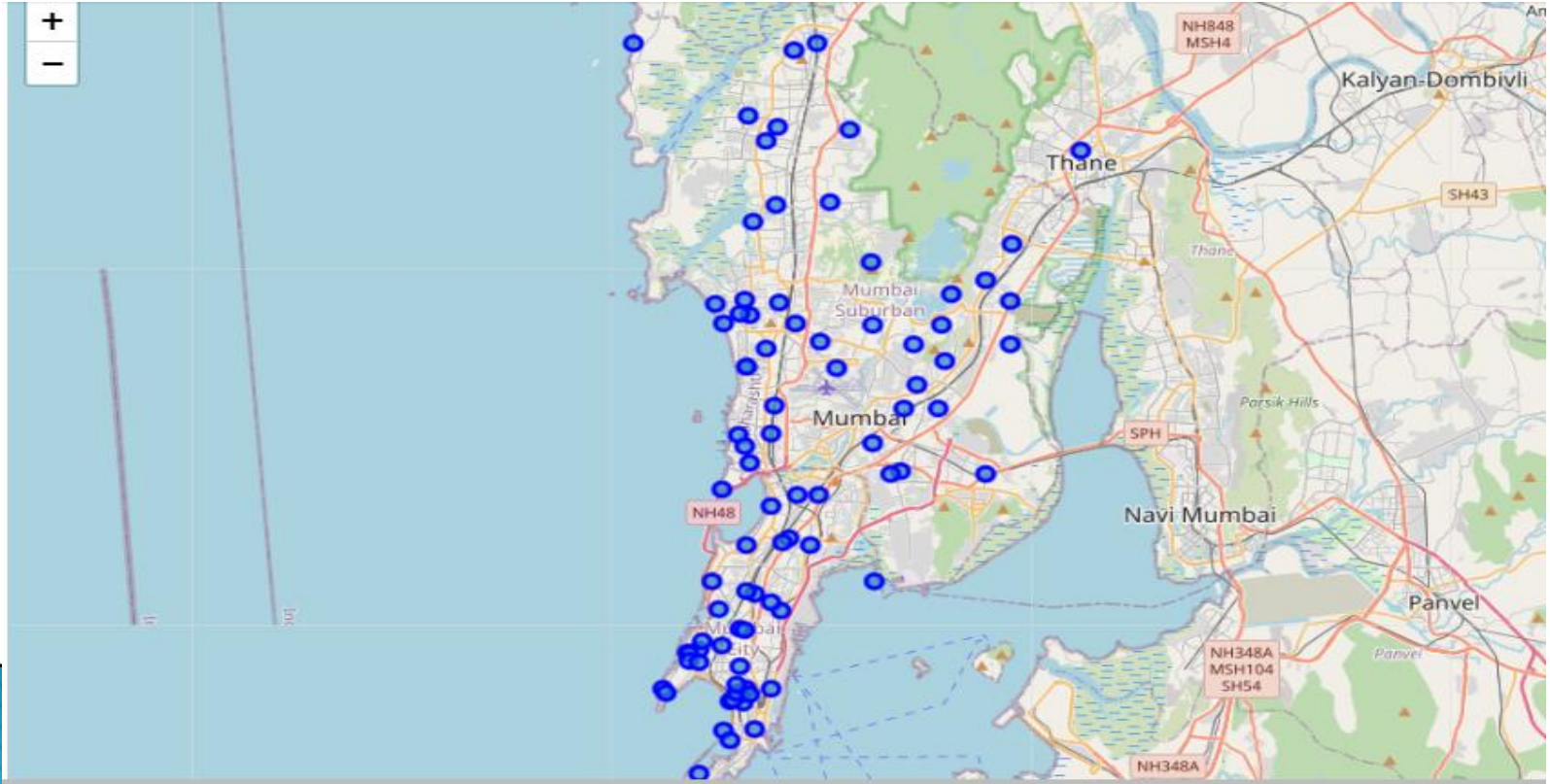| Venue Category	Frequency
Indian Restaurant	163
Café	84
Coffee Shop	54
Fast Food Restaurant	53
Bakery	42
Ice Cream Shop	40
Chinese Restaurant	39
Bar	38
Restaurant	34
Pizza Place	34
Snack Place	28
Dessert Shop	27

Exploratory Data Analysis

Here is a sample of the Mumbai neighbourhoods we analysed:

	Neighbourhood	Location	Latitude	Longitude
0	Amboli	Andheri,Western Suburbs	19.129300	72.843400
1	Chakala, Andheri	Western Suburbs	19.111388	72.860833
2	D.N. Nagar	Andheri,Western Suburbs	19.124085	72.831373
3	Four Bungalows	Andheri,Western Suburbs	19.124714	72.827210
4	Lokhandwala	Andheri,Western Suburbs	19.130815	72.829270
5	Marol	Andheri,Western Suburbs	19.119219	72.882743
6	Sahar	Andheri,Western Suburbs	19.098889	72.867222
7	Seven Bungalows	Andheri,Western Suburbs	19.129052	72.817018
8	Versova	Andheri,Western Suburbs	19.120000	72.820000
9	Mira Road	Mira-Bhayandar,Western Suburbs	19.284167	72.871111
10	Bhayandar	Mira-Bhayandar,Western Suburbs	19.290000	72.850000
11	Uttan	Mira-Bhayandar,Western Suburbs	19.280000	72.785000
12	Bandstand Promenade	Bandra,Western Suburbs	19.042718	72.819132
13	Kherwadi	Bandra,Western Suburbs	19.055300	72.831400
14	Pali Hill	Bandra,Western Suburbs	19.068000	72.826000
15	I.C. Colony	Borivali (West),Western Suburbs	19.247039	72.849830
16	Gorai	Borivali (West),Western Suburbs	19.250057	72.782021
17	Dahisar	Western Suburbs	19.250069	72.859347
18	Aarey Milk Colony	Goregaon,Western Suburbs	19.148493	72.881756

Exploratory Data Analysis

Here is a map of Mumbai city with the neighbourhoods superimposed as blue dots:

Exploratory Data Analysis

Here's the neighbourhoodwise venue category frequency table sample:

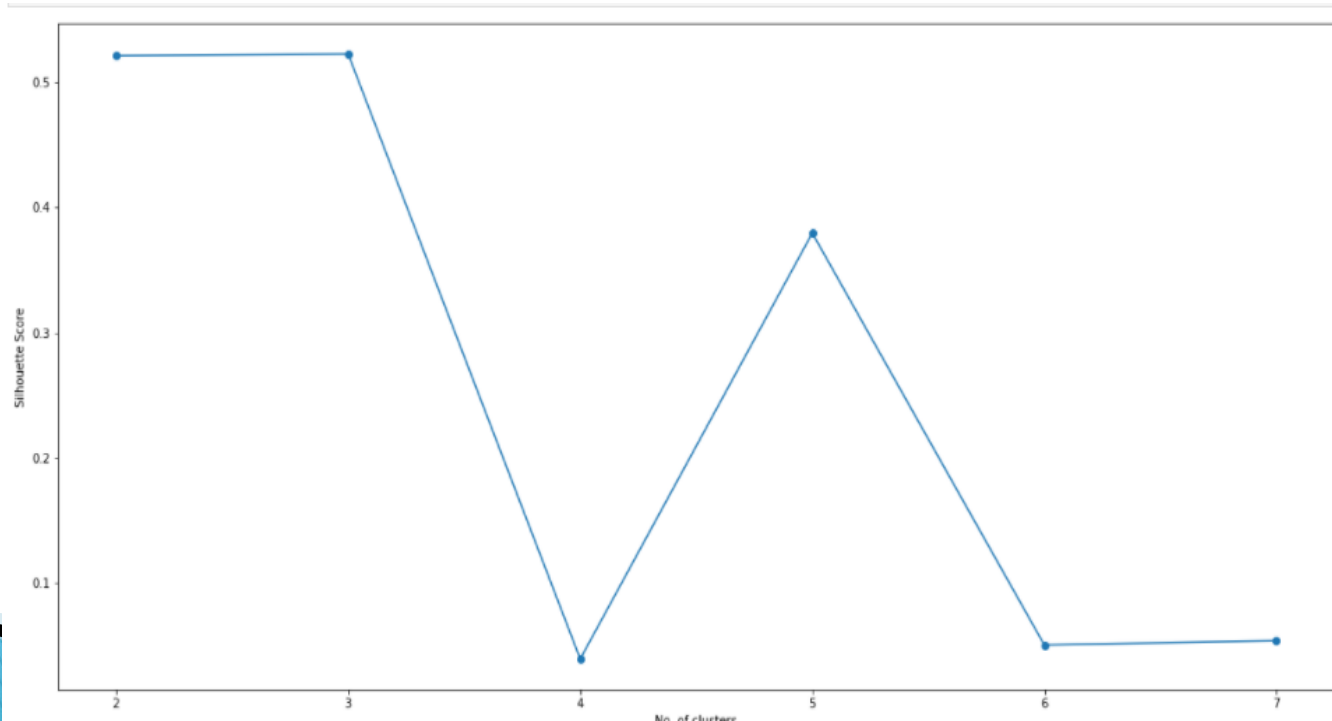|	Neighbourhoods	Advertising Agency	Afghan Restaurant	American Restaurant	Amphitheater	Antique Shop	Aquarium	Arcade	Art Gallery	Arts & Crafts Store	Asian Restaurant	Automotive Shop	BBQ Joint	Bagel Shop	Bakery	Bar
0	Agripada	0.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.250000	0.0
1	Altamount Road	0.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.142857	0.0
2	Amboli	0.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.000000	0.0
3	Amrut Nagar	0.0	0.027027	0.027027	0.0	0.0	0.0	0.0	0.0	0.0	0.027027	0.0	0.0	0.0	0.000000	0.0
4	Asalfa	0.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.000000	0.0
5	Ballard Estate	0.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.000000	0.0
6	Bandstand Promenade	0.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.000000	0.0
7	Bangur Nagar	0.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.000000	0.0
8	Bhandup	0.0	0.000000	0.000000	0.0	0.0	0.0	0.1	0.0	0.0	0.000000	0.0	0.0	0.0	0.000000	0.0
9	Bhayandar	0.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.000000	0.0

Exploratory Data Analysis

Here's the neighbourhoodwise top 10 venue category table sample:

	Neighbourhood	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	Agripada	Bakery	Gym	Indian Restaurant	Coffee Shop	Yoga Studio	Field	Fast Food Restaurant	Farmers Market	Falafel Restaurant	Event Space
1	Altamount Road	Café	Coffee Shop	Indian Restaurant	Sandwich Place	Theater	Bakery	Yoga Studio	Fast Food Restaurant	Farmers Market	Falafel Restaurant
2	Amboli	Fast Food Restaurant	Park	Gym	Coffee Shop	Indian Restaurant	Chinese Restaurant	Sandwich Place	Diner	Farmers Market	Falafel Restaurant
3	Amrut Nagar	Indian Restaurant	Café	Fast Food Restaurant	Electronics Store	Clothing Store	Pizza Place	Brewery	Sandwich Place	Bowling Alley	Mediterranean Restaurant
4	Asalfa	Men's Store	Yoga Studio	Flea Market	Field	Fast Food Restaurant	Farmers Market	Falafel Restaurant	Event Space	Electronics Store	Donut Shop

Segmenting/Clustering

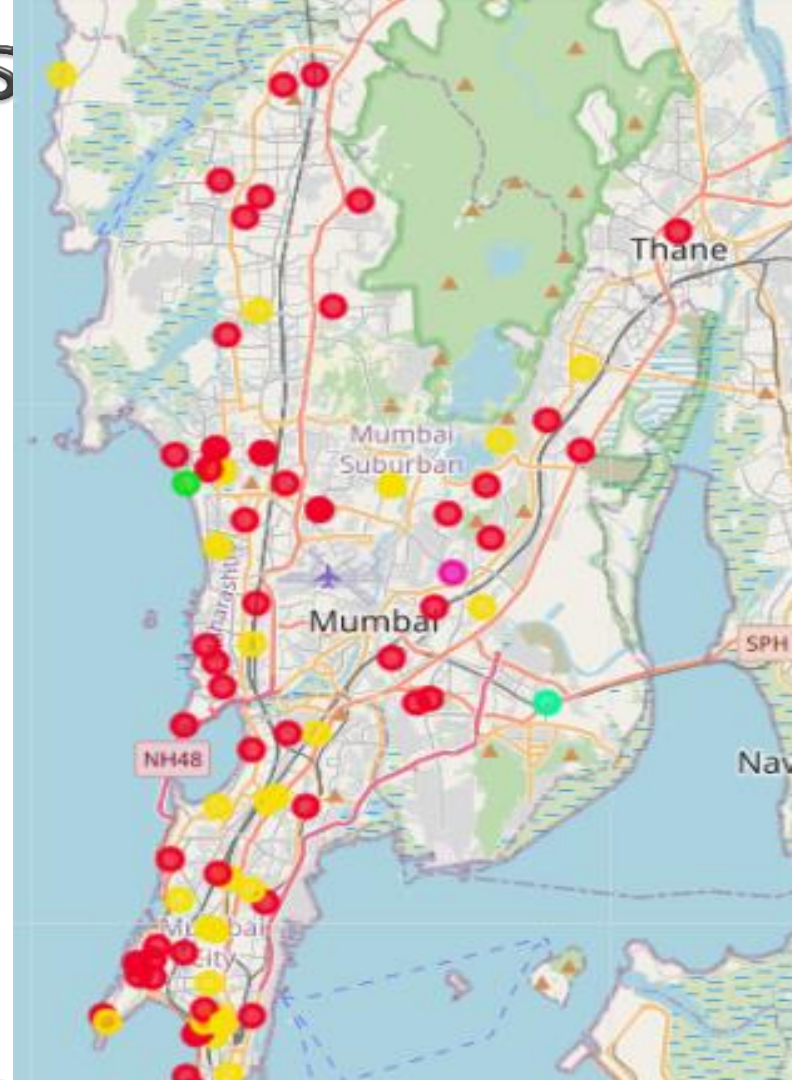We segmented the Mumbai/Manhattan neighbourhoods into 6 clusters using the Kmeans clustering algorithm. We find the optimal K using the elbow method as illustrated in the following diagram

Neighbourhood clusters on Mumbai map

One can see two dominant neighbourhood clusters emerging :

- The RED dots predominant along the western coastline of the city
- The YELLOW dots predominant in the southern part of the city

Neighbourhood clusters on Manhattan (NYC) map

One can see two dominant neighbourhood clusters emerging :

- The CYAN dots predominant along the western boundary of the island
- The PURPLE dots predominant along the eastern boundary of the island

Mumbai – cluster 2

Neighbourhood	Location	Latitude	Longitude	Cluster Labels	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
D.N. Nagar	Andheri,Western Suburbs	19.124085	72.831373	1.0	Gym / Fitness Center	Pizza Place	Indian Restaurant	Snack Place	Yoga Studio	Diner	Fast Food Restaurant	Farmers Market
Marol	Andheri,Western Suburbs	19.119219	72.882743	1.0	Indian Restaurant	Ice Cream Shop	Snack Place	Diner	Bakery	Department Store	Asian Restaurant	Coffee Shop
Uttan	Mira-Bhayandar,Western Suburbs	19.280000	72.785000	1.0	Beach	Playground	Indian Restaurant	Bus Station	Resort	Yoga Studio	Dog Run	Fast Food Restaurant
Gorai	Borivali (West),Western Suburbs	19.250057	72.782021	1.0	Resort	Seafood Restaurant	Aquarium	Tourist Information Center	Indian Restaurant	Yoga Studio	Fast Food Restaurant	Farmers Market
Juhu	Western Suburbs	19.100000	72.830000	1.0	Indian Restaurant	Bar	Hotel	Café	Dessert Shop	Spa	Nightclub	Beach
Khar Danda	Khar,Western Suburbs	19.068598	72.840042	1.0	Indian Restaurant	Bar	Pub	Lounge	Grocery Store	Gastropub	Beer Garden	Beer Bar
Sunder Nagar	Malad,Western Suburbs	19.175000	72.842000	1.0	Indian Restaurant	Chinese Restaurant	Electronics Store	American Restaurant	Hotel	Gym	Dessert Shop	Coffee Shop
Vile Parle	Western Suburbs	19.100000	72.830000	1.0	Indian Restaurant	Bar	Hotel	Café	Dessert Shop	Spa	Nightclub	Beach
Pant Nagar	Ghatkopar,Eastern Suburbs	19.080000	72.910000	1.0	Indian Restaurant	Ice Cream Shop	Vegetarian / Vegan Restaurant	Pizza Place	Multiplex	Gym / Fitness Center	Snack Place	Coffee Shop

Mumbai – cluster 4

Neighbourhood	Location	Latitude	Longitude	Cluster Labels	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
Amboli	Andheri,Western Suburbs	19.129300	72.843400	3.0	Fast Food Restaurant	Park	Gym	Coffee Shop	Indian Restaurant	Chinese Restaurant	Sandwich Place
Chakala, Andheri	Western Suburbs	19.111388	72.860833	3.0	Fast Food Restaurant	Restaurant	Hotel	Multiplex	Café	Falafel Restaurant	Seafood Restaurant
Four Bungalows	Andheri,Western Suburbs	19.124714	72.827210	3.0	Gym	Bakery	Pizza Place	Residential Building (Apartment / Condo)	Sandwich Place	Fish Market	Market
Lokhandwala	Andheri,Western Suburbs	19.130815	72.829270	3.0	Restaurant	Lounge	Department Store	Yoga Studio	Women's Store	Indian Restaurant	Liquor Store
Seven Bungalows	Andheri,Western Suburbs	19.129052	72.817018	3.0	Café	Ice Cream Shop	Chinese Restaurant	Pub	Indian Restaurant	Seafood Restaurant	Bar
Mira Road	Mira-Bhayandar,Western Suburbs	19.284167	72.871111	3.0	Pizza Place	Café	Chinese Restaurant	Field	Fast Food Restaurant	Farmers Market	Falafel Restaurant
Bhayandar	Mira-Bhayandar,Western Suburbs	19.290000	72.850000	3.0	Shipping Store	Yoga Studio	Convenience Store	Field	Fast Food Restaurant	Farmers Market	Falafel Restaurant
Bandstand Promenade	Bandra,Western Suburbs	19.042718	72.819132	3.0	Scenic Lookout	Boat or Ferry	Beach	Lounge	Food Truck	Cocktail Bar	Italian Restaurant
Kherwadi	Bandra,Western Suburbs	19.055300	72.831400	3.0	Indian Restaurant	Café	Bar	Bakery	Chinese Restaurant	Snack Place	Gourmet Shop
Pali Hill	Bandra,Western Suburbs	19.068000	72.826000	3.0	Fast Food Restaurant	Ice Cream Shop	Bakery	Cupcake Shop	Dessert Shop	Italian Restaurant	BBQ Joint

Mumbai – cluster 6

Neighbourhood	Location	Latitude	Longitude	Cluster Labels	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	10 M Comm Ver
Naigaon	Vasai,Western Suburbs	19.351467	72.846343	5.0	Platform	Train Station	Yoga Studio	Diner	Field	Fast Food Restaurant	Farmers Market	Falafel Restaurant	Event Space	Electron St
Mankhurd	Harbour Suburbs	19.050000	72.930000	5.0	Coffee Shop	Train Station	Sports Bar	Yoga Studio	Diner	Field	Fast Food Restaurant	Farmers Market	Falafel Restaurant	Ev Sp

Manhattan – cluster 1

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
Inwood	Mexican Restaurant	Restaurant	Café	Deli / Bodega	Wine Bar	Pizza Place	Park	Bakery	Lounge	Chinese Restaurant
Hamilton Heights	Pizza Place	Coffee Shop	Café	Mexican Restaurant	Deli / Bodega	Yoga Studio	Bakery	Latin American Restaurant	Liquor Store	Park
East Harlem	Bakery	Deli / Bodega	Thai Restaurant	Mexican Restaurant	Sandwich Place	Latin American Restaurant	Cocktail Bar	Grocery Store	Fast Food Restaurant	Café
Lower East Side	Chinese Restaurant	Art Gallery	Pizza Place	Café	Ramen Restaurant	Bakery	Coffee Shop	Yoga Studio	Mediterranean Restaurant	Mexican Restaurant

Manhattan – cluster 2

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
Chinatown	Chinese Restaurant	Bakery	Cocktail Bar	American Restaurant	Salon / Barbershop	Dessert Shop	Spa	Hotpot Restaurant	Optical Shop	Mexican Restaurant
Washington Heights	Café	Grocery Store	Bakery	Mobile Phone Shop	Pizza Place	Sandwich Place	Chinese Restaurant	Supermarket	Supplement Shop	Coffee Shop
Manhattanville	Coffee Shop	Deli / Bodega	Mexican Restaurant	Italian Restaurant	Bar	Spanish Restaurant	Cuban Restaurant	Chinese Restaurant	Bike Trail	Boutique
Yorkville	Italian Restaurant	Gym	Bar	Coffee Shop	Deli / Bodega	Mexican Restaurant	Sushi Restaurant	Japanese Restaurant	Wine Shop	Pub
Lenox Hill	Italian Restaurant	Coffee Shop	Pizza Place	Sushi Restaurant	Café	Cocktail Bar	Gym	Burger Joint	Gym / Fitness Center	Steakhouse
Upper West Side	Italian Restaurant	Bakery	Wine Bar	Mediterranean Restaurant	Bar	Café	Coffee Shop	Pub	Sushi Restaurant	Indian Restaurant
Murray Hill	Coffee Shop	Sandwich Place	Japanese Restaurant	Hotel	American Restaurant	Bar	Burger Joint	Gym / Fitness Center	Sushi Restaurant	Taco Place
East Village	Bar	Cocktail Bar	Speakeasy	Mexican Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Pizza Place	Italian Restaurant	Ice Cream Shop	Coffee Shop
Little Italy	Bakery	Café	Italian Restaurant	Ice Cream Shop	Mediterranean Restaurant	Tea Room	Pizza Place	Coffee Shop	Bubble Tea Shop	Chinese Restaurant
Manhattan Valley	Coffee Shop	Mexican Restaurant	Bar	Vietnamese Restaurant	Pizza Place	Fried Chicken Joint	Farmers Market	Hill	Liquor Store	Caribbean Restaurant
Gramercy	Bar	Bagel Shop	Italian Restaurant	Coffee Shop	Pizza Place	Wine Shop	Mexican Restaurant	American Restaurant	Diner	Ice Cream Shop

Manhattan – cluster 3

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
Central Harlem	Seafood Restaurant	African Restaurant	Public Art	Bar	Gym / Fitness Center	French Restaurant	American Restaurant	Chinese Restaurant	Café	Event Space
Upper East Side	Italian Restaurant	Gym / Fitness Center	Exhibit	Bakery	Juice Bar	American Restaurant	Coffee Shop	Yoga Studio	Cosmetics Shop	Spa
Roosevelt Island	Park	Coffee Shop	School	Scenic Lookout	Liquor Store	Supermarket	Farmers Market	Outdoors & Recreation	Gym / Fitness Center	Gym
Lincoln Square	Plaza	Performing Arts Venue	Theater	Café	Concert Hall	Indie Movie Theater	Wine Shop	Park	Coffee Shop	French Restaurant
Clinton	Italian Restaurant	Gym / Fitness Center	American Restaurant	Theater	Sandwich Place	Wine Shop	Coffee Shop	Spa	Gym	Cocktail Bar
Midtown	Hotel	Clothing Store	Sporting Goods Shop	Theater	Coffee Shop	Steakhouse	Bookstore	American Restaurant	Spa	Bakery
Chelsea	Coffee Shop	Art Gallery	Bakery	American Restaurant	French Restaurant	Hotel	Wine Shop	Ice Cream Shop	Seafood Restaurant	Thai Restaurant
Greenwich Village	Italian Restaurant	Clothing Store	Sushi Restaurant	Dessert Shop	Cosmetics Shop	Boutique	Indian Restaurant	Coffee Shop	Gym	Chinese Restaurant
Tribeca	American Restaurant	Park	Italian Restaurant	Spa	Wine Bar	Café	Skate Park	Scenic Lookout	Bar	Men's Store
Soho	Clothing Store	Italian Restaurant	Boutique	Mediterranean Restaurant	Coffee Shop	Shoe Store	Optical Shop	Women's Store	Bakery	Art Gallery
West Village	Italian	New American	Park	American	Cocktail Bar	Cosmetics	Wine Bar	Ice Cream	Coffee Shop	Sushi

Results

Mumbai Data

- cluster 2 consists of neighbourhoods belonging to the quintessential "old" Mumbai with venues overbearingly depicting classical tastes such as Jewellery, cup cake, grocery, plaza, beach, playground etc.

- cluster 4 consists of some what affluent neighbourhoods with top venues of specialized restaurants, cafes, ice cream, bars and the sea side with a focus on entertainment

- Cluster 6 consists of far flung distant suburbs which are not considered affluent and whose 2nd most common venue is a train station with a focus on daily commute rather than entertainment followed by Yoga with a focus on fitness

Results

Manhattan Data

- Cluster 1 seems to have a round the world/immigrant feel with top venues such as Latin American, Mexican and Chinese restaurants and Deli/Bodegas.

- Cluster 2 consists of affluent neighbourhoods such as the financial district with top venues such as specialty restaurants, cocktail bars, wine bars and such rich tastes in lifestyle with a focus on the good life and entertainment

- Cluster 3 seems to have a global, bohemian, artistic feel with top venues such as Italian, Korean, African and Chinese restaurants and Deli/Bodegas, parks, plazas, concert hall, indie movie theatre and such rich tastes in lifestyle with a focus on the world food, art and entertainment

Conclusion

Cluster 2 of Manhattan seems to be similar to Cluster 4 of Mumbai and people living in the Cluster 2 of Manhattan would most probably feel at home living in Cluster 4 of Mumbai and vice versa.