

# **Capstone – Project**

## **The Battle of Neighborhoods Week 5**

### **1. Introduction:**

The City of New York, is the most populous city in the United States. It is diverse and is the financial capital of USA. New York City is often referred to collectively as the five boroughs, and in turn, there are hundreds of distinct neighborhoods throughout the boroughs, many with a definable history and character to call their own. If the boroughs were each independent city, four of the boroughs (Brooklyn, Queens, Manhattan, and the Bronx) would be among the ten most populous cities in the United States.

It provides lot of business opportunities and business friendly environment. It has attracted many different players into the market. The city is a major center for banking and finance, retailing, world trade, transportation, tourism, real estate, new media, traditional media, advertising, legal services, accountancy, insurance, theater, fashion, and the arts in the United States. This also means that the market is highly competitive. As it is highly developed city so cost of doing business is also one of the highest. Thus, any new business venture or expansion needs to be analyzed carefully. The insights derived from analysis will give good understanding of the business environment which help in strategically targeting the market.

### **2. Business problem:**

The City of New York is famous for numerous excellent cuisines across many nations with an array of international cuisines Indian restaurants have become so popular in the United States due to huge population of Asian immigrants. So, starting an Indian cuisine restaurant can be a great business opportunity and we need to determine the right location to cover wider customers.

### **3. Data:**

New York has a total of 5 boroughs and 306 neighborhoods. In order to segment the neighborhoods and explore them, we will essentially need a dataset that contains the 5 boroughs and the neighborhoods that exist in each borough as well as the latitude and longitude coordinates of each neighborhood.

Luckily, this dataset exists for free on the web. Feel free to try to find this dataset on your own, but here is the link to the dataset: [https://geo.nyu.edu/catalog/nyu\\_2451\\_34572](https://geo.nyu.edu/catalog/nyu_2451_34572)

From Foursquare Venues Categories -

<https://developer.foursquare.com/docs/resources/categories>

To find the best location for our Indian Restaurant, we will use the following sources of information:

Indian category Id - [4bf58dd8d48988d10f941735](#)

## 4. Methodology

In this project, I have used the same methodology as taught in Week 3 lab.

Out[5]:

	Borough	Neighborhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585

I have used Foursquare API to explore neighborhoods in Manhattan, New York. After that, explore function to get Indian restaurant categories in each neighborhood.

Out[15]:

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Marble Hill	40.876551	-73.910660	Riverdale Indian Cuisine	40.880886	-73.908800	Indian Restaurant
1	Marble Hill	40.876551	-73.910660	Tazmohol Indian Restaurant	40.879331	-73.903192	Indian Restaurant
2	Marble Hill	40.876551	-73.910660	Cumin Indian Cuisine	40.886459	-73.909816	Indian Restaurant
3	Chinatown	40.715618	-73.994279	Kabab Bites	40.720094	-73.995819	Indian Restaurant
4	Chinatown	40.715618	-73.994279	Hampton Chutney Co.	40.720220	-73.999347	Dosa Place

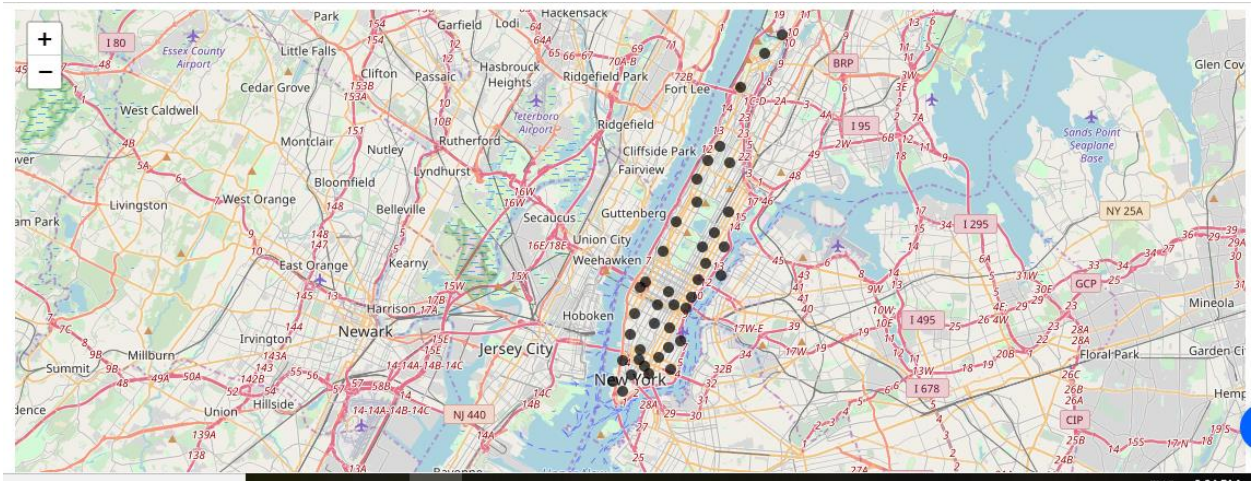
: newyork\_venues\_indian.shape

Out[21]: (1081, 7)

Then use this feature to group the neighborhoods into clusters K-means clustering algorithm will be use to complete this task. And also, the Folium library to visualize the neighborhoods in Manhattan and its emerging clusters

Out[19]:

	Neighborhood	Asian Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Food Truck	Himalayan Restaurant	Hookah Bar	Indian Chinese Restaurant	Indian Restaurant	Music Store	North Indian Restaurant	Pakistani Restaurant	South Indian Restaurant	Re
0	Marble Hill	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
1	Marble Hill	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
2	Marble Hill	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
3	Chinatown	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
4	Chinatown	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	



## 5. Results:

K-mean Cluster is used for clustering data area with less number of Indian Restaurants.

Cluster 0:

Out[27]:

	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
14	Clinton	Indian Restaurant	Food Truck	South Indian Restaurant	Diner	Vegetarian / Vegan Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Dosa Place	Hookah Bar
15	Midtown	Indian Restaurant	Food Truck	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Diner	Vegetarian / Vegan Restaurant	Dosa Place	Burrito Place	Chaat Place
16	Murray Hill	Indian Restaurant	South Indian Restaurant	Food Truck	Vegetarian / Vegan Restaurant	Burrito Place	North Indian Restaurant	Diner	Chaat Place	Deli / Bodega	Dosa Place
23	Soho	Indian Restaurant	Food Truck	Dosa Place	Asian Restaurant	North Indian Restaurant	Deli / Bodega	Burrito Place	Chaat Place	Diner	Vegetarian / Vegan Restaurant
24	West Village	Indian Restaurant	Food Truck	Indian Chinese Restaurant	Vegetarian / Vegan Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Hookah Bar
28	Battery Park City	Indian Restaurant	Food Truck	Asian Restaurant	Tapas Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Vegetarian / Vegan Restaurant
32	Civic Center	Indian Restaurant	Food Truck	Asian Restaurant	Dosa Place	Tapas Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Vegetarian / Vegan Restaurant
33	Midtown South	Indian Restaurant	Food Truck	South Indian Restaurant	Vegetarian / Vegan Restaurant	Pakistani Restaurant	Burrito Place	Diner	Chaat Place	Deli / Bodega	Dosa Place

## 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
0	Marble Hill	Indian Restaurant	Vegetarian / Vegan Restaurant	Himalayan Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Food Truck	Hookah Bar
2	Washington Heights	Indian Restaurant	Vegetarian / Vegan Restaurant	Himalayan Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Food Truck	Hookah Bar
4	Hamilton Heights	Indian Restaurant	Vegetarian / Vegan Restaurant	Himalayan Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Food Truck	Hookah Bar
5	Manhattanville	Indian Restaurant	Vegetarian / Vegan Restaurant	Himalayan Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Food Truck	Hookah Bar
6	Central Harlem	Indian Restaurant	Vegetarian / Vegan Restaurant	Himalayan Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Food Truck	Hookah Bar
7	East Harlem	Indian Restaurant	Vegetarian / Vegan Restaurant	Himalayan Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Food Truck	Hookah Bar
25	Manhattan Valley	Indian Restaurant	Himalayan Restaurant	Vegetarian / Vegan Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Food Truck	Hookah Bar
26	Morningside Heights	Indian Restaurant	Himalayan Restaurant	Vegetarian / Vegan Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Food Truck	Hookah Bar

## 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
1	Chinatown	Indian Restaurant	North Indian Restaurant	Deli / Bodega	Dosa Place	Vegetarian / Vegan Restaurant	Food Truck	Burrito Place	Chaat Place	Diner	Hookah Bar
8	Upper East Side	Indian Restaurant	North Indian Restaurant	Vegetarian / Vegan Restaurant	Food Truck	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Hookah Bar
9	Yorkville	Indian Restaurant	North Indian Restaurant	Vegetarian / Vegan Restaurant	Food Truck	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Hookah Bar
10	Lenox Hill	Indian Restaurant	Asian Restaurant	North Indian Restaurant	Food Truck	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Vegetarian / Vegan Restaurant
11	Roosevelt Island	Indian Restaurant	Asian Restaurant	Himalayan Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Food Truck	Vegetarian / Vegan Restaurant
12	Upper West Side	Indian Restaurant	South Indian Restaurant	Vegetarian / Vegan Restaurant	Food Truck	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Hookah Bar
13	Lincoln Square	Indian Restaurant	Food Truck	South Indian Restaurant	Vegetarian / Vegan Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Hookah Bar

## 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
37	Stuyvesant Town	Indian Restaurant	Vegetarian / Vegan Restaurant	Chaat Place	North Indian Restaurant	Deli / Bodega	Dosa Place	Food Truck	Burrito Place	Diner	Hookah Bar

## 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
17	Chelsea	Indian Restaurant	Food Truck	Vegetarian / Vegan Restaurant	Indian Chinese Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Hookah Bar
27	Gramercy	Indian Restaurant	Food Truck	Vegetarian / Vegan Restaurant	South Indian Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Hookah Bar	Music Store	North Indian Restaurant
29	Financial District	Indian Restaurant	Food Truck	Asian Restaurant	Tapas Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Diner	Dosa Place	Vegetarian / Vegan Restaurant
38	Flatiron	Indian Restaurant	Food Truck	South Indian Restaurant	Vegetarian / Vegan Restaurant	Burrito Place	Deli / Bodega	Diner	Hookah Bar	Indian Chinese Restaurant	North Indian Restaurant
39	Hudson Yards	Indian Restaurant	Food Truck	South Indian Restaurant	Diner	Vegetarian / Vegan Restaurant	Burrito Place	Chaat Place	Deli / Bodega	Dosa Place	Hookah Bar

## **6. Discussion:**

Based on the above cluster analysis, Cluster 3 will be most ideal location to open Indian restaurant followed by Cluster 4 as there are less number of restaurants available today.

- Stuyvesant Town neighborhood (under Cluster 3) has only one existing restaurant and this is the most viable location to open new Indian restaurant.
- Cluster 2 has numerous Indian based restaurants (close to 36) and this is the most risker zone to open new business.

## **7. Conclusion:**

Finally, we used Foursquare, Folium, K mean cluster to identify the zone to open Indian restaurant in New York neighborhood.