Selecting the best location to open an Indian restaurant in Manhattan, NY City

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1: Introduction

The City of New York, is the most populous in the United States. It is multicultural, diverse and is the financial capital of the USA. It provides a lot of business opportunities and a business-friendly environment. It has attracted many different players into the market. It is a global hub of business and commerce. The city is a major centre for banking and finance, retailing, world trade, transportation, tourism, real estate, new media, traditional media, advertising, legal services, accountancy, insurance, theatre, fashion, and the arts in the United States. This also means that the market is highly competitive. As it is a highly developed city so the cost of doing business is also one of the highest.

Thus, any new business venture or expansion needs to be analysed carefully. The insights derived from the analysis will give a good understanding of the business environment which help in strategically targeting the market. This will help in the reduction of risk and the return on Investment will be reasonable.

Business problem

The City of New York is famous for its excellent cuisine. Its food culture includes an array of international cuisines influenced by the city's immigrant history.

Indian restaurants have become so popular in the United States now it seems that there is one on every corner, not only in major cities but also in smaller cities. Starting an Indian restaurant can be a great business opportunity, but you need to distinguish yourself from others to enjoy long-term success.

1. Finding a suitable location

If you plan a real restaurant that can demand higher prices for authentic Indian different cuisines and Spicy food, focus on neighbourhoods and outlets that already attract a sophisticated Indian client. If you plan a cheap buffet restaurant, points to the masses looking for affordable high-traffic locations with large shopping centres and other local points of interest.

So it is evident that to survive in such a competitive market it is very important to strategically plan. Various factors need to be studied to decide on the Location.

2. Target Audience

My Client wants to open his business in the Manhattan area, so I only focus on that borough during my analysis. The objective is to locate and recommend to the management which neighbourhood of New York city will be the best choice to start a restaurant. Management also expects to understand the rationale of the recommendations made.

This would interest anyone who wants to start a new restaurant in New York city.

2: Data

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

1- New York has a total of 5 boroughs and 306 neighbourhoods. To segment the neighbourhoods and explore them, we will essentially need a dataset that contains the 5 boroughs and the neighbourhoods that exist in each borough as well as the latitude and longitude coordinates of each neighbourhood. Luckily, this dataset exists for free on the web.

```
# checking our data frame
neighborhoods.head()
```

	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

Here is the link to the dataset: https://geo.nyu.edu/catalog/nyu_2451_34572

2- From Foursquare Venues Categories - https://developer.foursquare.com/docs/resources/categories

Indian restaurant category Id – 4bf58dd8d48988d10f941735
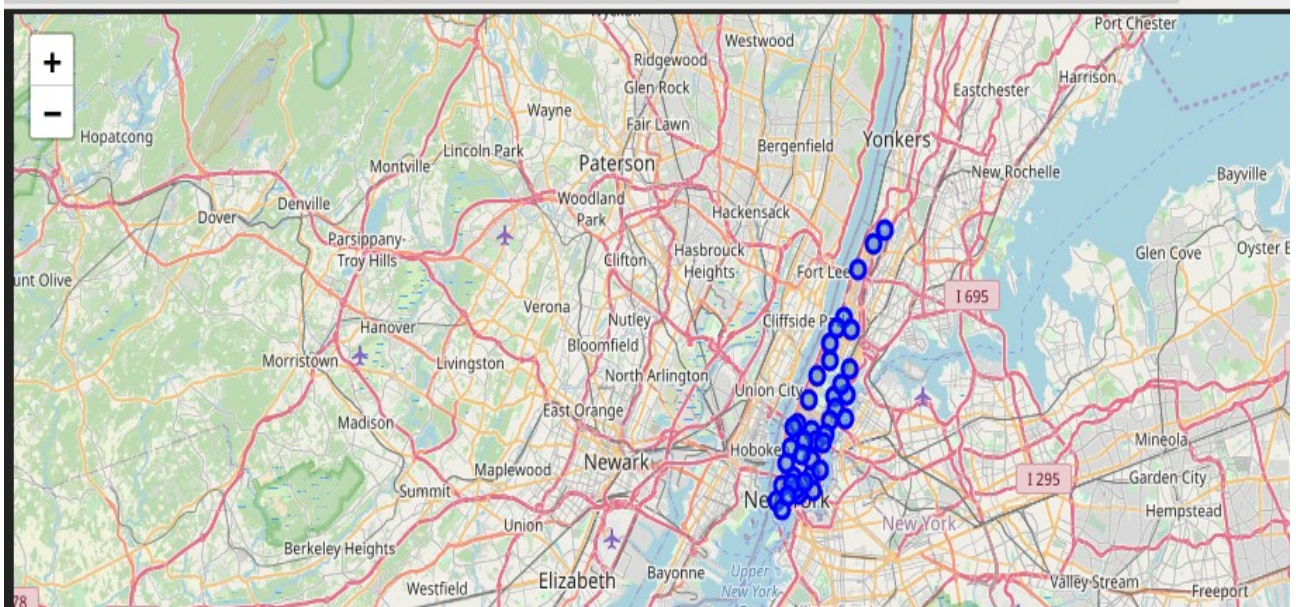
3: Methodology

In this project, I will use the basic methodology as taught in Week 3 lab.

Since we are only interested in Manhattan area. There are 40 neighbourhood in Manhattan.

```
Queens          81
Brooklyn        70
Staten Island   63
Bronx           52
Manhattan       40
Name: Borough, dtype: int64
```

	Borough	Neighborhood	Latitude	Longitude
0	Manhattan	Marble Hill	40.876551	-73.910660
1	Manhattan	Chinatown	40.715618	-73.994279
2	Manhattan	Washington Heights	40.851903	-73.936900
3	Manhattan	Inwood	40.867684	-73.921210
4	Manhattan	Hamilton Heights	40.823604	-73.949688

We will then create a map of New York with neighbourhood of Manhattan superimposed on it.

Then we will use the Foursquare API to explore neighbourhood in Manhattan,New York. After that, explore function to get Indian restaurant categories in each neighbourhood.

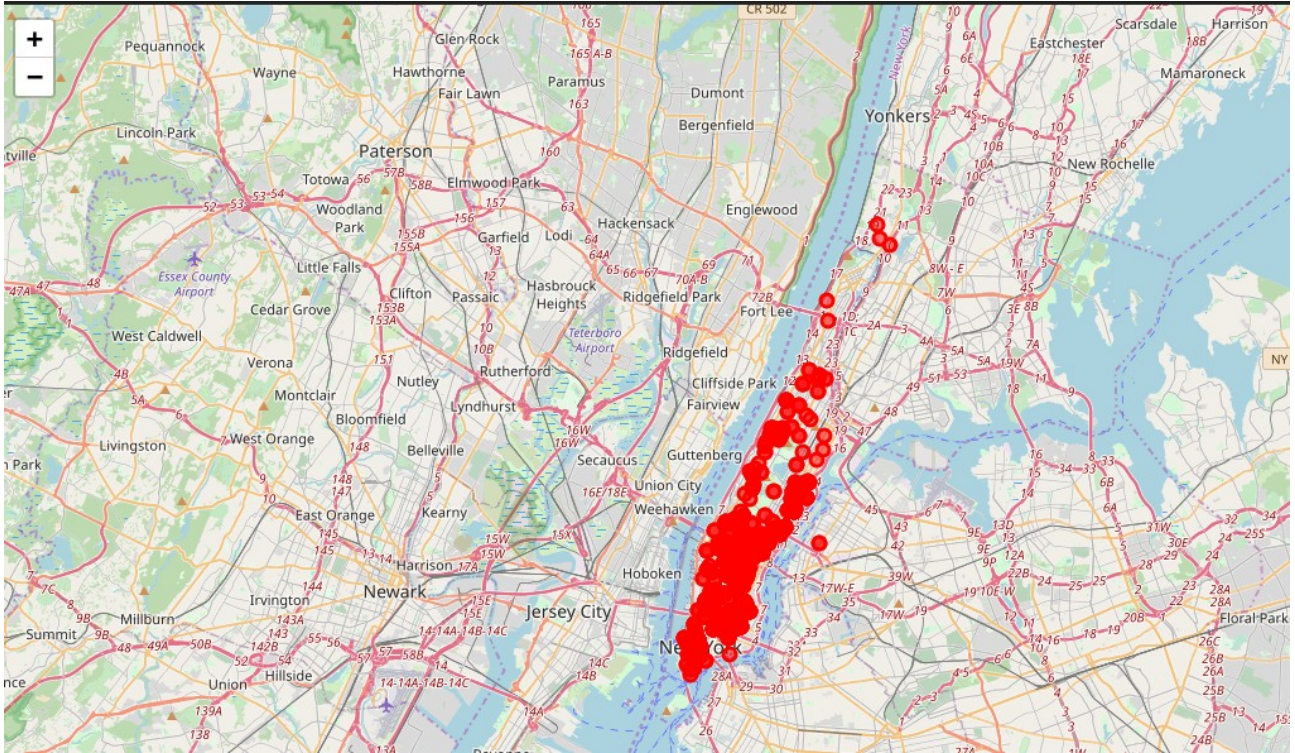|	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Marble Hill	40.876551	-73.910660	Riverdale Indian Cuisine	40.880886	-73.908800	Indian Restaurant
1	Marble Hill	40.876551	-73.910660	Tazmohol Indian Restaurant	40.878058	-73.903045	Indian 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	indi thai	40.719830	-73.990350	Indian Restaurant

```
newyork_venues_indian.shape
```
```
(1093, 7)
```

There are 1093 Indian restaurant venues across all neighbourhood in Manhattan.

Lets visualize all these 1093 Indian restaurant venues in Manhattan using folium.

Meanwhile I failed to get venue info for one of the neighbourhood using foursquare. So, I had to drop it. Next we group all the venues by neighbourhood, So we have 39 categories now.

Sorting all the neighbourhood by their most common venues. We get below data frame.
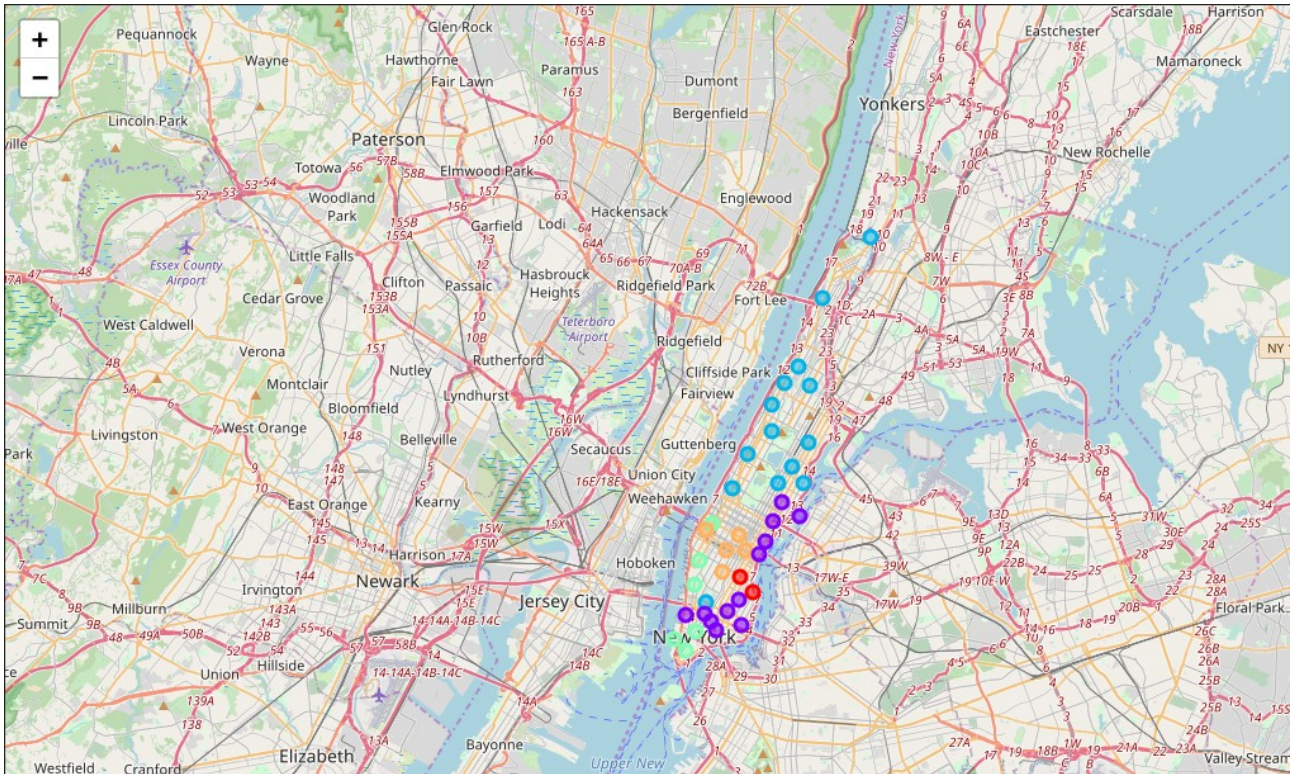
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
0	Battery Park City	Indian Restaurant	Food Truck	Tapas Restaurant	Asian Restaurant	Vegetarian / Vegan Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store
1	Carnegie Hill	Indian Restaurant	North Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	Music Store	Himalayan Restaurant	Food Truck
2	Central Harlem	Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store	Himalayan Restaurant	Food Truck
3	Chelsea	Indian Restaurant	Food Truck	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store	Himalayan Restaurant
4	Chinatown	Indian Restaurant	North Indian Restaurant	Dosa Place	Deli / Bodega	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	Music Store

Then use this feature to group the neighbourhoods into clusters using K-means clustering algorithm. We get clusters associated with each of these neighbourhood.

	Borough	Neighborhood	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 Co Ve
0	Manhattan	Marble Hill	40.876551	-73.910660	2	Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	No Inc Re
1	Manhattan	Chinatown	40.715618	-73.994279	1	Indian Restaurant	North Indian Restaurant	Dosa Place	Deli / Bodega	Vegetarian / Vegan Restaurant	Ta Re
2	Manhattan	Washington Heights	40.851903	-73.936900	2	Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	No Inc Re
4	Manhattan	Hamilton Heights	40.823604	-73.949688	2	Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	No Inc Re
5	Manhattan	Manhattanville	40.816934	-73.957385	2	Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	No Inc Re

Finally, Folium library to visualize the neighbourhoods in Manhattan and its emerging clusters.

4: Results

Following are the 5 clusters obtained:

Cluster 0:

	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	1(C V(
27	Gramercy	Indian Restaurant	South Indian Restaurant	North Indian Restaurant	Vegetarian / Vegan Restaurant	Dosa Place	Deli / Bodega	Chaat Place	Burrito Place	Asian Restaurant	Tí R
37	Stuyvesant Town	Indian Restaurant	Vegetarian / Vegan Restaurant	South Indian Restaurant	North Indian Restaurant	Dosa Place	Deli / Bodega	Chaat Place	Tapas Restaurant	Pakistani Restaurant	M S

Two neighbourhoods in cluster 0.

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
1	Chinatown	Indian Restaurant	North Indian Restaurant	Dosa Place	Deli / Bodega	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	Music Store
10	Lenox Hill	Indian Restaurant	North Indian Restaurant	Food Court	Asian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	Music Store
11	Roosevelt Island	Indian Restaurant	Food Court	Asian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store
19	East Village	Indian Restaurant	Dosa Place	Deli / Bodega	Vegetarian / Vegan Restaurant	South Indian Restaurant	North Indian Restaurant	Chaat Place	Tapas Restaurant	Pakistani Restaurant
20	Lower East Side	Indian Restaurant	Vegetarian / Vegan Restaurant	South Indian Restaurant	North Indian Restaurant	Deli / Bodega	Chaat Place	Tapas Restaurant	Pakistani Restaurant	Music Store
21	Tribeca	Indian Restaurant	Food Truck	Tapas Restaurant	Dosa Place	Asian Restaurant	Vegetarian / Vegan Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant
22	Little Italy	Indian Restaurant	Dosa Place	North Indian Restaurant	Deli / Bodega	Asian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant
23	Soho	Indian Restaurant	Food Truck	Dosa Place	North Indian Restaurant	Deli / Bodega	Asian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant
31	Noho	Indian Restaurant	Dosa Place	Vegetarian / Vegan Restaurant	South Indian Restaurant	Food Truck	Deli / Bodega	Chaat Place	Tapas Restaurant	Pakistani Restaurant
34	Sutton Place	Indian Restaurant	Food Truck	Food Court	Asian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant
35	Turtle Bay	Indian Restaurant	Food Truck	North Indian Restaurant	Food Court	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	Music Store
36	Tudor City	Indian Restaurant	South Indian Restaurant	North Indian Restaurant	Music Store	Food Truck	Chaat Place	Burrito Place	Asian Restaurant	Vegetarian / Vegan Restaurant

12 neighbourhoods in cluster 1.

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
0	Marble Hill	Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store	Himalayan Restaurant	Food Truck
2	Washington Heights	Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store	Himalayan Restaurant	Food Truck
4	Hamilton Heights	Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store	Himalayan Restaurant	Food Truck
5	Manhattanville	Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store	Himalayan Restaurant	Food Truck
6	Central Harlem	Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store	Himalayan Restaurant	Food Truck
7	East Harlem	Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store	Himalayan Restaurant	Food Truck
8	Upper East Side	Indian Restaurant	North Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	Music Store	Himalayan Restaurant	Food Truck
9	Yorkville	Indian Restaurant	North Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	Music Store	Himalayan Restaurant	Food Truck
12	Upper West Side	Indian Restaurant	South Indian Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store	Himalayan Restaurant	Food Truck
13	Lincoln Square	Indian Restaurant	South Indian Restaurant	Food Truck	Vegetarian / Vegan Restaurant	Tapas Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store	Himalayan Restaurant
18	Greenwich Village	Indian Restaurant	Dosa Place	Food Truck	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store
25	Manhattan Valley	Indian Restaurant	Himalayan Restaurant	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store	Food Truck
26	Morningside Heights	Indian Restaurant	Himalayan Restaurant	Vegetarian / Vegan	Tapas Restaurant	South Indian	Pakistani Restaurant	North Indian	Music Store	Food Truck

13 neighbourhoods in cluster 2.

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
14	Clinton	Indian Restaurant	Food Truck	South Indian Restaurant	Diner	Vegetarian / Vegan Restaurant	Tapas Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store
17	Chelsea	Indian Restaurant	Food Truck	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store	Himalayan Restaurant
24	West Village	Indian Restaurant	Food Truck	Vegetarian / Vegan Restaurant	Tapas Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store	Himalayan Restaurant
28	Battery Park City	Indian Restaurant	Food Truck	Tapas Restaurant	Asian Restaurant	Vegetarian / Vegan Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store
29	Financial District	Indian Restaurant	Food Truck	Tapas Restaurant	Asian Restaurant	Vegetarian / Vegan Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store
32	Civic Center	Indian Restaurant	Food Truck	Tapas Restaurant	Dosa Place	Asian Restaurant	Vegetarian / Vegan Restaurant	South Indian Restaurant	Pakistani Restaurant	North Indian Restaurant

6 neighbourhoods in cluster 3.

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
15	Midtown	Indian Restaurant	Food Truck	South Indian Restaurant	North Indian Restaurant	Pakistani Restaurant	Diner	Vegetarian / Vegan Restaurant	Tapas Restaurant	Music Store
16	Murray Hill	Indian Restaurant	South Indian Restaurant	North Indian Restaurant	Vegetarian / Vegan Restaurant	Pakistani Restaurant	Food Truck	Diner	Tapas Restaurant	Music Store
33	Midtown South	Indian Restaurant	South Indian Restaurant	North Indian Restaurant	Food Truck	Vegetarian / Vegan Restaurant	Pakistani Restaurant	Diner	Tapas Restaurant	Music Store
38	Flatiron	Indian Restaurant	North Indian Restaurant	South Indian Restaurant	Vegetarian / Vegan Restaurant	Food Truck	Dosa Place	Diner	Deli / Bodega	Asian Restaurant
39	Hudson Yards	Indian Restaurant	Food Truck	South Indian Restaurant	Diner	Vegetarian / Vegan Restaurant	Tapas Restaurant	Pakistani Restaurant	North Indian Restaurant	Music Store

5 neighbourhoods in cluster 4.

5: Discussion

In this section, I would be discussing the observations I have noted and the

recommendation that I can make based on the results.

- Gramercy and Stuyvesant town have good potential and unique cluster in itself.
- Cluster 3 neighbourhoods have also good potential with food trucks being second most common venue.
- Cluster 4 is more popular for South Indian restaurants.
- More detailed analysis by adding other factors such as transportation, demographics of inhabitants.

Finally, FourSquare proved to be a good source of data but data fetching limitations led to dropping of 2 neighbourhoods.

6: Conclusion

Although all of the goals of this project were met there is definitely room for further

improvement and development.

Incorporating transportation factors and demographic details, It could easily be developed into a fully fledged application that could support the opening a business idea in an unknown location.

A venue with lowest risk and competition can be identified by this approach.