

PROJECT REPORT ON

“The Battle of Neighborhoods” (Analyzing Neighborhoods in Delhi)

Submitted by: Reshabh Chauhan

December 2019

INTRODUCTION

Problem: -

In this project, I am going to resolve my friend's problem, who wants to open a '*Badminton Academy*' in *Delhi*, the National Capital of India. As I am a badminton player, therefore, He asked me about the place *where* He should open his badminton academy in Delhi so that He'll get lots of badminton players to learn in his academy.

This problem is not only related to finding a suitable place for badminton academy, but also for anything like restaurants, café, coffee shops. We just need to change a few things in our analysis, we'll get the result we want.

Who would be interested in this project: -

In this particular project, my friend needs my help to get a suitable place for his 'Badminton academy' in Delhi. But as I mentioned above that this project may be beneficial for anybody who is interested to open something within Delhi.

METHODOLOGY

Source of the Data: -

Secondary Data: - This project is based on the secondary data which is collected from the internet using Wikipedia and Delhi Govt. websites.

This Data includes ‘Geographical Data’ of Delhi, The National Capital of India which includes few Neighborhoods, their Postal Codes, Latitude, and Longitude.

	Postalcode	Neighborhood	latitude	longitude
0	110006	Chandni Chowk	28.6505	77.2303
1	110006	Chawri Bazaar	28.6482	77.2270
2	110007	Kamla Nagar	28.6809	77.2046
3	110054	Kashmiri Gate	28.6665	77.2333
4	110005	Karol Bagh	28.6550	77.1888

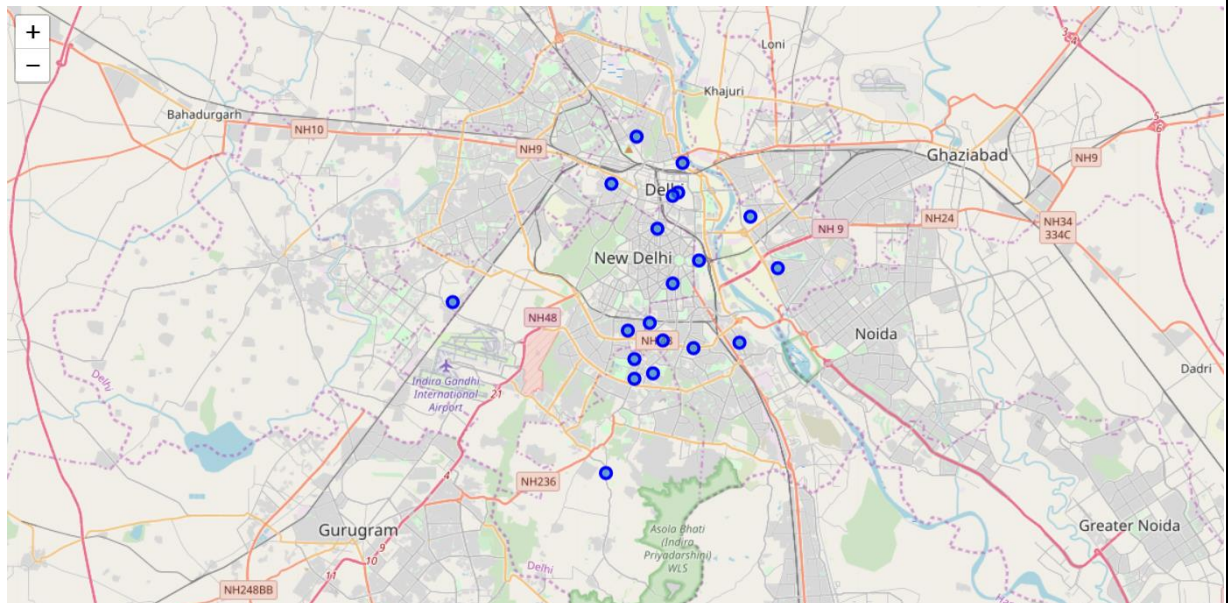
Methods used to describe the data: -

I have used the following steps to describe and analyze the data-

1. we have collected Geographic Data from the internet which includes Postal codes, Neighborhoods, Latitude, and Longitude of the Neighborhoods. The data was collected in 'Excel' file.
2. For analyzing this data, we used to read the function of the Pandas library to convert this data into the data frame.

	Postalcode	Neighborhood	latitude	longitude
0	110006	Chandni Chowk	28.6505	77.2303
1	110006	Chawri Bazaar	28.6482	77.2270
2	110007	Kamla Nagar	28.6809	77.2046
3	110054	Kashmiri Gate	28.6665	77.2333
4	110005	Karol Bagh	28.6550	77.1888

3. Using a few more functions, we get the latitude and longitude of Delhi to draw a map and then create a map of Delhi with neighborhoods superimposed on top.



4. We Define Foursquare Credentials and Version.

```
# define Foursquare Credentials and Version
CLIENT_ID = 'HUDBNWSLCX5E2WPPJCPHWJC2Z5QXEGGUPW44DQFAI3XNHGI' # your Foursquare ID
CLIENT_SECRET = 'ZUEL0EWB1F50JH5LMWMTATNKHKB0BLR0L1IZSHERK5MPDEHU' # your Foursquare Secret
VERSION = '20191206' # Foursquare API version
```

```
print('Your credentials:')
print('CLIENT_ID: ' + CLIENT_ID)
print('CLIENT_SECRET: ' + CLIENT_SECRET)
```

Your credentials:

CLIENT_ID: HUDBNWSLCX5E2WPPJCPHWJC2Z5QXEGGUPW44DQFAI3XNHGI

CLIENT_SECRET: ZUEL0EWB1F50JH5LMWMTATNKHKB0BLR0L1IZSHERK5MPDEHU

- Now, I get the top 100 venues that are in Chandni Chowk within a radius of 500 meters.
- Now we create a function to repeat the same process to all the neighborhoods in Delhi.
- Let's check how many venues were returned for each neighborhood.

```
In [32]: Delhi_venues.groupby('Neighborhood').count()
```

Out[32]:

	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Neighborhood						
Chandni Chowk	11	11	11	11	11	11
Chawri Bazaar	4	4	4	4	4	4
Chhattarpur	5	5	5	5	5	5
Connaught Place	65	65	65	65	65	65
Green Park	24	24	24	24	24	24
Hauz Khas	6	6	6	6	6	6
INA Colony	6	6	6	6	6	6
Kamla Nagar	23	23	23	23	23	23
Karol Bagh	6	6	6	6	6	6
Kashmiri Gate	5	5	5	5	5	5
Khan Market	44	44	44	44	44	44
Lajpat Nagar	14	14	14	14	14	14
Laxmi Nagar	4	4	4	4	4	4
Mayur Vihar	11	11	11	11	11	11
Palam	5	5	5	5	5	5
Pragati Maidan	7	7	7	7	7	7
Sarojini Nagar	9	9	9	9	9	9
Siri Fort	11	11	11	11	11	11
South Extension	14	14	14	14	14	14

8. Then we analyze each neighborhood.
9. Next, let's group rows by neighborhood and by taking the mean of the frequency of occurrence of each category.

	Neighborhood	Accessories Store	Antique Shop	Art Gallery	Art Museum	Arts & Crafts Store	Asian Restaurant	Australian Restaurant	BBQ Joint	Bakery	Bank	Bar	Beer Garden	Bistro	Bookstore	Boutique	Breakfast Spot	Brewery	Burger Joint
0	Chandni Chowk	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1	Chawri Bazaar	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	Chhattarpur	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
3	Connaught Place	0.00	0.000000	0.000000	0.000000	0.015385	0.015385	0.000000	0.015385	0.015385	0.000000	0.076923	0.015385	0.015385	0.000000	0.000000	0.000000	0.015385	0.000000
4	Green Park	0.00	0.000000	0.000000	0.000000	0.000000	0.041667	0.000000	0.000000	0.000000	0.000000	0.041667	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
5	Hauz Khas	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.166667
6	INA Colony	0.00	0.166667	0.166667	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
7	Kamla Nagar	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.043478	0.000000	0.000000
8	Karol Bagh	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
9	Kashmiri Gate	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
10	Khan Market	0.00	0.000000	0.000000	0.000000	0.000000	0.045455	0.000000	0.022727	0.000000	0.000000	0.068182	0.000000	0.000000	0.022727	0.022727	0.000000	0.000000	0.000000
11	Lajpat Nagar	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.071429	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
12	Laxmi Nagar	0.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
13	Mayur Vihar	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.090909	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
14	Palam	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.200000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
15	Pragati Maidan	0.00	0.000000	0.000000	0.142857	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
16	Sarojini Nagar	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
17	Siri Fort	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.090909	0.000000	0.000000	0.000000	0.181818	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

10. Now, we print each neighborhood along with the top 5 most common venues.
11. Then we create the new data frame and display the top 10 venues for each neighborhood.

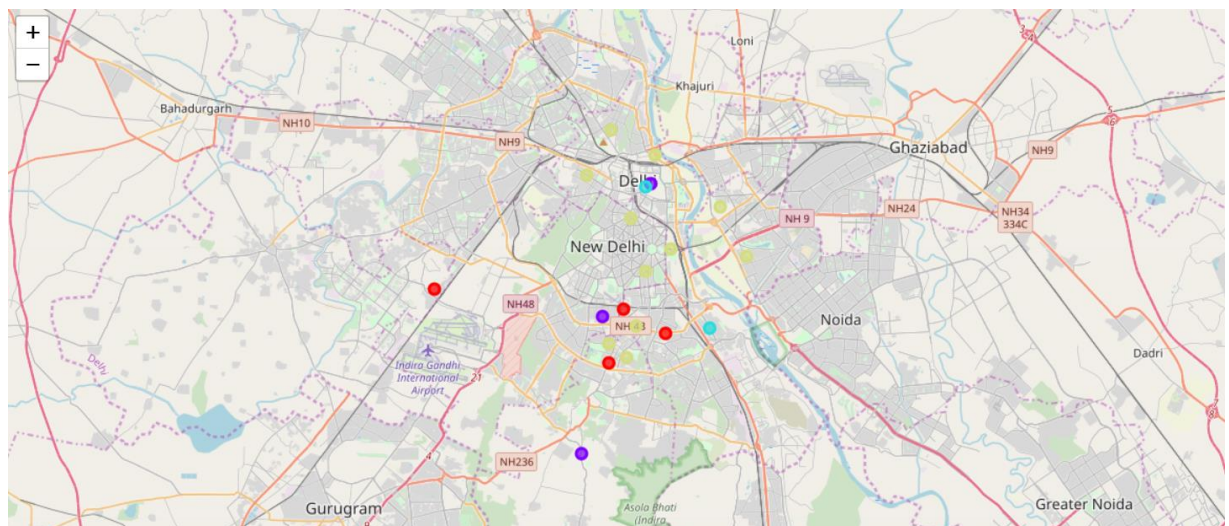
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Chandni Chowk	Indian Restaurant	Hotel	Hardware Store	Paper / Office Supplies Store	Mosque	Frozen Yogurt Shop	Smoke Shop	Light Rail Station	Fast Food Restaurant	Electronics Store
1	Chawni Bazaar	Fast Food Restaurant	Hardware Store	Light Rail Station	Travel Agency	Flea Market	Department Store	Dessert Shop	Donut Shop	Dumpling Restaurant	Eastern European Restaurant
2	Chhattarpur	Pub	Café	Indian Restaurant	Food Truck	Resort	Travel Agency	Department Store	Dessert Shop	Donut Shop	Dumpling Restaurant
3	Connaught Place	Café	Coffee Shop	Indian Restaurant	Bar	Fast Food Restaurant	Chinese Restaurant	Lounge	South Indian Restaurant	Italian Restaurant	Pub
4	Green Park	Indian Restaurant	Coffee Shop	Pizza Place	Donut Shop	Japanese Restaurant	Korean Restaurant	Lounge	Market	Fast Food Restaurant	Chinese Restaurant
5	Hauz Khas	Coffee Shop	Ice Cream Shop	Dessert Shop	Burger Joint	Event Space	Nightclub	Travel Agency	Fast Food Restaurant	Department Store	Donut Shop
6	INA Colony	Historic Site	Electronics Store	Park	Light Rail Station	Antique Shop	Art Gallery	Hardware Store	Flea Market	Dessert Shop	Donut Shop
7	Kamla Nagar	Fast Food Restaurant	Chinese Restaurant	Indian Restaurant	Donut Shop	Pizza Place	Coffee Shop	Electronics Store	Miscellaneous Shop	Sandwich Place	Café
8	Karol Bagh	Hotel	Snack Place	Pharmacy	Smoke Shop	Cosmetics Shop	Ice Cream Shop	Golf Course	Event Space	Delhi / Bodega	Department Store
9	Kashmiri Gate	Market	Ice Cream Shop	Bus Station	Playground	Fast Food Restaurant	Flea Market	Department Store	Dessert Shop	Donut Shop	Dumpling Restaurant
10	Khan Market	Café	Coffee Shop	Bar	Chinese Restaurant	Asian Restaurant	Hotel	Indian Restaurant	Market	Lounge	Bookstore
11	Lajpat Nagar	Indian Restaurant	Fast Food Restaurant	Market	Movie Theater	Restaurant	Bank	Indie Movie Theater	Café	Sporting Goods Shop	Clothing Store
12	Laxmi Nagar	Accessories Store	Fast Food Restaurant	Pharmacy	Food Truck	Delhi / Bodega	Department Store	Dessert Shop	Donut Shop	Dumpling Restaurant	Eastern European Restaurant
13	Mayur Vihar	Indian Restaurant	Snack Place	Coffee Shop	Department Store	Market	Bakery	Food Truck	Gym / Fitness Center	Gastropub	Furniture / Home Store
14	Palam	Travel Agency	Bar	Men's Store	Museum	IT Services	Grocery Store	Golf Course	Department Store	Dessert Shop	Donut Shop

12. Then we cluster Neighborhoods by using clustering as our **Machine Learning Algorithm**.

13. Let's create a new data frame that includes the cluster as well as the top 10 venues for each neighborhood.

	Postalcode	Neighborhood	latitude	longitude	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	110006	Chandni Chowk	28.6505	77.2303	Indian Restaurant	Hotel	Hardware Store	Paper / Office Supplies Store	Mosque	Frozen Yogurt Shop	Smoke Shop	Light Rail Station	Fast Food Restaurant	Electronics Store
1	110006	Chawri Bazaar	28.6482	77.2270	Fast Food Restaurant	Hardware Store	Light Rail Station	Travel Agency	Flea Market	Department Store	Dessert Shop	Donut Shop	Dumpling Restaurant	Eastern European Restaurant
2	110007	Kamla Nagar	28.6809	77.2046	Fast Food Restaurant	Chinese Restaurant	Indian Restaurant	Donut Shop	Pizza Place	Coffee Shop	Electronics Store	Miscellaneous Shop	Sandwich Place	Café
3	110054	Kashmiri Gate	28.6865	77.2333	Market	Ice Cream Shop	Bus Station	Playground	Fast Food Restaurant	Flea Market	Department Store	Dessert Shop	Donut Shop	Dumpling Restaurant
4	110005	Karol Bagh	28.6550	77.1888	Hotel	Snack Place	Pharmacy	Smoke Shop	Cosmetics Shop	Ice Cream Shop	Golf Course	Event Space	Deli / Bodega	Department Store
5	110001	Connaught Place	28.6304	77.2177	Café	Coffee Shop	Indian Restaurant	Bar	Fast Food Restaurant	Chinese Restaurant	Lounge	South Indian Restaurant	Italian Restaurant	Pub
6	110023	INA Colony	28.5782	77.2126	Historic Site	Electronics Store	Park	Light Rail Station	Antique Shop	Art Gallery	Hardware Store	Flea Market	Dessert Shop	Donut Shop
7	110003	Khan Market	28.6001	77.2270	Café	Coffee Shop	Bar	Chinese Restaurant	Asian Restaurant	Hotel	Indian Restaurant	Market	Lounge	Bookstore
8	110001	Pragati Maidan	28.6126	77.2434	History Museum	Pool	Historic Site	Café	Museum	Art Museum	Train Station	Grocery Store	Department Store	Dessert Shop
9	110092	Laxmi Nagar	28.6372	77.2756	Accessories Store	Fast Food Restaurant	Pharmacy	Food Truck	Deli / Bodega	Department Store	Dessert Shop	Donut Shop	Dumpling Restaurant	Eastern European Restaurant
10	110091	Mayur Vihar	28.6084	77.2931	Indian Restaurant	Snack Place	Coffee Shop	Department Store	Market	Bakery	Food Truck	Gym / Fitness Center	Gastropub	Furniture / Home Store
11	110074	Chhattarpur	28.4959	77.1848	Pub	Café	Indian Restaurant	Food Truck	Resort	Travel Agency	Department Store	Dessert Shop	Donut Shop	Dumpling Restaurant
12	110025	New Friends Colony	28.5675	77.2691	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
13	110040	Green Park	28.5584	77.2070	Indian	Coffee Shop	Pizza Place	Donut Shop	Japanese	Korean	Lounge	Market	Fast Food	Chinese

14. Finally, we visualize the resulting clusters.



FINDINGS

From the above analysis of around 20 Neighborhoods in Delhi, we found that we have around 95 Venues. After analyzing those Venues, we have created 4 clusters of Neighborhoods that having the same Venues nearby.

We found the venues using 'Foursquare API' and then cluster the Neighborhoods by analyzing those venues by their frequency or number of occurrences in those respective Neighborhoods.

We used Clustering Machine Learning Algorithm to analyze our project so that the Neighborhoods which are having almost the same venues, can be put together to make a cluster. All clusters have different types of venues or properties but the Neighborhoods in the same cluster will possess almost the same properties.

As we want to find a suitable place in Delhi where we can start a 'Badminton Academy'. As per my understanding, badminton is a kind of sport which is played by almost all age group categories. Here we'll analyze those kinds of venues where we'll get all age group category peoples. It may be somewhere nearby sports complexes, colleges, colonies, parks, etc.

After analyzing the data, we have found that the most common place near the Neighborhoods is not matching our criteria. Most of the venues are restaurants, Bar, Pub, Café, Coffee Shops, Hotels, etc.

So according to me, it is not a good idea to open a badminton academy in Neighborhoods in Delhi. As we still have a lot more areas to explore nearby Delhi, like; Gurugram, Noida, Greater Noida, Ghaziabad. We can explore these areas too to find a suitable place for the badminton academy.

DISCUSSION AND SUGGESTIONS

As I discussed above, in our analysis we have noted Neighborhoods' nearby places are not suitable for open a badminton academy but those areas have good opportunities if we want to open water parks, bars, Shopping malls, BnB services, Salon, Gaming zones, etc.

CONCLUSION

As the analyses, part shows that we have found a lot of venues nearby the Neighborhoods but we not able to get the venues which will actually suitable to start a badminton academy. Badminton academy required a suitable place, good connectivity, sports-loving people, and a healthy and polluted free environment. The venues we have found in our analysis are more like; Restaurants, Café, Beer Bars, Coffee Shops, etc. I think it will not be beneficial to start a badminton academy nearby those venues as we'll not get as many players to join there.