

IBM Data Science – Capstone Project

WEEK 5 PRESENTATION BY – AARUSHI SINGH

Topic:

Opening a Restaurant in Delhi, India



New Delhi

Capital of India

New Delhi is an urban district located in the city of Delhi. New Delhi serves as the capital of India and the seat of all three branches of the Government of India. The foundation stone of New Delhi was laid by Emperor George V during the Delhi Durbar of 1911.

[Wikipedia](#)

Area: 42.7 km²

Weather: 36 °C, Wind W at 2 km/h, 23% Humidity

Population: 2.18 crores (2011)

Local time: Monday, 11:27 pm

Area code(s): +91-11

Background Information

Business Problem:

A new business owner is looking to open a restaurant in Delhi. Where would you recommend that they open it?

Problem

- Venturing into a business in hospitality/food is tough
- Among the things of list to look into, knowing about the locality is important
- Can't rely on personal experiences alone
- Need data backed insights

Solution

- Leverage data from Foursquare API
- Procure information on venues
- Segment neighbourhoods of Delhi based on venues
- Provide data backed insights

Data

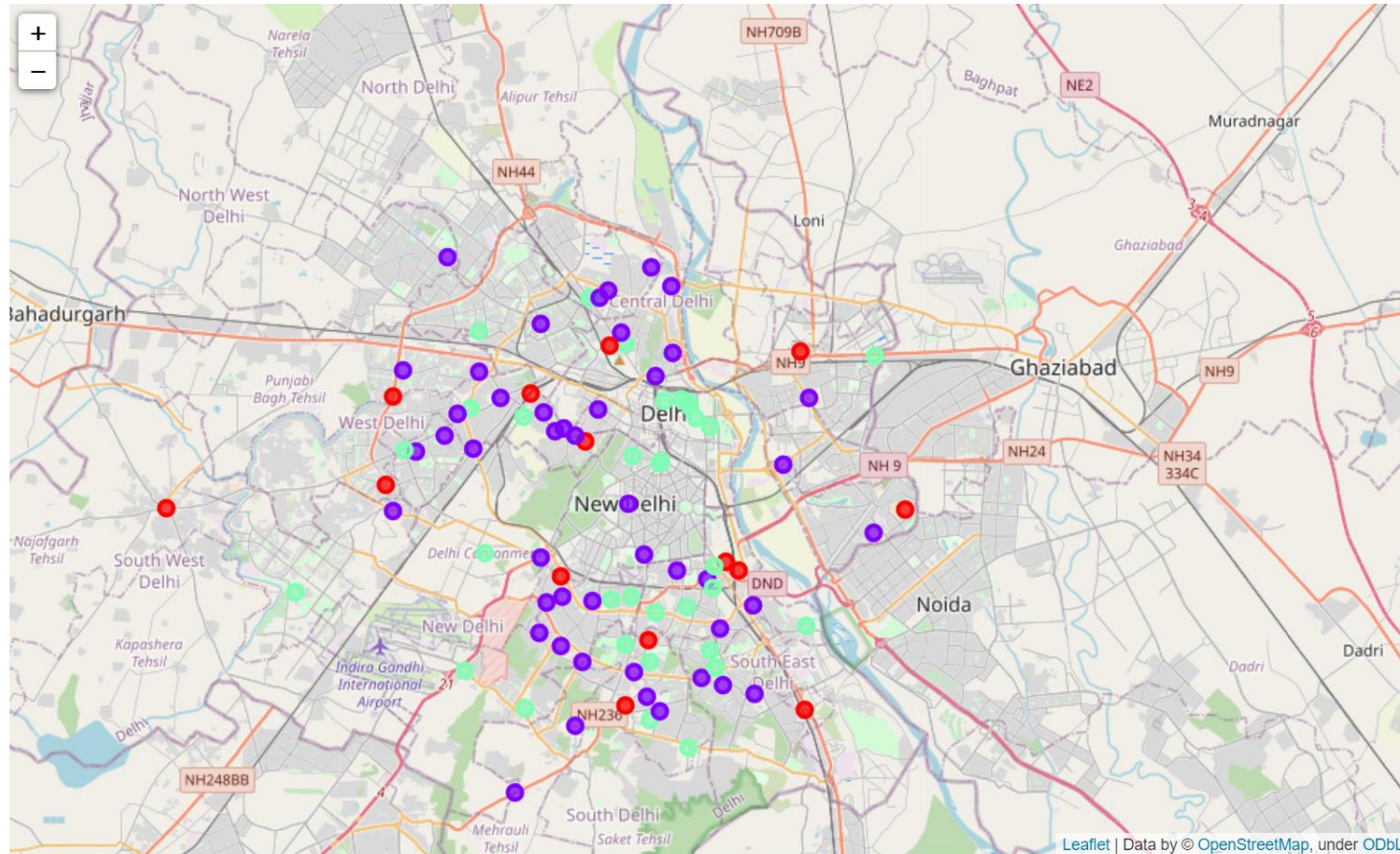
- Delhi neighbourhood data from Wikipedia
- https://en.wikipedia.org/wiki/Category:Neighbourhoods_in_Delhi
- Location and latitude from library geopy
- Venue recommendations from Foursquare API

	Neighbourhood	Latitude	Longitude
0	Ashok Nagar (Delhi)	28.636	77.1018
1	Ashok Vihar	28.6995	77.1848
2	Ashram Chowk	28.6831	77.1901
3	Babarpur	28.6874	77.2798
4	Badarpur, Delhi	28.4932	77.303
5	Bali Nagar	28.6541	77.1282
6	Bawana	28.7997	77.0329
7	Ber Sarai	28.5484	77.1815
8	Bhajanpura	28.701	77.261
9	Chanakyapuri	28.5947	77.1885

Methodology

- Web scrap data from Wikipedia page using library BeautifulSoup
- Get location coordinates using geopy
- Clean and process data
- Search call to foursquare API for venue recommendations (limit to 100 within 500 radius)
- Turn categorical features (Venue categories) into integers (one hot encoding)
- Group each neighbourhood by mean of the occurrence of each category
- Segment the neighbourhoods using K-means clustering algorithm
- Initialise the algorithm with $K = 1$

Clusters



- Red – Cluster #0
- Purple – Cluster #1
- Green – Cluster #2

Results

- Among 93 neighborhoods of Delhi, we see:
- 14 neighborhoods in the 1st cluster (numbered 0)
- 46 neighborhoods in 2nd cluster (numbered 1)
- 33 neighborhoods in 3rd cluster (numbered 2)

Cluster #0

	Neighbourhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue
27	Geetanjali Enclave	28.5304	77.2021	0.0	Café	Metro Station	Coffee Shop	Women's Store
35	Gulmohar Park	28.5571	77.213	0.0	Park	Theater	Café	Music Venue
37	Janakpuri	28.6219	77.0875	0.0	Park	Gym / Fitness Center	Café	Bakery
62	Mayur Vihar Phase - 3	28.6115	77.3363	0.0	ATM	Music Venue	Martial Arts Dojo	Burger Joint
63	Meera Bagh	28.6588	77.0908	0.0	ATM	Convenience Store	Spa	Café
70	Najafgarh	28.6123	76.9824	0.0	ATM	Food & Drink Shop	Mobile Phone Shop	Hookah Bar
71	Nanakpura	28.5839	77.1714	0.0	Department Store	Asian Restaurant	Café	Bus Stop
75	Naveen Shahdara	28.6773	77.286	0.0	ATM	Men's Store	Gym / Fitness Center	Vegetarian / Vegan Restaurant
80	Nizamuddin East	28.5897	77.2504	0.0	Train Station	Park	Café	Food Court
89	Patel Nagar	28.6598	77.157	0.0	Women's Store	Café	ATM	Train Station
93	Rajendra Nagar, Delhi	28.6397	77.1834	0.0	Café	Food & Drink Shop	Sandwich Place	Pizza Place
104	Sarai Kale Khan	28.5866	77.2562	0.0	Train Station	Food Court	Bus Station	Moving Target
105	Sarita Vihar	28.5286	77.2883	0.0	Park	Market	Juice Bar	Train Station
110	Shakti Nagar, Delhi	28.6798	77.1949	0.0	Fried Chicken Joint	Café	Playground	Concert Hall

Cluster #1 (*head)

	Neighbourhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue
0	Ashok Nagar (Delhi)	28.636	77.1018	1.0	Fast Food Restaurant	Ice Cream Shop	North Indian Restaurant	Café
7	Ber Sarai	28.5484	77.1815	1.0	Shopping Mall	Hotel	Airport Food Court	History Museum
11	Chittaranjan Park	28.5388	77.2492	1.0	Market	Pizza Place	Fast Food Restaurant	Women's Store
12	Civil Lines, Delhi	28.6769	77.225	1.0	Indian Restaurant	Smoke Shop	Italian Restaurant	Light Rail Station
14	Dabri, New Delhi	28.6108	77.0911	1.0	Movie Theater	Department Store	Grocery Store	Food & Drink Shop
18	Dayanand Colony	28.5622	77.2476	1.0	Restaurant	Indie Movie Theater	Fast Food Restaurant	Market
21	Derawal Nagar	28.6998	77.1901	1.0	Shopping Mall	Bakery	Snack Place	Pizza Place
22	Dhaura Kuan	28.5919	77.1617	1.0	Burger Joint	Sake Bar	Golf Course	Bakery
25	East Patel Nagar	28.6456	77.1726	1.0	Pizza Place	Hotel	Donut Shop	Bed & Breakfast
28	Ghitorni	28.4938	77.1492	1.0	Indian Restaurant	Pizza Place	Sandwich Place	Sporting Goods Shop
31	Govindpuri	28.5352	77.2638	1.0	Farmers Market	Pharmacy	Burger Joint	Bar
32	Greater Kailash	28.5419	77.2385	1.0	Restaurant	Park	BBQ Joint	Liquor Store
36	Hauz Khas	28.5443	77.2067	1.0	Chinese Restaurant	Metro Station	Nightclub	Lounge
38	Jangpura	28.5825	77.2415	1.0	Sandwich Place	Fast Food Restaurant	Hotel	Chinese Restaurant
43	Karol Bagh	28.653	77.189	1.0	Snack Place	Asian Restaurant	Dessert Shop	Hookah Bar
44	Keshav Puram	28.6889	77.1617	1.0	Moving Target	Boutique	Basketball Court	Bakery
50	Krishna Nagar, Delhi	28.6578	77.2902	1.0	Bakery	Pizza Place	Men's Store	Gym

Cluster #2 (*head)

	Neighbourhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue
1	Ashok Vihar	28.6995	77.1848	2.0	Indian Restaurant	Health & Beauty Service	Bakery	Diner
5	Bali Nagar	28.6541	77.1282	2.0	Indian Restaurant	Light Rail Station	Chinese Restaurant	Ice Cream Shop
10	Chandni Chowk	28.656	77.2322	2.0	Indian Restaurant	Snack Place	Market	Jewelry Store
13	Connaught Place, New Delhi	28.6314	77.2198	2.0	Indian Restaurant	Café	Chinese Restaurant	Bar
15	Dariba Kalan	28.6546	77.2334	2.0	Indian Restaurant	Market	Snack Place	Hotel
16	Daryaganj	28.6461	77.243	2.0	Indian Restaurant	Restaurant	Hotel	Road
19	Defence Colony	28.5712	77.2318	2.0	Indian Restaurant	Italian Restaurant	Bakery	Bar
20	Delhi Cantonment	28.5938	77.135	2.0	Indian Restaurant	Coffee Shop	Shopping Mall	Café
23	Dilshad Garden	28.6758	77.3215	2.0	Indian Restaurant	Light Rail Station	Diner	Pizza Place
24	Dwarka, Delhi	28.5772	77.0443	2.0	Indian Restaurant	Accessories Store	IT Services	Grocery Store
29	Gole Market	28.6337	77.2056	2.0	Indian Restaurant	Snack Place	Japanese Restaurant	Fast Food Restaurant
33	Green Park, Delhi	28.5555	77.2025	2.0	Indian Restaurant	Coffee Shop	Pizza Place	Donut Shop
41	Kailash Colony	28.5531	77.243	2.0	Bar	Indian Restaurant	Italian Restaurant	Flea Market
42	Kamla Nagar, New Delhi	28.6803	77.2021	2.0	Indian Restaurant	Breakfast Spot	Coffee Shop	Miscellaneous Shop
46	Khanpur, Delhi	28.5128	77.2324	2.0	Indian Restaurant	Chinese Restaurant	Plaza	Food & Drink Shop
47	Khari Baoli	28.6571	77.2211	2.0	Dessert Shop	Indian Restaurant	Market	Food & Drink Shop
51	Lajpat Nagar	28.5793	77.244	2.0	Sandwich Place	Indian Restaurant	BBQ Joint	Snack Place

Discussion

Insights

- 1st Cluster :

1. Among the popular venues are ATM, department/convenience stores, cafes and other utility businesses or parks
2. mostly consists of neighbourhoods with local market places having small or fast food joints among food venues.

- 2nd Cluster:

1. The greatest number of venues with very diverse categories
2. consists of a vast number of food businesses like restaurants with different range of cuisines, cafes, pizzerias, ice cream shops, bakery etc.
3. Other hospitality businesses or tourist attractions (Eg. Hotels, Multiplex, Museums etc.)

- 3rd Cluster:

1. Neighbourhoods heavily popular for Indian restaurants
2. Consists of a number of other restaurants and food joints, however the cuisines offered are very limited apart from Indian
3. Among the top 2 most common venues, food businesses are most common. Has a number of lodging businesses like hotels and bed and breakfasts, but not much to offer in terms of other tourist attractions

Discussion

Recommendations

- **1st Cluster** : The 1st cluster (numbered 0) does not seem to be a cluster with a lot of businesses in the hospitality sector that may attract customers. Their food preferences are limited to fast food joints, that suggests that most customers don't visit the areas for a dine-in experience (like Restaurants, Cafes etc.). Other factors considered, if a businessperson is looking to take the risk and get the first mover advantage may invest in a restaurant in this cluster
- **2nd Cluster**: The 2nd cluster (numbered 1) seems the most popular and conducive for any businessperson looking to get into restaurant business. The area is promising because the preferences are diverse in terms of customer's selection of the kind of food joint they wish to eat at (Restaurants, Cafes, Bakery etc.) and the cuisine preference is also diverse and so the owner may not be restricted in their business choices. The areas have strong tourist footfall owing to a number of attractions and lodging avenues offered, so there seems to be promising profitability for any new business to come up.
- **3rd Cluster**: The 3rd cluster (numbered 2), although popular for restaurants has heavy inclination towards Indian cuisine. Any businessperson looking to open an Indian restaurant may consider the areas, however, there will be high competition and poaching customers from already established Indian restaurants may be tough. Businessperson coming with a franchise that has reputation in similar localities in a different city may consider to open a restaurant here.

Conclusion

The safest best for a businessperson looking to open a restaurant in the Delhi are the neighbourhoods of 2nd cluster (numbered 1).