

## **Introduction:**

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In this project we will try to find an optimal location for a hostel. Specifically, this report will be targeted to stakeholders interested in opening a hostel in DELHI, India

Hostel is a place where backpackers can come and spend their time with other tourists and gain knowledge about cultures, different types of food and how to make friendship. This business was started with a vision to promote traveling as a way of life.

Since the stakeholder wants to provide the immersive experience to the travelers/tourists. We want to get the cluster information about the delhi, based on the surrounding available environment so that we can analyze the cluster. Secondly,

We will use our data science powers to generate a few most promising neighborhoods based on this criteria. Advantages of each area will then be clearly expressed and get the cluster character, so that best possible final location and hostel type can be chosen by stakeholders.

# Data Acquisition And Cleaning

Based on definition of our problem, factors that will influence our decision are:

- number of existing Borough in the delhi region
- number of existing Neighborhood in each Borough in the delhi region
- Latitude and longitude of each neighborhood
- Get the detailed information in each circle by using

## Foursquare API

Besides we use other packages, likes:

- Pandas
- Numpy
- Json
- Geopy
- Matplotlib
- Sklearn
- Folium
- Requests

We get the basic information like:

```
In [4]: import pandas as pd
import numpy as np
```

```
In [7]: delhi_df=pd.read_csv("Downloads/datasetdelhi.csv")
```

```
In [8]: delhi_df.head()
```

```
Out[8]:
```

	Unnamed: 0	Borough	Neighborhood	latitude	longitude
0	0	North West Delhi	Adarsh Nagar	28.614192	77.071541
1	1	North West Delhi	Ashok Vihar	28.699453	77.184826
2	2	North West Delhi	Azadpur	28.707657	77.175547
3	3	North West Delhi	Bawana	28.799660	77.032885
4	4	North West Delhi	Begum Pur	28.727273	77.064045

```
In [10]: delhi_df['Borough'].unique()
```

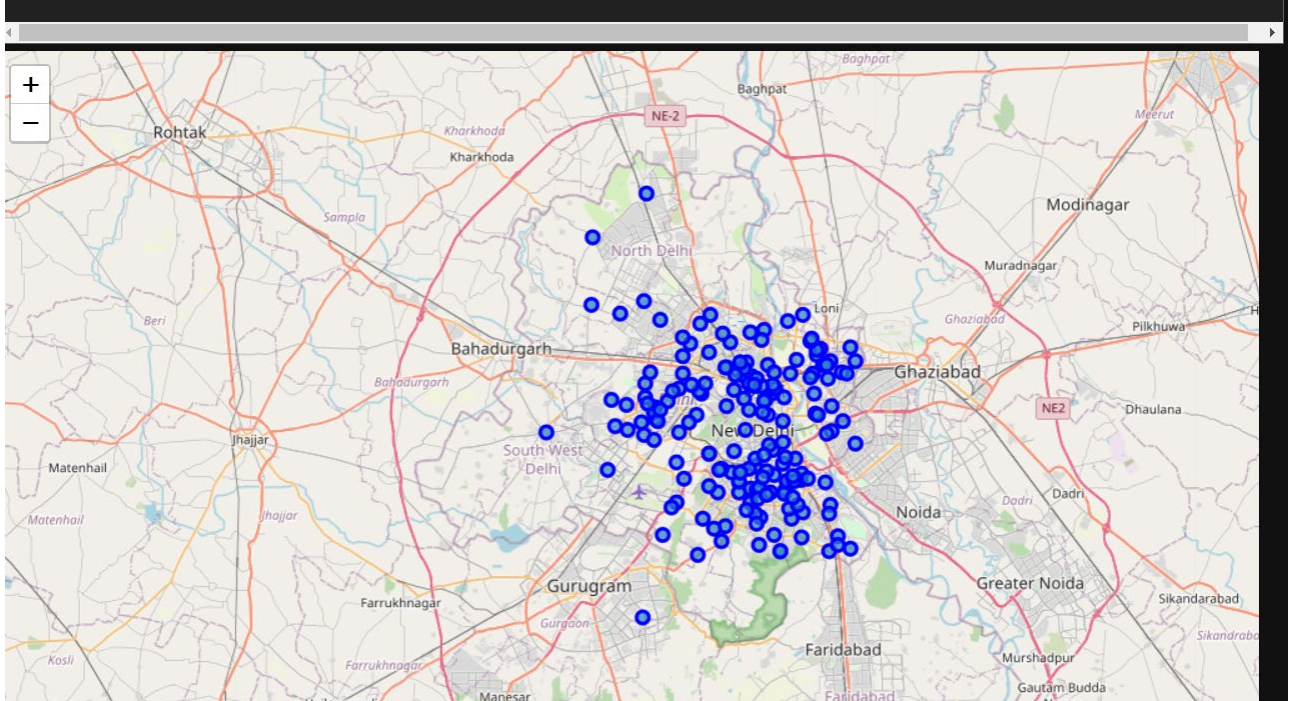
```
Out[10]: array(['North West Delhi', 'North Delhi', 'North East Delhi',
                'Central Delhi', 'New Delhi', 'East Delhi', 'South Delhi',
                'South West Delhi', 'West Delhi'], dtype=object)
```

```
In [11]: delhi_df['Neighborhood'].count()
```

```
Out[11]: 184
```

## Methodology

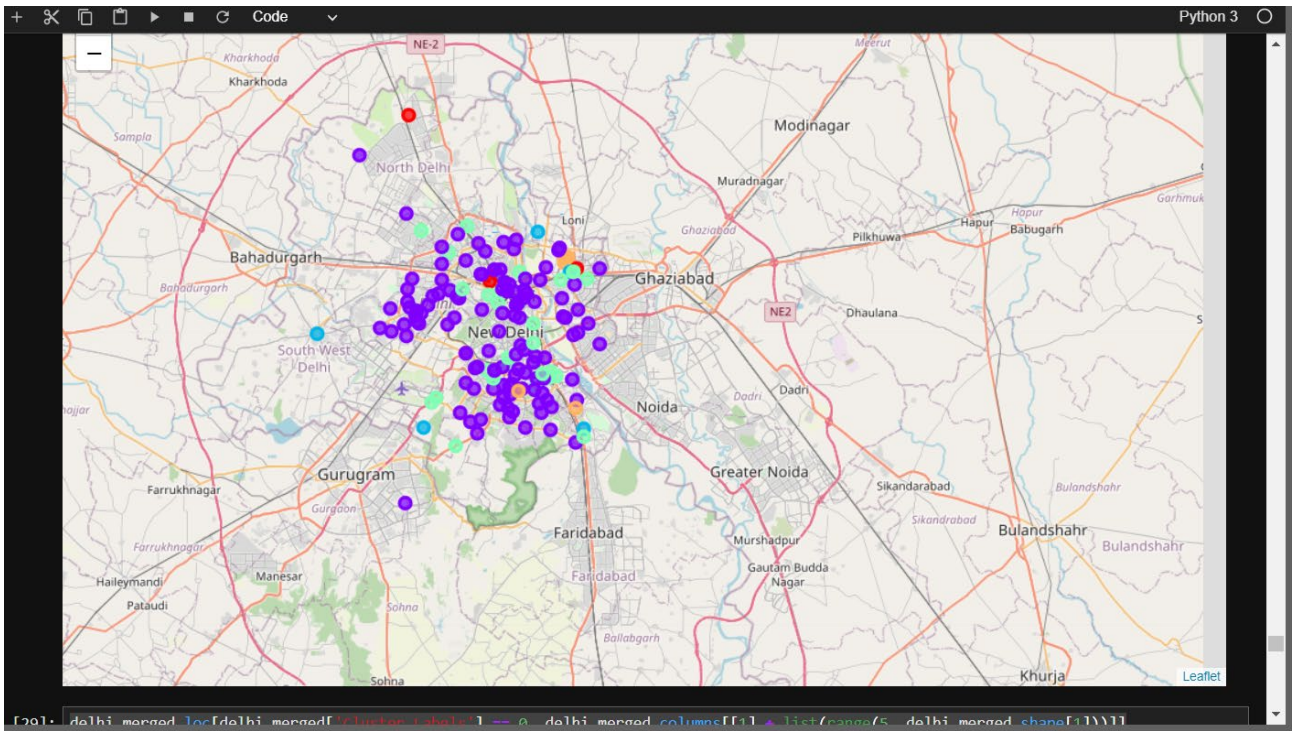
We create the data flow to get the data by using Foursquare API, then extract information about the surrounding , we can visualize the distribution of the surrounding



Then create the new dataframe 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	Adarsh Nagar	Indian Restaurant	Women's Store	Food	Gaming Cafe	Furniture / Home Store	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court
1	Alaknanda	BBQ Joint	Indian Restaurant	Pizza Place	Middle Eastern Restaurant	Coffee Shop	Restaurant	Steakhouse	Women's Store	Frozen Yogurt Shop	Fried Chicken Joint
2	Anand Vihar	Indian Restaurant	Indian Sweet Shop	Ice Cream Shop	Pizza Place	Soup Place	Punjabi Restaurant	Furniture / Home Store	Women's Store	Flea Market	Fried Chicken Joint
3	Ashok Nagar	North Indian Restaurant	Ice Cream Shop	Clothing Store	Metro Station	Women's Store	Furniture / Home Store	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck
4	Ashok Vihar	Shipping Store	Hotel Bar	Bakery	Athletics & Sports	Women's Store	Food & Drink Shop	Gaming Cafe	Furniture / Home Store	Frozen Yogurt Shop	Fried Chicken Joint
5	Azadpur	Pool Hall	Bus Station	Restaurant	Flea Market	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop
6	Babarpur	Park	Women's Store	Food	Gaming Cafe	Furniture / Home Store	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court
7	Badarpur	ATM	Train Station	Spa	Light Rail Station	Women's Store	Food & Drink Shop	Gaming Cafe	Furniture / Home Store	Frozen Yogurt Shop	Fried Chicken Joint
8	Bali Nagar	Light Rail Station	Shopping Mall	Ice Cream Shop	Shoe Store	Women's Store	Food	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck
9	Bara Hindu Rao	Afghan Restaurant	Indian Restaurant	Women's Store	Food	Gaming Cafe	Furniture / Home Store	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck
10	Barakhamba Road	Gastropub	Asian Restaurant	Salon / Barbershop	Historic Site	North Indian Restaurant	Tea Room	Hotel Bar	Electronics Store	Diner	Frozen Yogurt Shop

Finally, we use the KMeans method.



## Results and Discussion

In search of new place for zotel, explored different categories of venues. In this analysis, initially, a sum of 9 unique borough has been observed. Using geocoder of Geopy library for delhi, INDIA,

we split the data into longitude and latitude of the neighborhood. analysis of each neighborhood is carried out with the help of one-hot encoding. The result of one-hot encoding identified 173 types of places. Followed by one-hot encoding we explore the top 10 common venues in each of the neighborhoods.

After one hot encoding and venue exploration, we applied the k-means algorithm for k=5. It has identified 5 cluster centroids c0, c1, c2, c3, and c4. These five clusters identified in five different colors. Cluster 0 is having only four neighborhood, cluster 1 is having the maximum number of neighborhoods.

### Cluster 1:

```
[29]: delhi_merged.loc[delhi_merged['Cluster Labels'] == 0, delhi_merged.columns[[1] + list(range(5, delhi_merged.shape[1]))]]
```

[29]:	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
12	Narela	Mobile Phone Shop	Men's Store	Garden	Furniture / Home Store	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop
24	Gulabi Bagh	Men's Store	Wine Bar	Gaming Cafe	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food
38	Sarai Rohilla	Mini Golf	Men's Store	Wine Bar	Gaming Cafe	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop
47	Mandoli	Men's Store	Wine Bar	Gaming Cafe	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food

# Cluster 2:

```
[30]: delhi_merged.loc[delhi_merged['Cluster Labels'] == 1, delhi_merged.columns[[1] + list(range(5, delhi_merged.shape[1]))]]
```

[30]:

	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	Adarsh Nagar	Fast Food Restaurant	Indian Restaurant	Business Service	Flea Market	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop
1	Ashok Vihar	Indian Restaurant	Hotel Bar	Bakery	Diner	Athletics & Sports	Smoke Shop	Food & Drink Shop	Furniture / Home Store	Frozen Yogurt Shop	Fried Chicken Joint
2	Azadpur	Restaurant	Pool Hall	Bus Station	Fabric Shop	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food	Flea Market
3	Bawana	Playground	Wine Bar	Fabric Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food	Flea Market
5	Dhaka	ATM	Train Station	Pizza Place	Diner	Wine Bar	Fast Food Restaurant	Fried Chicken Joint	French Restaurant	Food Truck	Food Court
...	...	...	...	...	...	...	...	...	...	...	...
178	Shivaji Place	Fast Food Restaurant	Café	Indian Restaurant	Cosmetics Shop	Diner	Snack Place	Multiplex	Lounge	Shopping Mall	Pizza Place
179	Tihar Village	Fast Food Restaurant	Sculpture Garden	Sandwich Place	Cricket Ground	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food
180	Tilak Nagar	Fast Food Restaurant	Women's Store	Electronics Store	Light Rail Station	Indian Restaurant	Airport	Dessert Shop	Gaming Cafe	Furniture / Home Store	Frozen Yogurt Shop
181	Uttam Nagar	Pizza Place	Indian Restaurant	ATM	Train Station	Fabric Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop
183	Vikasपुरi	Indian Restaurant	Flea Market	Beer Garden	Pizza Place	Department Store	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court

124 rows × 11 columns

# Cluster 3:

```
[31]: delhi_merged.loc[delhi_merged['Cluster Labels'] == 2, delhi_merged.columns[[1] + list(range(5, delhi_merged.shape[1]))]]
```

[31]:

	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
50	Naveen Shahdara	ATM	Vegetarian / Vegan Restaurant	Mobile Phone Shop	Indian Restaurant	Gaming Cafe	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court
54	Sonia Vihar	ATM	Wine Bar	Flea Market	Furniture / Home Store	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop
68	Gautampuri	ATM	Wine Bar	Flea Market	Furniture / Home Store	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop
154	Najafgarh	ATM	Food & Drink Shop	Wine Bar	Flea Market	Furniture / Home Store	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court
158	Rajokri	ATM	Wine Bar	Flea Market	Furniture / Home Store	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop



# Cluster 4:

[32]: delhi\_merged.loc[delhi\_merged['Cluster Labels'] == 3, delhi\_merged.columns[[1] + list(range(5, delhi\_merged.shape[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
6	Jahangirpuri	Light Rail Station	Wine Bar	Fast Food Restaurant	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food
10	Kohat Enclave	Snack Place	Light Rail Station	Mobile Phone Shop	Indian Restaurant	Hotel	Hot Dog Joint	Fried Chicken Joint	French Restaurant	Food Truck	Food Court
15	Rithala	Hotel	Clothing Store	Light Rail Station	Restaurant	Wine Bar	Fast Food Restaurant	Fried Chicken Joint	French Restaurant	Food Truck	Food Court
22	Civil Lines	Light Rail Station	Smoke Shop	Coffee Shop	Burger Joint	Café	Chinese Restaurant	Italian Restaurant	Hotel	Indian Restaurant	Flea Market
31	Pratap Nagar	Train Station	Mobile Phone Shop	Light Rail Station	Department Store	Dessert Shop	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court
53	Shahdara	ATM	Vegetarian / Vegan Restaurant	Light Rail Station	Clothing Store	Mobile Phone Shop	Hotel Bar	Fast Food Restaurant	Fried Chicken Joint	French Restaurant	Food Truck
59	Jhandewalan	Hotel	High School	Motorcycle Shop	Light Rail Station	Fast Food Restaurant	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop
60	Karol Bagh	Snack Place	Dessert Shop	Hotel	Wine Bar	Flea Market	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court
71	INA Colony	Historic Site	Park	Airport	Antique Shop	Art Gallery	Light Rail Station	Fast Food Restaurant	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant
74	Pragati Maidan	Light Rail Station	Plaza	Hotel	Art Gallery	Fabric Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop
77	Gandhi Nagar	Shopping Plaza	Light Rail Station	Fast Food Restaurant	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food

# Cluster 5:

[33]: delhi\_merged.loc[delhi\_merged['Cluster Labels'] == 4, delhi\_merged.columns[[1] + list(range(5, delhi\_merged.shape[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
44	Babarpur	Park	Wine Bar	Fabric Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food	Flea Market
46	Kabir Nagar	Park	Motorcycle Shop	Wine Bar	Fast Food Restaurant	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food
48	Maujpur	Park	Wine Bar	Fabric Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food	Flea Market
133	Sarita Vihar	Café	Park	Fabric Shop	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food	Flea Market
137	Siri Fort	Park	Stadium	Café	Wine Bar	Fast Food Restaurant	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop

## **Conclusion**

The purpose of this project was to identify areas for zoster close to the center with a high number of different venues to aid stakeholders in narrowing down the search for the optimal location for a new zoster. By calculating different categories of venue distribution from Foursquare data we have first identified general boroughs that justify further analysis that the cluster number 2 has the highest number of different categories.

Final decisions on optimal zoster location will be made by stakeholders based on specific characteristics of neighborhoods and locations in every recommended zone, taking into consideration additional factors like attractiveness of each location (proximity to park or water), levels of noise/proximity to major roads, real estate availability, prices, social and economic dynamics of every neighborhood.