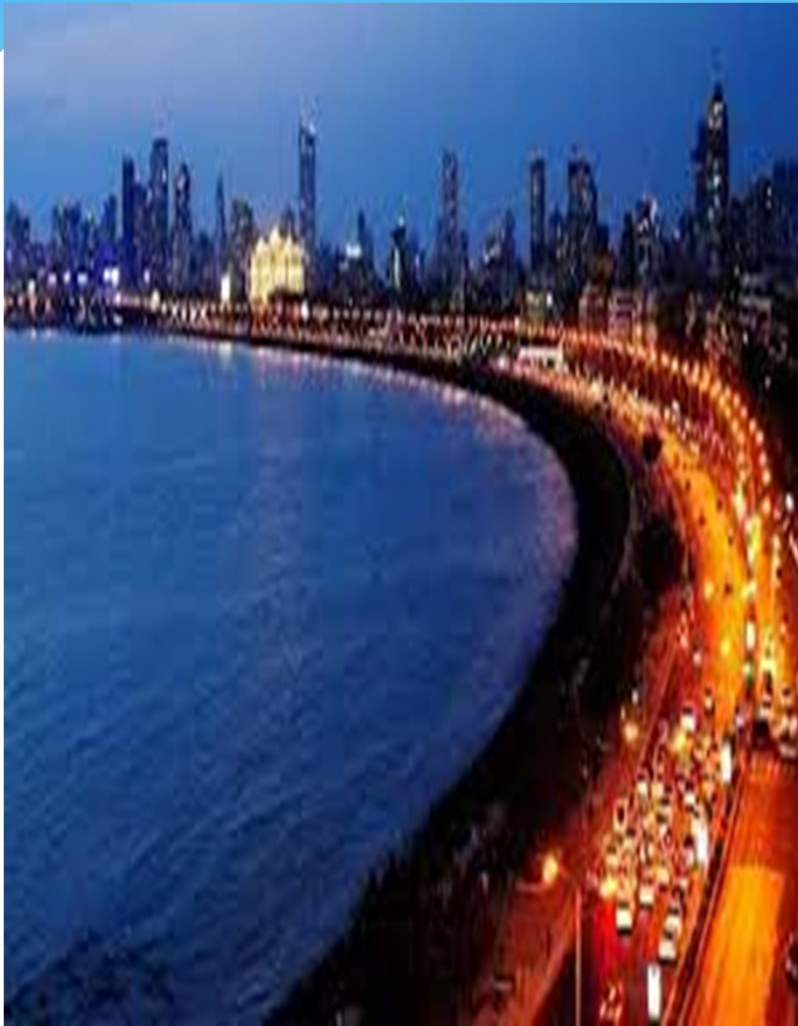# The Battle of Neighbourhoods

Introduction

Mumbai is the capital city of the Indian state of Maharashtra. It is the second-most populous city in the country after Delhi and the seventh-most populous city in the world with a population of roughly 20 million. It has the highest number of millionaires and billionaires among all cities in India and the eighth-highest number of billionaires of any city in the world. Mumbai is the financial, commercial, and the entertainment capital of India. It is also one of the world's top ten centres of commerce in terms of global financial flow. The city houses important financial institutions and the corporate headquarters of numerous Indian companies and multinational corporations. It is also home to some of India's premier scientific and nuclear institutes. The city is also home to Bollywood and Marathi cinema industries. Mumbai's business opportunities attract migrants from all over India.

Problem Statement

Business problem: Using the data sources mentioned in the data section, we are going to explore and analyse neighbourhoods in Mumbai to decide the best location for Italian cuisine in the city. In the process, we will explore areas populated with restaurants, areas with a large number of Italian restaurants, areas having less number of restaurants, areas with the best rated Italian restaurants, neighbourhoods with the best restaurants in Mumbai, the best neighbourhood to stay if you prefer Italian Cuisine.

Data

Data Acquisition:

For this project we will get data from the following datasets:

Mumbai Restaurants data that contains localities, restaurant names, restaurant rating along with their latitudes and longitudes:

Data source: Zomato kaggel dataset ("https://www.kaggle.com/shrutimehta/zomato-restaurants-data")

Data description: This dataset provides information about the cuisines of the countries and localities of said countries serving a given cuisine with maximum number of restaurants.

This dataset contains the information we need for analysis and we will use it to explore various localities of Mumbai.

Venues near each neighbourhood of Mumbai:

Data source: Foursquare API ("https://developer.foursquare.com/")

Description: This Dataset will provide us with the location based data we need to explore neighbourhoods in Mumbai.By using this api, we will get the relevant venues in each neighborhood in Mumbai.

Approach

Strategy for problem solving:

* We will collect the Mumbai city data from Zomato kaggel dataset
* We will find the venues for each neighbourhood using FourSquare API
* We will group the venues by nearby localities
* We will find the best places to eat based on the basis of aggregate rating.
* Using folium library, we will visualise the results.

Data Cleaning:

Download Zomato kaggel dataset and select the restaurant data for Mumbai as a pandas DataFrame

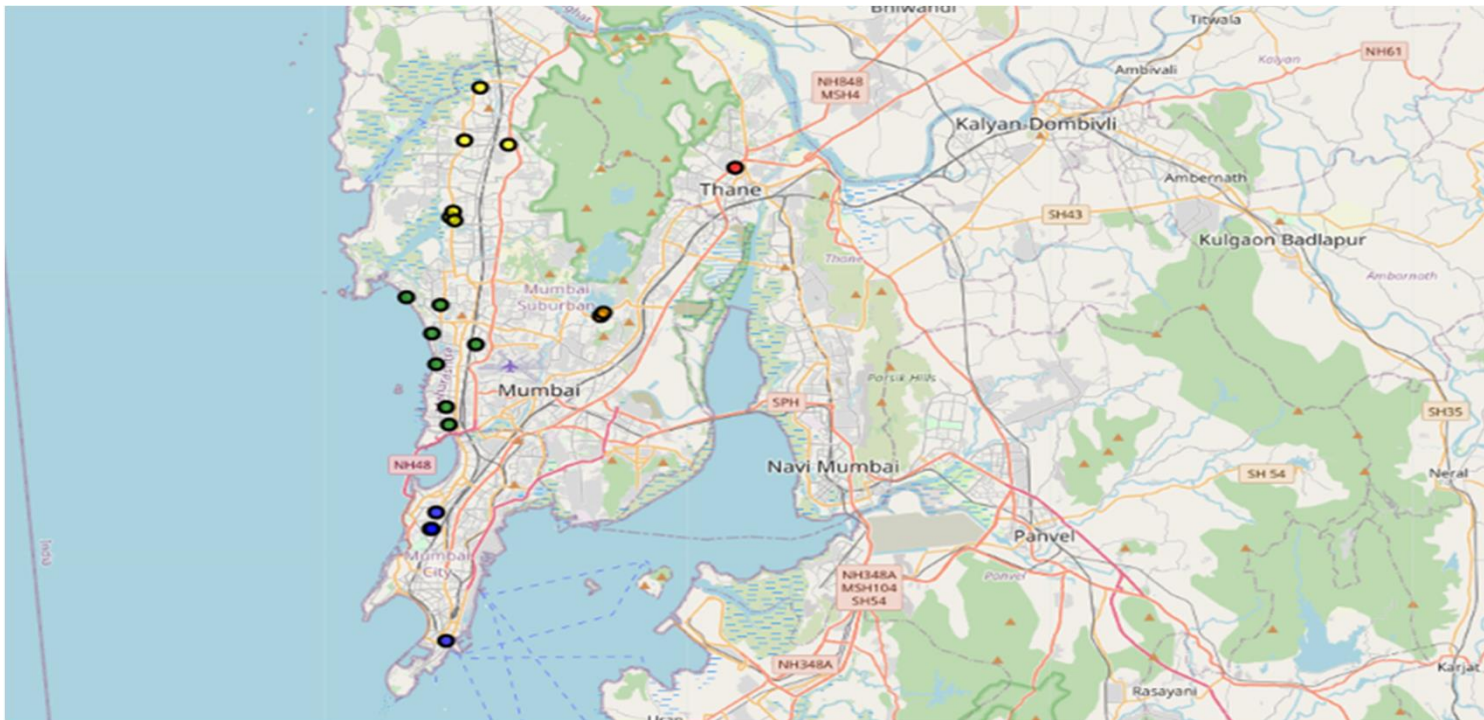|	Restaurant ID	Restaurant Name	Country Code	City	Address	Locality	Locality Verbose	Longitude	Latitude	Cuisines	Average Cost for two	Currency	Has Table booking	Has Online delivery	Is delivering now	Switch to order menu	Price range	Aggregate rating	Rating color	Rating text	Votes
0	35217	Joey's Pizza	1	Mumbai	6 & 7, Upvan Building, Near Indian Oil Colony,...	Azad Nagar	Azad Nagar, Mumbai	72.829978	19.128830	Pizza	800	Indian Rupees(Rs.)	No	No	No	No	2	4.0	Green	Very Good	5145
1	18447068	Cafe Hydro	1	Mumbai	Esspee Tower, Rajendra Nagar, Dattapada Road, ...	Borivali East	Borivali East, Mumbai	72.882381	19.221315	Asian	1000	Indian Rupees(Rs.)	No	No	No	No	3	4.0	Green	Very Good	156
2	18458583	The American Joint	1	Mumbai	The Ahcl Homes Tower, Chikuwadi New Link Road,...	Borivali West	Borivali West, Mumbai	72.841347	19.223840	Healthy Food, American, Burger, Salad	850	Indian Rupees(Rs.)	Yes	No	No	No	2	3.4	Orange	Average	170
3	18075122	The Fusion Kitchen	1	Mumbai	Shop 1, Opposite Veda Building, Near Bhavdevi ...	Borivali West	Borivali West, Mumbai	72.848923	19.254587	North Indian, Italian, Chinese, Mexican	1000	Indian Rupees(Rs.)	Yes	Yes	No	No	3	4.7	Dark Green	Excellent	2083
4	18233317	145 Kala Ghoda	1	Mumbai	145, Kala Ghoda, Fort, Mumbai	Fort	Fort, Mumbai	72.832585	18.927584	Fast Food, Beverages, Desserts	1500	Indian Rupees(Rs.)	No	No	No	No	3	4.2	Green	Very Good	1608

Data Cleaning:

Drop irrelevant columns and clean the downloaded DataFrame for Mumbai

	Restaurant Name	Locality	Longitude	Latitude	Cuisines	Aggregate rating	Rating text	Votes
0	Joey's Pizza	Azad Nagar	72.829976	19.128630	Pizza	4.0	Very Good	5145
1	Cafe Hydro	Borivali East	72.862381	19.221315	Asian	4.0	Very Good	156
2	The American Joint	Borivali West	72.841347	19.223840	Healthy Food, American, Burger, Salad	3.4	Average	170
3	The Fusion Kitchen	Borivali West	72.848923	19.254567	North Indian, Italian, Chinese, Mexican	4.7	Excellent	2083
4	145 Kala Ghoda	Fort	72.832585	18.927584	Fast Food, Beverages, Desserts	4.2	Very Good	1606

Exploration & Visualization

Create a **Map** and **cluster** the restaurants using k-means clustering

Exploration & Visualization

Clustered Mumbai restaurant data

	Restaurant Name	Locality	Longitude	Latitude	Cuisines	Aggregate rating	Rating text	Votes	Cluster
0	Joey's Pizza	Azad Nagar	72.829976	19.126630	Pizza	4.0	Very Good	5145	1
1	Cafe Hydro	Borivali East	72.862381	19.221315	Asian	4.0	Very Good	156	3
2	The American Joint	Borivali West	72.841347	19.223840	Healthy Food, American, Burger, Salad	3.4	Average	170	3
3	The Fusion Kitchen	Borivali West	72.848923	19.254567	North Indian, Italian, Chinese, Mexican	4.7	Excellent	2083	3
4	145 Kala Ghoda	Fort	72.832585	18.927584	Fast Food, Beverages, Desserts	4.2	Very Good	1606	2

Exploration & Visualization

In this section, we explore various localities of Mumbai City and group them according to various characteristics

Localities with highest-rated restaurants in Mumbai:

Exploration & Visualization

Localities with highest-rated restaurants in Mumbai:

Top Localities with the lowest-rated restaurants in Mumbai

Exploration & Visualization

Localities best suited for foodies who prefer eating out frequently:
Top Localities with the highest number of restaurants in Mumbai:

Top Localities with the highest number of restaurants in Mumbai

Exploration & Visualization

Top Localities with the lowest number of restaurants in Mumbai:

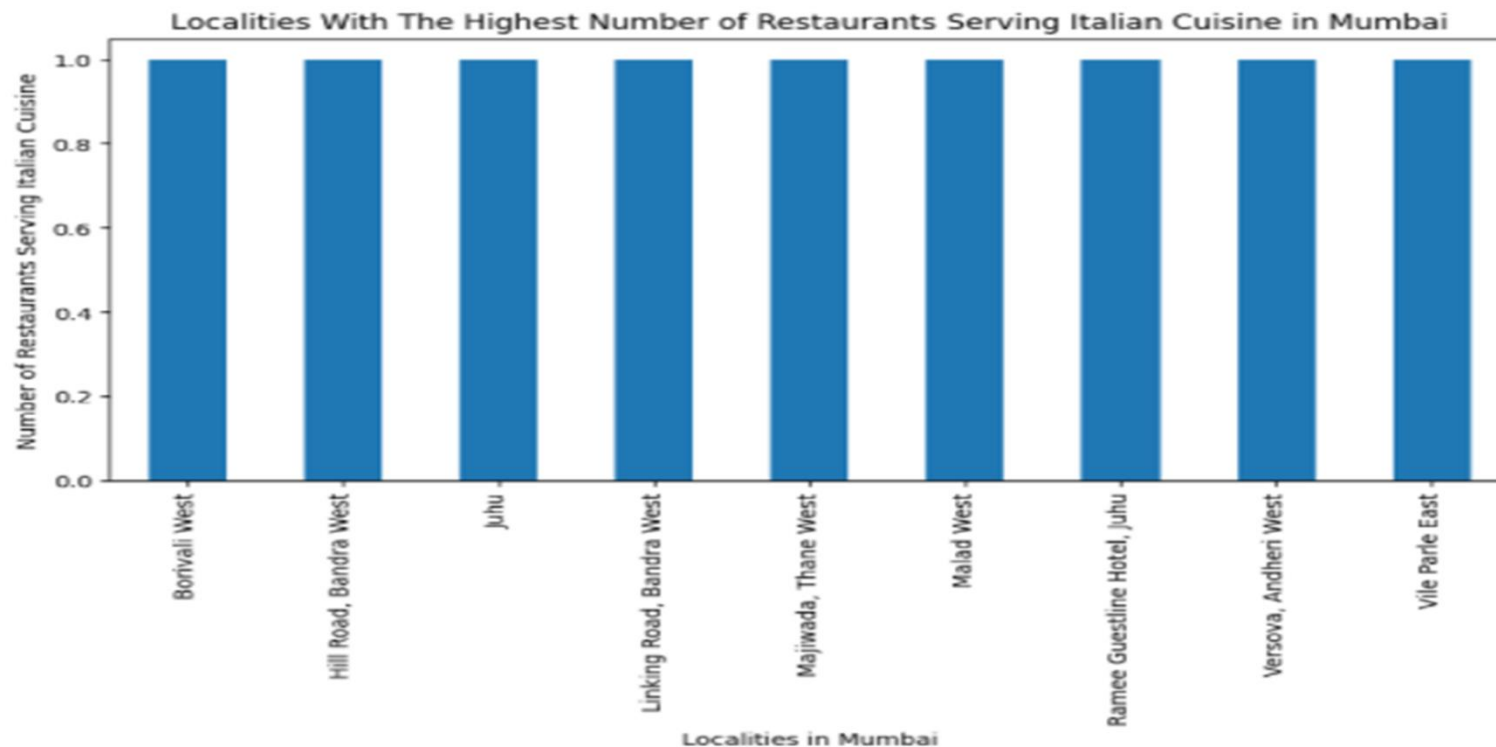Top Localities with the lowest number of restaurants in Mumbai

Exploration & Visualization

Best places for Italian cuisine in Mumbai:
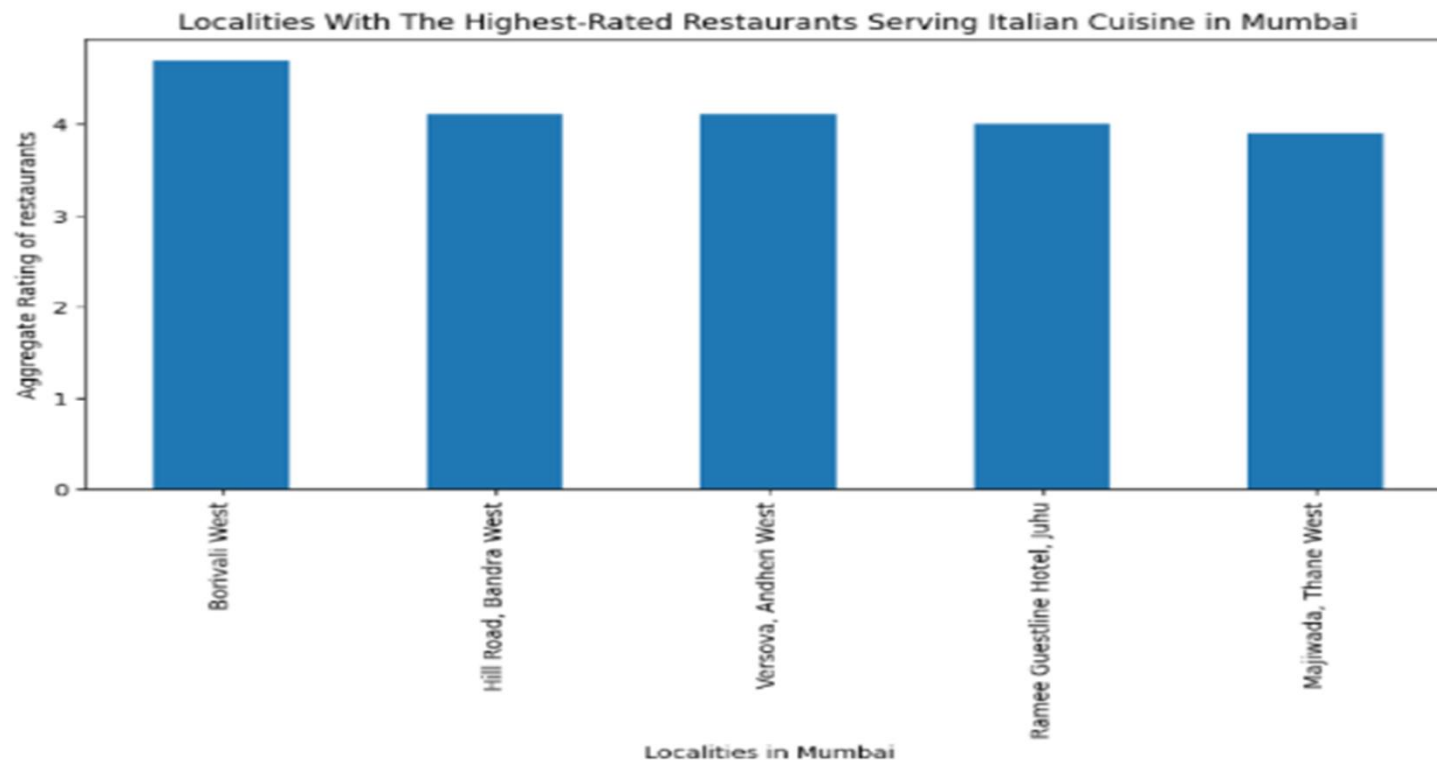
Localities with the Highest Number of Restaurants Serving Italian Cuisine in Mumbai:

Localities With The Highest Number of Restaurants Serving Italian Cuisine in Mumbai

Exploration & Visualization

Localities with the Highest-Rated Restaurants Serving Italian Cuisine in Mumbai:

Localities With The Highest-Rated Restaurants Serving Italian Cuisine in Mumbai

Data Transformation

Group the data according to locality

	Locality	Lat	Lng	No_of_Restaurant	Cusines	Agg_Rating	Comments	No_of_Votes
0	Azad Nagar	19.126630	72.829976	1	Pizza	4.00	Very Good	5145
1	Borivali East	19.221315	72.862381	1	Asian	4.00	Very Good	156
2	Borivali West	19.239203	72.845135	2	Healthy Food, American, Burger, Salad, North I...	4.05	Average, Excellent	2253
3	Fort	18.927584	72.832585	1	Fast Food, Beverages, Desserts	4.20	Very Good	1606
4	Hill Road, Bandra West	19.055831	72.833984	1	Cafe, Italian, Desserts, Fast Food, Chinese, Tea	4.10	Very Good	2040

Data Transformation

Using Foursquare API and credentials, get venues from each of the Mumbai localities:

	Locality	Locality Latitude	Locality Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Azad Nagar	19.12663	72.829976	Joey's Pizza	19.126762	72.830001	Pizza Place
1	Azad Nagar	19.12663	72.829976	Tirumala Store	19.128816	72.827619	Women's Store
2	Azad Nagar	19.12663	72.829976	Manish Nagar	19.127750	72.827595	Residential Building (Apartment / Condo)
3	Azad Nagar	19.12663	72.829976	48 fitness	19.130918	72.831286	Gym / Fitness Center
4	Azad Nagar	19.12663	72.829976	Living Liquidz	19.130882	72.831212	Liquor Store

Data Transformation

Group different venues by localities

Locality	Locality Latitude	Locality Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Azad Nagar	9	9	9	9	9	9
Borivali East	11	11	11	11	11	11
Borivali West	9	9	9	9	9	9
Fort	31	31	31	31	31	31
Hill Road, Bandra West	33	33	33	33	33	33
Juhu	27	27	27	27	27	27
Linking Road, Bandra West	35	35	35	35	35	35
Lower Parel	58	58	58	58	58	58
Majiwada, Thane West	31	31	31	31	31	31
Malad West	26	26	26	26	26	26
Powai	43	43	43	43	43	43
Ramee Guestline Hotel, Juhu	40	40	40	40	40	40
Versova, Andheri West	24	24	24	24	24	24
Vile Parle East	13	13	13	13	13	13

Data Transformation

Create new DataFrame and display the top 10 venues for each Locality:

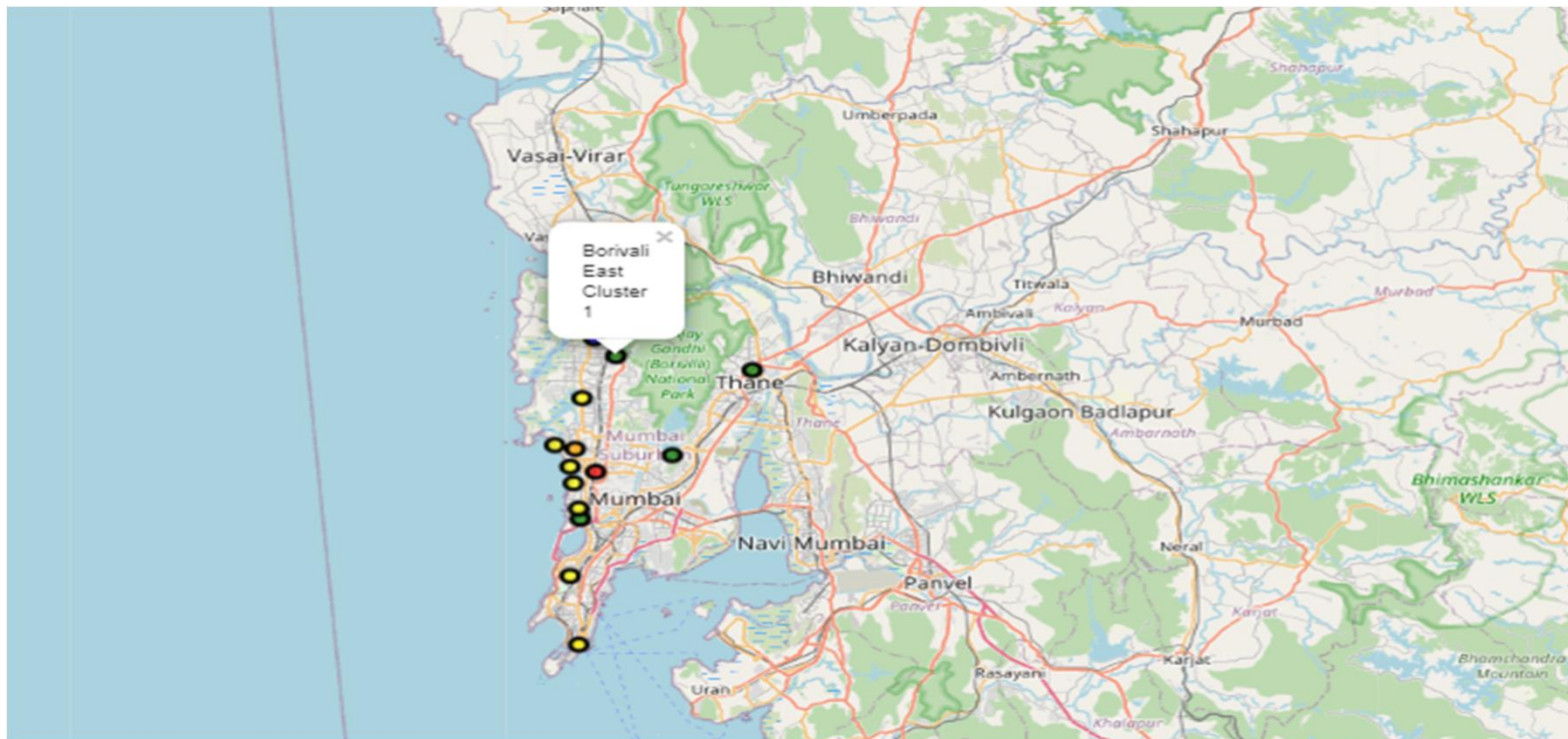|	Locality	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Azad Nagar	Women's Store	Residential Building (Apartment / Condo)	Indian Restaurant	Liquor Store	Lounge	Department Store	Pizza Place	Chinese Restaurant	Gym / Fitness Center	Bakery
1	Borivali East	Indian Restaurant	Ice Cream Shop	Garden Center	Department Store	Café	Bus Station	Bike Rental / Bike Share	Shopping Mall	Automotive Shop	Gourmet Shop
2	Borivali West	Café	Restaurant	Convenience Store	Dessert Shop	Italian Restaurant	Snack Place	Fish & Chips Shop	Cupcake Shop	Deli / Bodega	Department Store
3	Fort	Café	Indian Restaurant	Bar	Breakfast Spot	Boutique	Seafood Restaurant	Mughlai Restaurant	Men's Store	New American Restaurant	Coffee Shop
4	Hill Road, Bandra West	Indian Restaurant	Café	Gourmet Shop	Chinese Restaurant	Snack Place	Women's Store	Fried Chicken Joint	Men's Store	Coffee Shop	Clothing Store
5	Juhu	Hotel	Indian Restaurant	Italian Restaurant	Clothing Store	Restaurant	Gym	Bistro	Dessert Shop	Nightclub	Cosmetics Shop
6	Linking Road, Bandra West	Indian Restaurant	Bar	Seafood Restaurant	Dessert Shop	Arcade	Asian Restaurant	Lounge	Ice Cream Shop	Modern European Restaurant	Coffee Shop
7	Lower Parel	Indian Restaurant	Shopping Mall	Café	Pizza Place	Clothing Store	Chinese Restaurant	Asian Restaurant	Pub	Italian Restaurant	Mediterranean Restaurant
8	Majiwada, Thane West	Indian Restaurant	Clothing Store	Fast Food Restaurant	Italian Restaurant	Chinese Restaurant	Seafood Restaurant	Multiplex	Coffee Shop	Department Store	Pizza Place
9	Malad West	Coffee Shop	Café	Fast Food Restaurant	Italian Restaurant	Dessert Shop	Diner	Outdoors & Recreation	Dumpling Restaurant	Pizza Place	Chinese Restaurant
10	Powai	Indian Restaurant	Café	Bar	Asian Restaurant	Chinese Restaurant	Italian Restaurant	Clothing Store	Fast Food Restaurant	Hotel	Department Store
11	Ramee Guestline Hotel, Juhu	Café	Chinese Restaurant	Indian Restaurant	Bar	Cocktail Bar	Hotel	Asian Restaurant	Coffee Shop	Lounge	Donut Shop
12	Versova, Andheri West	Café	Ice Cream Shop	Beach	Bar	Arts & Crafts Store	Coffee Shop	Salon / Barbershop	Sandwich Place	Music Venue	Seafood Restaurant
13	Vile Parle East	Tea Room	Chinese Restaurant	Market	Fast Food Restaurant	Martial Arts School	Juice Bar	Snack Place	Diner	Maharashtrian Restaurant	Indian Restaurant

Data Transformation

Run k-means to cluster the Locality into 5 clusters:

	Locality	Lat	Lng	No_of_Restaurant	Cusines	Agg_Rating	Comments	No_of_Votes	Cluster Labels	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	Azad Nagar	19.126630	72.829976	1	Pizza	4.00	Very Good	5145	4	Women's Store	Residential Building (Apartment / Condo)	Indian Restaurant	Liquor Store	Lounge	Department Store	Pizza Place	Chinese Restaurant	Gym / Fitness Center	Bakery
1	Borivali East	19.221315	72.862381	1	Asian	4.00	Very Good	156	1	Indian Restaurant	Ice Cream Shop	Garden Center	Department Store	Café	Bus Station	Bike Rental / Bike Share	Shopping Mall	Automotive Shop	Gourmet Shop
2	Borivali West	19.239203	72.845135	2	Healthy Food, American, Burger, Salad, North I...	4.05	Average, Excellent	2253	2	Café	Restaurant	Convenience Store	Dessert Shop	Italian Restaurant	Snack Place	Fish & Chips Shop	Cupcake Shop	Deli / Bodega	Department Store
3	Fort	18.927584	72.832585	1	Fast Food, Beverages, Desserts	4.20	Very Good	1606	3	Café	Indian Restaurant	Bar	Breakfast Spot	Boutique	Seafood Restaurant	Mughlai Restaurant	Men's Store	New American Restaurant	Coffee Shop
4	Hill Road, Bandra West	19.055831	72.833984	1	Cafe, Italian, Desserts, Fast Food, Chinese, Tea	4.10	Very Good	2040	1	Indian Restaurant	Café	Gourmet Shop	Chinese Restaurant	Snack Place	Women's Store	Fried Chicken Joint	Men's Store	Coffee Shop	Clothing Store

Data Transformation

Create a Map with Marker labels

Clusters

Cluster 1

	Lat	Agg_Rating	Comments	No_of_Votes	Cluster Labels	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
13	19.103249	3.6	Good	1515	0	Tea Room	Chinese Restaurant	Market	Fast Food Restaurant	Martial Arts School	Juice Bar	Snack Place	Diner	Maharashtrian Restaurant	Indian Restaurant

Clusters

Cluster 2

	Lat	Agg_Rating	Comments	No_of_Votes	Cluster Labels	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	19.221315	4.00	Very Good	156	1	Indian Restaurant	Ice Cream Shop	Garden Center	Department Store	Café	Bus Station	Bike Rental / Bike Share	Shopping Mall	Automotive Shop	Gourmet Shop
4	19.055831	4.10	Very Good	2040	1	Indian Restaurant	Café	Gourmet Shop	Chinese Restaurant	Snack Place	Women's Store	Fried Chicken Joint	Men's Store	Coffee Shop	Clothing Store
8	19.207222	3.90	Good	317	1	Indian Restaurant	Clothing Store	Fast Food Restaurant	Italian Restaurant	Chinese Restaurant	Seafood Restaurant	Multiplex	Coffee Shop	Department Store	Pizza Place
10	19.121041	4.35	Excellent, Good	3425	1	Indian Restaurant	Café	Bar	Asian Restaurant	Chinese Restaurant	Italian Restaurant	Clothing Store	Fast Food Restaurant	Hotel	Department Store

Clusters

Cluster 3

	Lat	Agg_Rating	Comments	No_of_Votes	Cluster Labels	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
2	19.239203	4.05	Average, Excellent	2253	2	Café	Restaurant	Convenience Store	Dessert Shop	Italian Restaurant	Snack Place	Fish & Chips Shop	Cupcake Shop	Deli / Bodega	Department Store

Clusters

Cluster 4:

	Lat	Agg_Rating	Comments	No_of_Votes	Cluster Labels	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
3	18.927584	4.200000	Very Good	1606	3	Café	Indian Restaurant	Bar	Breakfast Spot	Boutique	Seafood Restaurant	Mughlai Restaurant	Men's Store	New American Restaurant	Coffee Shop
5	19.091458	3.800000	Good	617	3	Hotel	Indian Restaurant	Italian Restaurant	Clothing Store	Restaurant	Gym	Bistro	Dessert Shop	Nightclub	Cosmetics Shop
6	19.065838	3.800000	Good	146	3	Indian Restaurant	Bar	Seafood Restaurant	Dessert Shop	Arcade	Asian Restaurant	Lounge	Ice Cream Shop	Modern European Restaurant	Coffee Shop
7	18.997268	4.133333	Good, Very Good	6686	3	Indian Restaurant	Shopping Mall	Café	Pizza Place	Clothing Store	Chinese Restaurant	Asian Restaurant	Pub	Italian Restaurant	Mediterranean Restaurant
9	19.178630	4.333333	Excellent, Good	3960	3	Coffee Shop	Café	Fast Food Restaurant	Italian Restaurant	Dessert Shop	Diner	Outdoors & Recreation	Dumpling Restaurant	Pizza Place	Chinese Restaurant
11	19.109300	4.000000	Very Good	536	3	Café	Chinese Restaurant	Indian Restaurant	Bar	Cocktail Bar	Hotel	Asian Restaurant	Coffee Shop	Lounge	Donut Shop
12	19.131141	4.100000	Very Good	1295	3	Café	Ice Cream Shop	Beach	Bar	Arts & Crafts Store	Coffee Shop	Salon / Barbershop	Sandwich Place	Music Venue	Seafood Restaurant

Clusters

Cluster 5

	Lat	Agg_Rating	Comments	No_of_Votes	Cluster Labels	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	19.12663	4.0	Very Good	5145	4	Women's Store	Residential Building (Apartment / Condo)	Indian Restaurant	Liquor Store	Lounge	Department Store	Pizza Place	Chinese Restaurant	Gym / Fitness Center	Bakery

Conclusion

* Borivali west, Bandra West, Versova, Juhu are some of the best neighbourhoods for Italian cuisine.
* Lower Parel, Malad West, Powai are the best places for foodies who like eating out frequently.
* Powai, Malad West, Fort have the highest-rated restaurants in Mumbai.
* **Cluster 1, Cluster 3 & Cluster 4:** It is most recommended for tea rooms & cafes
* **Cluster 2**: It is most recommended for Indian Restaurants.
* **Cluster 5:** It is most recommended for Stores.