

# Locating a New Indian Restaurant in Mumbai

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# Introduction / Problem Definition

- Mumbai has 24 wards
- To identify a ward that is best suited to open a new Indian restaurant in Mumbai
- Criteria: The area should already be popular for having Indian restaurants but Indian restaurants should not be the most popular venue

# Data

- Mumbai ward geometry from [https://github.com/datameet/Municipal Spatial Data/blob/master/Mumbai/BMC Wards.geojson](https://github.com/datameet/Municipal_Spatial_Data/blob/master/Mumbai/BMC_Wards.geojson)
- Mumbai ward names from <http://www.demographia.com/db-mumbaidistr91.htm>

## ... Data

- Create Data Frame combining the two

	WardArea	Latitude	Longitude
0	Ward A - Colaba	18.920981	72.827472
1	Ward B - Sanhurst Road	18.956941	72.839720
2	Ward C - Marine Lines	18.951097	72.827200
3	Ward D - Grant Road	18.955231	72.808287
4	Ward E - Byculla	18.973439	72.843214
5	Ward F South - Parel	18.998980	72.853965
6	Ward F North - Matunga	19.031895	72.870740
7	Ward G South - Elphinstone	19.004169	72.820140
8	Ward G North - Dadar/Plaza	19.030693	72.844038
9	Ward H East - Khar/Santacruz	19.077906	72.859472

## ... Data

- Get venues for each ward from Four Square API

	Ward	Ward Latitude	Ward Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Ward A - Colaba	18.920981	72.827472	Theobroma	18.919298	72.829185	Dessert Shop
1	Ward A - Colaba	18.920981	72.827472	New Martin	18.918624	72.829512	Indian Restaurant
2	Ward A - Colaba	18.920981	72.827472	Mad Over Donuts	18.919209	72.829427	Donut Shop
3	Ward A - Colaba	18.920981	72.827472	Café Basilico	18.918609	72.830484	Diner
4	Ward A - Colaba	18.920981	72.827472	Piccadilly	18.921425	72.830936	Falafel Restaurant

# Explore and Process Data

- Get the frequency of occurrence of venues for each ward

----Ward A - Colaba----

	venue	freq
0	Indian Restaurant	0.15
1	Café	0.12
2	Diner	0.09
3	Coffee Shop	0.06
4	German Restaurant	0.03

----Ward B - Sanhurst Road----

	venue	freq
0	Indian Restaurant	0.29
1	Convenience Store	0.14
2	Harbor / Marina	0.14
3	Furniture / Home Store	0.14
4	Sandwich Place	0.14

# ... Explore and Process Data

- Get top 10 venues by ward

	Ward	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	Ward A - Colaba	Indian Restaurant	Café	Diner	Coffee Shop	German Restaurant	Chaat Place	Cosmetics Shop	Middle Eastern Restaurant	Mediterranean Restaurant	Juice Bar
1	Ward B - Sanhurst Road	Indian Restaurant	Furniture / Home Store	Harbor / Marina	Sandwich Place	Smoke Shop	Convenience Store	Diner	Cosmetics Shop	Cupcake Shop	Dance Studio
2	Ward C - Marine Lines	Indian Restaurant	Women's Store	Multiplex	Food	Fast Food Restaurant	Bus Station	Jewelry Store	Diner	Cupcake Shop	Dance Studio
3	Ward D - Grant Road	Indian Restaurant	Coffee Shop	Park	Restaurant	Gastropub	Ice Cream Shop	Clothing Store	Food & Drink Shop	Theater	Bakery
4	Ward E - Byculla	Chinese Restaurant	Dessert Shop	Ice Cream Shop	Indian Restaurant	Women's Store	Donut Shop	Cosmetics Shop	Cupcake Shop	Dance Studio	Deli / Bodega

# Clustering

- Clustering using Kmeans
  - Find optimum number of clusters by elbow method
  - The 1<sup>st</sup> cycle with number of clusters = 5, we get one big group and the other 4 clusters which can be ignored as not of interest for opening an Indian restaurant
  - Re-cluster the one big group this time with number of clusters = 6



# Results

- Of the 6 clusters following cluster best meets our criteria

Cluster 1 - Restaurants and eateries											
: mumbai_sub.loc[mumbai_sub['Cluster Labels'] == 1, mumbai_sub.columns[[1] + list(range(4, mumbai_sub.shape[1]))]]											
	WardArea	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	Ward A - Colaba	Indian Restaurant	Café	Diner	Coffee Shop	German Restaurant	Chaat Place	Cosmetics Shop	Middle Eastern Restaurant	Mediterranean Restaurant	Juice Bar
10	Ward H West - Bandra	Indian Restaurant	Café	Chinese Restaurant	Dessert Shop	Gym / Fitness Center	Arcade	Asian Restaurant	Bakery	Bar	Bookstore
11	Ward K East - Andheri (East)	Hotel	Indian Restaurant	Multiplex	Vegetarian / Vegan Restaurant	Pizza Place	Department Store	Hotel Bar	Burger Joint	Diner	Cosmetics Shop
13	Ward L - Kurla	Café	Indian Restaurant	Coffee Shop	Clothing Store	Fast Food Restaurant	Chinese Restaurant	Restaurant	Dessert Shop	Beer Garden	Shopping Mall
17	Ward P South - Goregaon	Indian Restaurant	Smoke Shop	Chinese Restaurant	Dance Studio	Fast Food Restaurant	Breakfast Spot	Donut Shop	Cosmetics Shop	Cupcake Shop	Deli / Bodega
19	Ward R South - Kandivalli	Park	Moving Target	Café	Ice Cream Shop	Snack Place	Diner	Convenience Store	Cosmetics Shop	Cupcake Shop	Dance Studio
20	Ward R Central - Borivali West	Café	Restaurant	Indian Restaurant	Arcade	Chinese Restaurant	Fast Food Restaurant	Pub	Bus Station	Multiplex	Women's Store
23	Ward T - Mulund	Indian Restaurant	Pizza Place	Fast Food Restaurant	Clothing Store	Cosmetics Shop	Coffee Shop	Food Court	Mobile Phone Shop	Café	Shopping Mall

# Discussion

- From this cluster the following areas can be considered
  - Ward K East – Andheri East – where Indian restaurant was the 2<sup>nd</sup> most popular
  - Ward L – Kurla – where Indian restaurant was the 2<sup>nd</sup> most popular
  - Ward R Central – Borivali West – where Indian restaurant was the 3<sup>rd</sup> most popular

## ... Discussion

- Based on this it is recommended to open a new Indian restaurant in **Borivali West**
- As a secondary alternative **Andheri East / Kurla** in this cluster could be considered

# Conclusion

- A analysis of Mumbai Wards was done
- Venues for each ward within 500m of the center of ward was obtained using Four Square API
- Based on clustering it is recommended that the best place to open a new Indian restaurant is Borivali West
- Alternative locations are Andheri East and Kurla