

# Location for a new Indian restaurant in Mumbai

## 1. Introduction / Business Problem

I live in the city of Mumbai in India, I have therefore chosen a project that is based in Mumbai.

**Mumbai**, also known as **Bombay** (the official name until 1995) is the capital city of the Indian state of Maharashtra. As of 2011 (last census) it is the most populous city in India with an estimated city proper population of 12.4 million. The larger Mumbai Metropolitan Region is the second-most-populous metropolitan area in India, with a population of 21.3 million as of 2016. Mumbai lies on the Konkan coast on the west coast of India and has a deep natural harbour. It is also the wealthiest city in India, and has the highest number of millionaires and billionaires among all cities in India.

In Mumbai there are 24 wards. For the convenience of city administration, wards have been decentralized. Each ward has its own ward office with the Ward Officer who is responsible for the municipal services under his area.

Taking the municipal wards as the unit, the aim is to find the most optimum ward to open a new Indian restaurant. We would like to choose a ward which is popular for its eateries, has Indian restaurants that are reasonably popular, but as yet not the top in popularity. This will provide us with a good location where the new Indian restaurant can shine.

## 2. Data

We need ward wise geometry so that we can get the latitude and longitude for the various wards from it. For this the geoson file was taken from the following location which has the geometry for various municipalities in India

[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)

The geometry of each ward is a polygon with multiple vertices. To obtain the center of the various wards (to use as input to four square api) the mean of all the vertices was used.

Then a dataframe was created with three columns – Ward, Latitude, Longitude

	Ward	Latitude	Longitude
0	A	18.920981	72.827472
1	B	18.956941	72.839720
2	C	18.951097	72.827200
3	D	18.955231	72.808287
4	E	18.973439	72.843214
5	F South	18.998980	72.853965
6	G South	19.004169	72.820140
7	F North	19.031895	72.870740
8	G North	19.030693	72.844038
9	N	19.086679	72.920185
10	R Central	19.233691	72.829735
11	S	19.133590	72.921913
12	T	19.167511	72.937554
13	K West	19.133594	72.781897

This Latitude and longitude will be used with a radius of 500m to get the venues from the Four Square API.

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

The venues obtained will then be categorized by type like café, indian restaurand, Chinese restaurant, beach, etc and then sorted based on number of occurences in determine the most popular location in each ward. A one hot dataframe will be created which can then be analysed for most popular location in each ward based on frequency.

	Ward	American Restaurant	Arcade	Art Gallery	Asian Restaurant	BBQ Joint	Bagel Shop	Bakery	Bank	Bar	Beach	Bed & Breakfast	Beer Garden	Bistro	E
0	A	0.000000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
1	B	0.000000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
2	C	0.000000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
3	D	0.000000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
4	E	0.000000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
5	F North	0.000000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
6	F South	0.000000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
7	G North	0.000000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.045455	0.045455	0.000000	0.000000	0.000000	
8	G South	0.000000	0.200000	0.2	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
9	H East	0.000000	0.000000	0.0	0.000000	0.000000	0.000000	0.250000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
10	H West	0.025641	0.038462	0.0	0.038462	0.000000	0.025641	0.038462	0.000000	0.038462	0.000000	0.000000	0.000000	0.012821	
11	K East	0.000000	0.000000	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	

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----Ward A----
      venue  freq
0  Indian Restaurant  0.15
1           Café      0.12
2           Diner     0.09
3     Coffee Shop    0.06
4           Hotel     0.06

----Ward B----
      venue  freq
0  Harbor / Marina  0.17
1 Furniture / Home Store  0.17
2       Flea Market  0.17
3  Indian Restaurant  0.17
4  Convenience Store  0.17

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Based on the frequency we can create a dataframe of the top 10 popular locations which will be used for further analysis.

	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	A	Indian Restaurant	Café	Diner	Coffee Shop	Hotel	Flea Market	Mediterranean Restaurant	Juice Bar	Chinese Restaurant	Chaat Place
1	B	Convenience Store	Indian Restaurant	Harbor / Marina	Flea Market	Hotel	Furniture / Home Store	Bagel Shop	BBQ Joint	Department Store	Dessert Shop
2	C	Indian Restaurant	Multiplex	Chinese Restaurant	Food	Fast Food Restaurant	Ice Cream Shop	Donut Shop	Cupcake Shop	Dance Studio	Deli / Bodega
3	D	Indian Restaurant	Coffee Shop	Café	Food & Drink Shop	Ice Cream Shop	Park	Clothing Store	Restaurant	Gastropub	Theater
4	E	Dessert Shop	Café	Ice Cream Shop	Indian Restaurant	Women's Store	Falafel Restaurant	Dance Studio	Deli / Bodega	Department Store	Dim Sum Restaurant