

# **Setting up and Italian Restaurant in Mumbai - Analysis Report**

## **1. Introduction:**

### **1.1 Background:**

The city of Mumbai is the highest populated city in India. It is known all around the world for its famous film city, Bollywood as well as for the street food found widely across the city. It has been known as the hub for traditional Indian cuisine, especially Western Indian, but now is opening up many international cuisine which are expected to be extremely successful considering the population residing in Mumbai and the fact that it is the only Indian name to feature among the world's top 20 wealthiest cities, according to New World Wealth's October 2019 report.

### **1.2 Business Problem:**

A client interested in opening a Italian restaurant comes with the problem of the location as to where in Mumbai setting up the Italian restaurant is extremely beneficial. Our job is to analyse the location data i.e. the number and density of Italian restaurants in a locality as well as how far a particular locality is from the centre of Mumbai or from the food hotspots of the city. Based on the analysis we will provide an answer to the question that where setting up the Italian restaurant will be more profitable in the city of Mumbai. It is important to know the place for setting up the restaurant because setting it up at a place with already well established restaurants will lead to lower foot fall and hence lower profits

### **1.3 Target Audience:**

The target audience includes business owners interested in setting up Italian restaurants in Mumbai. They will be faced with the problem of the location to set up their restaurants so as to maximise foot fall as well as reduce competition with other Italian restaurants in the initial years of working.

## **2. Data:**

### **2.1 Data Factors used in solving problem:**

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

- Number of existing restaurants in the neighborhood (any type of restaurant), found using Foursquare API
- Number of and distance to Italian restaurants in the neighborhood, if any
- Distance of neighborhood from city center

### **2.2 Data Sources:**

Following data sources will be needed to extract/generate the required information:

- Centers of candidate areas will be generated algorithmically and approximate addresses of centers of those areas will be obtained using
- Number of restaurants and their type and location in every neighborhood will be obtained using Foursquare API
- We get the neighbourhoods in Mumbai along with their latitude and longitudes from table present on the Wikipedia page : [https://en.wikipedia.org/wiki/List\\_of\\_neighbourhoods\\_in\\_Mumbai](https://en.wikipedia.org/wiki/List_of_neighbourhoods_in_Mumbai)
- Geojson file for Mumbai wards from the link : [https://raw.githubusercontent.com/datameet/Municipal\\_Spatial\\_Data/master/Mumbai/BMC\\_Wards.geojson](https://raw.githubusercontent.com/datameet/Municipal_Spatial_Data/master/Mumbai/BMC_Wards.geojson)

Note that even though the neighbourhoods data is taken from the wikipedia page but after extensive research it is found that no geojson file for the same is available. So we work with the Geojson file of the wards of Mumbai.

### **2.3 More features extracted from available data:**

Based on the data sets obtained above we can extract more features from the data set like:

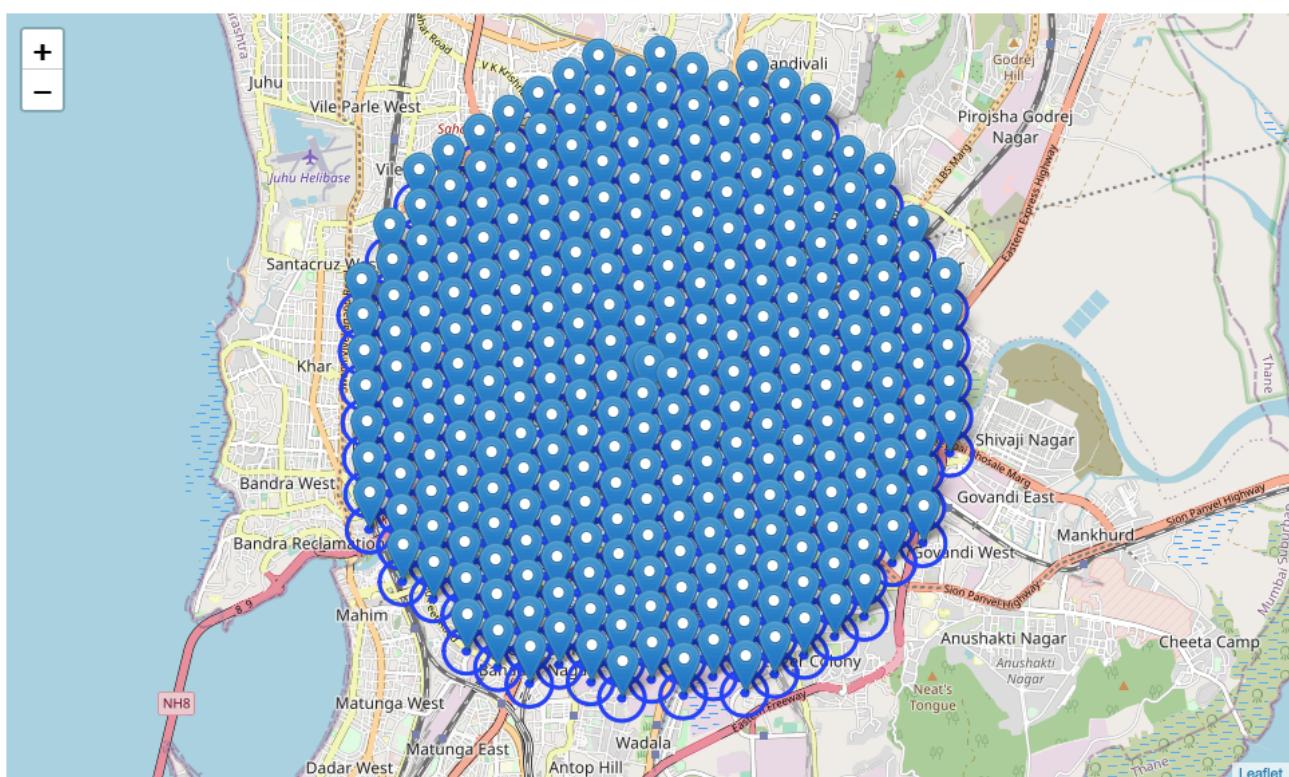
The distance can be extracted from the latitude and longitudes we have.

The nearby venues in particular neighborhoods can be obtained using Foursquare API and the latitude, longitudes for the neighborhoods.

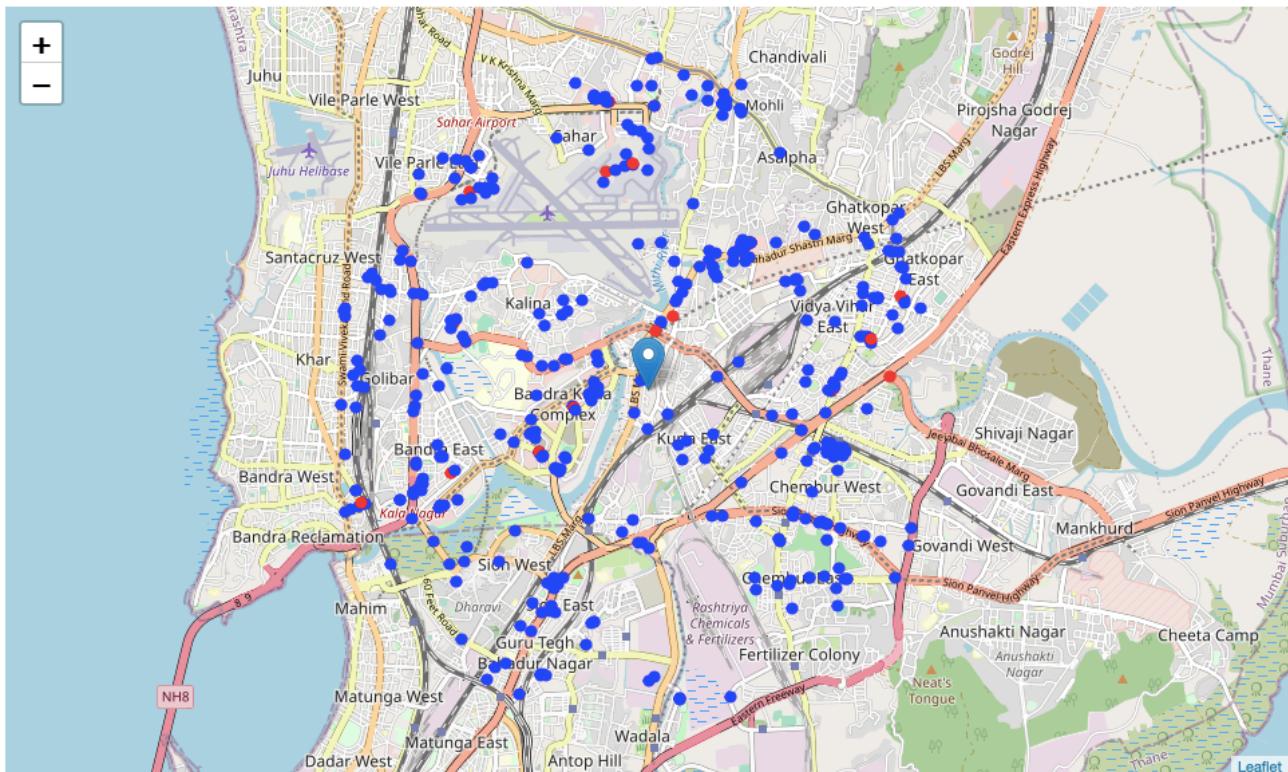
The density of restaurants in a particular neighbourhood can also be found by getting venues filtered by restaurants in a particular radius and then looking at their counts in a particular area.

### **3. Methodology:**

We create candidate neighbourhoods in the vicinity of the centre of Mumbai. This is done using the Folium library and the coordinates of the centre of Mumbai generated by reverse geocoding.



We now try to find the low density areas for restaurants and Italian restaurants. We look in the vicinity of the center of Mumbai, i.e. Kurla West we find out distances from nearest restaurants and the average number of restaurants in an area with 400m radius as we created those regions before. First the restaurants are displayed on the map with markers. Different colour markers are used for Italian restaurants and other restaurants.



Red marker is used for Italian restaurant and blue for other restaurants.

Now the distances of the restaurant from the centre of candidate areas are displayed as in the table below and average distance is then found.

	Address	Latitude	Longitude	X	Y	Distance from center	Restaurants in area	Distance to Italian restaurant
0	(60 Feet Road, Cooperative Housing Society, Dh...	19.037987	72.853253	7.519023e+06	3.664825e+06	7000.000000	1	3848.789036
1	(Shamshan Bhoomi, Sulochana Shetty Marg, F/N W...	19.035979	72.857276	7.519823e+06	3.664825e+06	6931.089380	3	4333.592160
2	(Agarwada Colony, F/N Ward, Zone 2, Mumbai, Mu...	19.033972	72.861299	7.520623e+06	3.664825e+06	6954.135460	4	4901.720613
3	(Senapati Bapat Marg, Central Govt Staff Colon...	19.046322	72.845021	7.517023e+06	3.665518e+06	6919.537557	1	1872.008427
4	(60 Feet Road, Dharavi, Zone 2, Mumbai, Mumbai...	19.044313	72.849045	7.517823e+06	3.665518e+06	6612.110102	1	2577.177670
5	(Dharavi, Zone 2, Mumbai, Mumbai City, Maharashtra...	19.042305	72.853069	7.518623e+06	3.665518e+06	6390.618123	0	3049.910062
6	(Dharavi, Zone 2, Mumbai, Mumbai City, Maharashtra...	19.040297	72.857093	7.519423e+06	3.665518e+06	6264.183905	1	3553.701640
7	(Laxmibai Kelkar Marg, Agarwada Colony, F/N Wa...	19.038289	72.861116	7.520223e+06	3.665518e+06	6238.589584	2	4151.582747
8	(Guru Nanak High School & College, R Jaimal Ya...	19.036281	72.865138	7.521023e+06	3.665518e+06	6315.061362	4	4645.326275
9	(Hutment Colony, F/N Ward, Zone 2, Mumbai, Mum...	19.034273	72.869161	7.521823e+06	3.665518e+06	6489.992296	0	5125.647021

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print('Average distance to closest Italian restaurant from each area center:', df_locations['Distance to Italian restaurant'].mean())
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Average distance to closest Italian restaurant from each area center: 2014.8234158043401

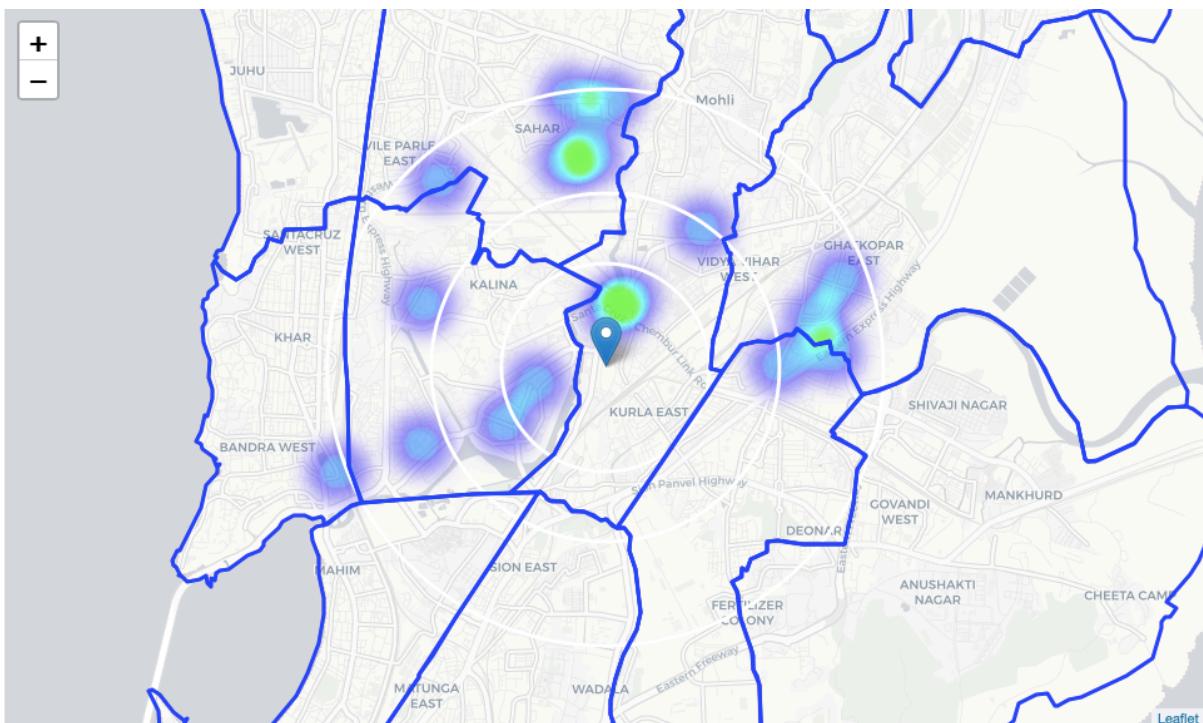
So on average Italian restaurant can be found within ~2km from every area center candidate.

Then we use heat maps to display the densities of restaurants as well as Italian restaurants in particular to get an idea of the candidates for suitable locations. Note that along with this the wards are also divided in the map using a blue line which is achieved using Folium.Geojson function and the geojson file obtained from the last data source mentioned in section 2.2.



We observe that there are a few pockets of low restaurant density closest to city center can be found south and north-west from Kurla West.

We also display the density of Italian restaurants using heat maps.

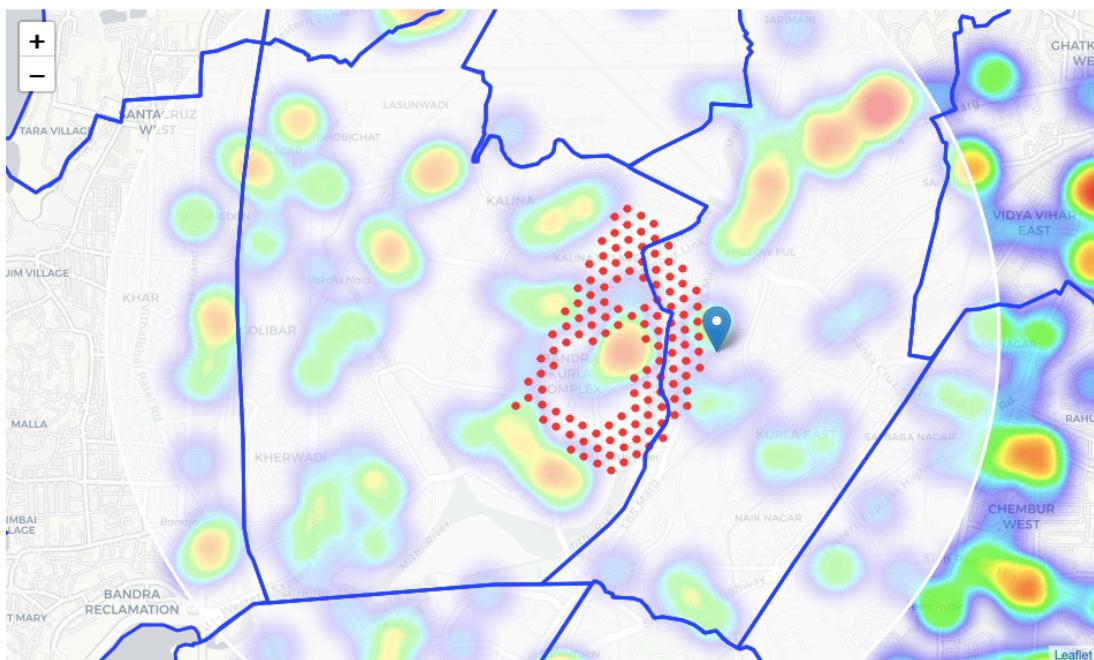


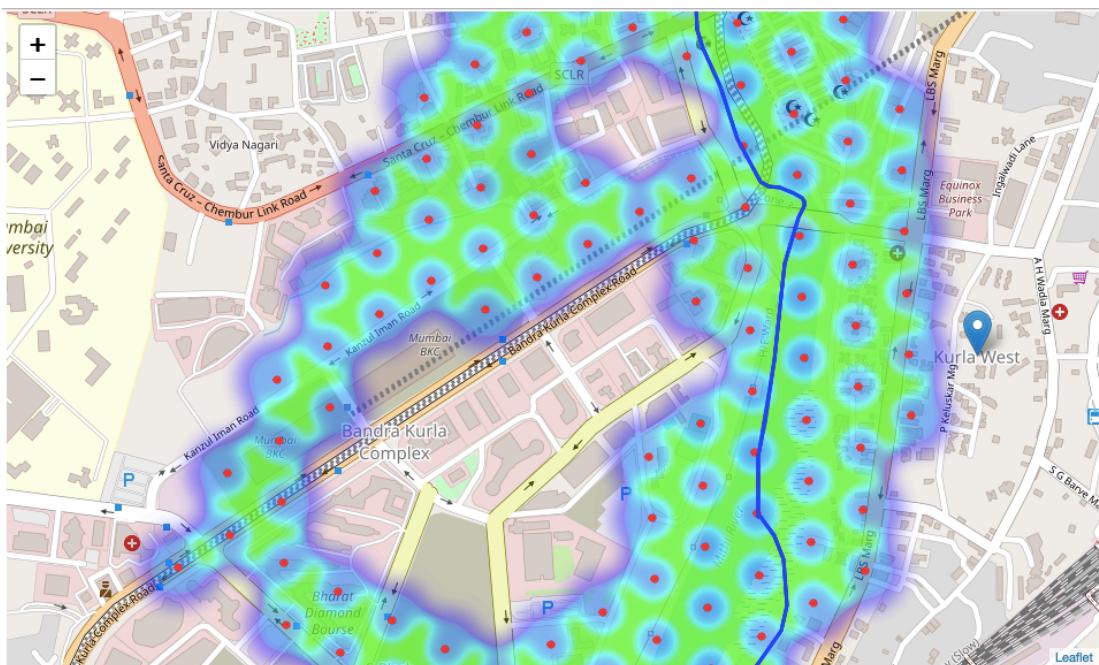
This indicates that higher density of existing Italian restaurants directly north and east from Kurla West, with closest pockets towards North-West and South from the centre and closer to the centre.

In fourth and final step we will focus on most promising areas and within those create clusters of locations that meet some basic requirements established in discussion with stakeholders: we will take into consideration locations with no more than two restaurants in radius of 250 meters, and we want locations without Italian restaurants in radius of 400 meters. We will present map of all such locations but also create clusters (using k-means clustering) of those locations to identify general zones / neighborhoods / addresses which should be a starting point for final 'street level' exploration and search for optimal venue location by stakeholders.

But first we refine our region of interest to a smaller area. In particular we look at the Bandra Kurla Complex region which is within our present area of interest. This particular location is chosen because Bandra Kurla Complex is a business and residential district which is a prominent commercial hub in India.

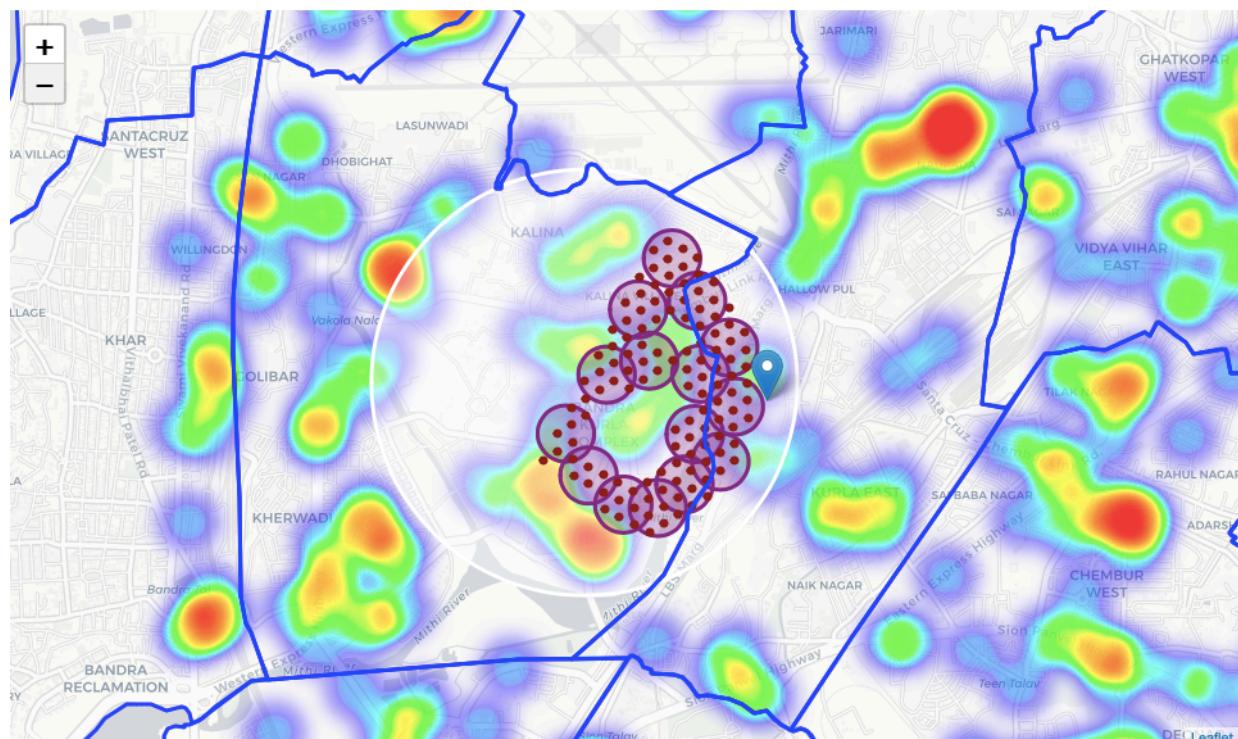
So focusing on that particular region we create and visualise possible candidate locations which are 200m apart. They are shown by the red markers in the region of interest which now is Bandra Kurla Complex.

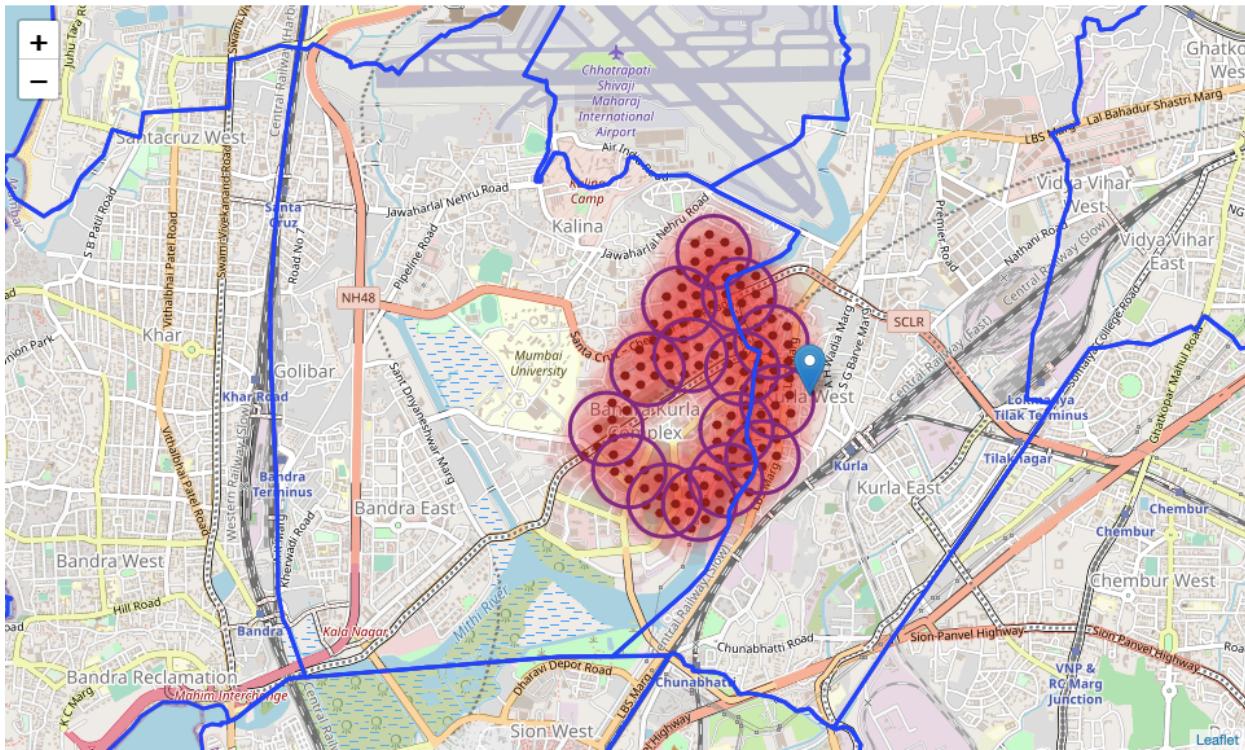




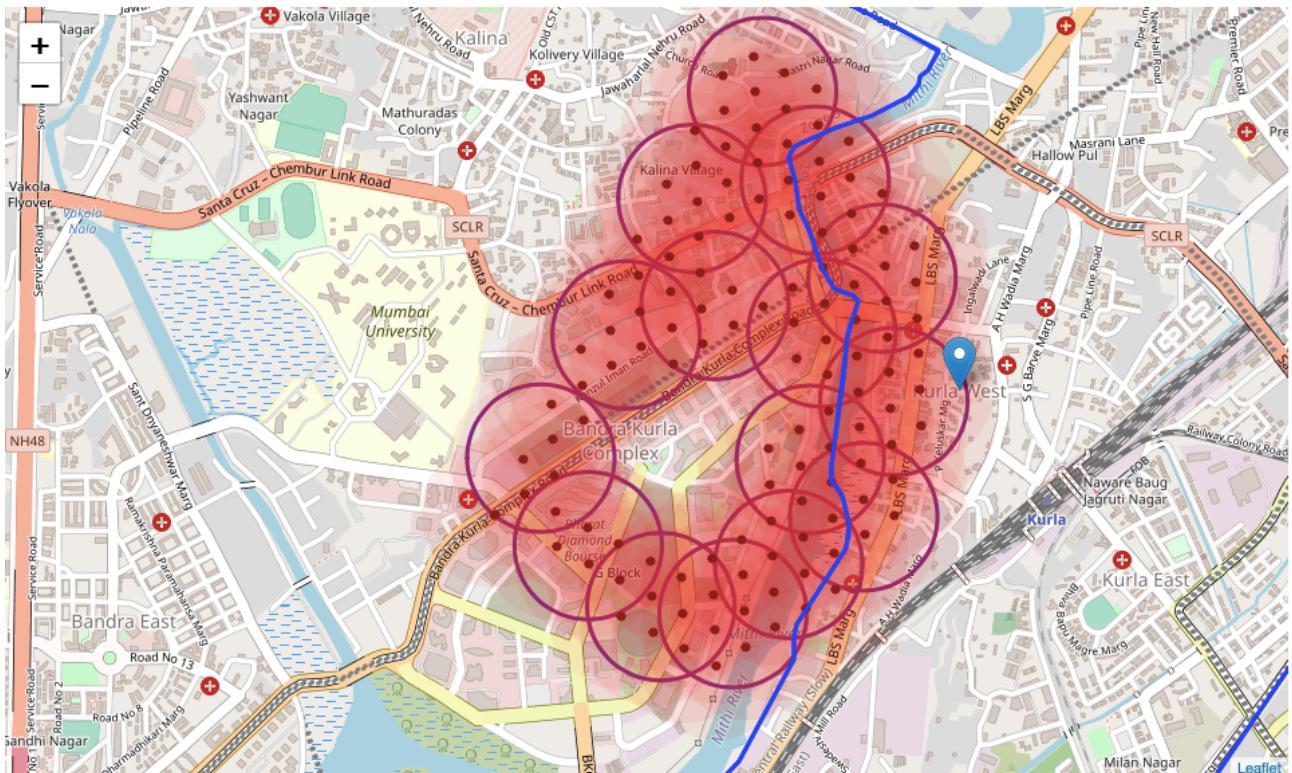
It is observed that there are several viable spots to set up the restaurant around the main region.

Now we create the clusters in this location using the k-means clustering method and display them on the map. We cluster the above displayed locations to create centers of zones containing good locations. Those zones, their centers and addresses will be the final result of our analysis.





We can now zoom in on our region of interest that is the Bandra-Kurla Complex. The final clusters look like the following:



Now that we have the clusters we know from our analysis that there are a fair amount of good candidate locations for our clients to set up their restaurants. The final step would be to get the addresses of these good candidate locations so that they can be provided

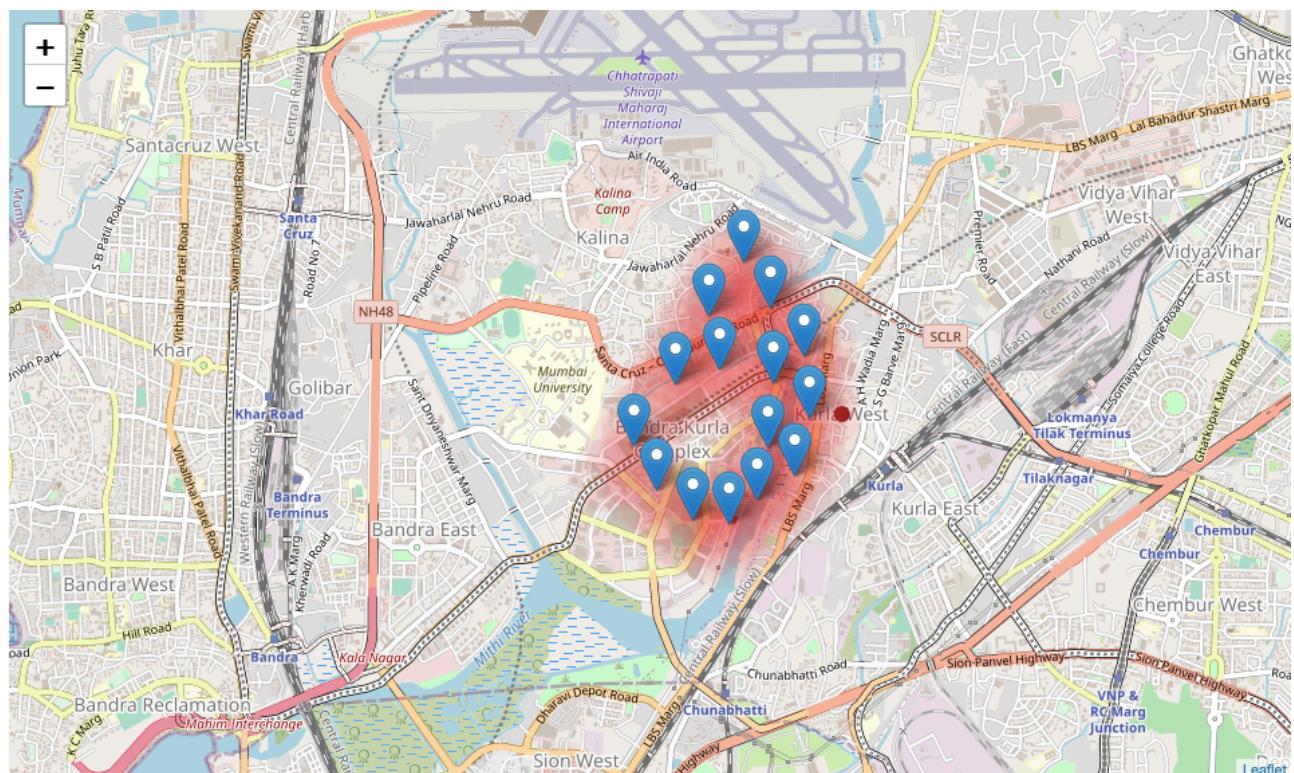
to the clients. In particular we need the addresses for the centres of the clusters. This can be obtained by getting their latitude and longitude values and then reverse geocoding to get the required addresses. So in the next step we do the needful and we also display their distances from the centre of Mumbai, i.e. Kurla West to get an idea of how accessible it is from every corner of the city.

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Addresses of centers of areas recommended for further analysis  
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Kanzul Iman Road, Kalina Village, H/E Ward, Zone 3, Mumbai, Mumbai Suburban, Maharashtra, 400 051, India  
 => 1.9km from Kurla West  
 Naware Baug Jagruti Nagar, L Ward, Zone 5, Mumbai, Mumbai Suburban, Maharashtra, 400024, India  
 => 0.9km from Kurla West  
 Santa Cruz – Chembur Link Road, Hallow Pul, L Ward, Zone 5, Mumbai, Mumbai Suburban, Maharashtra, 400070, India  
 => 1.4km from Kurla West  
 H/E Ward, Zone 3, Mumbai, Mumbai Suburban, Maharashtra, 400 051, India  
 => 2.3km from Kurla West  
 H/E Ward, Zone 3, Mumbai, Mumbai Suburban, Maharashtra, 400 051, India  
 => 2.1km from Kurla West  
 Naware Baug Jagruti Nagar, L Ward, Zone 5, Mumbai, Mumbai Suburban, Maharashtra, 400024, India  
 => 0.4km from Kurla West  
 Hallow Pul, L Ward, Zone 5, Mumbai, Mumbai Suburban, Maharashtra, 400024, India  
 => 0.8km from Kurla West  
 Kalina Village, H/E Ward, Zone 3, Mumbai, Mumbai Suburban, Maharashtra, 400098, India  
 => 1.9km from Kurla West  
 Kalina Village, H/E Ward, Zone 3, Mumbai, Mumbai Suburban, Maharashtra, 400098, India  
 => 2.0km from Kurla West  
 Kanzul Iman Road, Kalina Village, H/E Ward, Zone 3, Mumbai, Mumbai Suburban, Maharashtra, 400 051, India  
 => 1.5km from Kurla West  
 Mithi River, Road No 8, Gandhi Nagar, H/E Ward, Zone 3, Mumbai, Mumbai Suburban, Maharashtra, 40051, India  
 => 0.9km from Kurla West  
 Mithi River, Road No 8, Gandhi Nagar, H/E Ward, Zone 3, Mumbai, Mumbai Suburban, Maharashtra, 40051, India  
 => 1.4km from Kurla West  
 Mumbai BKC, Kanzul Iman Road, Kalina Village, H/E Ward, Zone 3, Mumbai, Mumbai Suburban, Maharashtra, 400 051, India  
 => 2.4km from Kurla West  
 H/E Ward, Zone 3, Mumbai, Mumbai Suburban, Maharashtra, 400 051, India  
 => 0.8km from Kurla West  
 H/E Ward, Zone 3, Mumbai, Mumbai Suburban, Maharashtra, 400 051, India  
 => 1.8km from Kurla West

This concludes the analysis. We have the addresses of centers of clusters of most appropriate candidate locations for our purpose.

We display the above displayed addresses on the map finally for a better visualisation.



## **4. Result:**

The analysis done shows that even though there are a number of restaurants in Mumbai and a fair amount of Italian restaurants as well but still we can find pockets of areas around the center of Mumbai where restaurants can be set up. The heat maps show that there are particular directions towards which there is a higher density but it is not as if it is completely crowded all around. Further focussing on Bandra Kurla Complex, we create clusters which are the most accurate on the criteria that they have low density of restaurants and absolutely no Italian restaurant in a radius of 250m and finally we get the addresses for these cluster centers which give the most suitable places to set up a restaurant in this area. This analysis does not imply that these are the best places to set up an Italian restaurant in the whole city but it gives us the best places to set up the restaurant under the assumption that the center of the city is easily accessible from every corner of Mumbai and that the center of city is expected to have a higher footfall due to that positional advantage.

## **5. Discussion:**

We observe that there are pockets of areas around the center of Mumbai where restaurants can be set up. Bandra Kurla Complex is chosen in particular as a region of interest because it is a prominent commercial hub in India and BKC houses a number of commercial buildings including Jammu & Kashmir Bank National Business Centre, National Stock Exchange, SEBI, NABARD Head Office, IL&FS, Amazon.com, Asian Heart Institute, Dow Chemicals, ICICI Bank, Citibank, Dena Bank, Bank of Baroda, State Bank of India, Bank of India, Kotak Mahindra Bank, Bharat Diamond Bourse, Unit Trust of India, Dhirubhai Ambani International School, American School of Bombay, Institute of Chartered Accountants of India, Fortune 2000 and JioGarden. It also is home to the Mumbai Cricket Association's cricket ground, the Consulate General of the United States, Mumbai and the British Deputy High Commission. So there are about 400,000 people working in various offices throughout the BKC which would be advantageous as it would attract official meetings from a number of major offices of MNCs present. And apart from this there are a bunch of tourist places and it is a well known hangout hub with places to eat and enjoy amongst the youth.

## **6. Conclusion:**

The purpose was to find the low density regions around the centre of the city to get the best out of positional advantage for setting up an Italian restaurant. Heat maps were created around the center of Mumbai and then the focus was shifted to the nearby Bandra Kurla Complex due to several factors and features it possesses as a business hub with tourist attractions nearby. Then clusters were made and center addresses were obtained by reverse geocoding.

Among these clusters it will be advantageous to choose from the clusters further north as they will be closer to Mumbai airport which will give it further positional advantage. Final decision on optimal restaurant 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 etc.