Company's new branch in Bangalore

Business Problem:

- This project is for a company which is already established where there headquarters is located. Now they want to expand their business by constructing a new unit in Bangalore, INDIA for which they need to find a plot which is reasonable but also surrounded by venues which will attract more talented employees and keeps the productivity high.
- Finding a plot in a populated city like Bangalore is not an easy job. Locality average prices, its basic features needs to be considered. This project will help them in zeroing out the probable locations and then they may get into further details based on their specific needs.

Data description:

- Firstly, we extracted data for area names in Bangalore, INDIA with its average price per sqft in rupees. (https://www.makaan.com/price-trends/property-rates-for-buy-inbangalore) We used plot section from this site as our project is about constructing new company.
- Secondly, we used foursquare api for extracting neighbourhood venues.
- And finally we used a json file for boundaries of each area in Bangalore from here- (https://raw.githubusercontent.com/datameet/PincodeBoundary/master/Bangalore/bou ndary.geojson).

Methodology:

- Data extraction for average price per sqft in rupees for plots in each locality of Bangalore.
- Extracting Longitudes and Latitudes for localities mentioned in the data frame. For this we have used geopy and Nominatim.
- Plotting each column data on map and bar plot for average price in INR with respect to locality name.
- Collection of venues for each locality using Foursquare and creating a table for venue categories.
- Kmeans Modelling.

Data extraction for average price per sqft in rupees for plots in each locality of Bangalore.

	Locality_Name	Avg_price_per_sqft	Longitude	Latitude
0	HSR Layout	20833.33	77.638862	12.911623
1	Koramangala	40959.90	77.751926	13.292399
2	Whitefield	17408.84	-71.611858	44.373058
3	Krishnarajapura	5126.25	76.805633	12.032522
4	Begur	7571.43	3.208835	41.954192

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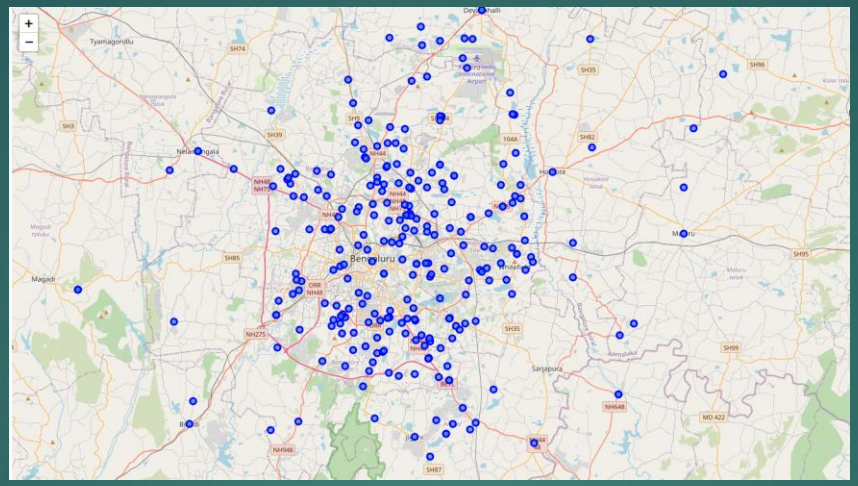
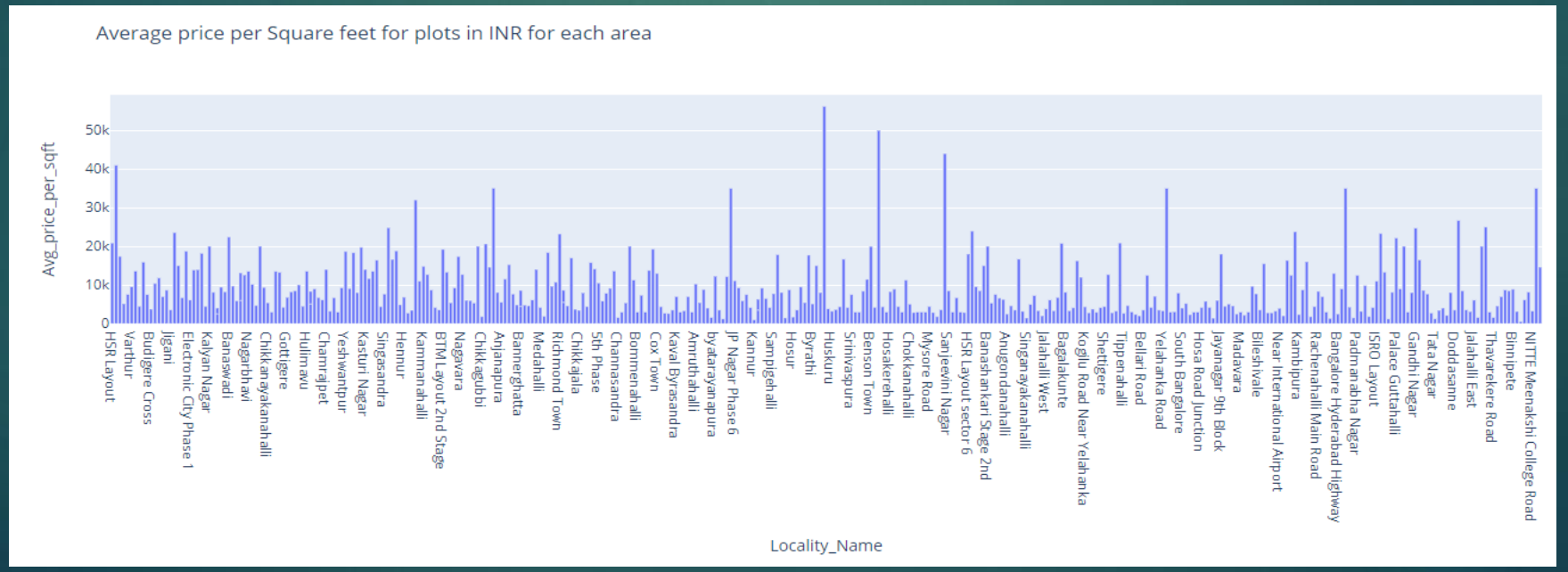
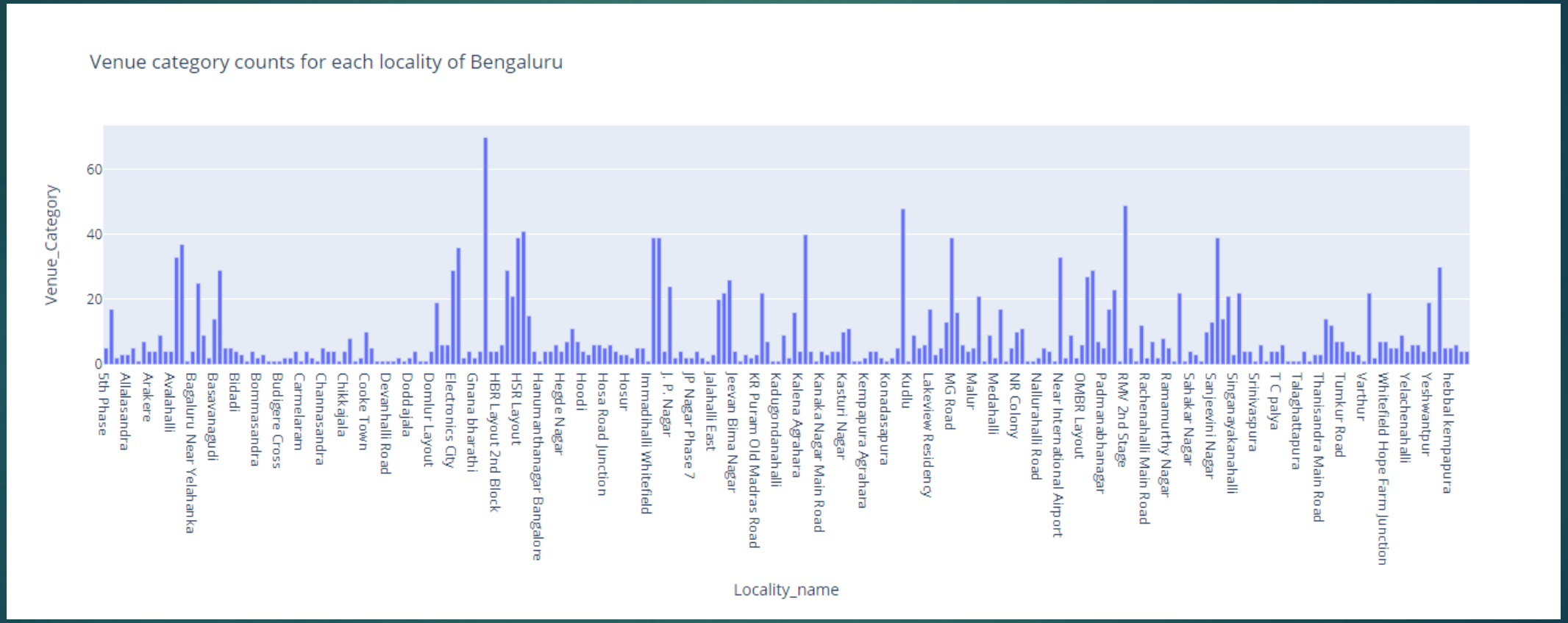
4	Begur	7571.43	3.208835	41.954192
5	Varthur	9534.09	77.746994	12.940615
6	Devanahalli	13611.17	77.713438	13.248350
7	Chandapura	4473.16	77.433391	17.443639
8	Mahadevapura	15922.58	77.692416	12.993498
9	Whitefield Hope Farm Junction	7500.00	77.752044	12.983974
10	Budigere Cross	3723.50	77.750307	13.046410
11	Bellandur	10391.92	77.666761	12.935772
12	Jakkur	11820.00	77.606894	13.078474
13	Marathahalli	6999.50	77.698416	12.955257
14	Yelahanka	8638.38	77.596345	13.100698
15	Jigani	3565.19	77.638093	12.785253
16	Indira Nagar	23531.75	77.640467	12.973291
17	Murugeshpalya	15000.00	77.655593	12.958948
18	Horamavu	6692.31	77.660151	13.027331
19	BTM Layout	18750.00	77.610282	12.915177

Plotting each column data on map and bar plot for average price in INR with respect to locality name.





Collection of venues for each locality using Foursquare and creating a table for venue categories.

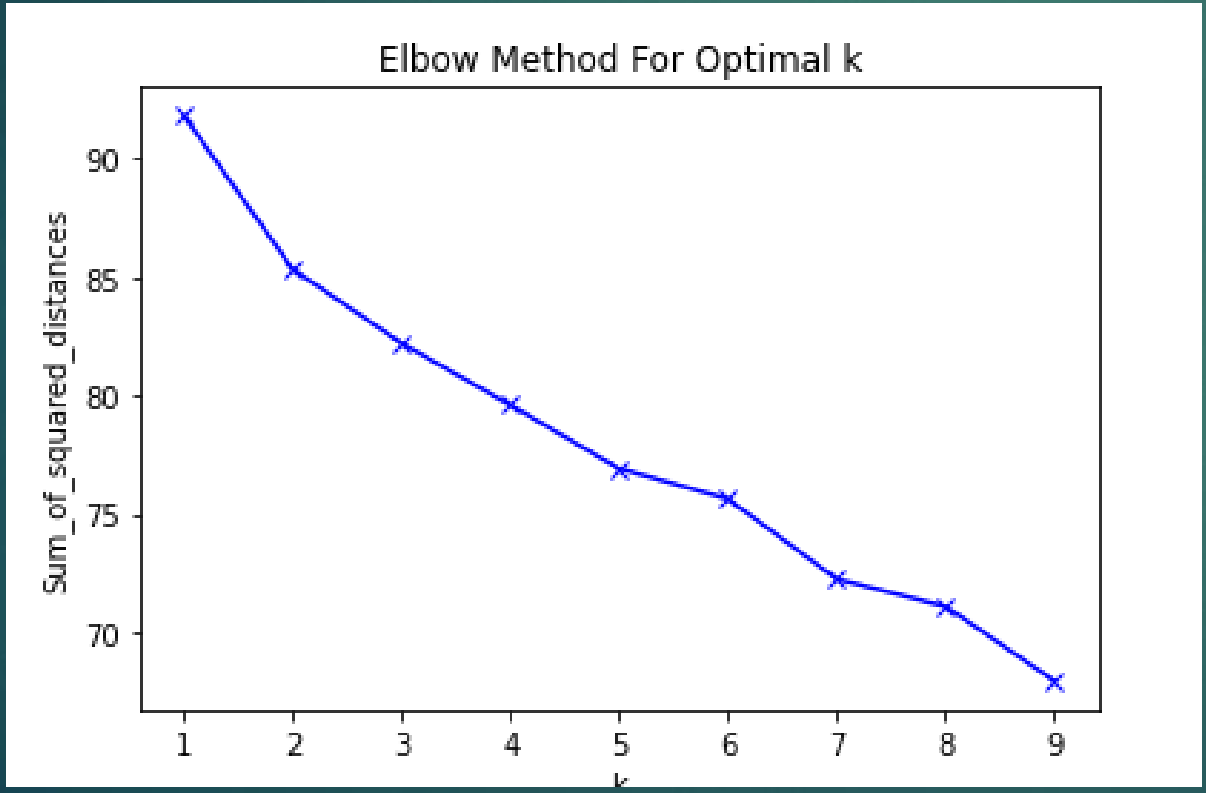


Placing the top ten venues of each locality, converted into columns and placed it as a table with locality name column.

	Locality_name	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	5th Phase	Indian Restaurant	Snack Place	Bus Station	Women's Store	Doner Restaurant	Fish Market	Field	Fast Food Restaurant	Farmers Market	Fabric Shop
1	AECS Layout	Indian Restaurant	Department Store	Bakery	Salon / Barbershop	Breakfast Spot	Udupi Restaurant	Coffee Shop	South Indian Restaurant	Tea Room	Diner
2	AECS Layout A Block Singasandra	Lake	Kerala Restaurant	Women's Store	Flower Shop	Fishing Store	Fish Market	Field	Fast Food Restaurant	Farmers Market	Fabric Shop
3	Abbigere	Business Service	Bakery	Indie Movie Theater	Doner Restaurant	Fishing Store	Fish Market	Field	Fast Food Restaurant	Farmers Market	Fabric Shop
4	Allalasandra	ATM	Doner Restaurant	Flea Market	Fishing Store	Fish Market	Field	Fast Food Restaurant	Farmers Market	Fabric Shop	Event Service

Kmeans Modelling.

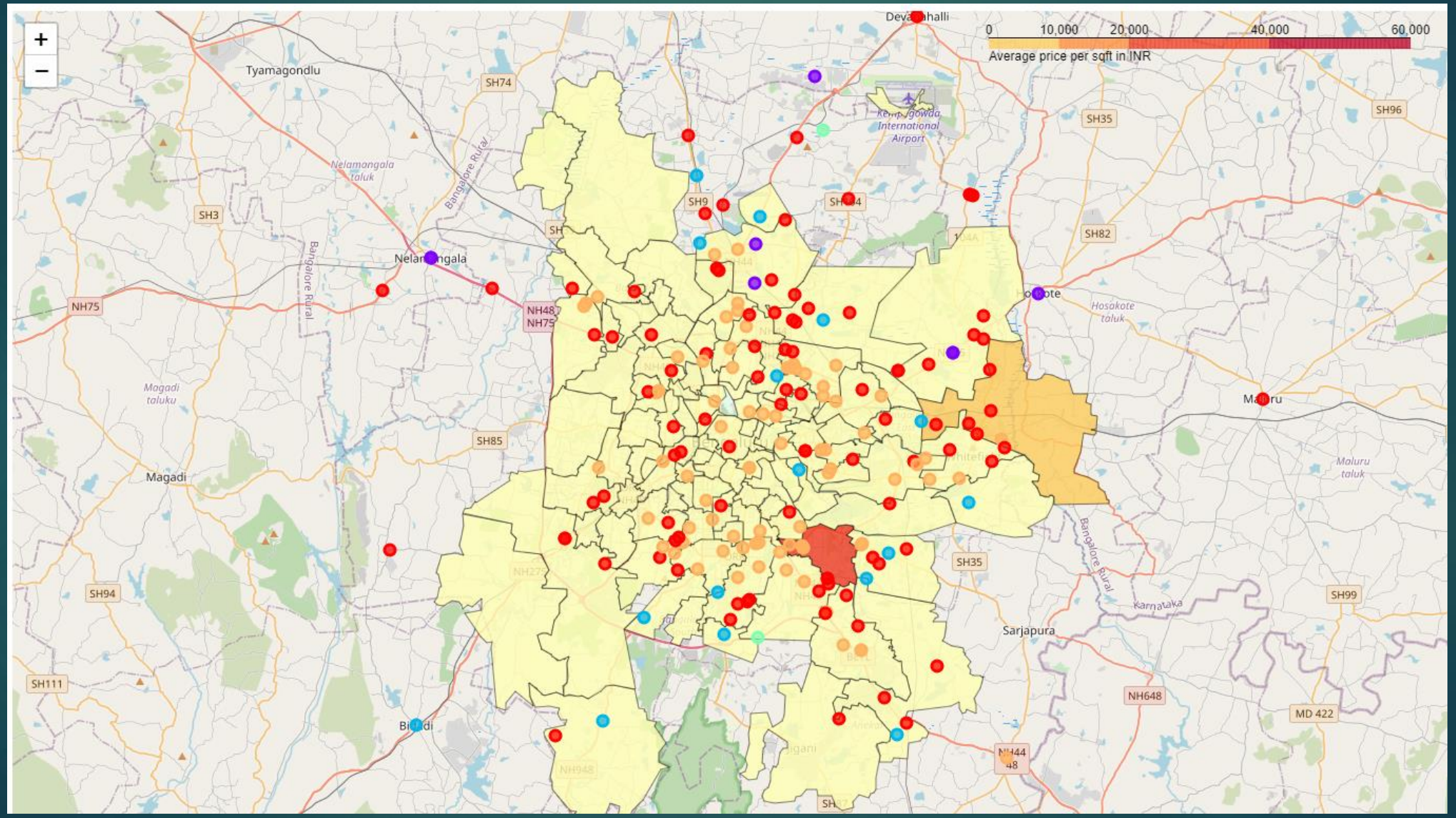
We used one hot coded data to use it for kmeans modelling for which first we found the best k using elbow curve method and chose k as 5 and modelled.



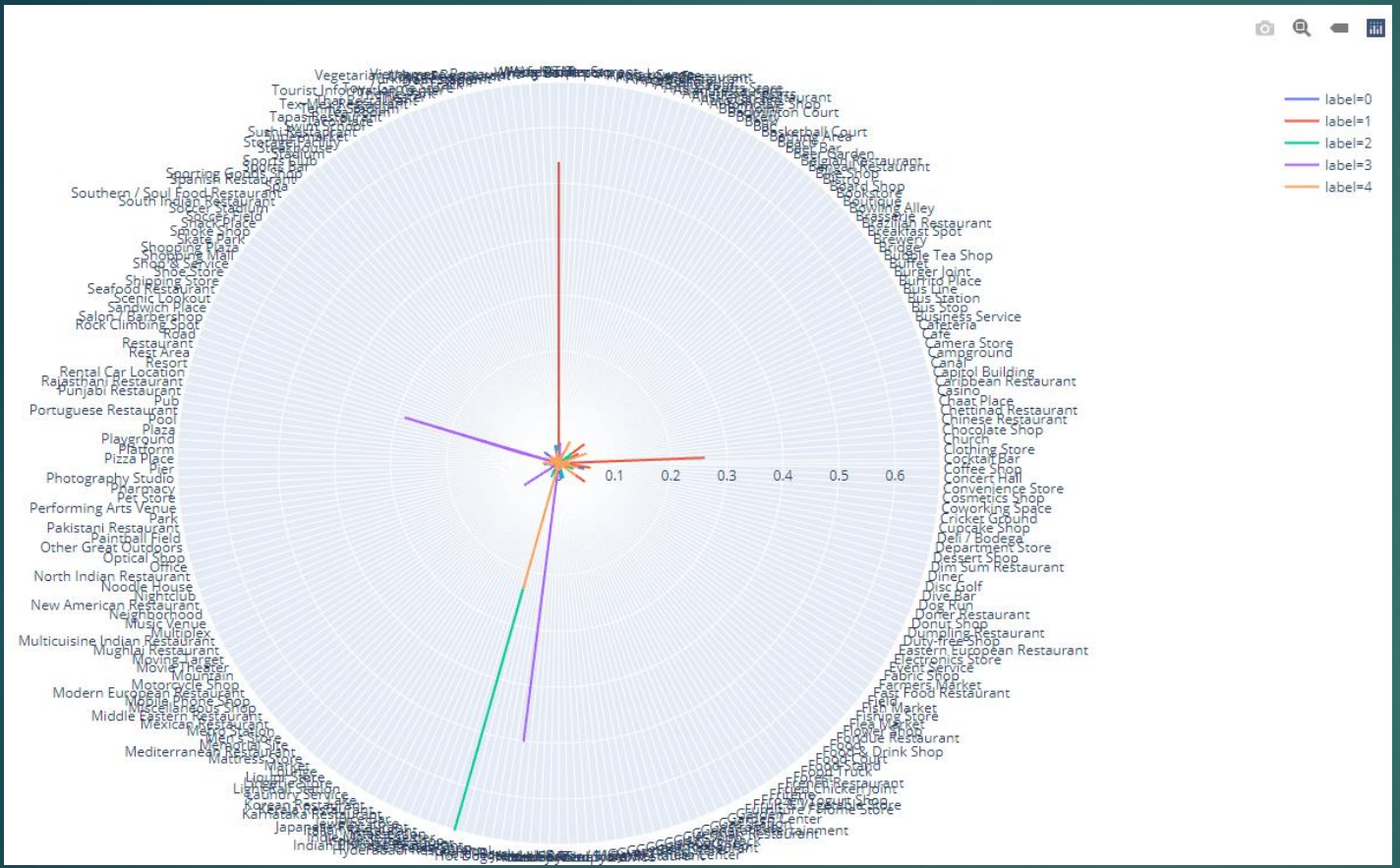
Then we merged all the data for including columns with Locality_Name, average price, Longitudes, latitudes and top ten venues associated.

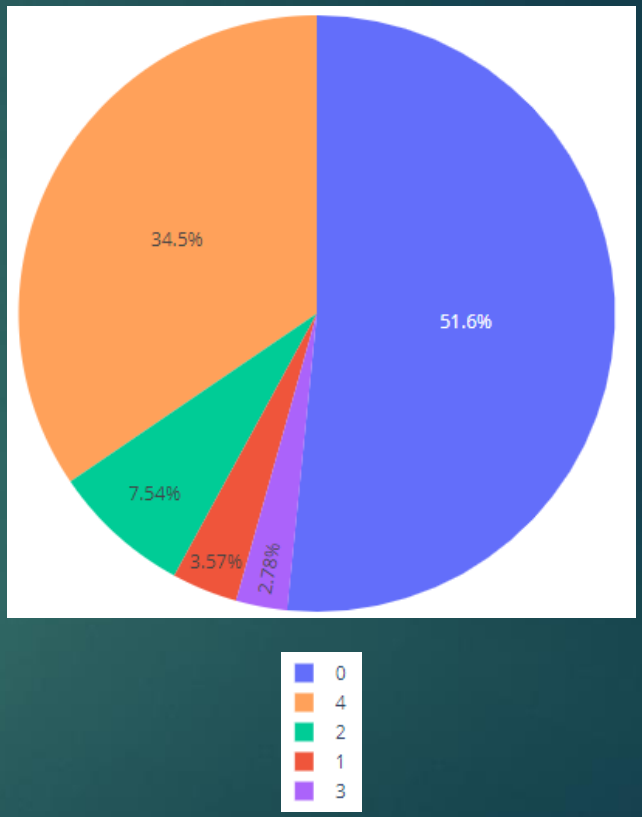
	Locality_Name	Avg_price_per_sqft	Longitude	Latitude	Cluster_Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
0	HSR Layout	20833.33	77.638862	12.911623	4.0	Indian Restaurant	Ice Cream Shop	Café	Snack Place	Liquor Store	Farmers Market	Seafood Restaurant	Food Court	Coffee Shop
1	Whitefield	17408.84	-71.611858	44.373058	0.0	Pizza Place	Sandwich Place	Donut Shop	Gun Shop	Grocery Store	Convenience Store	Women's Store	Electronics Store	Dumpling Restaurant
2	Begur	7571.43	3.208835	41.954192	0.0	Mediterranean Restaurant	Hotel	Tapas Restaurant	Spanish Restaurant	Cocktail Bar	Pub	Athletics & Sports	Bar	Bakery
3	Varthur	9534.09	77.746994	12.940615	2.0	Indian Restaurant	Women's Store	Dog Run	Fishing Store	Fish Market	Field	Fast Food Restaurant	Farmers Market	Fabric Shop
4	Devanahalli	13611.17	77.713438	13.248350	0.0	Campground	Women's Store	Dog Run	Fishing Store	Fish Market	Field	Fast Food Restaurant	Farmers Market	Fabric Shop
5	Mahadevapura	15922.58	77.692416	12.993498	0.0	Movie Theater	Coffee Shop	Women's Store	Bar	Italian Restaurant	French Restaurant	Fast Food Restaurant	Multiplex	Noodle House
6	Whitefield Hope Farm Junction	7500.00	77.752044	12.983974	4.0	Intersection	Eastern European Restaurant	Vegetarian / Vegan Restaurant	Indian Restaurant	Breakfast Spot	Restaurant	Department Store	Doner Restaurant	Donut Shop
7	Budigere Cross	3723.50	77.750307	13.046410	0.0	Bus Stop	Women's Store	Fishing Store	Fish Market	Field	Fast Food Restaurant	Farmers Market	Fabric Shop	Event Service
8	Marathahalli	6999.50	77.698416	12.955257	4.0	Indian Restaurant	Clothing Store	Asian Restaurant	Shoe Store	South Indian Restaurant	Kerala Restaurant	Sporting Goods Shop	Restaurant	Bakery
9	Yelahanka	8638.38	77.596345	13.100698	4.0	ATM	Train Station	Indian Restaurant	Mobile Phone Shop	Food Truck	Farmers Market	Fabric Shop	Fast Food Restaurant	Doner Restaurant

Plotting the clusters on map using json data for boundaries of locality in Bangalore and choropleth for Average price per sqft of plots.



Lastly, we used Line polar for visualizing which cluster has the maximum frequency per venue and also used a pie chart to check the number of localities in each cluster.





Results discussion:

- Finally we will conclude with results in this section:
- We need to consider two facts here: Average price per sqft in INR for each locality and Number of venues available at each locality
- With respect to above observations we may say that prices are almost equal around the city other than couple of locality where prices are at peak. We can also say that cluster 4 considers the highest venues with help of line polar and pie plots. Cluster 4 can be seen in the maximum around south, east and central-north Bangalore.
- Any of these places might be suitable for new office space considering many other established companies and start-ups are also set up here. Please note that plot selection of different companies may depend on many other factors, so other deep research is also required based on company requirements

Conclusion:

- In this project we have searched data available from all possible sources available and selected the best suitable data for analysing results.
- Here we have identified locality names, average price per sqft, its longitudes, latitudes, best possible general venues. Then used this data to plot on map with both heat map of average prices and marking clusters based on venues.
- Finally discussed about the possible results. This project as used for a company to open their new branch office in best possible location of Bangalore, we can say that this project may also be used with similar scenarios when required