

Capstone Project: Analysis of Indian Cities - Report

- Radhika

A: Introduction:

India, a country in South Asia, is the second-most populous country and the most populous democracy in the world, with the population of about **135.26 crores (2018)**. It has a population density of about **454.94 inhabitants per square kilometer**.

With 29 states and 7 union territories, India is a place with enormous growth. In a diverse country like this, there is audience for almost everything, may it be art, science, sports, culture, technology or even farming. Along with the interesting history and mythology, the variety in the attire, nature, language speaks about the quality and versatility of life in the country.

A1: Description and Discussion of the Background:

Many students travel across the country for education, jobs, and to settle down. The main concern, whenever you move to a new city, is a house to stay in. Obviously, you will want to search for a good neighborhood, and this project, will give an idea as to how to select and what to choose, based on your requirements. The majority of the population in India is middle class.

Buying a real estate in a country as populated as India can be a real problem, especially when you have just started earning. Hence, rented apartments seem to be the new trend among the generation. The young generation does not prefer stability, and the short rent agreements allow you to move frequently. This analysis will also help the investors/ businessmen to decide where there is more scope.

The main cities in India are also the centers for the migrants, always looking for jobs. Hence, there can never be shortage of employees. Depending on the stream of the business/startup (tech, sports centers, education hubs, restaurants, and transportation), the choice of a city differs.

- Pune is called as the education hub of India.
- Mumbai is the city of dreams, the city that never sleeps.
- Surat is called as the city of mirrors and mirages, a huge production centre.
- Delhi, the capital of the country, is rich in everything, the historical places, the culture, and has tremendous scope for the government jobs.
- The cities have mixed and intertwined structure. Comparing the nearby venues and the average rent values in each city, different categories of groups of cities can be made .

A2: Data Description:

To consider the above idea, I collected the data as mentioned below:

1. I used **Foursquare API** to get the most common venues in the top 5 cities.
2. I collected the average housing rent values of 106 cities from the link: <https://www.makaan.com/price-trends>
3. I used the **geopy** library to get the coordinates of each of the 106 cities and folium library to plot them on the map.

B: Data and Methodology:

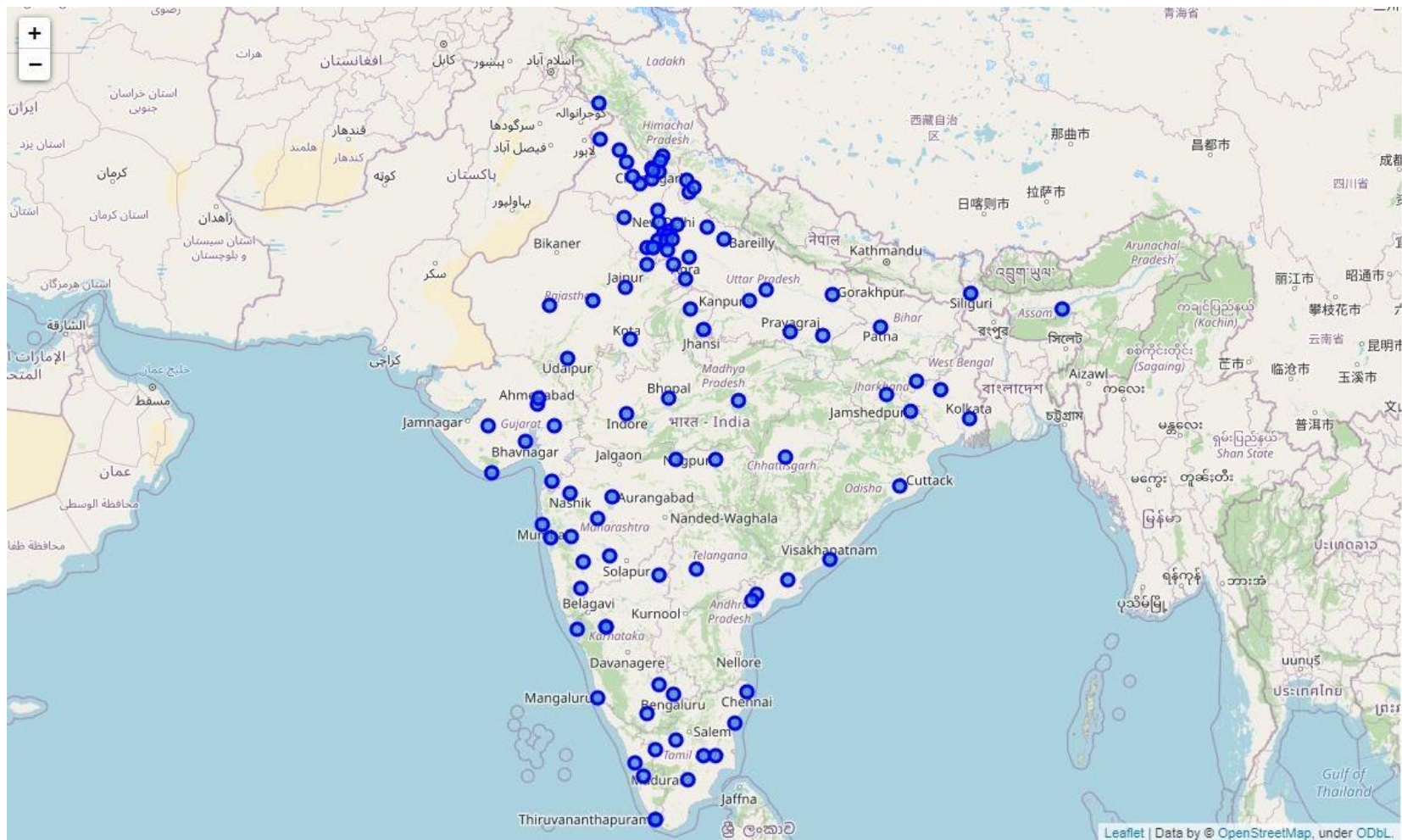
As a database, I used GitHub repository in my study. The main data consists of the columns: City, 1bk_avg_rent, 2bhk_avg_rent, 3bhk_avg_rent, latitude, longitude information.

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Results:

The following results were displayed by the code which is attached in the GitHub link for the notebook.

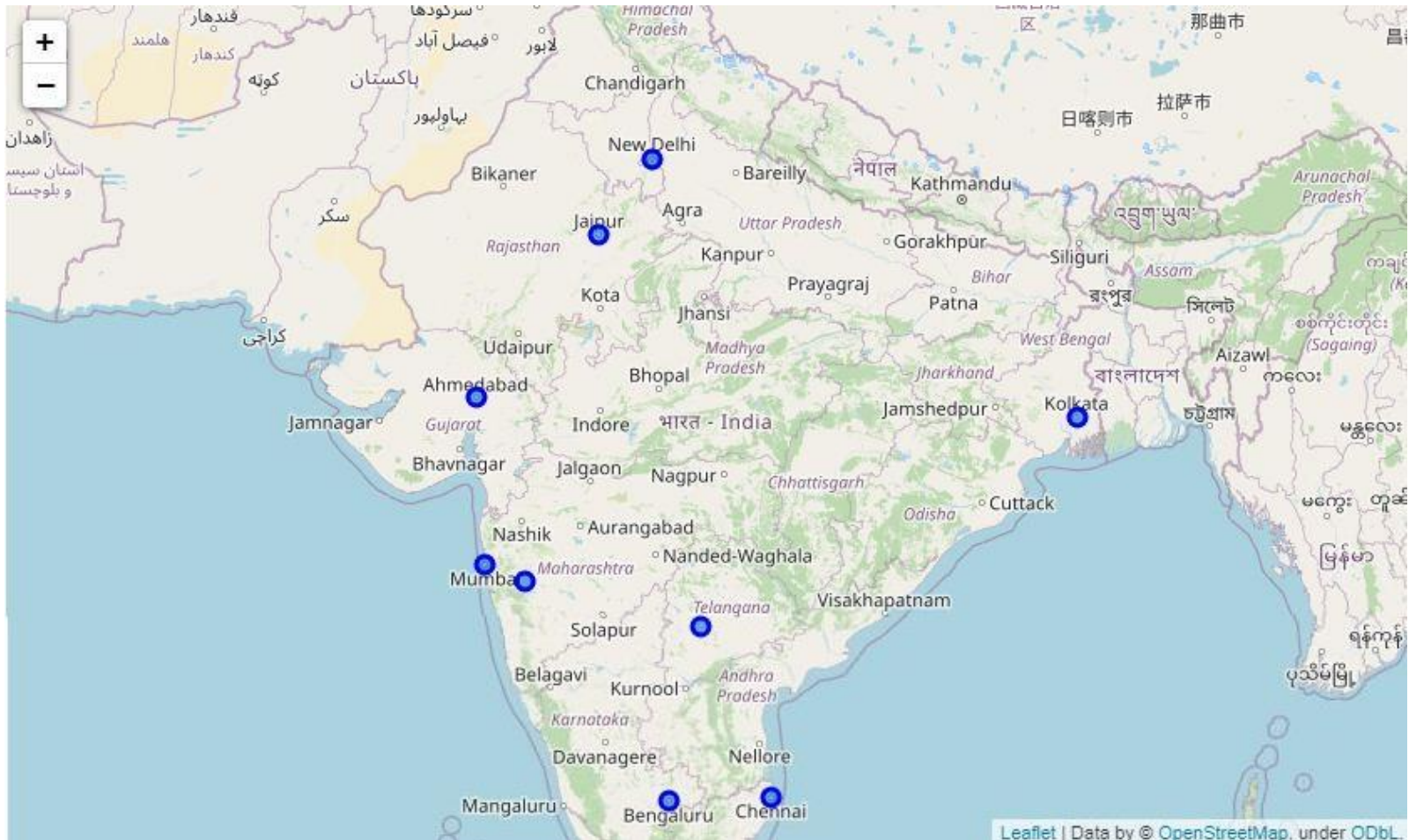
The screenshots of some of the results are inserted in the following slides.



I then made a different dataframe for the **top 10** cities.

	City	1bhk_avg_rent	2bhk_avg_rent	3bhk_avg_rent	latitude	longitude
0	Ahmedabad	11631.58	19566.09	31308.69	23.021624	72.579707
1	Bangalore	12691.02	19688.55	41341.30	12.979120	77.591300
2	Chennai	9469.39	15760.46	36254.73	13.080172	80.283833
3	Delhi	12425.47	19357.13	47127.06	28.651718	77.221939
4	Hyderabad	9524.62	13331.54	23103.28	17.388786	78.461065
5	Kolkata	7213.54	10584.40	23261.11	22.545412	88.356775
6	Mumbai	13623.06	34893.94	67617.86	18.938771	72.835335
7	Pune	9954.02	18325.97	33399.49	18.521428	73.854454
8	Jaipur	7624.14	13463.92	22586.96	26.916194	75.820349
9	Surat	14250.00	12750.00	24269.23	45.938300	3.255300

I then plotted them on map too.



I utilized **Foursquare API** to explore the venues of **top 5** countries. I set the radius 500m and the limit 100 for each.

The venues of the following cities were returned by Foursquare API:

1. Ahmedabad:

	name	categories	lat	lng
0	Lucky Tea	Tea Room	23.027829	72.581394
1	Manek Chowk Khau Gali	Snack Place	23.023505	72.588539
2	Manek Chowk	Fast Food Restaurant	23.023626	72.588553
3	Agashiye	Indian Restaurant	23.027104	72.581614
4	House of MG	Hotel	23.027186	72.581621
5	Hotel Patang	Indian Restaurant	23.026421	72.572185
6	Sidi Saiyyed's Jali	Historic Site	23.027022	72.581175
7	Jama Masjid	Historic Site	23.024323	72.587042
8	Hotel Neelkanth Patang	Restaurant	23.026472	72.572237
9	The Green House	Vegetarian / Vegan Restaurant	23.027270	72.581461

2. Bangalore:

	name	categories	lat	lng
0	Cubbon Park	Park	12.977042	77.595277
1	Vidhana Soudha	Capitol Building	12.979027	77.591881
2	JW Marriott Hotel Bengaluru	Hotel	12.972362	77.595051
3	M. Chinnaswamy Stadium	Cricket Ground	12.978144	77.599223
4	Taj West End	Hotel	12.984572	77.584893
5	Infinitea	Tea Room	12.987157	77.594835
6	J W Kitchen	Asian Restaurant	12.972410	77.594592
7	Tosceno	Italian Restaurant	12.971980	77.596066
8	Spice Terrace	Lounge	12.972254	77.595200
9	UB City	Shopping Mall	12.971709	77.595905

3. Delhi:

	name	categories	lat	lng
0	Amritsari Lassi Wala	Snack Place	28.657325	77.224138
1	Kake Di Hatti काके दी हट्टी	Indian Restaurant	28.658050	77.223377
2	bloomrooms @ New Delhi Railway Station	Hotel	28.645537	77.217701
3	Spice Market	Food & Drink Shop	28.657287	77.222595
4	Giani's Di Hatti Rabri Faluda	Dessert Shop	28.657889	77.223296
5	The Prime Balaji Deluxe @ New Delhi Railway St...	Hotel	28.645247	77.217433
6	Chawri Bazaar चावड़ी बाजार	Hardware Store	28.649771	77.227364
7	The Indian Grill Restaurant	Restaurant	28.646141	77.215133
8	Giani Kulfi	Dessert Shop	28.657847	77.223231
9	Nai Sarak नई सड़क	Paper / Office Supplies Store	28.652839	77.228708

4. Mumbai:

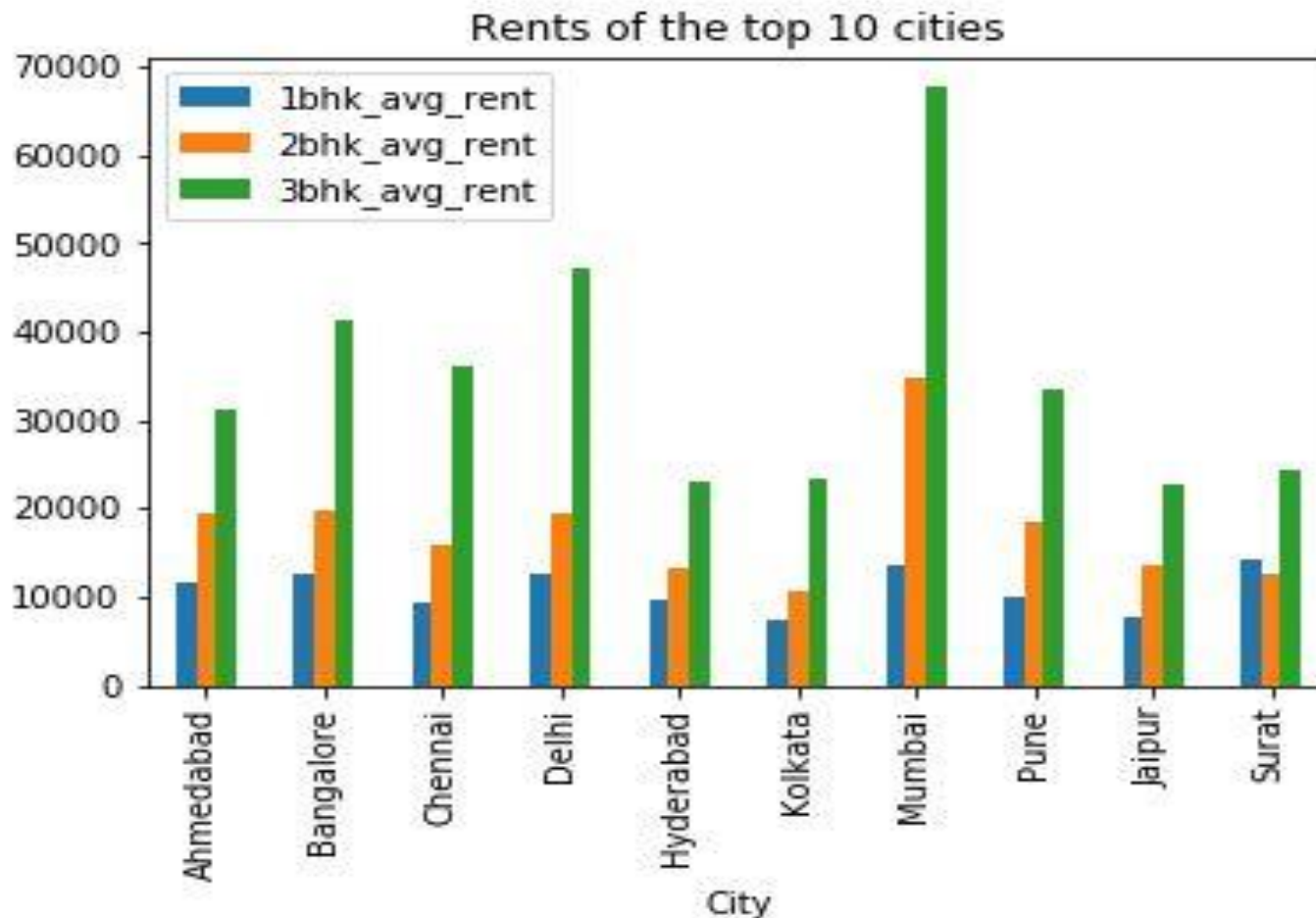
	name	categories	lat	lng
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5. Pune:

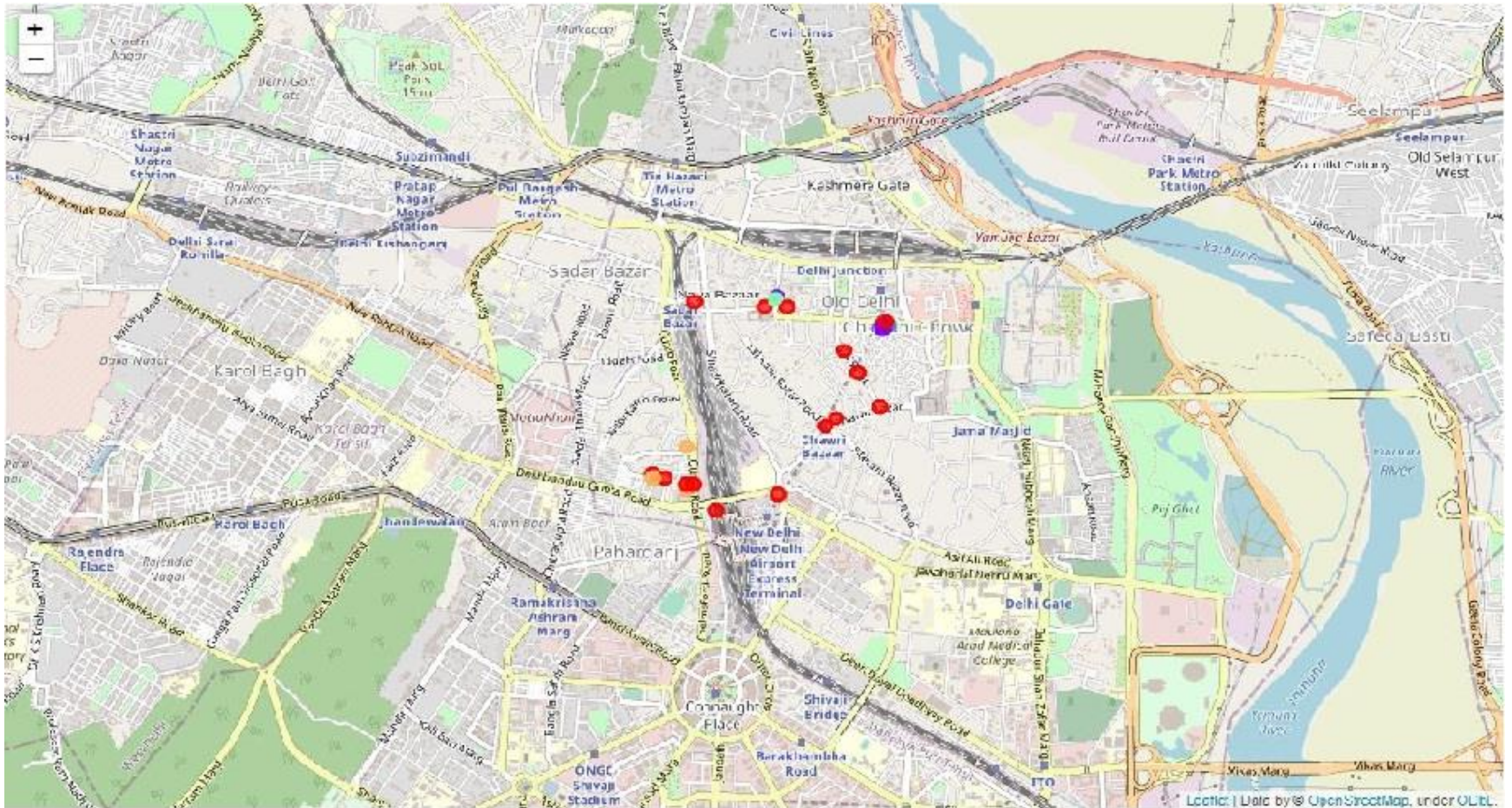
count	items	referralId	categories	id	address	cc	city	country	crossStreet	...	formattedAddress	labeledLatLngs
0	[[{"summary": "This spot is popular", "type": "..."}]]	e-0-4f579db56b740547b24e5d3a-0	Historic Site	4f579db56b740547b24e5d3a	Corner of Kasba Ganapati Mandir,	IN	Pune	India	off Shivaji Road,	...	[Corner of Kasba Ganapati Mandir, (off Shivaji ...	[{"label": "display", "lat": 18.51871967405886...
1	[[{"summary": "This spot is popular", "type": "..."}]]	e-0-50f6c177e4b0e9762504f426-1	Tea Room	50f6c177e4b0e9762504f426	Shanivar Peth	IN	Pune	India	near Omkareshwar Temple	...	[Shanivar Peth (near Omkareshwar Temple), Pune...	[{"label": "display", "lat": 18.51924829541048...
2	[[{"summary": "This spot is popular", "type": "..."}]]	e-0-4cb161a1562d224b6fc91e88-2	Juice Bar	4cb161a1562d224b6fc91e88	Vasantrao Deshmukh Path, Shivaji Nagar	IN	Pune	India	NaN	...	[Vasantrao Deshmukh Path, Shivaji Nagar, Pune...	[{"label": "display", "lat": 18.52355342051691...
3	[[{"summary": "This spot is popular", "type": "..."}]]	e-0-4b9cf1e3f964a520fe8336e3-3	Coffee Shop	4b9cf1e3f964a520fe8336e3	Jangli Maharaj Road	IN	Pune	India	NaN	...	[Jangli Maharaj Road, Pune, Mahārāshtra, India]	[{"label": "display", "lat": 18.5231306426117,...
4	[[{"summary": "This spot is popular", "type": "..."}]]	e-0-4fee9bcafe4b0da11fdb582b-4	Donut Shop	4fee9bcafe4b0da11fdb582b	Near Sambhaji Park, JM Road	IN	Pune	India	NaN	...	[Near Sambhaji Park, JM Road, Pune 411004, Mah...	[{"label": "display", "lat": 18.51933511140425...
5	[[{"summary": "This spot is popular", "type": "..."}]]	e-0-4c41785da5c5ef3bb73eb06f-5	Indian Restaurant	4c41785da5c5ef3bb73eb06f	Above Vishal Megamart	IN	Pune	India	Laxmi Road	...	[Above Vishal Megamart (Laxmi Road), Pune, Mah...	[{"label": "display", "lat": 18.51433226555955...
[[{"summary": "..."}]]		e-0-		585					Near		[585 Gangaadhar	

* We can increase the number of venues with more latitude longitude information.

Understanding the trend of rents is important. Usually, the most common rented apartments are 2bhk. The multiple bar chart of the rents of the top 10 cities is as below:



Using one hot encoding to the venues data gotten from Foursquare enables you to make clusters. I have done one for **Delhi**.



Observations and Discussion:

All these cities have adaptable neighborhoods, covering almost all the necessities.

Being a resident of Pune, I personally would recommend the city to the investors, as there are a lot of opportunities here. The rents data will help the common man who wants to move here.

There are other factors like weather, financial and job opportunities, education, family needs, which differ from person to person, hence the audience has to prioritize their needs and may choose this project to decide the city they want to move in.

Conclusion:

What comes to your mind when you hear the name 'India'?

Definitely culture, world heritage, food, etc.

India is one of the fastest growing economies.

The above analyzed 5 cities are the safest cities to live in, having the best quality of life. I have tried to tell you the which are the best cities to live in according to various factors.

I used the methods taught in the series of courses.

THANK YOU!