



# THE BATTLE OF CITIES.

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# Introduction

Hello, Welcome to my project report. Hang tight & make sure you scroll till the end to find out how similar the cities of India are with context to what's most-common venue in their vicinity.

Source of data : “<https://www.latlong.net/category/cities-102-15.html>”

**Business Problem that this data might solve:** For a business owner, wanting to start his current business in a city similar to where his business already is.

**Solution:** A compiled report depicting which Indian cities are alike.

**Method:** I have clustered the Indian cities using K-Means(a machine learning, clustering technique) where a given set of data is broken up & clustered into a set of categories, based on how similar they are.

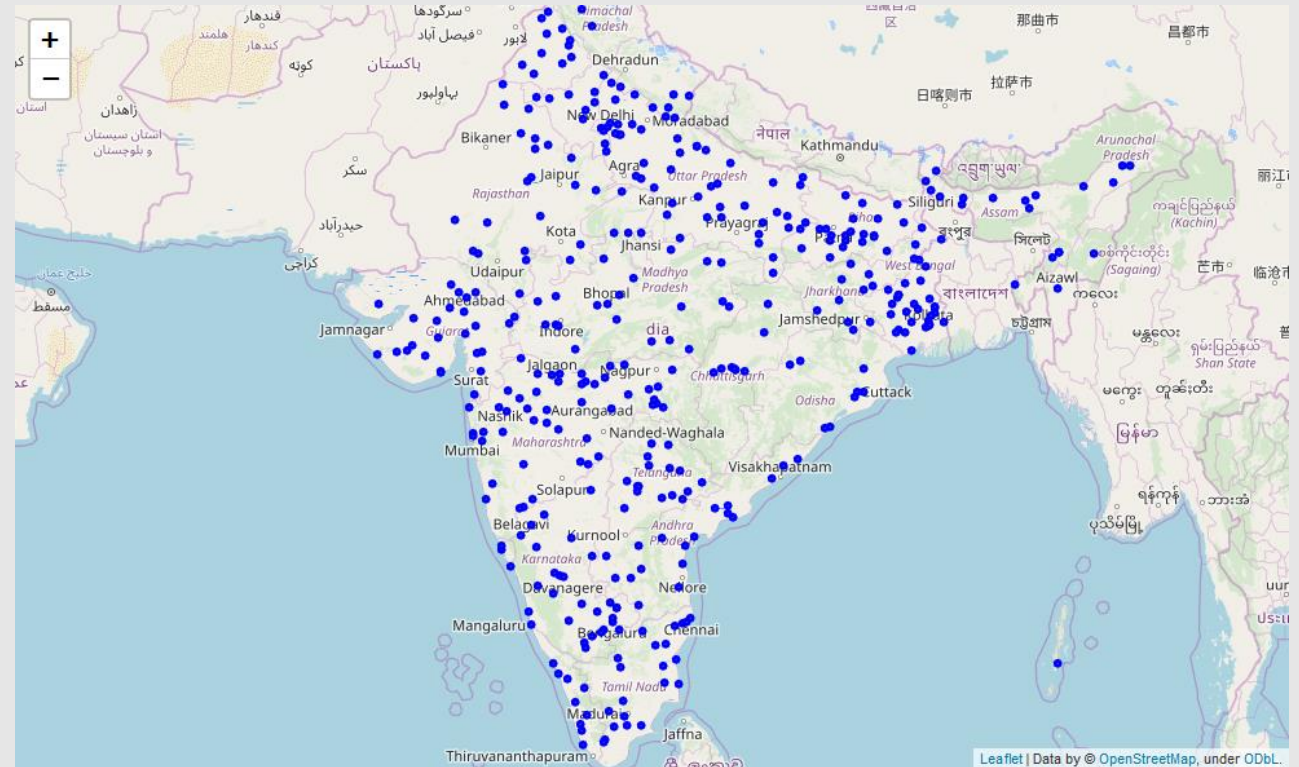
To get nearby Venues of each city, I have used the Foursquare api.

Read more about Foursquare [here](#).

# Let's take a look into the data\_set.

	Place Name	Latitude	Longitude
0	Nanjangud, Mysore, Karnataka, India	12.120000	76.680000
1	Chittorgarh, Rajasthan, India	24.879999	74.629997
2	Ratnagiri, Maharashtra, India	16.994444	73.300003
3	Goregaon, Mumbai, Maharashtra, India	19.155001	72.849998
4	Pindwara, Rajasthan, India	24.794500	73.055000
...	...	...	...
95	Hasanpur, Uttar Pradesh, India	28.719999	78.279999
96	Jabalpur, Madhya Pradesh, India	23.168770	79.931847
97	Shahada, Maharashtra, India	21.546185	74.470009
98	Mysuru, Karnataka, India	12.295810	76.639381
99	Tiruvannamalai, Tamil Nadu, India	12.228628	79.066544

400 rows × 3 columns



Each dot on the map represents a city as given on the table in the left.

Now, after applying K-Means, let's see what we got. Starting from each cluster.

1.

### Cluster 1

```
In [167]: cities_merged.loc[cities_merged['Cluster Labels'] == 0, cities_merged.columns[[0] + list(range(4, cities_merged.shape[1]))]]
```

Out[167]:

	Place 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	Nanjangud, Mysore, Karnataka, India	ATM	Hotel	Bus Station	Yoga Studio	Embassy / Consulate	Food Court	Food & Drink Shop	Food	Flower Shop	Flea Market
11	Jalpaiguri, West Bengal, India	Health & Beauty Service	ATM	Electronics Store	Food Court	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fast Food Restaurant
14	Sirohi, Rajasthan, India	ATM	Yoga Studio	Electronics Store	Food Court	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fast Food Restaurant
25	Suri, West Bengal, India	ATM	Bookstore	Yoga Studio	Factory	Food Truck	Food Court	Food & Drink Shop	Food	Flower Shop	Flea Market
40	Kushtagi, Karnataka, India	ATM	Yoga Studio	Electronics Store	Food Court	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fast Food Restaurant
50	Hodal, Haryana,	ATM	Yoga Studio	Electronics	Food Court	Food & Drink	Food	Flower	Flea Market	Fish Market	Fast Food

# 2.

## Cluster 2

```
In [168]: cities_merged.loc[cities_merged['Cluster Labels'] == 1, cities_merged.columns[[0] + list(range(4, cities_merged.shape[1]))]]
```

Out[168]:

	Place 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
2	Ratnagiri, Maharashtra, India	Hotel	Beach	Resort	Bus Station	Yoga Studio	Electronics Store	Food	Flower Shop	Flea Market	Fish Market
3	Goregaon, Mumbai, Maharashtra, India	Indian Restaurant	Train Station	Sandwich Place	Fast Food Restaurant	Gym / Fitness Center	Coffee Shop	Tea Room	Plaza	Dance Studio	Chinese Restaurant
7	Lucknow, Uttar Pradesh, India	Indian Restaurant	Café	Fast Food Restaurant	Shopping Mall	Clothing Store	Neighborhood	Food Truck	Multiplex	Sandwich Place	Bakery
8	Delhi, the National Capital Territory of Delhi...	Indian Restaurant	Restaurant	Chinese Restaurant	Sculpture Garden	Ice Cream Shop	Park	Hotel	Japanese Restaurant	Snack Place	Food & Drink Shop
9	Mumbai, Maharashtra, India	Indian Restaurant	Bar	Middle Eastern Restaurant	Coffee Shop	Burrito Place	Asian Restaurant	Mughlai Restaurant	Lounge	Pharmacy	Pizza Place



# 3.

## Cluster 3

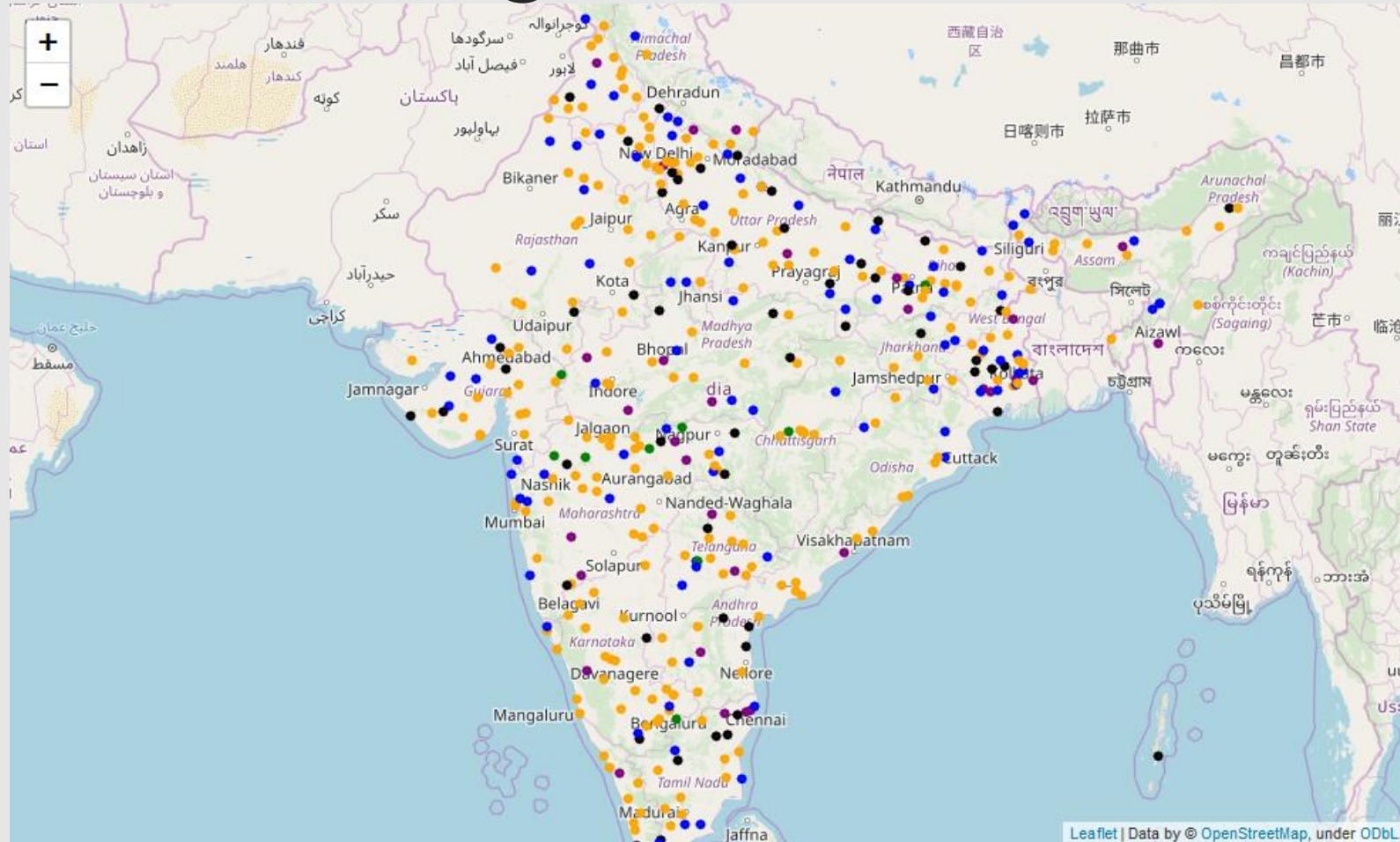
```
In [169]: cities_merged.loc[cities_merged['Cluster Labels'] == 2, cities_merged.columns[[0] + list(range(4, cities_merged.shape[1]))]]
```

Out[169]:

	Place 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
67	Jalgaon Jamod, Maharashtra, India	Mobile Phone Shop	Yoga Studio	Embassy / Consulate	Food Court	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fast Food Restaurant
70	Ausa, Maharashtra, India	Mobile Phone Shop	Yoga Studio	Embassy / Consulate	Food Court	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fast Food Restaurant
76	Sinnar, Maharashtra, India	Motel	Mobile Phone Shop	Embassy / Consulate	Food Court	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fast Food Restaurant
43	Morshi, Maharashtra, India	Mobile Phone Shop	Yoga Studio	Embassy / Consulate	Food Court	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market	Fast Food Restaurant
82	Georai, Maharashtra	Mobile Phone	Shipping	Yoga Studio	Embassy /	Food &	Food	Flower	Flea Market	Fish Market	Fast Food

& so on..

& this, is what India would look like, after  
it's clustering of cities.



Quite Cool,  
isn't it?

# Now, let's check out the results & see if the clustering has been efficient enough to trust.

Let's check if some metropolitan cities have been put into the same cluster.

```
cities_merged.loc[cities_merged['Place Name'].str.contains('Mumbai')]
```

	Place Name	Latitude	Longitude	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	10th Most Common Venue
3	Goregaon, Mumbai, Maharashtra, India	19.155001	72.849998	3.0	Indian Restaurant	Fast Food Restaurant	Sandwich Place	Sporting Goods Shop	Bank	Multiplex	Tea Room	Café	Italian Restaurant	Plaza
9	Mumbai, Maharashtra, India	19.076090	72.877426	3.0	Bar	Indian Restaurant	Hotel	Diner	Mughlai Restaurant	Middle Eastern Restaurant	Coffee Shop	Lounge	Auto Workshop	Pizza Place
94	Vashi, Navi Mumbai, Maharashtra, India	19.077065	72.998993	3.0	Indian Restaurant	Fast Food Restaurant	Hotel	Snack Place	Café	Restaurant	Gym / Fitness Center	Sports Club	Pizza Place	Sandwich Place

```
cities_merged.loc[cities_merged['Place Name'].str.contains('Kolkata')]
```

	Place Name	Latitude	Longitude	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	10th Most Common Venue
21	Khidirpur, Kolkata, West Bengal, India	22.542061	88.318954	3.0	Awadhi Restaurant	ATM	Pharmacy	Flea Market	Men's Store	Port	Burger Joint	Fabric Shop	Dumpling Restaurant	Eastern European Restaurant
51	Bhatpara, Kolkata, West Bengal, India	22.859726	88.404839	3.0	Platform	ATM	Dumpling Restaurant	Discount Store	Fishing Store	Fish Market	Fast Food Restaurant	Farmers Market	Farm	Factory

“Check column ‘Cluster Labels’ to verify.” ❄



# Verifying some more results..

```
cities_merged.loc[cities_merged['Place Name'].str.contains('Delhi')]
```

	Place Name	Latitude	Longitude	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	10th Most Common Venue
8	Delhi, the National Capital Territory of Delhi...	28.610001	77.230003	3.0	Indian Restaurant	Restaurant	Park	Chinese Restaurant	Sculpture Garden	Hotel Bar	Ice Cream Shop	Hotel	Pool	Monument / Landmark
74	Saidabad, New Delhi, Delhi, India	28.526592	77.290169	3.0	Indian Restaurant	Indian Sweet Shop	Café	Juice Bar	Fast Food Restaurant	Farmers Market	Farm	Factory	Fabric Shop	Discount Store

```
cities_merged.loc[cities_merged['Place Name'].str.contains('Chennai')]
```

	Place Name	Latitude	Longitude	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	10th Most Common Venue
87	DCKAP Technologies, Anna Nagar, Chennai, Tamil...	13.090994	80.224998	3.0	Indian Restaurant	Middle Eastern Restaurant	Restaurant	Café	Fast Food Restaurant	Electronics Store	Shoe Store	Bakery	Burger Joint	Thai Restaurant



& Voila!

Finally, we've reached the end of this report.

Hope you found the findings informative.

Find the source-code of the project in my Github repository here :

[https://github.com/huzaifatausif0410/hufaiza/blob/master/Citiies-Alike\(1\).ipynb](https://github.com/huzaifatausif0410/hufaiza/blob/master/Citiies-Alike(1).ipynb)

Do Let me know how I can polish this report further or any other feedback that you might have.

Thank you.