Predicting Covid Intensive Zones in Delhi

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2. Data

To solve the above problem, I have made use of the following data:

- **Neighborhoods of Delhi (and the basis of their segmentation)**
  - https://en.wikipedia.org/wiki/Neighbourhoods_of_Delhi
  There are 9 districts in Delhi and the neighborhoods are aggregated into one of these districts.
  This data would be used to define the neighborhoods when I will be plotting the results on the map. I used the help of the 'search' option in Google Maps to figure out the approximate coordinates of each neighborhood and created my own dataset.

```
In [6]: districts

Out[6]: ['North West Delhi',
         'North Delhi',
         'North East Delhi',
         'Central Delhi',
         'New Delhi',
         'East Delhi',
         'South Delhi',
         'South West Delhi',
         'West Delhi']
```

Fig1. Districts of Delhi

Out[8]:

	District	Neighborhood	Latitude	Longitude
0	North West Delhi	Adarsh Nagar	28.719390	77.173270
1	North West Delhi	Ashok Vihar	28.687260	77.177689
2	North West Delhi	Azadpur	28.712997	77.177360
3	North West Delhi	Bawana	28.797247	77.048331
4	North West Delhi	Begum Pur	28.726457	77.064246

Fig2. Data frame containing Neighborhood Coordinates

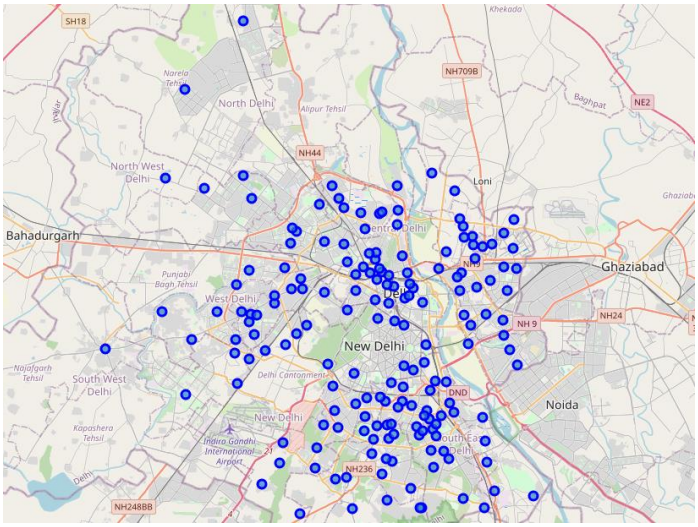

Fig3. Location of these neighborhoods (plotted using folium)

- **Location data of popular venues - provided by Foursquare API**
  The Foursquare API provides data related to the frequency of occurrence of different venues at a particular place.
  I will be using the location data to identify clusters where proximity of venues with high footfall (like markets) are present.
  These will be identified as hotspot heighborhoods.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Adarsh Nagar	28.71939	77.173270	My Idea Store	28.717487	77.170922	Mobile Phone Shop
1	Adarsh Nagar	28.71939	77.173270	Pahalwan Vaishno Dhaba	28.715881	77.173565	North Indian Restaurant
2	Adarsh Nagar	28.71939	77.173270	Adarsh Nagar Metro Station	28.716598	77.170436	Light Rail Station
3	Adarsh Nagar	28.71939	77.173270	Vishyavidyalaya Metro Station@Entry gate #1 n ...	28.715596	77.170981	Train Station
4	Ashok Vihar	28.68726	77.177689	Mirch te Masala	28.687374	77.173744	Mughlai Restaurant

Fig4. Data frame containing venue data

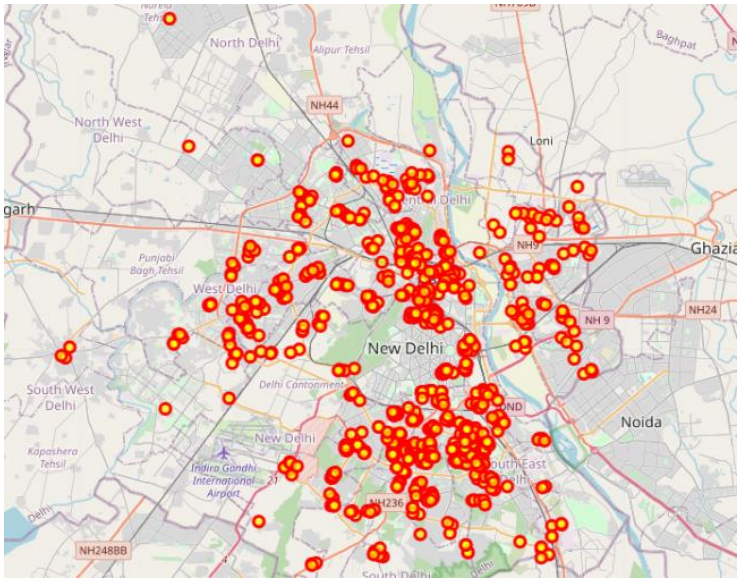

Fig5. Location of these venues (plotted using folium)

It is noted that Foursquare API doesn't have much details regarding venues in Delhi, therefore this is just an approximate picture of the real world. But we can surely say that it is a good approximation and will serve our need.

- **Population density of various districts - Census 2011 data**
  - https://www.census2011.co.in/census/state/districtlist/delhi.html
  The population density data would be used to mark districts with potentially high risk of community transmission due to the high proximity in living conditions.

	#	Density	District	Increase	Literacy	Population	Sex Ratio	Sub-Districts
0	1	8254	North West Delhi	27.81 %	84.45 %	3,656,539	865	List
1	2	11060	South Delhi	20.51 %	86.57 %	2,731,929	862	List
2	3	19563	West Delhi	19.46 %	86.98 %	2,543,243	875	List
3	4	5446	South West Delhi	30.65 %	88.28 %	2,292,958	840	List
4	5	36155	North East Delhi	26.78 %	83.09 %	2,241,624	886	List
5	6	27132	East Delhi	16.79 %	89.31 %	1,709,346	884	List
6	7	14557	North Delhi	13.62 %	86.85 %	887,978	869	List
7	(adsbygoogle = window.adsbygoogle || []).push(...	NaN	NaN	NaN	NaN	NaN	NaN	NaN
8	8	27730	Central Delhi	-9.91 %	85.14 %	582,320	892	List
9	9	4057	New Delhi	-20.72 %	88.34 %	142,004	822	List

Fig6. Data frame after scraping the website

We will drop the row with the google advertisement info. Also, we just want the district-wise population density data so we drop the other columns.

	District	Density
0	North West Delhi	8254
1	South Delhi	11060
2	West Delhi	19563
3	South West Delhi	5446
4	North East Delhi	36155
5	East Delhi	27132
6	North Delhi	14557
8	Central Delhi	27730
9	New Delhi	4057

Fig7. Final Data frame containing district-wise population density