Indian Food for Containment Zones

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Introduction and Problem Definition

1. As the world faces an unprecedented crisis in the form of COVID-19, India, which is the third-worst hit country has tried to tackle the disease for which there is no permanent cure yet through a series of lockdowns.
2. Mumbai has been among the worst-hit cities in India and has over 700 containment zones as per a report published on July 5.
3. Many of the people living in these containment zones are young migrants who are working full-time from home and have little to no culinary skills and are used to having domestic help who are no longer permitted in the containment zones.
4. Finding good Indian Restaurants in the localities which can deliver food to their apartments has become important for these young professionals.
5. The project tries to map the localities of Mumbai buy the amount of COVID-19 risk (by the number of containment zones) and the richness of choice of food (by the number of Indian Restaurants in the localities).

Target Audience and Data

The target audience includes people in the containment zones. But, the map will also help future migrants to the city to find places where they will get better access to Indian-style food. Also people who wish to open Indian-style food outlets in Mumbai can use the map to know the competition in each locality.

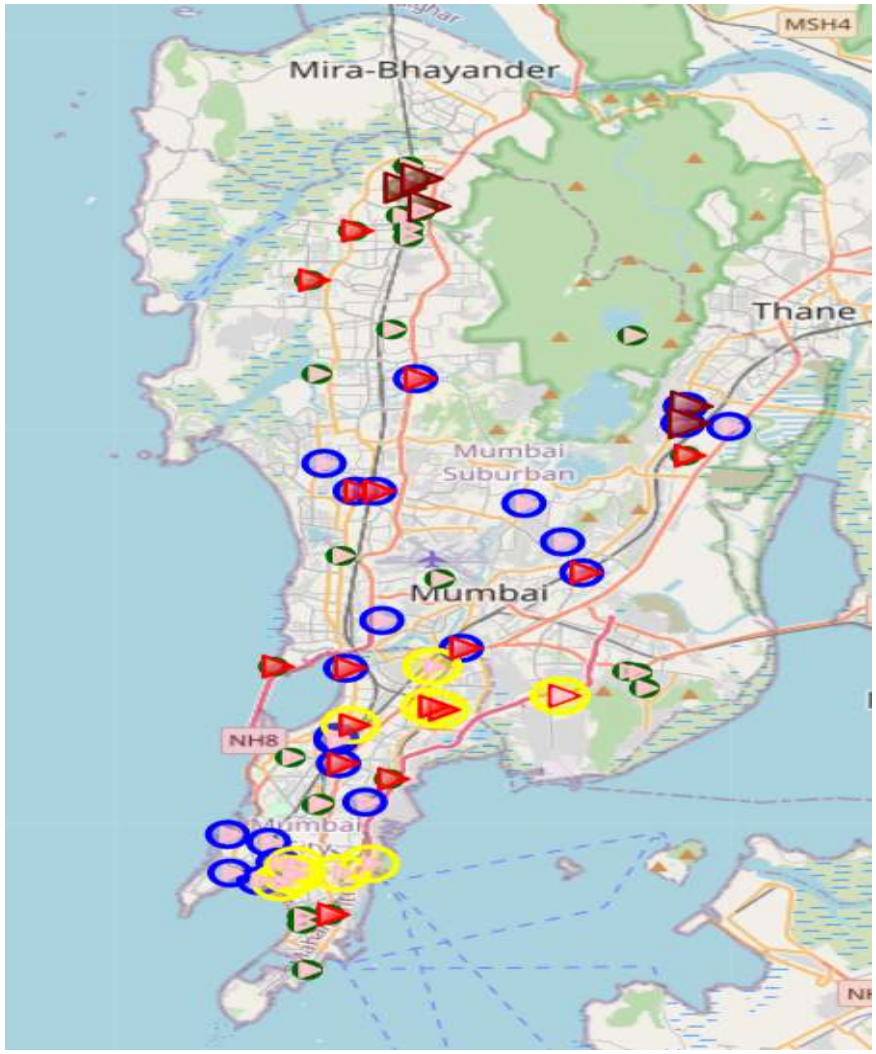
Data

1. Data from the link ‘https://www.scribd.com/document/468160449/Mumbai-Containment-Zones#download’.
2. Restaurants data for Mumbai from Foursquare API.
3. List of Pincodes in Mumbai from ‘https://finkode.com/mh/mumbai.html’.
4. Latitudes and Longitudes of the localities. This will be obtained from Geocode.

Methodology

1. The list of localities and the pincodes are available at ‘https://finkode.com/mh/mumbai.html’. The same can be extracted and converted into a pandas dataframe using the Python Web-Scraping and BeautifulSoup packages.
2. The Geocoder package, next, converts the geographical locations that we get in step 1 to latitudes and longitudes.
3. The geographical locations are then visualized once to check if the locations are in line with the actual locations. The Folium package is used for this purpose.
4. The COVID-affected localities of Mumbai from ‘https://www.scribd.com/document/468160449/Mumbai-Containment-Zones#download’ were converted into suitable format to be uploaded to a dataframe and joined with the original dataframe based on the pincodes.
5. The pincodes with at least one containment zone were filtered out.
6. Using the Foursquare API, the data about Restaurants and other venues in and around the said pincodes were mapped to the dataframe.
7. All outlets like ‘Bengali Restaurant’, ‘South Indian Restaurant’, ‘North Indian Restaurant’, etc. which mainly serve Indian Food were grouped under the head ‘Indian Restaurant.’
8. Clustering using K-Means were done twice on the locations, once based on number of containment zones and once base on number of Indian Restaurants.
9. The clusters were marked onto the Folium map for Mumbai with the different clusters (under each type of clustering) represented by the size and colour of the markers.

Result



Result

Clusters based on number of Indian Restaurants are represented by the circular markers where

1. Green represents Cluster 0 with lowest number of restaurants.
2. Blue represents Cluster 1 with number of restaurants in the medium range.
3. Yellow represents Cluster 2 with highest number of restaurants.

Clusters based on number of containment zones are represented by the circular markers where

1. Pink represents Cluster 0 with lowest number of containment zones.
2. Light Red represents Cluster 1 with number of containment zones in the medium range.
3. Dark Red represents Cluster 2 with highest number of containment zones.

Discussion and Conclusion

1. No high-risk zone has high number of restaurant choices.
2. The high-risk zones are in the northern Mumbai and the high-restaurants regions are in the southern Mumbai.
3. This may have to do with the distribution of wealth in the city as southern Mumbai is the wealthier half of Mumbai and therefore has more number of choices to have good Indian food.
4. The localities with at least one containment zones are more towards the southern Mumbai. This may be a result of better medical facilities in the region leading to quicker recognition of COVID cases through faster testing.
5. The northern (and poorer half of Mumbai) may be witnessing slower testing rate. This may lead to slower recognition of presence of COVID cases and higher spread within the communities leading to all high-risk zones being in this half of Mumbai.