Location Recommendation to open a new Restaurant in Kolkata

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Business Problem and Interested Audience

- The main objective of this project is to determine a location in city Kolkata suitable for opening a new restaurant.
- Here we will determine the location based on mainly two criteria:

    1. The location should be close to the centre of the City.
    2. There should be very few or no restaurants nearby the location.

- Any individual who is interested to open a new restaurant or any food company who is interested to open a new branch will be the audience for this project.

Data acquisition and cleaning

- To find out the prime and popular locations of Kolkata based on their pin code we have used the below website resources:
  - https://www.mapsofindia.com/
  - https://pincode.india-server.com/
- From the above resources we have created an CSV file of all popular locations of Kolkata along with Pin codes. The link to the CSV file is:
  - https://drive.google.com/uc?export=download&id=1qCRjM5S6RzSNFT1MvUAszuBTxBlSZEvl
- Besides the above data, following data sources was used to extract/generate the required information:
  - **Nomination Geocoder** to get the latitude & longitude information of all the locations including the centre of the city Kolkata.

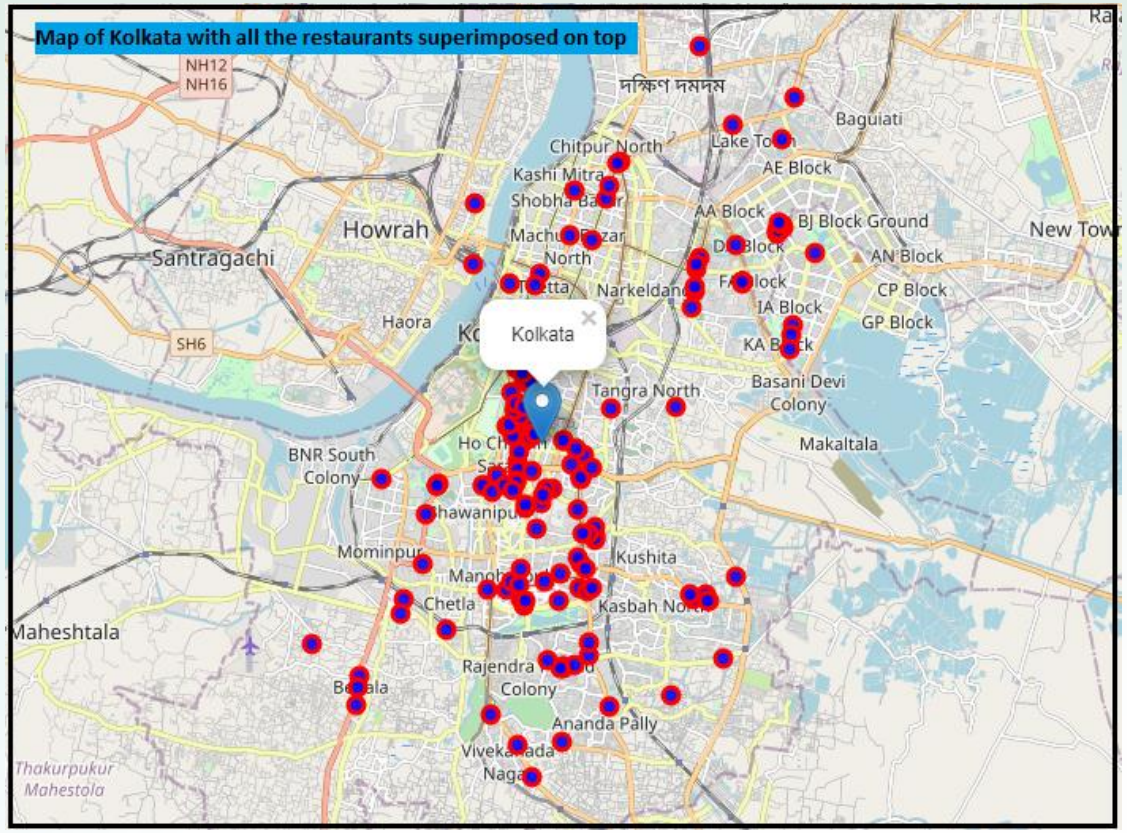
Data acquisition and cleaning (Continued)

- **Foursquare API** to get all the restaurants located around the different locations of city Kolkata.

- If latitude & longitude details are not populated for any location using nomination Geocoder we will be dropping the locations.
- Using Foursquare API we will get all the nearby venues for all of our locations. Here we will be working with only the restaurant's data so after exploring all the locations we need to eliminate the other venues except restaurants.
- The main features that we will be using for our analysis and visualizations are: Location, Location latitude, Location Longitude, Venue, Location's Distance from centre.

Exploratory data analysis

- After preparing the data and extracting the required features from it we visualized the data by creating a map of city Kolkata with all the Restaurants superimposed on top.



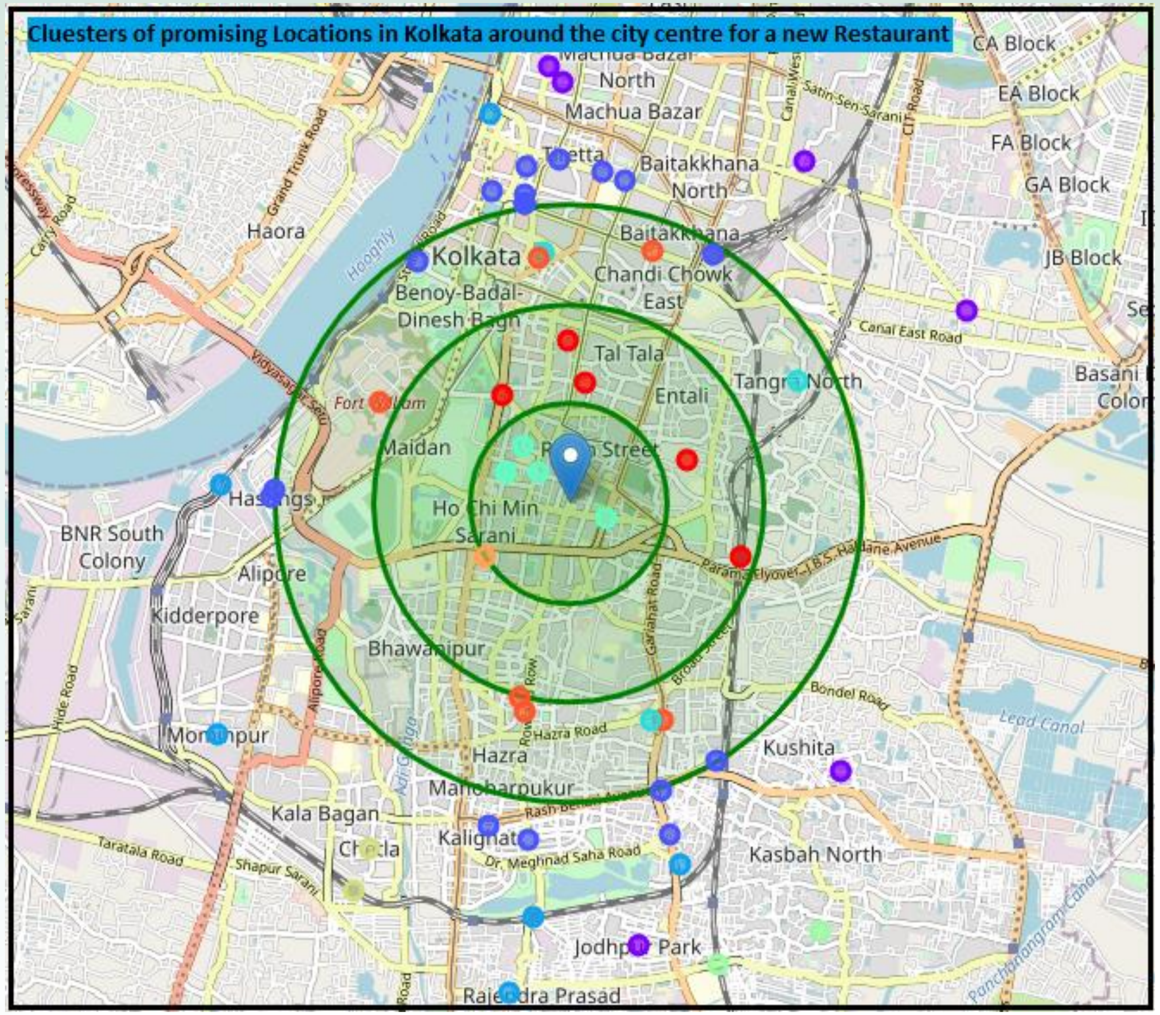
Exploratory data analysis (Continued)

- We need to count the number of restaurants in every location candidate to get the restaurants' density for every location. So performed some basic explanatory data analysis and derive this additional info from our data.
- Finally created a data frame with all the locations name, latitude, longitude, distance from the city centre and total restaurants count for applying clustering algorithm.

Algorithm

- We will focus on most promising locations and within those create clusters of locations that meet some basic requirements established in discussion with stakeholders: we will take into consideration locations with no more than two restaurants nearby and it should be within 5km of the centre of the city.
- For clustering the considered locations here, we will be using **k-means clustering** and will create a total of 10 clusters.
- We will be using k-means clustering here to segment the locations because here we need to group the locations based on some similar characteristics: Their distance from the city centre and Number of restaurants nearby.

Results



Cluesters of promising Locations in Kolkata around the city centre for a new Restaurant

Results (Continued)

- After clustering we visualized the resulting clusters which is our final result (3 circles indicating distance of 1km, 2km and 3km from the centre of the City). Please refer to the image above.
- From the visualized data, we can see that there are 4 locations within 1km radius of the city centre which belong to a cluster for which there is no restaurants nearby.
- From the cluster labels we could find that they belong to cluster 5 and the most promising address are as follows:
  - Shakespeare Sarani, Kolkata – 700017
  - Mall Road, Kolkata – 700080
  - Little Russel Street, Kolkata – 700071
  - Middletown Row, Kolkata – 700071

Conclusion

- We have analysed and visualized the data and have used clustering technique to cluster the filtered out top locations to identify the best location in city Kolkata nearest to city centre to open a new restaurant depending upon the restaurant density in that location.
- However we were able to find out the promising locations best on our requirements. The final decision to determine the optimal restaurant location will be made by the stakeholders based on the characteristics of the neighborhood of every recommended location taking into consideration of other important factors like the popularity of the area, number of school/college/office nearby, availability of water/electricity, real estate availability, price, transport availability etc.