# Coursera Capstone

IBM Applied Data Science Capstone

Analyzing Restaurants in Bangalore

# Problem Statement

- The problem is classified as differentiating out the varying varieties of restaurants available in Bangalore.

- Can we group similar restaurants together which have a similar rating and a relatively affordable price.

- This should be done for various ranges or categories and the question that the decision of visiting these restaurants could be made easier employing the process described above?

# Data

- Fetching the data from Geopy for getting the coordinates of Bangalore (since Geopy seems to be down we'll just do a Google Search)
- Data from the Foursquare API making appropriate calls to get a list of venues across a radius of about 9kms. This data would contain information about venues which are not restaurants as well so we'll have to perform a data cleaning process and get rid of such entries.
- Data from the Zomato API as well, which would contain the restaurants (which will be used to drop the non restaurant venues from the Foursquare data) and contain the ratings and average price of these restaurants as well which form the backbone of the analysis.

# Methodology

- We nee to analyze what the data from from the respective APIs actually contained and how could they be used in a proper way.

- The “explore” endpoint for the Foursquare API was pretty useful to get the venues according to the parameters we set and similarly the fetched  data in turn helped us to get the corresponding data from the Zomato API as well.

- The latitude and longitude data from both of these datasets were pretty helpful to accurately cluster the restaurants according to their correct geographic location as well. This was easily represented visually on a map through the Folium library.

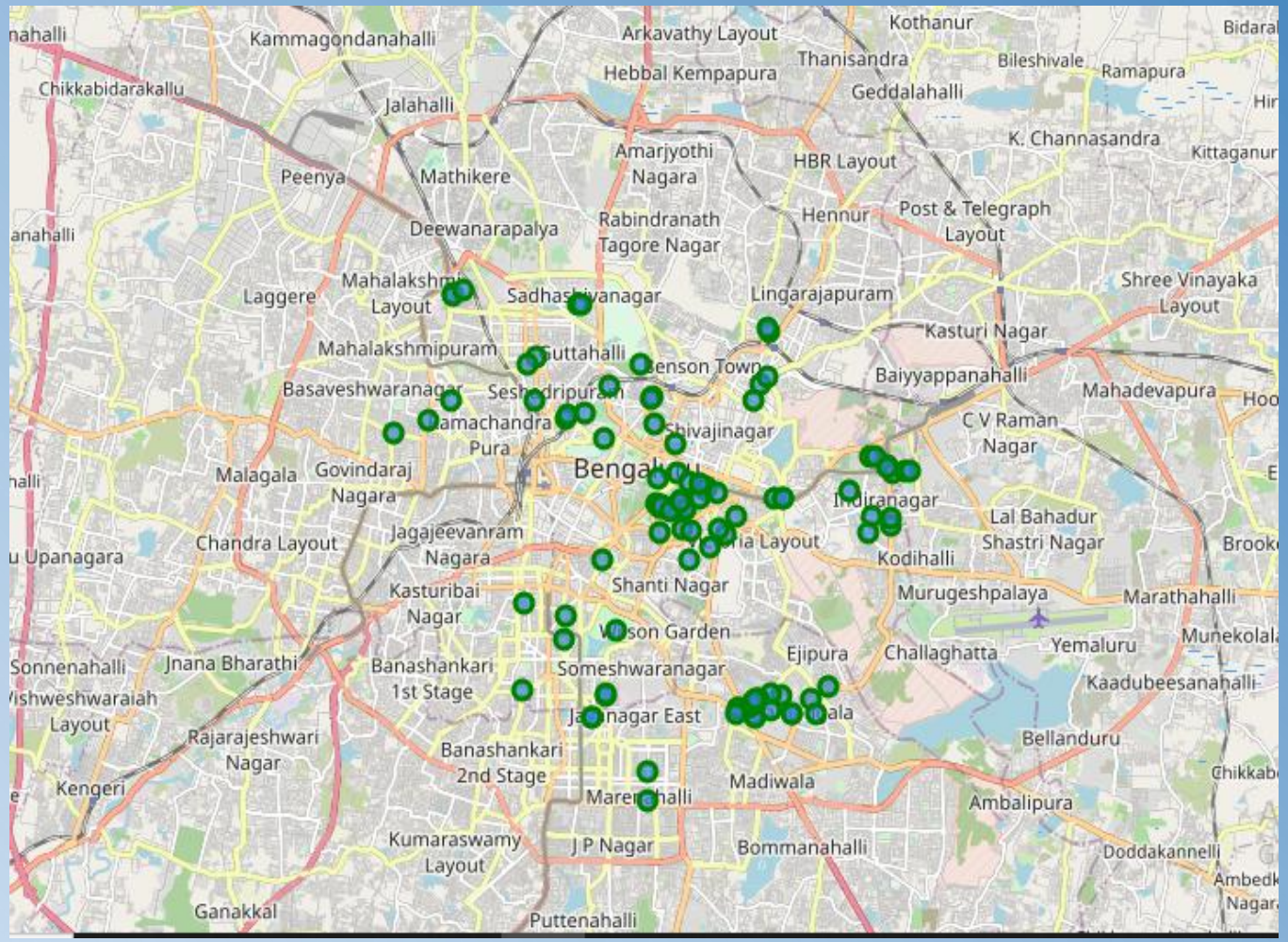
- The average price and ratings of the restaurants from the Zomato API formed the features of to cluster the restaurants together with the help of k-means algorithm from scikit-learn library.

# Accuracy of Location from both APIs

The location data of restaurants from both the APIs are plotted on the same map using Folium.

Two markers are superimposed on the same location  as mentioned by the coordinates.

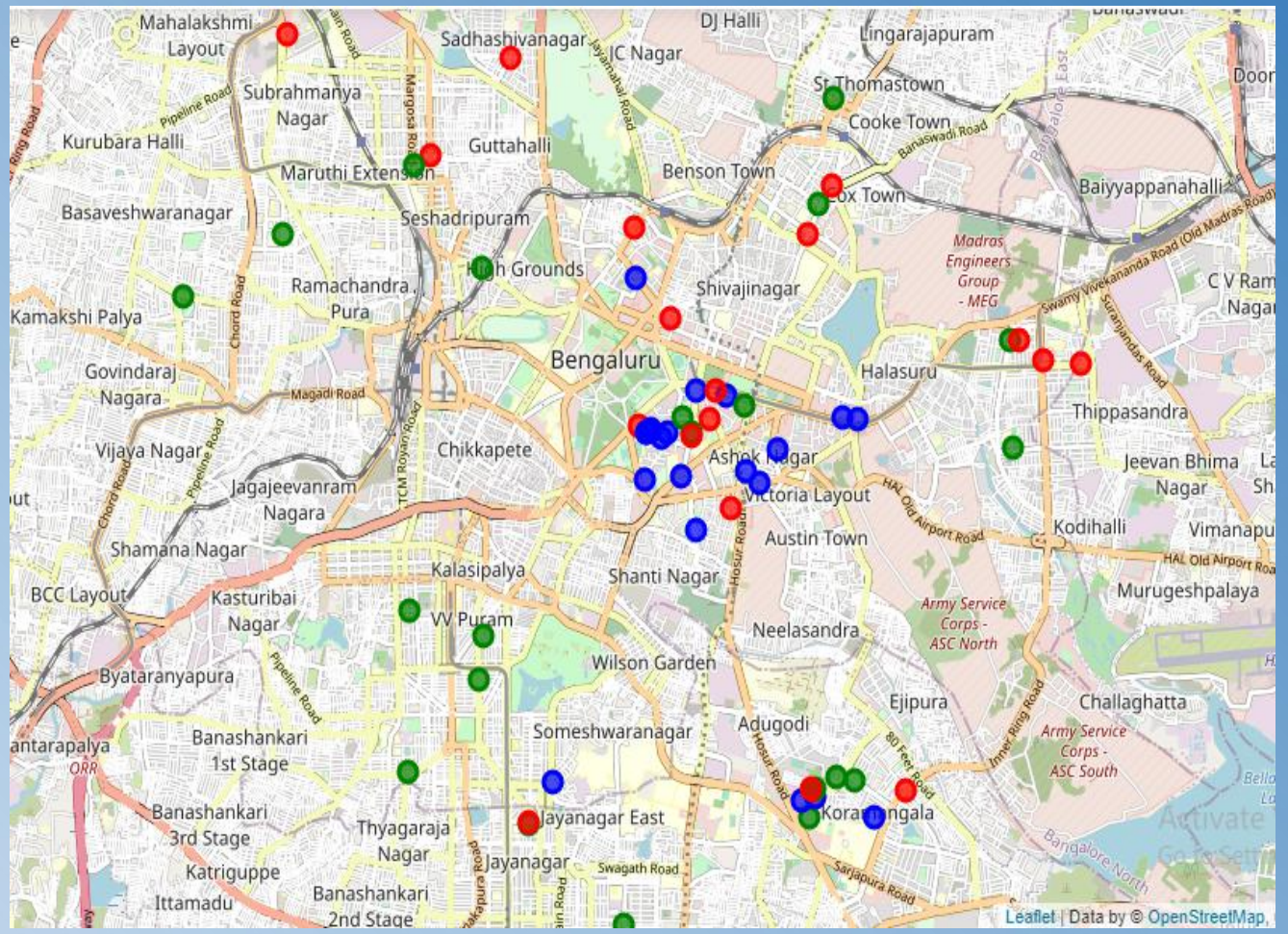
A darker marker indicates some difference in the data from both the columns



# Results

We have 3 clusters formed in the following map:

- 1. Cluster 0 (colour - green) : These are the restaurants who have a relatively low price and an highly rated (average > 4.5)
- 2. Cluster 1 (colour - red): These are the restaurants which are cheap but are not rated as well as the ones above so these are the ones toavoid (average rating < 4)
- 3. Cluster 3 (colour - blue): These are the restaurants which are rated pretty high but are also quite expensive (Average price > 2000₹)



# Discussion

- The choice of 3 clusters were made as suggested by the Elbow curve technique which made 3 groups of such restaurants as described above. The grouping could have been slightly more discreet with 1 or 2 more labels used which may have grouped expensive restaurants having similar ratings together.
- The general idea remains the same and results obtained from the analysis of the machine learning model above suggest us to select restaurants according to our own choices but made easier with the plots obtained above since we can avoid the restaurants which have received a relatively low rating from the users.
- Further, we can suitably choose these restaurants according to the their price range and how affordable it is.

# Conclusion

- A simple clustering machine learning algorithm was used in this analysis which was sufficient to separate out necessary information about the various restaurants in Bangalore which could prove to be useful for anyone who is having a hard time making such a decision themselves.
- Not to mention that this can be further improved further using various techniques.

  To mention a few:

- We can retrieve some additional info about the locality of restaurants so that some of them located in a smaller area could be grouped together accordingly.
- We could engineer the features even more or add some more features to obtain a more accurate model.
- Lastly, data science techniques are almost always helpful to any problem in an ingenious way.