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**Restaurant Types and Rating : Data Analysis of London, Visakhapatnam and New York** Published on September 12th , 2020

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**1. Introduction**

**(A).Description & Discussion of the Background**

London and New York are among the largest metropolitan cities in the world with a combined population of **17.5 million** and a varied and heterogenous communities with a matching demand for gastronomic fare. However, the fact that the restaurants are spread across the cities, I decided to use areas which are mainly tourist attraction and define both the cities, I chose London Bridge and Statue of Liberty as iconic landmarks around which the different types of restaurants can be explored in detail.

I also checked a developing city from India, Visakhapatnam, to identify trends similar to the two major cities. What I found is though the number of restaurants are more or less similar in the foursquare database, most of the restaurants in Visakhapatnam are not rated and hence difficult to compare.

However, I have created maps and placed information on the restaurants and their analysis can be understood.

**2. Data Description**

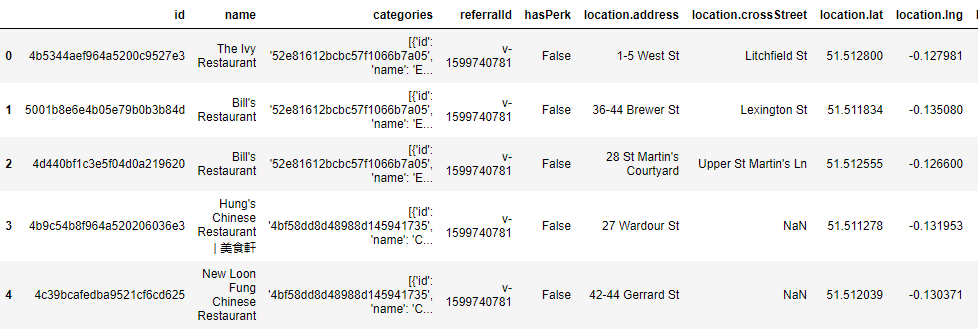
To consider the problem I used **Foursquare API** to get the list of restaurants and their classification and rating in London, Visakhapatnam and New York.

**3. Methodology**

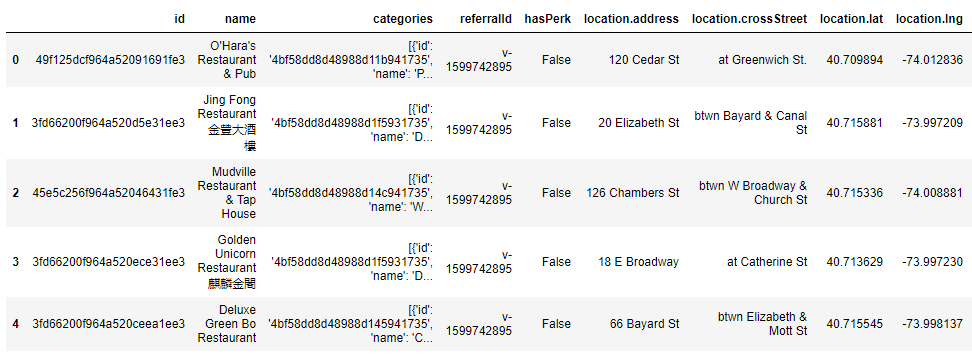
As a database, I used GitHub repository in my study. My master data which has the main components Restaurant name*, Category, Latitude* and *Longitude* information of the restaurants in London, New York and Visakhapatnam cities.

I utilized the Foursquare API to explore the restaurants and segment them. I gave latitude and longitude information. Here is a head of the list restaurants name, category, latitude and longitude informations from Foursquare API.

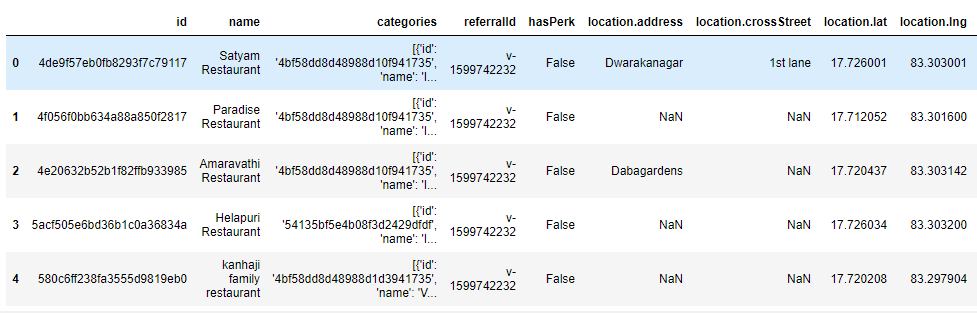
London



New York



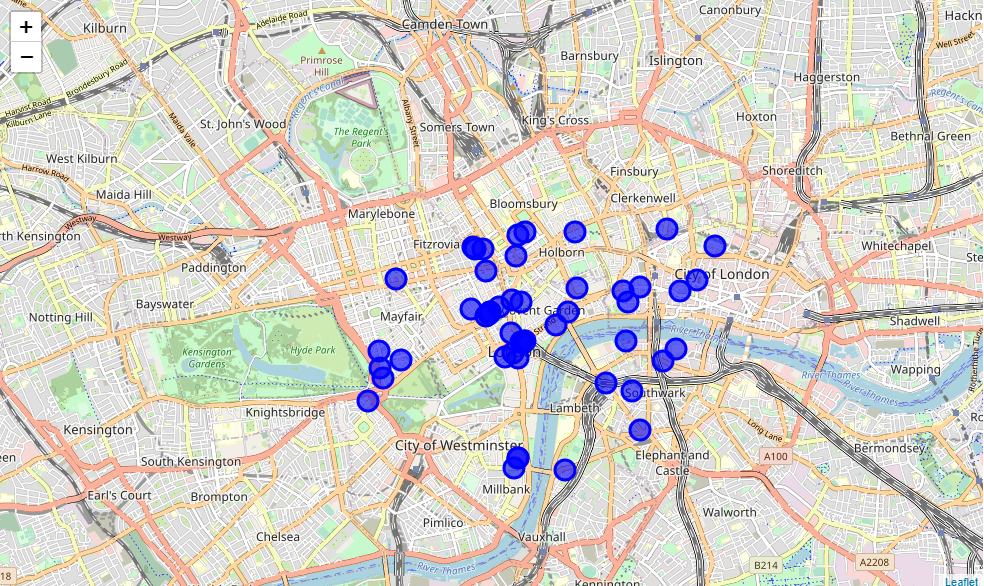
Visakhapatnam



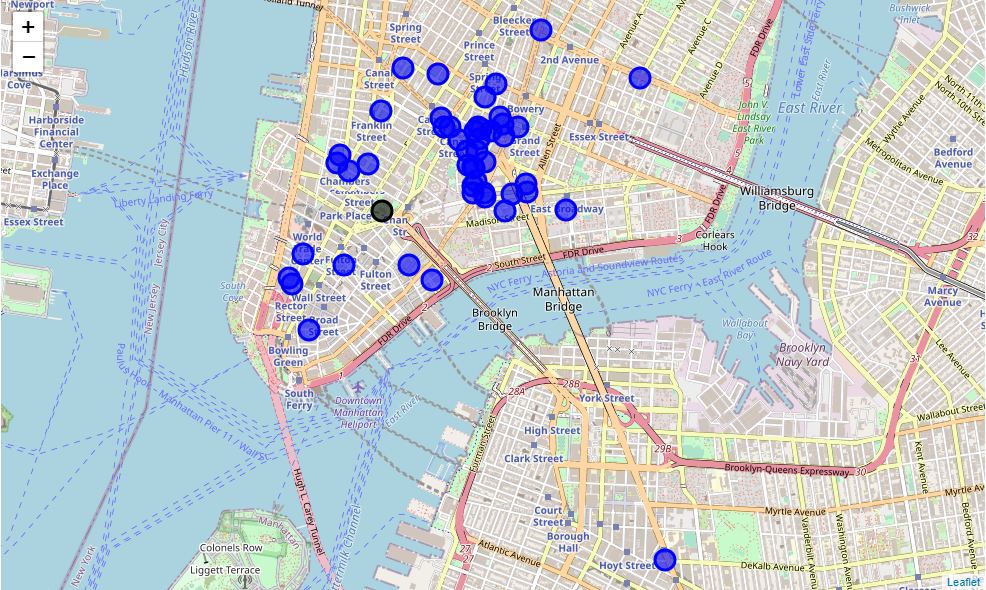
Although there were 50 restaurants that came up for each city, the number of rated restaurants was **25** for London, **24** for New York and **3** for Visakhapatnam.

I used the python **folium** library to visualize geographic details of the three cities and restaurants and I created a map of the cities with restaurant locations as markers on the respective maps. I used latitude and longitude values to get the visuals as below:

Restaurants in London

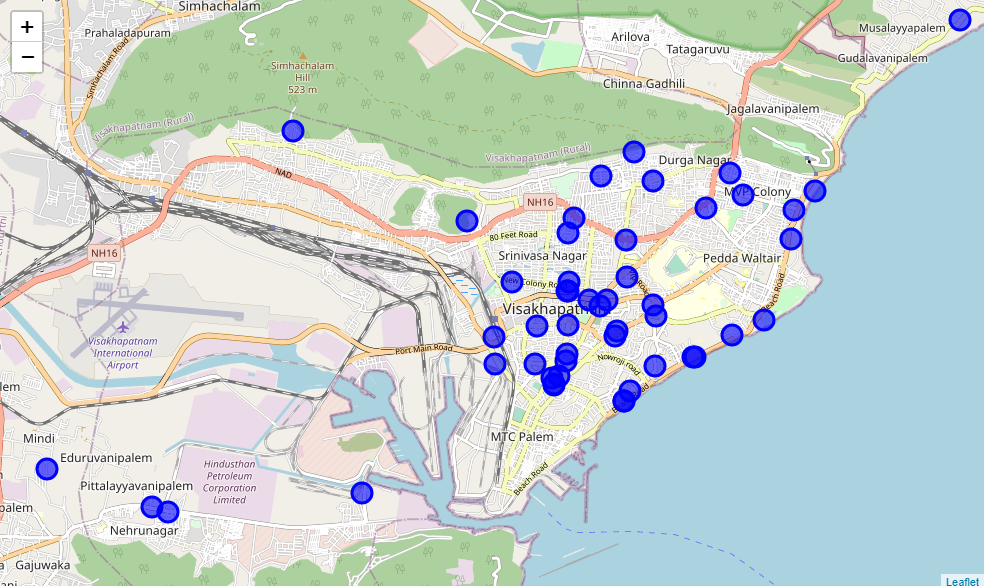


Restaurants in New York



The marker in black represents the Statue of Liberty.

Restaurants in Visakhapatnam



The result doesn’t include all the restaurants in the cities, it just takes the top 3 categories of restaurants. The categories can be increased from 3 to 5 or even higher. Also, the samples can be increased and different neighbourhood information to cover the entire cities.

We have some restaurants with ratings across London and New York, for this reason I used unsupervised learning. **K-means algorithm** to cluster the boroughs. K-Means algorithm is one of the most common cluster method of unsupervised learning.

I ran K-Means to cluster the ratings for London and New York into **4** clusters to get the optimum k of the K-Means. After we get the output, the groups of restaurants are

The broad categories of restaurants for each city are

London Restaurant Categories



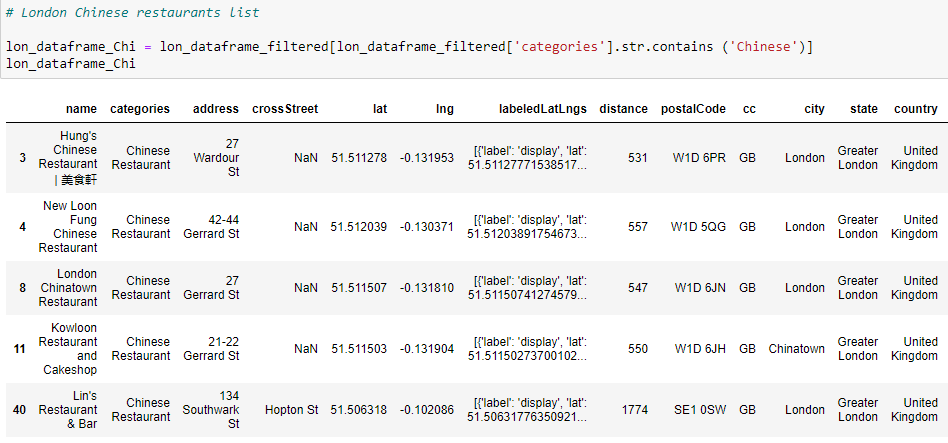
New York Restaurant Categories



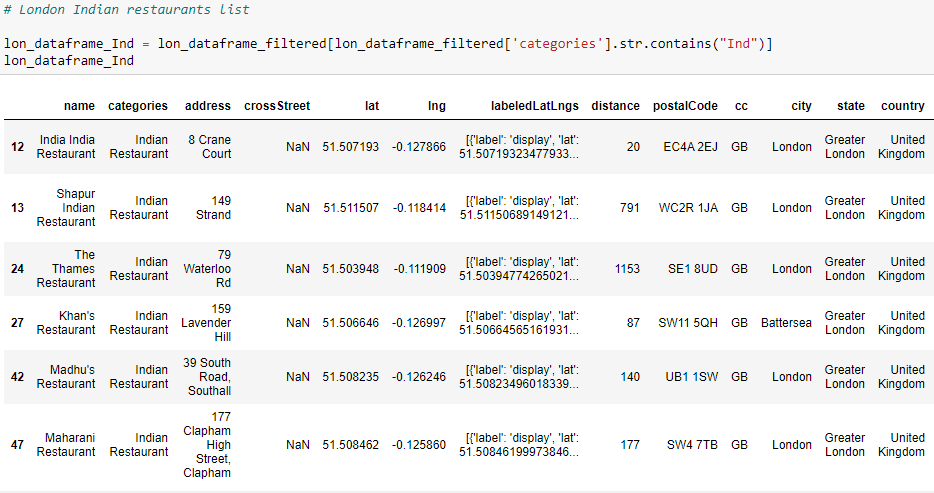
**4. Results**

I then took the category of the restaurant and classified the top categories of restaurants across the three cities. For London and Visakhapatnam, I took ‘Chinese’, ‘Indian’ and ‘Bars and Restaurants’ as my three top categories and for New York I had to take ‘Chinese’, ‘Italian’ and ‘Seafood’ as the top categories based on the number of restaurants for the category. The list of the restaurants can be seen as

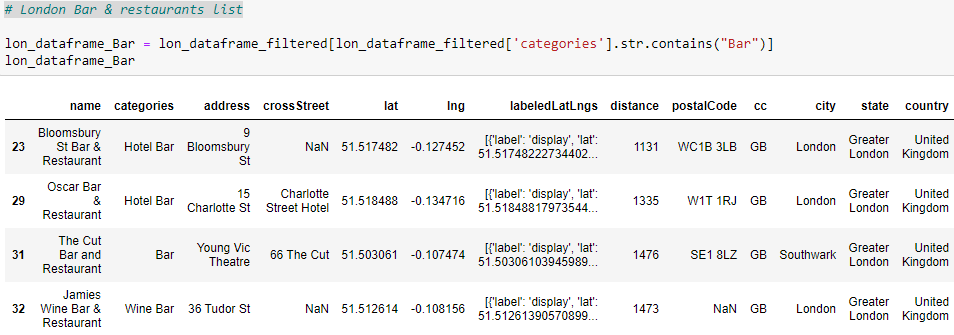
London Chinese Restaurants



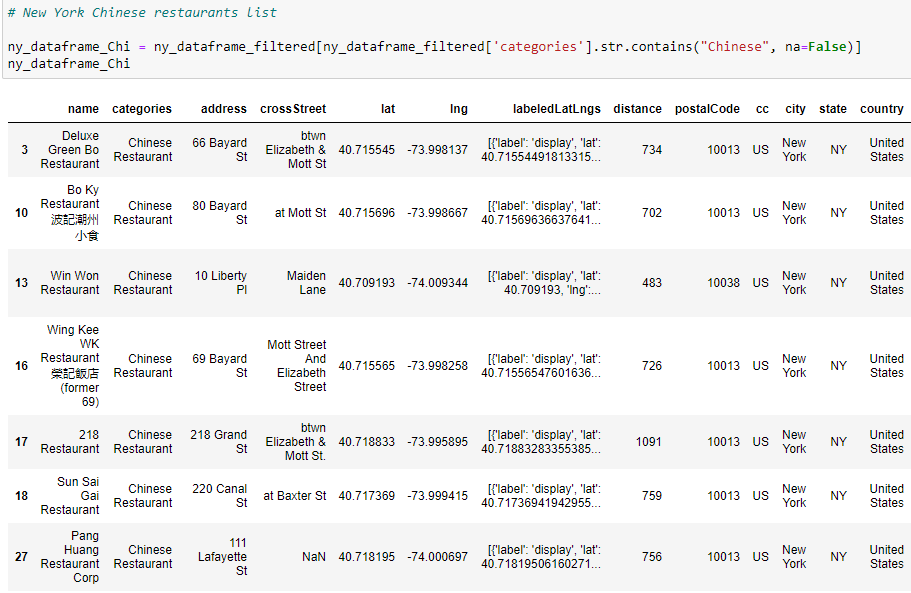
London Indian Restaurants



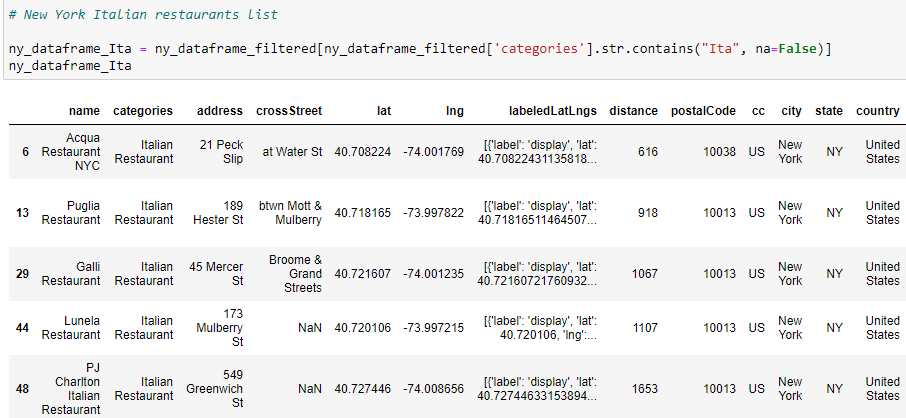
London Bars Bars and Restaurants



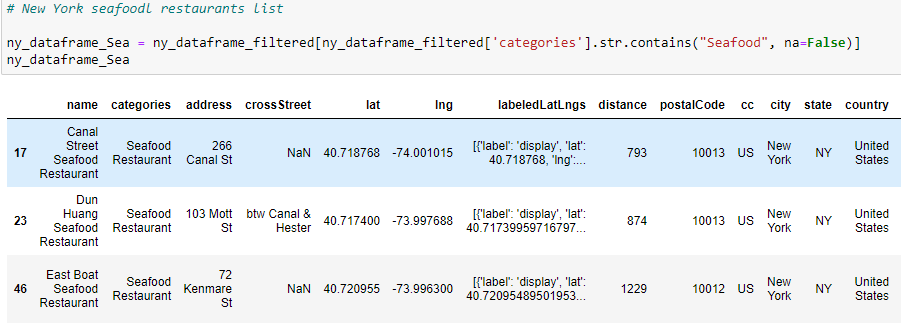
New York Chinese Restaurants



New York Italian Restaurants



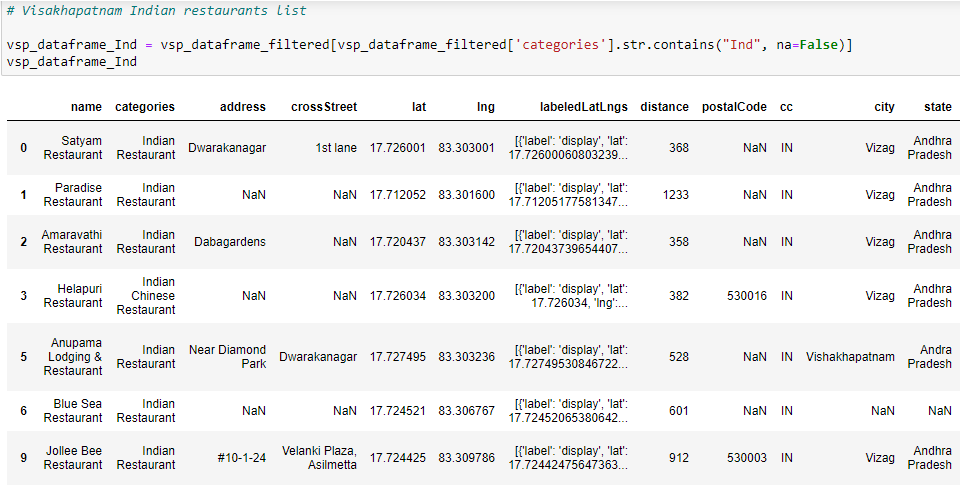
New York Seafood Restaurants



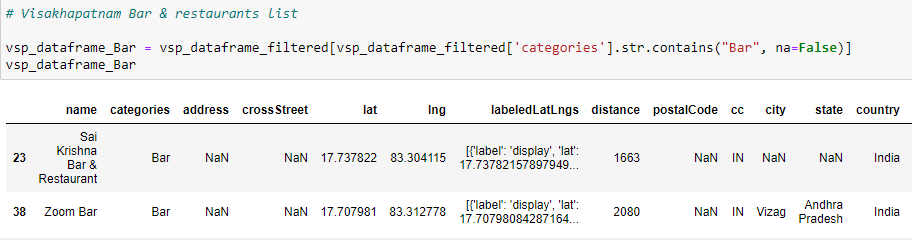
Visakhapatnam Chinese Restaurants



Visakhapatnam Indian Restaurants

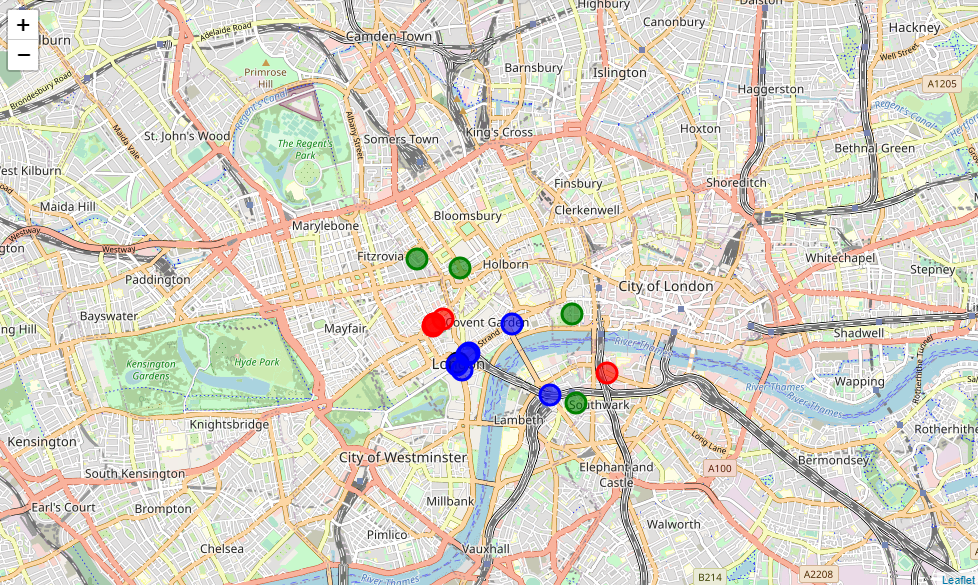


Visakhapatnam Bars and Restaurants

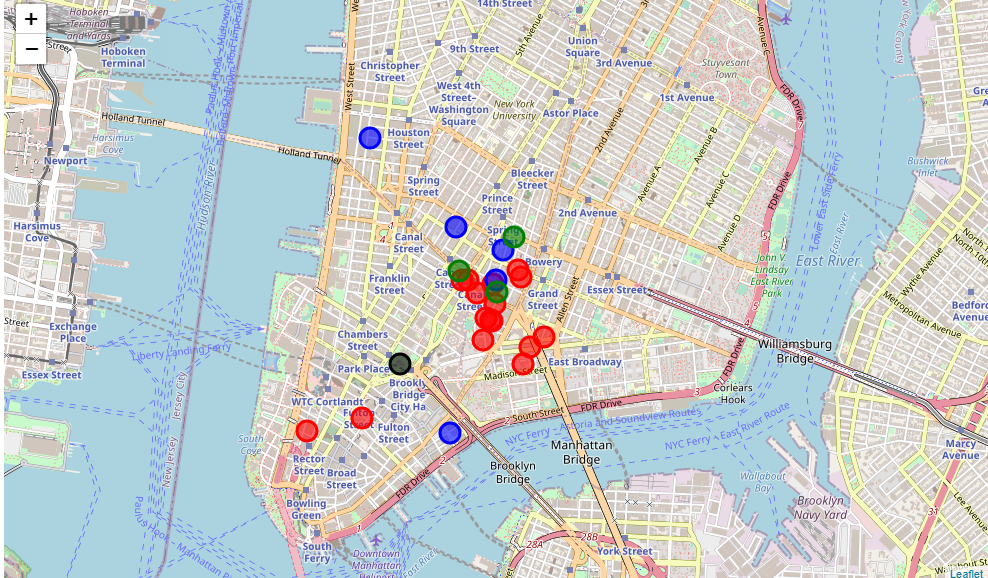


I then put the lists of categories of restaurants on the respective maps and it looked like this

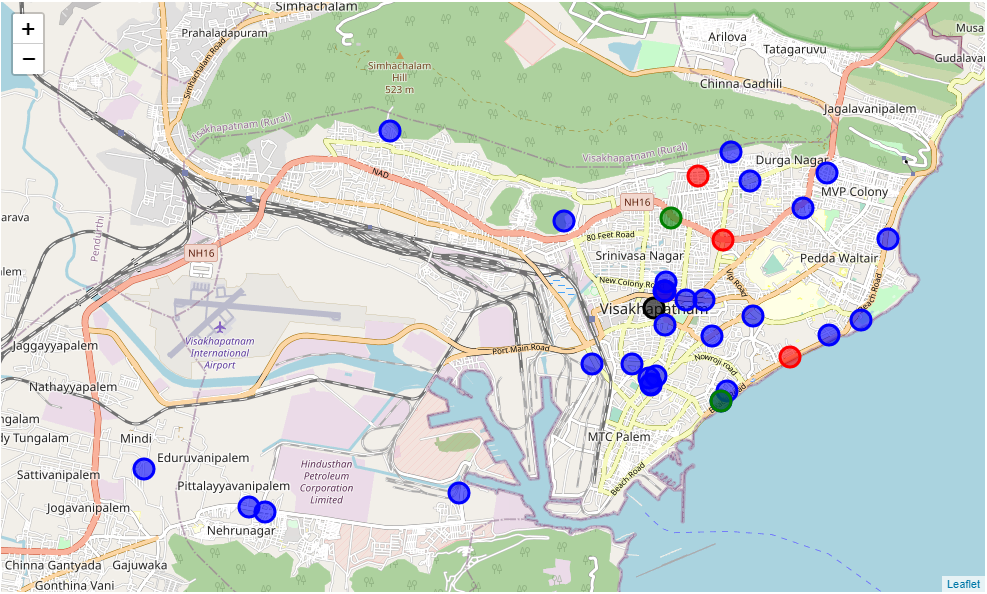
London Classified Restaurants Map



New York Classified Restaurants Map



Visakhapatnam Classified Restaurants Map



**5. Discussion**

As mentioned earlier, the list of restaurants is not comprehensive and there is an information gap of restaurant ratings to contend with.

As an example, the following map illustrates the availability of restaurants in the area considered but are not seen in the foursquare api database and are available in google maps or other sources but that is outside the scope of this study for now. It can be an area of future analysis or subsequent study.

I used the Kmeans algorithm as part of this clustering study. The idea was to get the rating for restaurants for classified lists and use the k-means algorithm on their ratings.

I ended the study by visualizing the data and clustering information on the city maps. In future studies, we could expand to cover entire cities or restaurant types across the world.

**6. Conclusion**

The study started with aiming to find out if there is a possibility of getting the tastes and preferences culminating in the restaurants of different ethnic groups and considerations of business climates.

Incomplete information from a source largely reduced the limit of the study to the end. A couple of conclusions made are 1) The area around the HSBC bank in London has a lot Chinese restaurants. 2) There are a lot for Italian restaurants near the statue of liberty due to the historical influence of Italian immigrants in New York. 3) what is counter intuitive is the high number of Chinese restaurants and missing Indian restaurants in the Foursquare database.

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**References:**

* [1] [Foursquare API](https://developer.foursquare.com/)
* [2] [Google - London](https://www.google.com/search?ei=L79bX8mnCYuf9QPL8J_IDQ&q=population+of+london&oq=population+of+london&gs_lcp=CgZwc3ktYWIQAzIHCAAQsQMQQzICCAAyAggAMgIIADICCAAyAggAMgIIADICCAAyAggAMgIIADoHCAAQRxCwAzoECAAQQzoFCAAQsQNQt3JYzZQBYIueAWgBcAB4AIAB4gGIAYkLkgEGMTEuMi4xmAEAoAEBqgEHZ3dzLXdpergBAsABAQ&sclient=psy-ab&ved=0ahUKEwiJ-_SP2-HrAhWLT30KHUv4B9kQ4dUDCA0&uact=5)
* [3] [Google - New York](https://www.google.com/search?source=hp&ei=Db9bX6mmO97az7sPxfWmoAU&q=population+of+new+york&oq=population+of+new+&gs_lcp=CgZwc3ktYWIQARgBMgIIADIFCAAQsQMyAggAMgIIADICCAAyAggAMgIIADICCAAyAggAMgIIADoICAAQsQMQgwE6CwguELEDEMcBEKMCOg4ILhCxAxDHARCjAhCTAjoICC4QsQMQgwE6AgguOgsILhCxAxCDARCTAjoHCAAQsQMQCjoFCC4QsQNQwpMBWKrhAWCK_wFoAnAAeACAAW-IAesNkgEEMTkuMZgBAKABAaoBB2d3cy13aXqwAQA&sclient=psy-ab)