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IBM Applied Data Science Capstone Project

**Opening up a
Fast Food Restaurant
in Chennai**

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Introduction

The India online food delivery market attained a value of nearly USD 2,926 million in 2019. In the past three years, the industry has shown a year on year growth of 100%. The industry growth is highly fluctuating and is dependent on investments. It is expected to witness a robust growth in the coming few years.

Evolving lifestyles, urbanization, and growing nuclear families have long supported the upward trend of the restaurant market in India. The QSR's (Quick Service Restaurants) and the casual dining restaurants together constitute over 74 percent of the market and are growing exponentially. The QSR industry has spearheaded restaurant trends such as expansion to small cities in India, and different formats such as dine-in, in-mall outlets, and drive-thrus, which has provided the customers an easy access to eating out. Additionally, due to the growing exposure to the international cultures and lifestyles, Indians have started experimenting with food. They are developing their tastes for different cuisines, apart from traditional Indian cuisine. According to a new report by EMR titled, 'India Online Food Delivery Market Report and Forecast 2020-2025', the India online food delivery market reached a value of almost USD 2.92 billion in 2019. Rapid digitization and growth in both online buyer base and spending will help India's online food industry to become a \$8 billion market by 2022.

Business Problem

The objective of this capstone project is to analyze the neighborhood in Chennai and choose the best place for people who are looking to start up a Fast Food Restaurant through data analysis and clustering.

Target Audience

This project will be useful for people who are looking to get into food industry business and particularly opening up a fast food restaurant in Chennai. Here, the food is prepared in bulk and served fast. The restaurants also have minimum table service and there is usually provision for both eating at the outlet and take-home. This can be done with minimum investment under 5 lakhs.

Also, since consumers are becoming more health conscious, there is need for healthy fast food restaurants. People having ideas of healthy fast foods can open up their own restaurants as people are looking for it and if they can balance the taste of the food, health of the consumer, along with the right price to be paid in the right way, it will be a sure success for both the producer and the consumer.

Data required for the analysis

1. List of neighborhoods in Chennai: -

This data is essential to determine the scope of the project and its feasibility in the location.

2. Location data of List of neighborhoods in Chennai: -

This data is essential to determine the location of the neighborhoods in Chennai in order to visualize in the real world through the map.

3. Venues near the neighborhoods in Chennai: -

This data, in particular the fast food restaurants in Chennai is required in order to choose the best place for opening up a fast food restaurant.

Source of data and methods to extract it

For the list of neighborhoods in Chennai, it can be extracted from Wikipedia from the link https://en.wikipedia.org/wiki/Areas_of_Chennai . The list of neighborhoods is extracted from the link through web scraping package in python called BeautifulSoup.

For the location of the list of neighborhoods, it can be extracted with the help of geocoder library in python once the list of neighborhoods is converted into a data frame.

Venues near the neighborhoods in Chennai can be collected from Foursquare database through their API. Foursquare database consists of more than 105 million places worldwide and are being constantly updated. Hence from their database we can collect our current data on fast food restaurants in Chennai.

This project uses data cleaning, data wrangling methods and also K-means clustering to cluster the venue categories in the neighborhoods and Folium library in python to visualize the fast food restaurant clusters in the map of Chennai.

Methodology

1. The list of neighborhoods in Chennai was obtained from the Wikipedia page.
2. Using BeautifulSoup library in python the required names of the neighborhoods were obtained from the Wikipedia page through web scrapping a stored in a data frame.
3. This data frame was then cleaned by removing the unnecessary data for further analysis
4. The latitude and longitude of the neighborhoods were obtained thorough the geocoder library available in the python.
5. The locations were downloaded and stored in a separate data frame.
6. The location data frame and name list data frames were combined for further analysis
7. Through the use of folium library in python the neighborhoods were visualized in the map of Chennai.
8. To get the venues near the neighborhoods, Foursquare database was used through their API.
9. The list of venues and its categories were obtained from the Foursquare and added to the data frame.
10. The data frame was then analysis to view to the unique categories in the neighborhoods.
11. The data frame was grouped based on the neighborhoods taking the mean of the frequency of each venue category occurrence.
12. From this database, the Fast Foods Restaurant venue category was filtered along with its neighborhood.
13. K-means clustering was performed on the data frame and the neighborhood was split into 5 clusters based on frequency of occurrence of Fast Food Restaurants in the neighborhoods.
14. The clusters were then visualized on the Chennai map to choose the best place to open up a Fast Food Restaurant.
15. The best option was chosen based on minimum number of occurrences of Fast Food Restaurant in the neighborhood for having less competition.

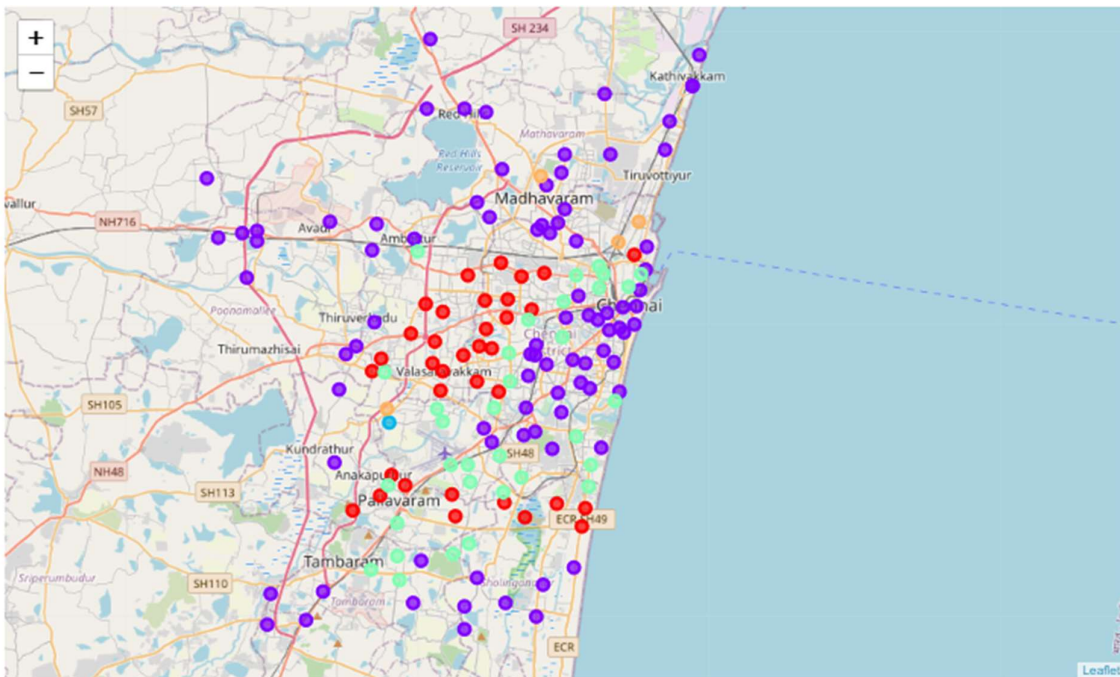
Result

Through K-means clustering the results were categorized into following 5 clusters based on frequency of occurrence of Fast Food Restaurants:

Cluster 1 (Red), Cluster 2 (Violet), Cluster4 (Green): The neighborhoods in this cluster have high number of Fast Food Restaurants.

Cluster 5 (Orange): The neighborhoods in this cluster have low to moderate number of Fast Food Restaurants.

Cluster 3 (Blue): The neighborhood in this cluster has the lowest number of Fast Food Restaurants.



The above map of Chennai visualizes the clusters and the respective neighborhoods under their respective clusters.

Discussion

The neighborhoods in Cluster 1 (Red), Cluster 2 (Violet), Cluster4 (Green) have high number of Fast Food Restaurants. Hence it is challenging to open a Fast Food Restaurant in these neighborhoods unless its unique and has a great brand image. The neighborhoods in Cluster 5 (Orange) have low to moderate number of Fast Food Restaurants. Hence it has less competition than the clusters 1,2 and 4. Opening up a restaurant in these neighborhoods might require some promotion. The neighborhood in Cluster 3 (Blue) has the lowest number of Fast Food Restaurants. Hence, it is the best option to open up a Fast Food Restaurant as it has no competitors.

Based the analysis, for people who are planning to open a Fast Food Restaurant it is recommended to open in the neighborhood areas of cluster 3, which is the best option if they are willing to have no competition. If they can invest in some brand promotion activities, they can open in the neighborhoods in cluster 5 as they have comparatively low competition than the clusters 1,2 and 4.

Note:

In this project only the frequency of the occurrence was taken into account. There are other factors such as population of the people, their food preferences and easy of access. With these data, further analysis might be required for getting the most relevant results. But such data are unavailable or needs to paid for access. Future analysis will be done with the paid access to obtain the best result.

Conclusion

In this project, the business problem was identified based on the trends, required data was obtained, cleaned, analyzed and split into clusters and finally recommendations were given based on the obtained results.

The results of this project will be helpful for people who are looking forward to open a Fast Food Restaurant in Chennai.

“After a good dinner one can forgive anybody, even one's own relations.”
— Oscar Wilde, A Woman of No Importance

References

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