The Battle of Neighborhoods:

Recommendation System To Start A Restaurant Business In London

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Introduction

DESCRIPTION & DISCUSSION OF THE BACKGROUND

London is a megacity, the capital of the United Kingdom and one of the oldest of the world’s great cities, with its history spanning nearly two millennia. The population of London had already exceeded one million by 1800 and it reached 9 million in 2018. Also, London is one of the world's leading tourism destinations with 21 million international visitors in 2018.

In recent years the restaurant industry in the United Kingdom and specifically London has undergone a period of growth. Considering London's diversity and ethnicity it is evident that starting a restaurant business would earn you more money comparatively than most of the other businesses. Although, with more profitable business there comes the most competition.

PROBLEM DESCRIPTION

Various factors need to be studied in order to decide on location such as:

- London Population and demographics
- Who are the competitors in that location?
- Cuisine served / Menu of the competitors
- Are there any venues like Tourist attractions, Entertainment zones, Parks etc., nearby where floating population is high?
- Segmentation of the Borough
- Untapped markets
- Saturated markets.

Target Audience:

To recommend the correct location, ABC Restaurant has appointed me to lead of the Data Science team. The objective is to locate and recommend to the management which neighborhood of London will be best choice to start a restaurant based on cuisine. The management also expects to understand the rationale of the recommendations made.

Success Criteria:

The success criteria of the project will be a good recommendation of neighborhood choice to ABC Restaurant based on Lack of such restaurants considering cuisine as a factor in that location.

Data

To build a recommendation model, following datasets and information are considered for analysis;

1. Scrapped Wikipedia using BeautifulSoup, to extract information about 33 London boroughs also known as local authority districts. Also, considered local areas or neighborhood for each borough for detailed analysis.
2. I used Foursquare API to get information about available restaurants for a given neighborhood and borough in London. The API also provided information about restaurant styles based on cuisine.
3. Employed data provided by the British Government from data.london.gov.uk to get more insights about London boroughs. The data provided knowledge about the population density, immigrants' country of origin and many more.

Methodology

Business Understanding:

Our main goal is to get optimum location for new restaurant business in London for ABC Restaurant based on cuisine.

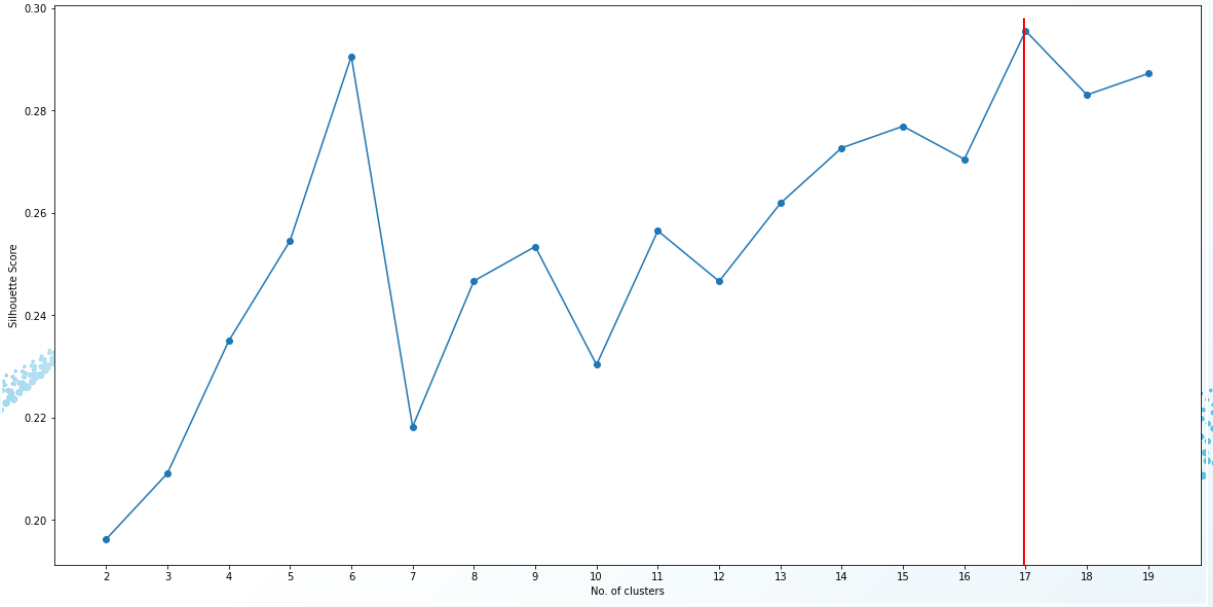
Exploratory data analysis:

London is mainly divided into 33 boroughs also known as local authority districts with 528 neighborhoods. Geopy and folium libraries to create a map to visualize neighborhoods of London.

Methodology

USING K-MEANS CLUSTERING

k-means clustering is performed on the data frame to check the pattern for each neighborhood and get the information about the top ten common restaurants for each neighborhood. It is observed from the graph below that, k = 17 would yield more better results for the computation using k-means clustering.



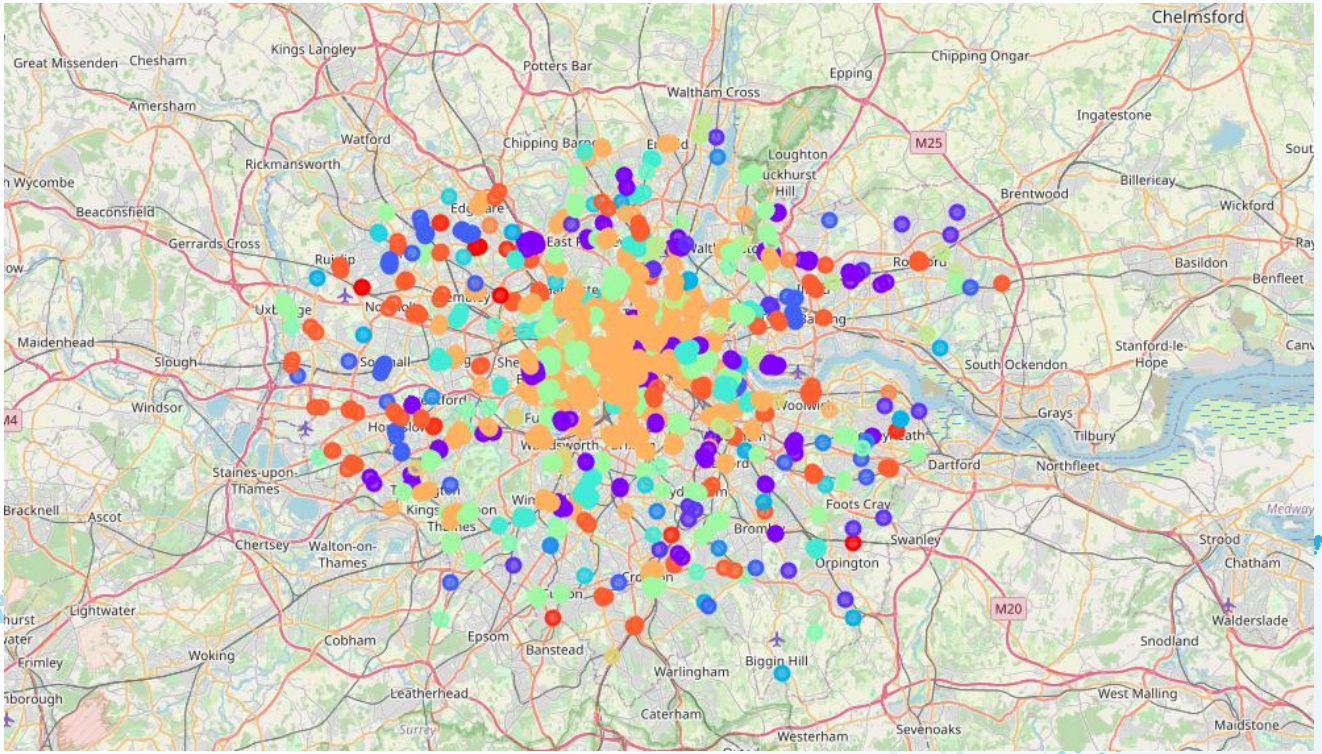
Results

Neighborhood K-Means clustering based on mean occurrence of venue category:

All 17 clusters follow unique pattern for top ten common restaurants for a particular neighborhood. The detail shows the number of neighborhoods assigned to each cluster.

```
13    1456
10     422
1      188
15     160
7      127
3       58
11      41
2       22
5       16
6       15
9       14
12      12
4        9
16       9
0        6
8        4
14       3
Name: Cluster Labels, dtype: int64
```

Results


Chelmsford
Great Missenden
Chesham
Kings Langley
Potters Bar
Chipping Ongar
Epping
Waltham Cross
Amersham
Ingatestone
Watford
Chipping Barnet
M25
Rickmansworth
Loughton
Billericay
Brentwood
Beaconsfield
Wickford
Gerrards Cross
Basildon
Benfleet
Maidenhead
Slough
Stanford-le-Hope
South Ockendon
Windsor
Grays
Tilbury
Staines-upon-Thames
Dartford
Northfleet
Bracknell
Ascot
Foots Cray
Swanley
Chertsey
Walton-on-Thames
Orpington
Strood
Chatham
Lightwater
M20
Walderslade
Cobham
Epsom
Banstead
Snodland
Woking
Warlingham
Biggin Hill
Leatherhead
West Malling
Caterham
Sevenoaks
Maidstone
Westerham
Surrey

DISCUSSION

1. If ABC Restaurant want to open a restaurant in preferred location and irrespective of cuisine, refer to that neighborhood in specific cluster and chose cuisine with the least common restaurant for better profits
2. If ABC Restaurant wants to open a restaurant with a preferred cuisine and irrespective of location, refer to the cluster with the least number of restaurants with that specific cuisine and select one among the neighborhoods based on company's preference.

CONCLUSION

This analysis is performed on limited data. This may be right or may be wrong. But if good amount of data is available there is scope to come up with better results. If there are lot of restaurants probably there is lot of demand. London has so many restaurants, yet certain neighborhood or borough doesn't have a specific cuisine restaurant available.