Location for opening a restaurant chain in London

Introduction

To find the safer districts of London for opening a restaurant

1.The task at hand

A restaurant owner wants to open a chain of restaurants in the City of London. The restaurant owner has asked the advice to carry out research using the designs to find one of the safest district of London. A safe district is likely to house generally the more affluent in society. This might mean less chances of vandalism and store break-ins for the business. It will also mean relatively higher selling prices of houses. This means the social attitudes and buying power of this neighbourhood is likely going to be high. This might be more customers will be visiting the restaurant and hence therefore more business for the restaurant owner.

Criteria

The crime statistics dataset with the breakdown of crimes in each of the boroughs will be looked at. This will be a period up till 2016. This will give a good indication of the trend, even though we are in 2020.

The research aims to get the safest burrow in London exploring the number of crimes in each of the neighbourhood. As a means of statistical inference, k-means clustering will be actually used to study the data.

Why Data?

Without leveraging data to make decisions about new restaurant locations, the chain owner could spend countless hours walking around districts, consulting many real estate agents with their own district biases, and end up opening in yet another location that is not ideal.

Data will provide better answers and better solutions to their task at hand.

Outcomes

The goal is to identify the best areas of London to open new restaurants as part of the chain's plan. The results will be translated to management in a simple form that will convey the data-driven analysis for the best location to open a restaurant.

2 The Data Science Workflow

Data Requirements

The data required for the project will be taken from the following sources

i) Section 1: London crime data

ii)Section 2: List of London boroughs

iii) Section 3: Wikipedia, list of neighbourhoods in the Royal Borough of Kingston.

The cleansed data will then be used alongside Foursquare data, which is readily available. Foursquare location data will be leveraged to explore or compare boroughs around London

The Data Science Workflow for Part 1, 2 & 3 includes the following:

- **Outline the initial data that is required:**
  - The London crime data will find the following: lsoa_code, borough, major_category, minor_category, value, year, month
  - The list of London Borough will provide the following:Borough,Inner,Status,Local authority, Political control,Headquarters,Area, Population,Co ordinates, Nr in map.
  - The list of neighbourhoods will provide the following:Neighbourhood, Borough,Latitude,Longitude.

- **Obtain the Data:**
  - Research and find suitable sources for the area of London.
  - Access and explore the data to determine if it can be manipulated for our purposes.

- **Initial Data Wrangling and Cleaning:**
  - Clean the data and convert to a useable form as a dataframe.

- **Data Analysis and Location Data:**

- Foursquare location data will be leveraged to explore or compare boroughs around London.
- Data manipulation and analysis to derive subsets of the initial data.

- **Visualization:**
  - Analysis and plotting visualizations.
  - Data visualization using various mapping libraries.

- **Discussion and Conclusions:**
  - Recommendations and results based on the data analysis.
  - Discussion of any limitations and how the results can be used, and any conclusions that can be drawn.

Table 1: London Crime after pre-processing

In three sections, data will be handled separately. From the London crime data, recent crimes are in selected. The major categories of crime are pivoted to get the total crimes per Borough

	Borough	Burglary	Criminal Damage	Drugs	Other Notifiable Offences	Robbery	Theft and Handling	Violence Against the Person	Total
0	Barking and Dagenham	1287	1949	919	378	534	5607	6067	16741
1	Barnet	3402	2183	906	499	464	9731	7499	24684
2	Bexley	1123	1673	646	294	209	4392	4503	12840
3	Brent	2631	2280	2096	536	919	9026	9205	26693
4	Bromley	2214	2202	728	417	369	7584	6650	20164

Table 2: List of London Boroughs

The second data scraped a Wikipedia page using the Beautiful soup library in Python.This helps us to extract the data in the tabular form as shown on the website. After web scraping, string manipulation is required the names of the boroughs in the correct form. This is important because of the merging of the datasets using borough names.

	Borough	Inner	Status	Local authority	Political control	Headquarters	Area (sq mi)	Population (2013 est)[1]	Co-ordinates	Nr. in map
0	Barking and Dagenham	NaN	NaN	Barking and Dagenham London Borough Council	Labour	Town Hall, 1 Town Square	13.93	194352	51°33′39″N 0°09′21″E / 51.5607°N 0.1557°E /...	25
1	Barnet	NaN	NaN	Barnet London Borough Council	Conservative	North London Business Park, Oakleigh Road South	33.49	369088	51°37′31″N 0°09′06″W / 51.6252°N 0.1517°W /...	31
2	Bexley	NaN	NaN	Bexley London Borough Council	Conservative	Civic Offices, 2 Watling Street	23.38	236687	51°27′18″N 0°09′02″E / 51.4549°N 0.1505°E /...	23
3	Brent	NaN	NaN	Brent London Borough Council	Labour	Brent Civic Centre, Engineers Way	16.70	317264	51°33′32″N 0°16′54″W / 51.5588°N 0.2817°W /...	12
4	Bromley	NaN	NaN	Bromley London Borough Council	Conservative	Civic Centre, Stockwell Close	57.97	317899	51°24′14″N 0°01′11″E / 51.4039°N 0.0198°E /...	20

Table 3: London Borough Crime

The two datasets are merged on the borough names form a new dataset that combines the necessary information. Purpose of this dataset is to visualise the crime rates in each borough and identify the borough with the least crimes recorded during 2016.

	Borough	Local authority	Political control	Headquarters	Area (sq mi)	Population (2013 est)[1]	Co-ordinates	Burglary	Criminal Damage	Drugs	Other Notifiable Offences	Robbery	Theft and Handling	Violence Against the Person	Total
0	Barking and Dagenham	Barking and Dagenham London Borough Council	Labour	Town Hall, 1 Town Square	13.93	194352	51°33′39″N 0°09′21″E / 51.5607°N 0.1557°E /...	1287	1949	919	378	534	5607	6067	16741
1	Barnet	Barnet London Borough Council	Conservative	North London Business Park, Oakleigh Road South	33.49	369088	51°37′31″N 0°09′06″W / 51.6252°N 0.1517°W /...	3402	2183	906	499	464	9731	7499	24684
2	Bexley	Bexley London Borough Council	Conservative	Civic Offices, 2 Watling Street	23.38	236687	51°27′18″N 0°09′02″E / 51.4549°N 0.1505°E /...	1123	1673	646	294	209	4392	4503	12840
3	Brent	Brent London Borough Council	Labour	Brent Civic Centre, Engineers Way	16.70	317264	51°33′32″N 0°16′54″W / 51.5588°N 0.2817°W /...	2631	2280	2096	536	919	9026	9205	26693
4	Bromley	Bromley London Borough Council	Conservative	Civic Centre, Stockwell Close	57.97	317899	51°24′14″N 0°01′11″E / 51.4039°N 0.0198°E /...	2214	2202	728	417	369	7584	6650	20164

Table 4: Neighbourhoods of the safest borough

After visualising the crime in each borough, we will find the lowest crime rate and hence rate that borough as the safest borough. Third source of data is acquired from the list of neighbourhoods in the safest borough on Wikipedia. This dataset is created from scratch. The pandas dataframe is created with the names of the neighbourhoods the name of the borough with the latitude and longitude are left blank.

	Neighborhood	Borough	Latitude	Longitude
0	Berrylands	Kingston upon Thames		
1	Canbury	Kingston upon Thames		
2	Chessington	Kingston upon Thames		
3	Coombe	Kingston upon Thames		
4	Hook	Kingston upon Thames		

Using Google Maps API geocoding for the final dataset

Table 5: Neighbourhoods with safest borough

The coordinates of the neighbourhoods are obtained using Google Maps API geocoding get the final dataset

	Neighborhood	Borough	Latitude	Longitude
0	Berrylands	Kingston upon Thames	51.393781	-0.284802
1	Canbury	Kingston upon Thames	51.417499	-0.305553
2	Chessington	Kingston upon Thames	51.358336	-0.298622
3	Coombe	Kingston upon Thames	51.419450	-0.265398
4	Hook	Kingston upon Thames	51.367898	-0.307145

This will be used to get the venues for each neighbourhood using the Foursquare API.