Report

Introduction & Business Problem :

Problem Background:

The restaurant industry in London is growing exponentially, every street is filled with every variety of restaurant, fast food place and pub; every type of food is available from classic European cuisines, primarily Italian, Spanish and French, to more exotic foods originating from Asia or South America. Demand, in the culinary industry, has become extremely high and as a result so has extent of competition to open a restaurant or cafeteria in a supposedly 'cool' area of the city.

So it become harder to choose location of new restaurn today espashily in big city like London

Problem

Pizza industry has grown up a lot in the last few years because the love of this dish along different people, so this industry is not only about food but also about the place of restauran because if you failed at your first branch you probably not going to success in the industry

So, the main purpose of the problem is to suggest a borough for a customer who want to open a pizza restaurant in london and suggest places for the new branches in the future

Target Audience

As the pizza industry is very big and has a lot of aspects to make successful name in this fiels all customers aim to open a restaurant where big number as possible can see in their street and at the same time this place has a weak competation as the restaurant will have hards at first to establish his name among people so my target audience will have a lot of interest in this problem because no one want to start his new industry badly because it will make him regret a lot in the future so the audience will need to have a solve to this problem here where my project come

Another point important for target audience is that my project also suggests the best places to open new restaurants in the future which is may be very considering for the customer

Success Criteria:

The success criteria of the project will be a good recommendation of borough/Neighborhood choice to The customer Ltd based on Lack of such restaurants in that location and recommend good places for the future branches

Data:

City will be analysed for the project is: Londaon

We will be using the below datasets for analysing London:

Data 1:

Neighborhood has a total of 32 boroughs. In order to segement the boroughs and explore them, we will essentially need a dataset that contains the 32 boroughs and the latitude and logitude coordinates of each borough.

The dataset also have population data about each borough so it will help in solving this problem

example for data before cleaning it:

	Borough	Inner	Status	Local authority	Political control	Headquarters	Area (sq mi)	Population (2013 est)[1]	Co-ordinates	Nr. in map
0	Barking and Dagenham [note 1]	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	Barnet House, 2 Bristol Avenue, Colindale	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

This dataset exists for free on the web. Link to the dataset is : https://en.wikipedia.org/wiki/List_of_London_boroughs

Data 2:

London geographical coordinates data will be utilized as input for the Foursquare API, that will be leveraged to provision venues information for each borough. We will use the Foursquare API to search pizza restaurants in each London borough.

example of data:

{'meta': {'code': 200, 'requestId': '5f11cfbc0af06e78b94b9611'}, 'response': {'venues': [{'id': '5c2f67e91acf11002be6f2d1',
'name': 'Pizza Hut Delivery', 'location': {'address': '339 Valence Avenue', 'lat': 51.55908765185484, 'lng': 0.13031458774526
072, 'labeledLatLngs': [{'label': 'display', 'lat': 51.55908765185484, 'lng': 0.13031458774526072}], 'distance': 1765, 'posta
lCode': 'RM8 3RA', 'cc': 'GB', 'city': 'Essex', 'state': 'Essex', 'country': 'United Kingdom', 'formattedAddress': ['339 Vale
nce Avenue', 'Essex', 'RM8 3RA', 'United Kingdom']}, 'categories': [{'id': '4bf58dd8d48988d1ca941735', 'name': 'Pizza Place',
'pluralName': 'Pizza Places', 'shortName': 'Pizza', 'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v2/food/pizza_',
'suffix': '.png'}, 'primary': True}], 'referralId': 'v-1595002846', 'hasPerk': False}, {'id': '4b65ba21f964a52011fc2ae3', 'na
me': 'Pizza Hut', 'location': {'address': '36 London Road', 'lat': 51.57592887721421, 'lng': 0.17643078529908962, 'labeledLat
click to unscroll output; double click to hide isplay', 'lat': 51.57592887721421, 'lng': 0.17643078529908962}], 'distance': 2220, 'postalCode': 'RM7 9R
': 'Essex', 'state': 'Essex', 'country': 'United Kingdom', 'formattedAddress': ['36 London Road', 'Esse
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g'}, 'primary': True}], 'referralId': 'v-1595002846', 'hasPerk': False}, {'id': '4bd1b556046076b05a457271', 'name': "Domino's
Pizza", 'location': {'address': '161 High Road', 'lat': 51.57215484535873, 'lng': 0.13795070353944539, 'labeledLatLngs': [{'l
abel': 'display', 'lat': 51.57215484535873, 'lng': 0.13795070353944539}], 'distance': 1770, 'postalCode': 'RM6 6NL', 'cc': 'G
B', 'city': 'Chadwell Heath', 'state': 'Greater London', 'country': 'United Kingdom', 'formattedAddress': ['161 High Road',
'Chadwell Heath', 'Greater London', 'RM6 6NL', 'United Kingdom']}, 'categories': [{'id': '4bf58dd8d48988d1ca941735', 'name':
'Pizza Place', 'pluralName': 'Pizza Places', 'shortName': 'Pizza', 'icon': {'prefix': 'https://ss3.4sqi.net/img/categories_v
2/food/pizza_', 'suffix': '.png'}, 'primary': True}], 'referralId': 'v-1595002846', 'hasPerk': False}, {'id': '4d3ed35e05b872

Mathedology

1. We begin by collecting data about London Boroughs from this link 'https://en.wikipedia.org/wiki/List_of_London_boroughs'

	Borough	Inner	Status	Local authority	Political control	Headquarters	Area (sq mi)	Population (2013 est)[1]	Co-ordinates	Nr. in map
0	Barking and Dagenham [note 1]	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
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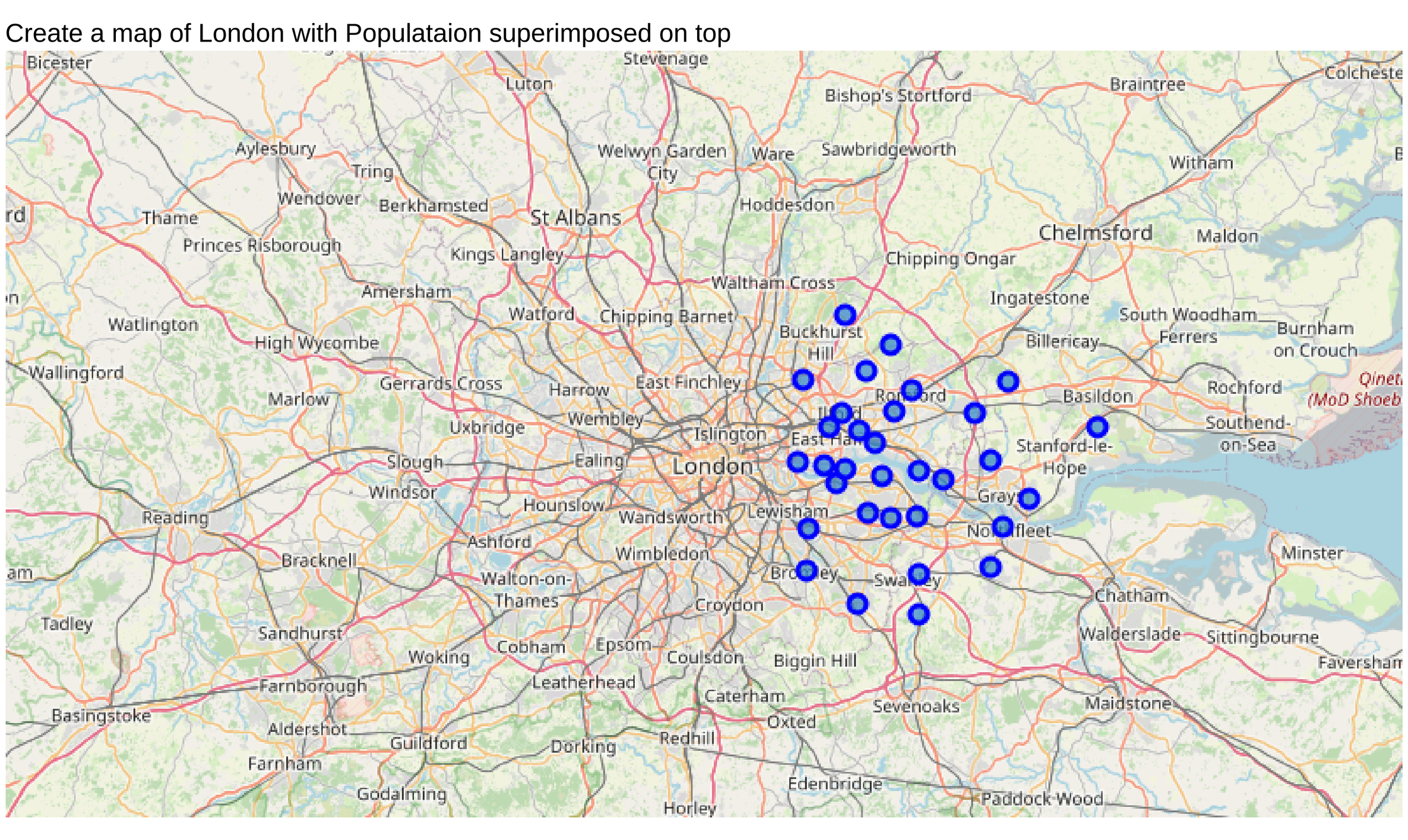
4	Bromley	NaN	NaN	Bromley London Borough Council	Conservative	Civic Centre, Stockwell Close	57.97	317899	51°24′14″N 0°01′11″E / 51.4039°N 0.0198°E	20

1. We cleaned Data and Remved unwanted Columns

	Borough	Population	Latitude	Longitude
0	Barking and Dagenham	194352	51.5607	0.1557
1	Barnet	369088	51.6252	0.1517
2	Bexley	236687	51.4549	0.1505
3	Brent	317264	51.5588	0.2817
4	Bromley	317899	51.4039	0.0198

1. Use geopy to get coordinates of London "The geograpical coordinate of London are 51.5073219, -0.1276474."

1. Create a map of London with Populataion superimposed on top



1. Get the pizza restaurants in each borough from Foursquare API

{'meta': {'code': 200, 'requestId': '5f11cfbc0af06e78b94b9611'}, 'response': {'venues': [{'id': '5c2f67e91acf11002be6f2d1',
'name': 'Pizza Hut Delivery', 'location': {'address': '339 Valence Avenue', 'lat': 51.55908765185484, 'lng': 0.13031458774526
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'suffix': '.png'}, 'primary': True}], 'referralId': 'v-1595002846', 'hasPerk': False}, {'id': '4b65ba21f964a52011fc2ae3', 'na
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g'}, 'primary': True}], 'referralId': 'v-1595002846', 'hasPerk': False}, {'id': '4bd1b556046076b05a457271', 'name': "Domino's
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'Chadwell Heath', 'Greater London', 'RM6 6NL', 'United Kingdom']}, 'categories': [{'id': '4bf58dd8d48988d1ca941735', 'name':
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2/food/pizza_', 'suffix': '.png'}, 'primary': True}], 'referralId': 'v-1595002846', 'hasPerk': False}, {'id': '4d3ed35e05b872

1. Make new Dataframe contain info about pizza res in Boroughs

	Borough	Venue	Population
0	Barking and Dagenham	12	194352
1	Barnet	1	369088
2	Bexley	9	236687
3	Brent	5	317264
4	Bromley	10	317899

1. Analyze each Borough By Pop/res

	Borough	Venue	Population	Pop/res
0	Barking and Dagenham	12	194352	16196
1	Barnet	1	369088	369088
2	Bexley	9	236687	26298
3	Brent	5	317264	63452
4	Bromley	10	317899	31789

Pop/res indicator

This indicator basicly show how many people in average go to each restauran in the Borough

High Pop/res: indicates that this borough has low number of restaurants for the population in borough

Low Pop/res: indicates that this borough has high number of restaurants for the population in borough

so, The high the Pop/res the more this borough is good market for starting a new pizza restaurant

1. Pre-processing for ML k-means Algorithm

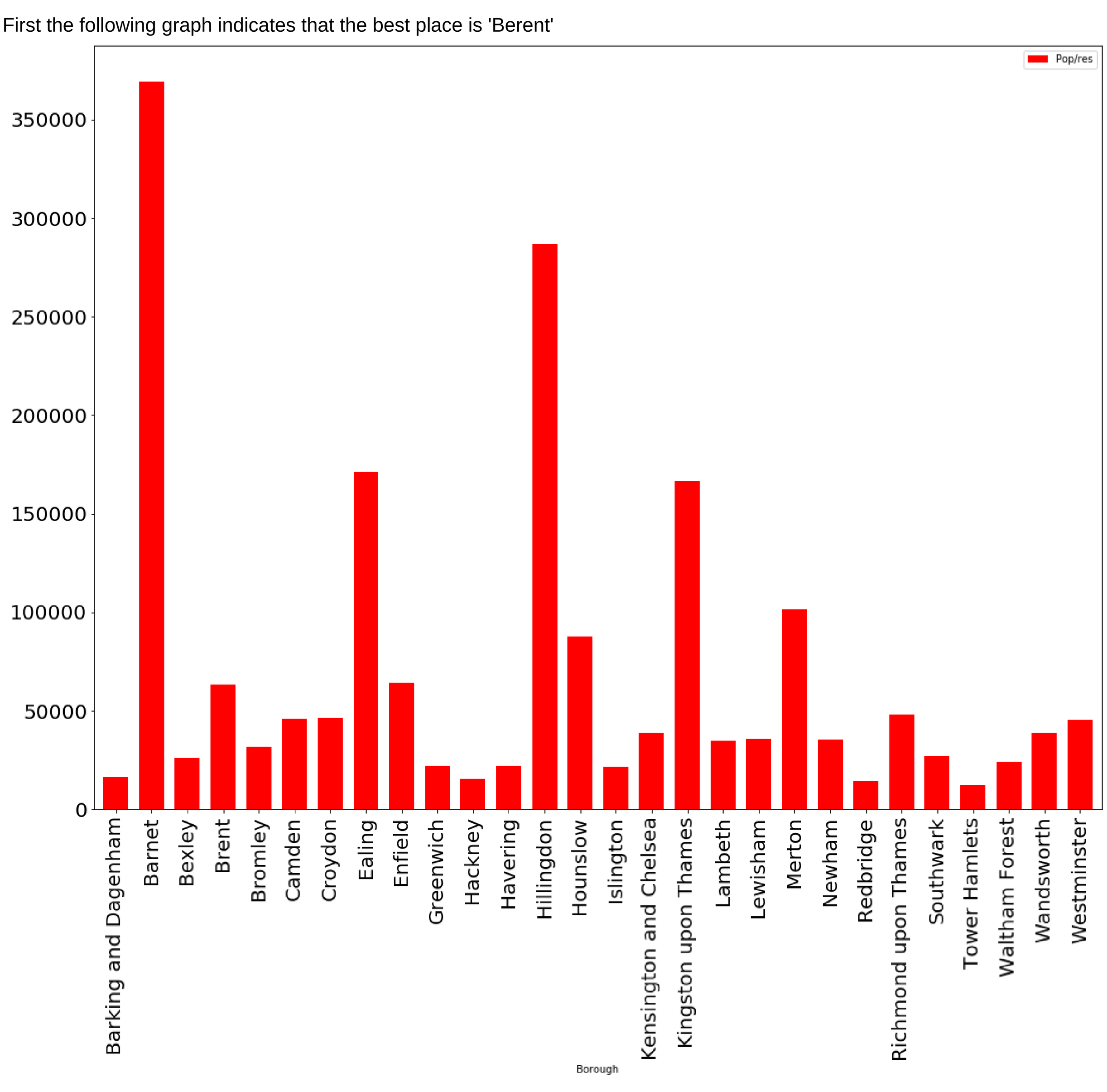
	Venue	Population	Pop/res
0	12	194352	16196
1	1	369088	369088
2	9	236687	26298
3	5	317264	63452
4	10	317899	31789

1. Modeling using scikit learn and got this labels [0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]

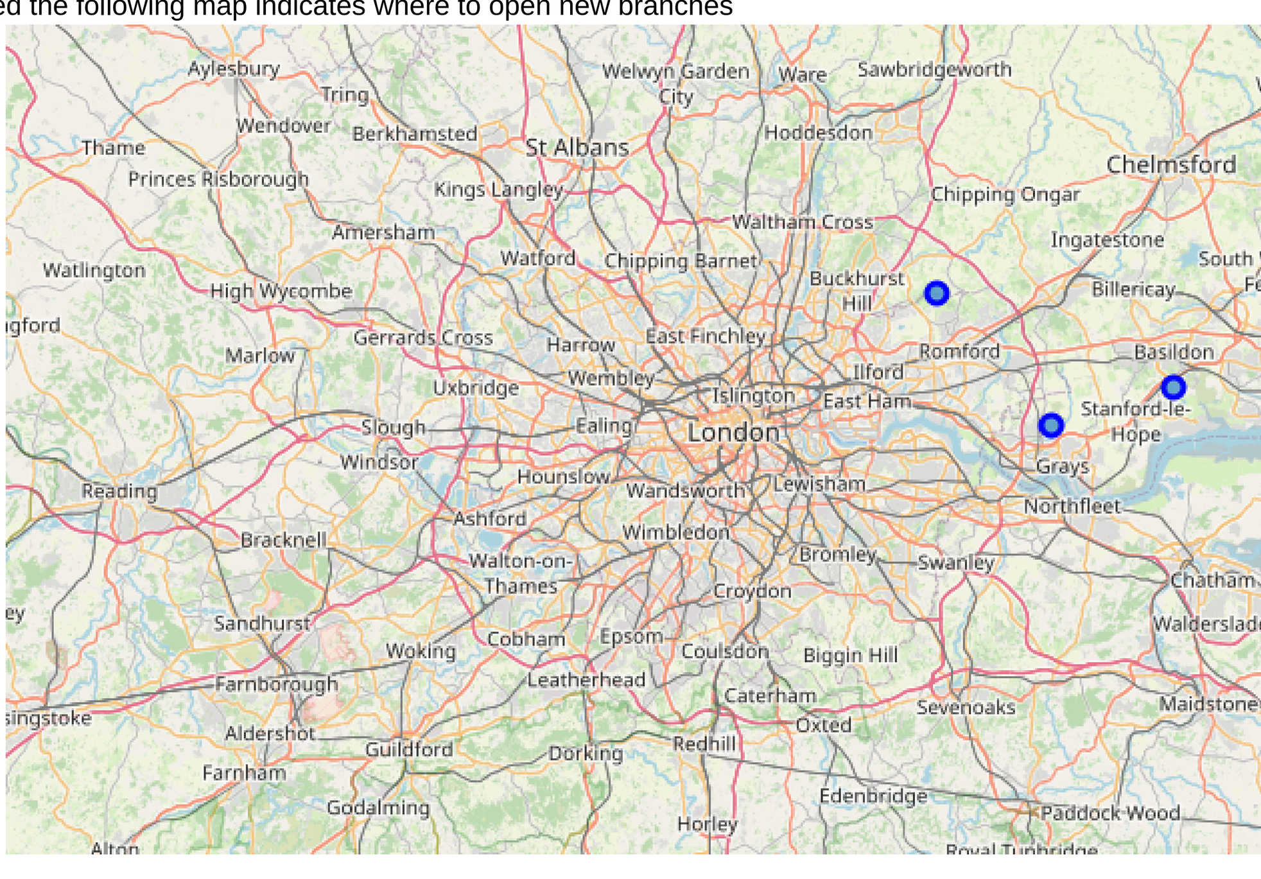
Results

So we can know which borough is recommended to open pizza restaurant and where to open new branches

First the following graph indicates that the best place is 'Berent'



Seconed the following map indicates where to open new branches



Conclusion:

There is always room for improvement and hence the above solution I have provided can also be improved for best results depending upon the data we have.

In [ ]: