

## Introduction

A financial center, or a financial hub, refers to a city with a strategic location, leading financial institutions, reputed stock exchanges, a dense concentration of public and private banks and trading and insurance companies. In addition, these hubs are equipped with first-class infrastructure, communications, and commercial systems, and there is a transparent and sound legal and regulatory regime backed by a stable political system. Such cities are favorable destinations for professionals because of the high living standards they offer along with immense growth opportunities.

Since the middle ages, London has been one of the most prominent trade and business centers. The city is one of the most visited places on earth and is among the most preferred places to do business.

From a business perspective, Singapore's attractiveness lies in its transparent and sound legal framework complementing its economic and political stability. The small island located in the Southeast Asia region has emerged as one of the Four Asian Tigers and established itself as a major financial center.

These two cities belong to different continent. One to Europe and the second to Asia. In our study we will compare neighborhood of both cities and tell how similar or dissimilar they are.

## Data

To Accomplish this study, we will use foursquare location to get all venues of each city. We will categorize venue on each city to see how these city are similar or dissimilar. We will need:

- London's geolocation,
- Singapore geolocation,
- Foursquare venues of each city. Each venue will be categorized and shown in a map.
- Venue name, description and category

We will take the most frequent venue category in each city such as restaurant, park, coffee, shopping.

We will filter our neighborhood data frame to these categories and show in a map each category with a different color using folium.

## Methodology

After creating a foursquare account and getting our credentials we have to get London center geolocation and Singapore center geolocation. We will put this in two dictionaries with other information like area.

City	Latitude	Longitude	Area
London	51.509865	-0.118092	1572
Singapore	1.290270	103.851959	721.5

The second step is to get neighborhood for each city using foursquare APIs. The result we will convert as a data frame showing all venues information's for each city.

London data

	<b>id</b>	<b>name</b>	<b>categories</b>	<b>location.address</b>	<b>location.lat</b>	<b>location.lng</b>	<b>location.labeledLatLngs</b>	<b>location.distance</b>	<b>lo</b>
0	4ac518cff964a52063a620e3	Somerset House	[{"id": "4bf58dd8d48988d171941735", "name": "E..."}]	Strand	51.510786	-0.117899	[{"label": "display", "lat": 51.5107857130956...}		103
1	4c6950702c29d13ab5d50a41	The Savoy Hotel	[{"id": "4bf58dd8d48988d1fa931735", "name": "H..."}]	Strand	51.510448	-0.120876	[{"label": "display", "lat": 51.51044776531987...}		203
2	4bad083df964a52078263be3	Lyceum Theatre	[{"id": "4bf58dd8d48988d137941735", "name": "T..."}]	21 Wellington St	51.511598	-0.119785	[{"label": "display", "lat": 51.51159771114791...}		225
3	4b9e3908f964a520f6d236e3	Victoria Embankment Gardens	[{"id": "4bf58dd8d48988d15a941735", "name": "G..."}]	Victoria Embankment	51.508135	-0.122079	[{"label": "display", "lat": 51.50813522335623...}		336
4	4ac7a2caf964a520adb820e3	National Theatre	[{"id": "4bf58dd8d48988d137941735", "name": "T..."}]	Upper Ground	51.507376	-0.114793	[{"label": "display", "lat": 51.50737580946016...}		359

## Singapore data

	<b>id</b>	<b>name</b>	<b>categories</b>	<b>location.address</b>	<b>location.lat</b>	<b>location.lng</b>	<b>location.labeledLatLngs</b>	<b>location.distance</b>	<b>lo</b>
0	4d438c6514aa8cfa743d5c3d	National Gallery Singapore	[{"id": "4bf58dd8d48988d1e2931735", "name": "A..."}]	1 St. Andrew's Road	1.290740	103.851548	[{"label": "display", "lat": 1.290739591334198...}		69
1	4b058810f964a52036af22e3	Esplanade Park	[{"id": "4bf58dd8d48988d163941735", "name": "P..."}]	Connaught Dr.	1.288968	103.853580	[{"label": "display", "lat": 1.288967570835395...}		231
2	4e7f3d04f5b97a346f1afe04	Singapore F1 GP: Padang Stage	[{"id": "5032792091d4c4b30a586dc5", "name": "C..."}]	Marina Bay Street Circuit	1.290697	103.853297	[{"label": "display", "lat": 1.290696620128562...}		156
3	4f0bbc70e4b0baf830387ef5	The Oval @ Singapore Cricket Club Pavilion	[{"id": "4bf58dd8d48988d1c4941735", "name": "R..."}]	Connaught Dr	1.289006	103.852438	[{"label": "display", "lat": 1.289006326179918...}		150
4	5630c035498ed421ed0b2afc	Odette Restaurant	[{"id": "4bf58dd8d48988d10c941735", "name": "F..."}]	#01-04, National Gallery Singapore	1.289679	103.851691	[{"label": "display", "lat": 1.289679438856723...}		72

This figure shows the shape of each data frame

```
Entrée [122]: df_london.shape
```

```
Out[122]: (100, 21)
```

```
Entrée [124]: df_singapor.shape
```

```
Out[124]: (100, 19)
```

## Data cleaning

It's important to clean our data as we want only to get the name, latitude, longitude and category of each data frame.

We see categories is an array with many values or we just want to display the category name of each place.

After applying a filter, we will get this result:

	<code>id</code>	<code>name</code>	<code>categories</code>	<code>location.address</code>	<code>location.lat</code>	<code>location.lng</code>	<code>location.labeledLatLngs</code>	<code>location.distance</code>	<code>location.postalCode</code>
0	4ac518cff964a52063a620e3	Somerset House	Event Space	Strand	51.510786	-0.117899	[{"label": "display", "lat": 51.51078575130956...}	103	WC2R 1LA
1	4c6950702c29d13ab5d50a41	The Savoy Hotel	Hotel	Strand	51.510448	-0.120876	[{"label": "display", "lat": 51.51044776531987...}	203	WC2R 0EU
2	4bad083df964a52078263be3	Lyceum Theatre	Theater	21 Wellington St	51.511598	-0.119785	[{"label": "display", "lat": 51.51159771114791...}	225	WC2E 7DA
3	4b9e3908f964a520f6d236e3	Victoria Embankment Gardens	Garden	Victoria Embankment	51.508135	-0.122079	[{"label": "display", "lat": 51.50813522335623...}	336	NaN
4	4ac7a2caf964a520adb820e3	National Theatre	Theater	Upper Ground	51.507376	-0.114793	[{"label": "display", "lat": 51.50737580946016...}	359	SE1 9PX

5 rows × 21 columns

	<code>id</code>	<code>name</code>	<code>categories</code>	<code>location.address</code>	<code>location.lat</code>	<code>location.lng</code>	<code>location.labeledLatLngs</code>	<code>location.distance</code>	<code>location.postalCode</code>	<code>id</code>
0	4d438c6514aa8cfa743d5c3d	National Gallery Singapore	Art Gallery	1 St. Andrew's Road	1.290740	103.851548	[{"label": "display", "lat": 1.290739591334198...}	69	178957	
1	4b058810f964a52036af22e3	Esplanade Park	Park	Connaught Dr.	1.288968	103.853580	[{"label": "display", "lat": 1.288967570835395...}	231	179558	
2	4e7f3d04f5b97a346f1afe04	Singapore F1 GP: Padang Stage	Concert Hall	Marina Bay Street Circuit	1.290697	103.853297	[{"label": "display", "lat": 1.290696620128562...}	156	NaN	
3	4f0bbc70e4b0baf830387ef5	The Oval @ Singapore Cricket Club Pavilion	Restaurant	Connaught Dr	1.289006	103.852438	[{"label": "display", "lat": 1.289006326179918...}	150	NaN	
4	5630c035498ed421ed0b2afc	Odette Restaurant	French Restaurant	#01-04, National Gallery Singapore	1.289679	103.851691	[{"label": "display", "lat": 1.289679438856723...}	72	178957	

As you can see in the figure above, we have an explicit category name that we can use to categorize our places.

after having obtained the categories of our places we will use only columns that we need and remove others columns. These columns are name, categories, latitude and longitude. We will also rename location.lat to lat and location.lng to lng. In the same time, we will reduce our data for showing only categories that we have selected. These categories are: Restaurant, park, shopping center and coffee. So, the final result of our data frames will look like this:

	<code>name</code>	<code>categories</code>	<code>lat</code>	<code>lng</code>
1	Esplanade Park	Park	1.288968	103.853580
3	The Oval @ Singapore Cricket Club Pavilion	Restaurant	1.289006	103.852438
4	Odette Restaurant	French Restaurant	1.289679	103.851691
7	Funan	Shopping Mall	1.291333	103.850121
15	PPP Coffee	Coffee Shop	1.291628	103.849741

	<b>name</b>	<b>categories</b>	<b>lat</b>	<b>lng</b>
<b>6</b>	SUSHISAMBA	Sushi Restaurant	51.512232	-0.122371
<b>7</b>	Covent Garden Market	Shopping Plaza	51.511977	-0.122799
<b>8</b>	Lundenwic	Coffee Shop	51.512823	-0.118343
<b>13</b>	Sticks'n'Sushi	Sushi Restaurant	51.511038	-0.123655
<b>15</b>	Southbank Skate Park	Skate Park	51.506911	-0.116636

## Results

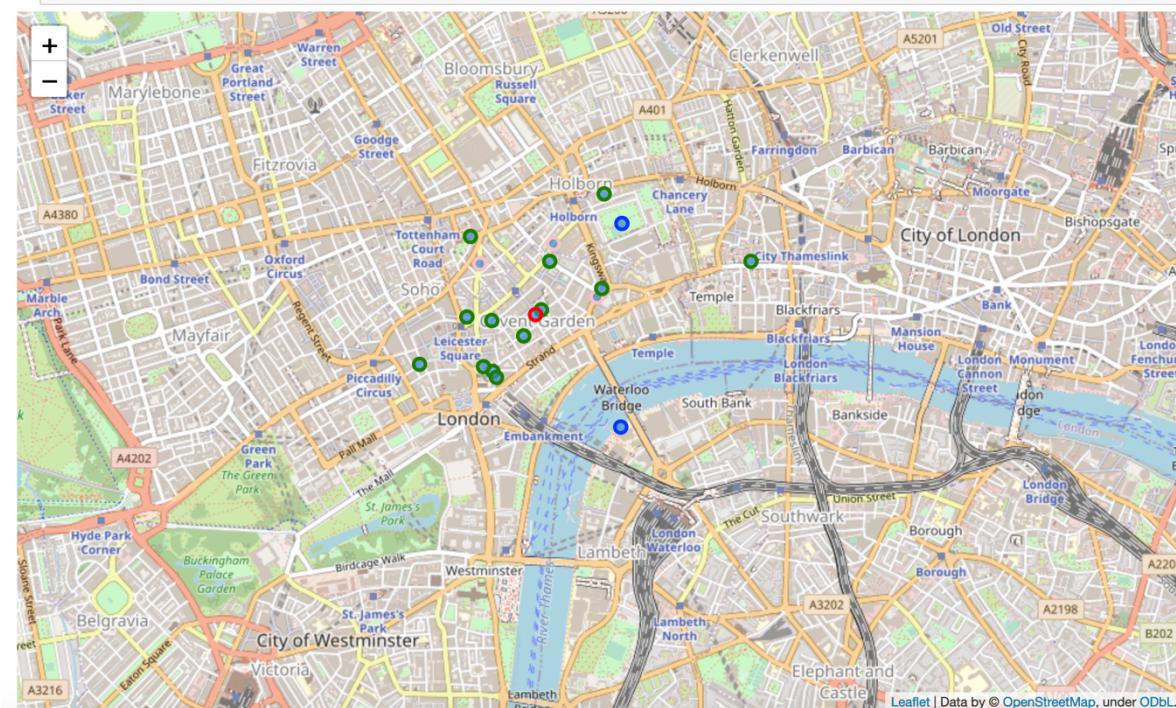
After cleaning our data, we can show the neighborhood of cities and a map using folium, before this we have to define a function which we will give a color for each place depending on these categories. The result of the two maps will be:

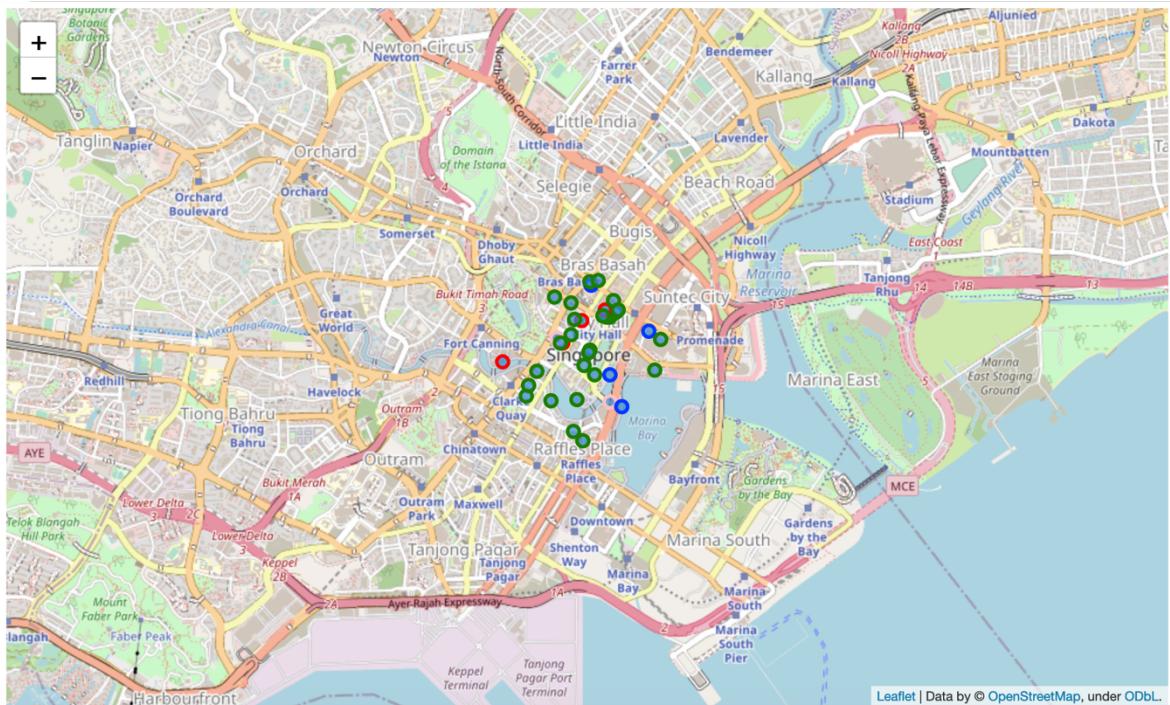
Green: restaurant

Blue: park

Pink: coffee

Red: shopping





we can also print number of each place depending on his category:

```
Entrée [143]: print_total_categories(df_filtered_singapor, "singapor")
```

```
total neighborhood for each categories for singapor
categories restaurant:26
categories park:1
categories coffee:2
categories shopping:4
```

```
Entrée [144]: print_total_categories(df_filtered_london, "london")
```

```
total neighborhood for each categories for london
categories restaurant:13
categories park:2
categories coffee:3
categories shopping:1
```

We can easily compare the two cities depending on category.

## Discussion

We can easily see that in London we have more restaurant and variety in the city. But in Singapore we have more shopping center and coffee shop than London. We can resume this result that Singapore is a best place for making shopping than London but for eating London is a good city. If someone want to open a restaurant, we can say that London is a good place.

## Conclusion

This report attempts to make a comparison of two big city using some kind of categories. We can use more data to make a better comparison and also predict where is the place to make a business in food or in clothes. If someone want to start a business in these two cities in food or an clothes in these two cities this report can be a good start.