

# The battle of Neighborhoods

## Introduction

Brussels is the capital of Belgium and the center of European Commission. Due to this, it is very diverse as people from all European countries visit Brussels mostly for business purpose but also for holidays.

Many people from various countries work in Brussels and there is one of the largest Greek communities populated with 40.000 people ([Demographics of Belgium](#)).

After the 2015-2017 economic crisis many Greeks relocated to Brussels, mostly working for the EU committee. This creates an opportunity for traditional Greek food. In 2012 the Greek restaurant “Leonidas place” opens for business with only one shop. Because of the exceptional quality and service soon gets 40 stores over Greece and currently is looking for expansion to other countries. So, they hired me to find potential locations for their first shop.

## Problem Description

Restaurants is a very demanding business and especially in Brussels where the population is so diverse many factors need to be considered. Since it is the first shop of the “Leonidas place” we need everything so to succeed. We get data of popular restaurants and cluster the locations also we will take in mind the population of the neighborhood as we need to be close to many people.

- People are from various countries religions etc
- Many people visit Brussels for business so internet presence is a must
- There is strong Greek community

## Considerations

- Dynamic environment
- Are there close enough farmer markets wholesale markets so we can easily get first quality fresh products?
- Demographics
- What types of restaurants are proffered in the neighborhood?
- As there are also the famous pralines named “Leonidas” a new name should be recommended in order to avoid confusion

## Target Audience

The audience is “Leonidas place” owners and partners as well as anyone who might interested in opening a restaurant business. The management also needs to understand and support the final decision.

## Success Criteria

The success criteria of the project will be a good recommendation of the location of the first Belgian “Leonidas place” restaurant in Brussels which will be at a commercial center with ease of transportation.

## Data

Only the city of Brussels will be analyzed in the project.

The population data for the city of Brussels can be found : [Brussels population](#)

Top 5 butcher shops in Brussels: [5 best bushers](#)

Location data from foursquare api category Restaurants  
(4d4b7105d754a06374d81259)

## Methodology

In this project, I will use the methodology as introduced in Week 3 lab.

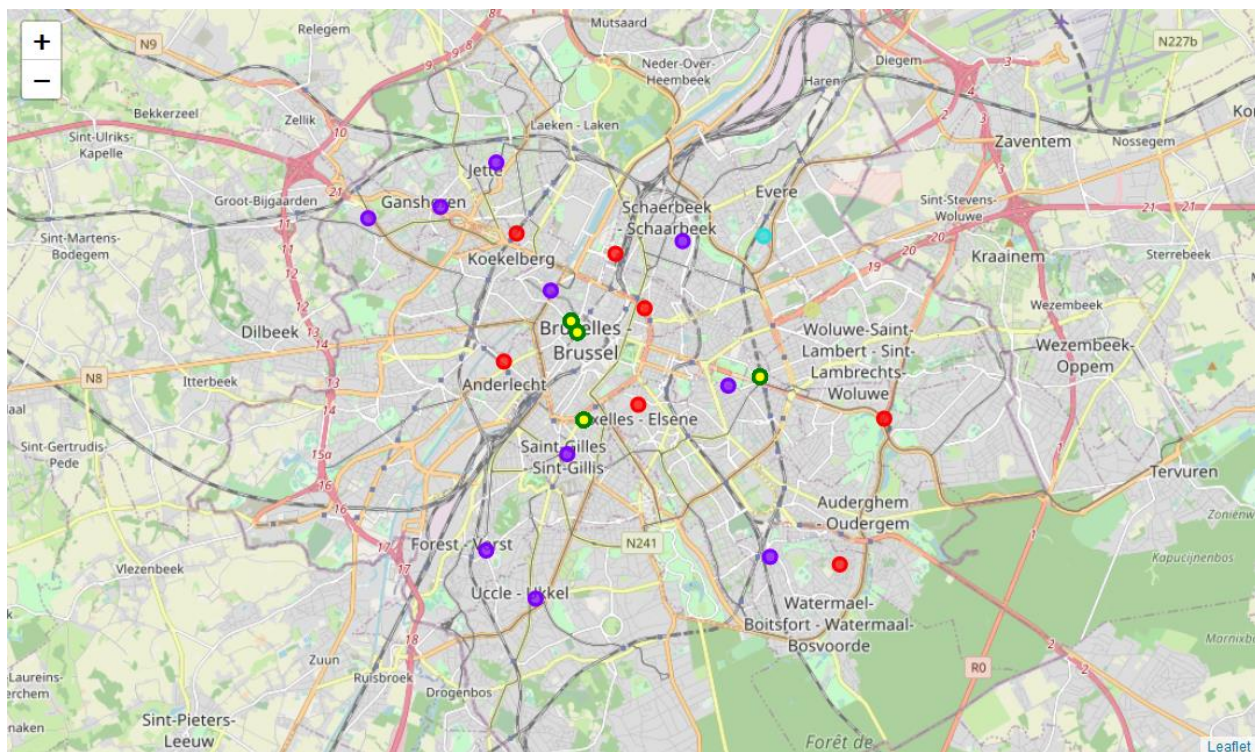
First, we convert the addresses from population data to their latitude and longitude values, this was performed from Google api.

|    | Name  | Population2019 | Latitude  | Longitude |
|----|---|----------------|-----------|-----------|
| 0  | Anderlecht                                    | 119714         | 50.842989 | 4.329696  |
| 1  | Auderghem (Oudergem)                          | 34013          | 50.808369 | 4.420675  |
| 2  | Berchem-Sainte-Agathe (Sint-Agatha-Berchem)   | 25179          | 50.867495 | 4.292965  |
| 3  | Bruxelles (Brussel) [Brussels]                | 181726         | 50.861350 | 4.359934  |
| 4  | Etterbeek                                     | 48367          | 50.838881 | 4.390485  |
| 5  | Evere   | 41763          | 50.864549 | 4.400135  |
| 6  | Forest (Vorst)                                | 56289          | 50.810635 | 4.324910  |
| 7  | Ganshoren                                     | 24902          | 50.869363 | 4.312332  |
| 8  | Ixelles (Elsene)                              | 86876          | 50.835549 | 4.366051  |
| 9  | Jette   | 52536          | 50.877103 | 4.327729  |
| 10 | Koekelberg                                    | 21990          | 50.864891 | 4.333086  |
| 11 | Molenbeek-Saint-Jean (Sint-Jans-Molenbeek)    | 97462          | 50.855180 | 4.342221  |
| 12 | Saint-Gilles (Sint-Gillis)                    | 50267          | 50.827240 | 4.346762  |
| 13 | Saint-Josse-ten-Noode (Sint-Joost-ten-Node)   | 27457          | 50.852112 | 4.367682  |
| 14 | Schaerbeek (Schaarbeek)                       | 133309         | 50.863715 | 4.378198  |
| 15 | Uccle (Ukkel)                                 | 83024          | 50.802483 | 4.338319  |
| 16 | Watermael-Boitsfort (Watermaal-Bosvoorde)     | 25184          | 50.809617 | 4.401701  |
| 17 | Woluwe-Saint-Lambert (Sint-Lambrechts-Woluwe) | 56660          | 50.851874 | 4.413006  |
| 18 | Woluwe-Saint-Pierre (Sint-Pieters-Woluwe)     | 41824          | 50.833303 | 4.432686  |

Then we will use the Foursquare API to explore neighborhoods in Brussels, Belgium. After that, explore function to get the most common venue categories in each neighborhood, and then use this feature to group the neighborhoods into clusters K-means clustering algorithm will be use to complete this task. And also, the Folium library to visualize the neighborhoods in Brussels and their emerging clusters. We need also the 5 best butcher shop geolocations, this has performed also from the Google api

### K-Means Cluster – Brussels restaurants

Using K-mean to clustering data area with most common venue. Notice on the map you can see also the top 5 butcher shops with the green-yellow circle.



Result

Cluster 0

```
pd.loc[brussels_merged['Cluster Labels'] == 0, brussels_merged.columns[[0,1] + list(range(5, brussels_merged.shape[1])],
```

<

|    | Name  | Population2019 | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue    | 7th Most Common Venue | 8th Most Common Venue   | 9th Most Common Venue       | 10th Most Common Venue |
|----|---|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------|-----------------------|-------------------------|-----------------------------|------------------------|
| 0  | Anderlecht                                  | 119714         | Food Court            | Lebanese Restaurant   | Steakhouse            | Snack Place           | French Restaurant     | Restaurant               | Sandwich Place        | Deli / Bodega           | Italian Restaurant          | Indian Restaurant      |
| 1  | Auderghem (Oudergem)                        | 34013          | Italian Restaurant    | Sandwich Place        | Bakery                | Bistro                | Snack Place           | Wings Joint              | Falafel Restaurant    | Doner Restaurant        | Eastern European Restaurant | Egyptian Restaurant    |
| 3  | Bruxelles (Brussel) [Brussels]              | 181726         | Sandwich Place        | Snack Place           | Italian Restaurant    | Bakery                | Thai Restaurant       | Doner Restaurant         | Greek Restaurant      | Burger Joint            | Gastropub                   | Fast Food Restaurant   |
| 8  | Ixelles (Elsene)                            | 86876          | Italian Restaurant    | Sandwich Place        | Thai Restaurant       | Café                  | Restaurant            | Mediterranean Restaurant | African Restaurant    | Japanese Restaurant     | Burger Joint                | Fried Chicken Joint    |
| 10 | Koekelberg                                  | 21990          | Italian Restaurant    | Restaurant            | Greek Restaurant      | Snack Place           | Indonesian Restaurant | Falafel Restaurant       | Doner Restaurant      | Comfort Food Restaurant | Chinese Restaurant          | Sandwich Place         |
| 13 | Saint-Josse-ten-Noode (Sint-Joost-ten-Node) | 27457          | Italian Restaurant    | Sandwich Place        | Restaurant            | Snack Place           | Thai Restaurant       | Belgian Restaurant       | Deli / Bodega         | Japanese Restaurant     | Pizza Place                 | Kebab Restaurant       |
| 18 | Woluwe-Saint-Pierre (Sint-Pieters-Woluwe)   | 41824          | Italian Restaurant    | French Restaurant     | Fast Food Restaurant  | Restaurant            | Sandwich Place        | Burger Joint             | Japanese Restaurant   | Diner                   | Pizza Place                 | Cafeteria              |

Cluster 1

```
brussels_merged.loc[brussels_merged['Cluster Labels'] == 1, brussels_merged.columns[[0,1] + list(range(5, brussels_merged.shape[1]))]]
```

|    | Name  | Population2019 | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue     | 7th Most Common Venue | 8th Most Common Venue       | 9th Most Common Venue | 10th Most Common Venue |
|----|---|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|-----------------------|-----------------------------|-----------------------|------------------------|
| 2  | Berchem-Sainte-Agathe (Sint-Agatha-Berchem) | 25179          | Snack Place           | Greek Restaurant      | Bakery                | Sandwich Place        | Buffet                | Fast Food Restaurant      | Diner                 | Deli / Bodega               | Pizza Place           | Restaurant             |
| 4  | Etterbeek                                   | 48367          | Greek Restaurant      | Pizza Place           | Bakery                | Brasserie             | Italian Restaurant    | Asian Restaurant          | Deli / Bodega         | Eastern European Restaurant | Kebab Restaurant      | Japanese Restaurant    |
| 6  | Forest (Vorst)                              | 56289          | Pizza Place           | Chinese Restaurant    | Steakhouse            | French Restaurant     | Halal Restaurant      | Middle Eastern Restaurant | Sandwich Place        | Friterie                    | Bistro                | Brasserie              |
| 7  | Ganshoren                                   | 24902          | Burger Joint          | Pizza Place           | Friterie              | Bakery                | Snack Place           | Italian Restaurant        | Sandwich Place        | Restaurant                  | Asian Restaurant      | Turkish Restaurant     |
| 9  | Jette                                       | 52536          | Snack Place           | Bakery                | Pizza Place           | Gastropub             | Italian Restaurant    | Belgian Restaurant        | Chinese Restaurant    | Friterie                    | Deli / Bodega         | Burger Joint           |
| 11 | Molenbeek (Sint-Jans-Molenbeek)             | 97462          | Pizza Place           | Sandwich Place        | Snack Place           | Gastropub             | Italian Restaurant    | Burger Joint              | Seafood Restaurant    | French Restaurant           | Greek Restaurant      | Breakfast Spot         |
| 12 | Saint-Gilles (Sint-Gillis)                  | 50267          | Pizza Place           | Brasserie             | Italian Restaurant    | Moroccan Restaurant   | Portuguese Restaurant | Friterie                  | Sandwich Place        | Bakery                      | Belgian Restaurant    | French Restaurant      |
| 14 | Schaerbeek (Schaarbeek)                     | 133309         | Snack Place           | French Restaurant     | Turkish Restaurant    | Spanish Restaurant    | Gastropub             | Falafel Restaurant        | Italian Restaurant    | Middle Eastern Restaurant   | Restaurant            | Sandwich Place         |
| 15 | Uccle (Ukkel)                               | 83024          | Sandwich Place        | Bakery                | Pizza Place           | Fast Food Restaurant  | Italian Restaurant    | Chinese Restaurant        | Restaurant            | Gastropub                   | Falafel Restaurant    | Diner                  |
| 16 | Watermael-Boitsfort (Watermaal-Bosvoorde)   | 25184          | French Restaurant     | Restaurant            | Asian Restaurant      | Indian Restaurant     | Bakery                | Belgian Restaurant        | Brasserie             | Salad Place                 | Fast Food Restaurant  | Falafel Restaurant     |

## Cluster 2

```
brussels_merged.loc[brussels_merged['Cluster Labels'] == 2, brussels_merged.columns[[0,1] + list(range(5, brussels_merged.shape[1]))]]
```

|   | Name  | Population2019 | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue | 8th Most Common Venue       | 9th Most Common Venue | 10th Most Common Venue |
|---|-------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------------|-----------------------|------------------------|
| 5 | Evere | 41763          | Chinese Restaurant    | Indian Restaurant     | Restaurant            | Sandwich Place        | Buffet                | Sushi Restaurant      | Snack Place           | Eastern European Restaurant | Deli / Bodega         | Diner                  |

## Cluster 3

```
pd.loc[brussels_merged['Cluster Labels'] == 3, brussels_merged.columns[[0,1] + list(range(5, brussels_merged.shape[1]))]
```

|    | Name  | Population2019 | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue | 8th Most Common Venue       | 9th Most Common Venue | 10th Most Common Venue |
|----|---|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------------|-----------------------|------------------------|
| 17 | Woluwe-Saint-Lambert (Sint-Lambrechts-Woluwe) | 56660          | Sandwich Place        | Food Truck            | Italian Restaurant    | Burger Joint          | Wings Joint           | Falafel Restaurant    | Doner Restaurant      | Eastern European Restaurant | Egyptian Restaurant   | Fish & Chips Shop      |

Based on dataframe analysis above, we found out that Cluster 1 has the most Greek restaurants.

## Discussion

Based on our analysis for the Brussels restaurants we see that for cluster 1 there are more based on southern Europe cuisine and for two locations the favorite cuisine is the Greek.

What is lacking at this point is a systematic, quantitative way to identify and distinguish different district and to describe the correlation most common venues as recorded in Foursquare. The reality is however more complex as similar neighborhoods might have different mixture of citizens. A further step in this classification would be to find a method to extract these common venues and integrate the spatial correlations between different of areas or district.

We believe that the classification we propose is an encouraging step towards a quantitative and systematic comparison of the different cities. Further studies are indeed needed in order to relate the data acquired, then observe it to more meaningful and objective results.

## Conclusion

We the use of Foursquare API, we capture data of common restaurants which we can use them to get our conclusion.

With a closer look to cluster 1 we can spot that Molenbeek (number 11) and Saint Gilles (number 12) are both appropriate for our first shop but as Molenbeek has a greater population and it's closer to the 2 of the best butcher shop we strongly recommend that the first "Leonidas place" should open in Molenbeek.