Where should I live?

A guide to move from Paris to Brussels

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1. Introduction

1.1. Background

Moving to a different city is one of the most stressful events on someone's life. The choice of your new city and the neighbourhood you'll live in has a tremendous impact in your life quality. Do you want to live near your work place? Do you prefer to have bars and restaurants nearby? Or maybe your kids are growing up and you need to take them to school and to a park every day?

Probably since you're moving to a new city you'll want to live in a similar environment to you previous city in order to feel more comfortable.

Brussels and Paris

1.2. Problem

Data may help characterising places: the economic activity, industrial sectors and jobs creation, social life, cultural offer. All of these parameters can give an indication of the quality of life you may expect in a different city and if you'll have a sense of familiarity. In this project I'll advise someone who is moving from Paris to Brussels on the choice of the best neighbourhood in which she/ he will feel better in the new city.

This kind of analysis may be interesting for anyone facing such a challenging moment in their lives as it is moving to a new home.

1.3. Interest

Anyone moving to a new country or city is confronted with hundreds of questions and must make dozens of choices that will have an impact in all aspects of their lives for years to come.

2. Data Acquisition and Cleaning

2.1. Data Sources

First we'll identify each cities neighbourhoods using their postal codes. These data can be found here: https://www.laposte.fr/particulier/outils/trouver-un-code-postal for Paris and here https://www.bpost.be/site/fr/envoyer/adressage/rechercher-un-code-postal for Brussels.
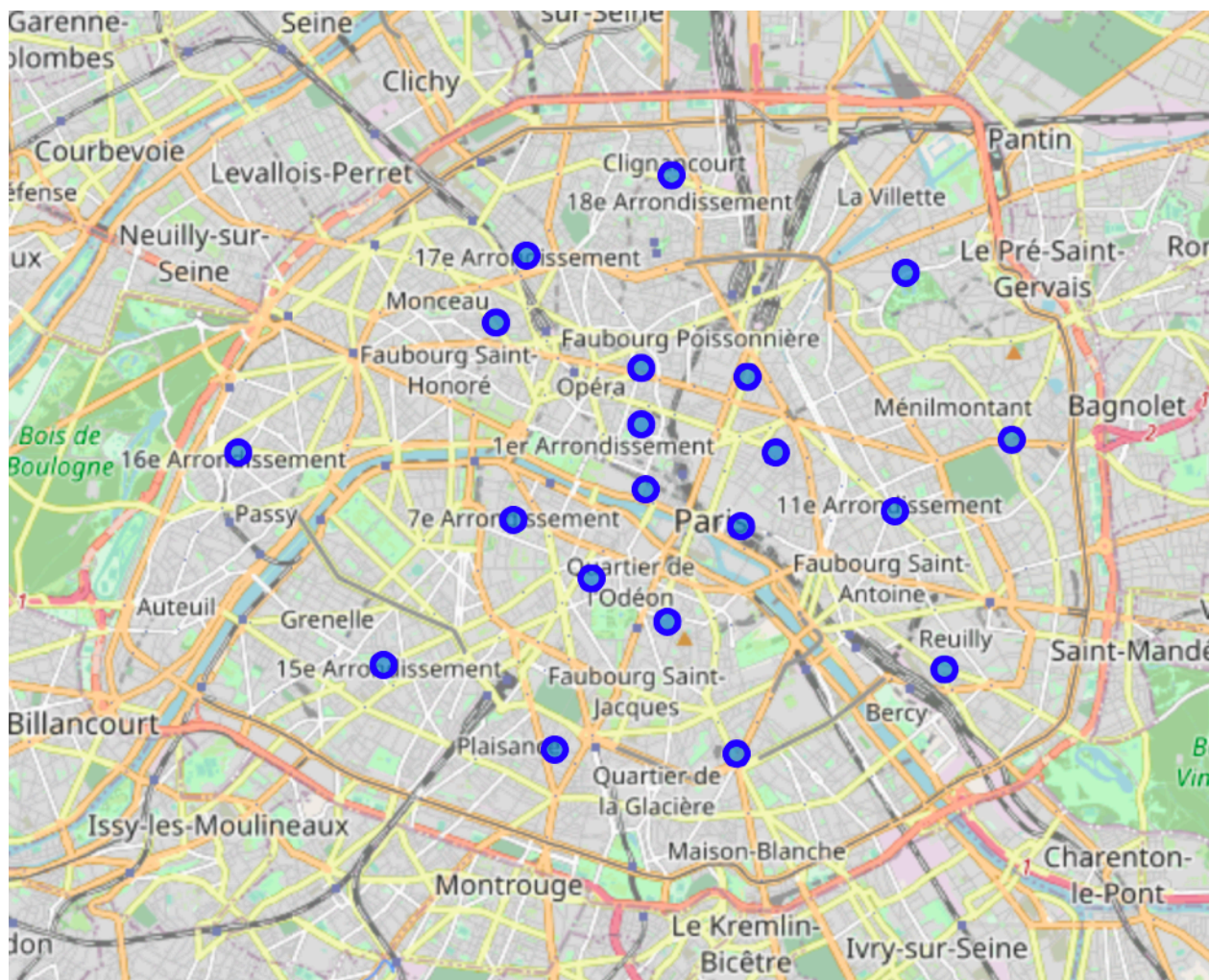
Paris has two postal codes for the 16th neighbourhood therefore I eliminated it.

I obtained 20 neighbourhoods for the city of Paris and 22 neighbourhoods for Brussels.
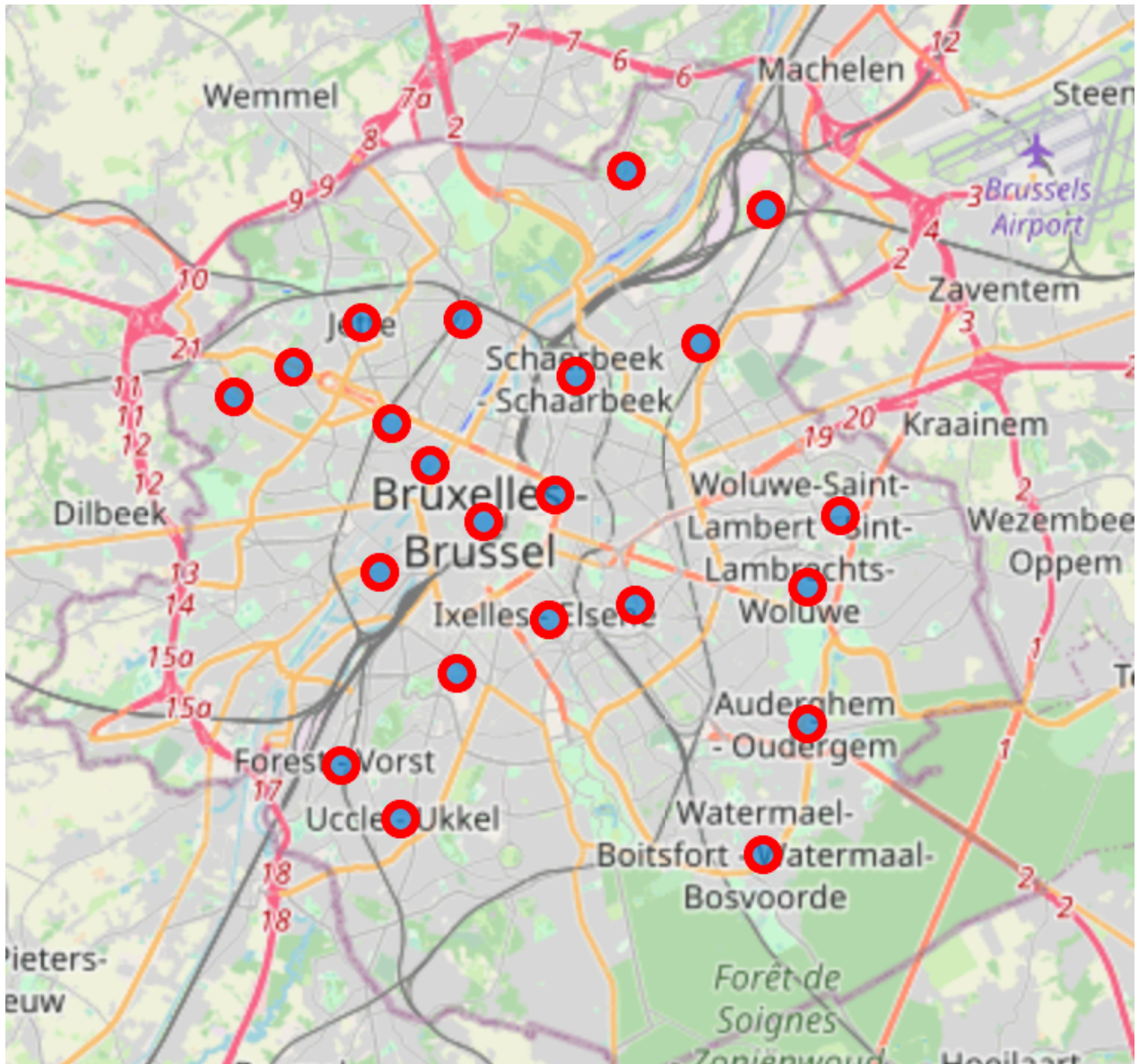
I then scrapped the web to find the the addresses of the town halls of each neighbourhood and considered them as the geographical centre. These data were represented in maps of both cities.

	Postal Code	Neighborhood	Latitude	Longitude
0	75001	Paris 1	48.860074	2.341092
1	75002	Paris 2	48.866729	2.340470
2	75003	Paris 3	48.863873	2.361786
3	75004	Paris 4	48.856053	2.356322
4	75005	Paris 5	48.846198	2.344591
5	75006	Paris 6	48.850714	2.332658
6	75007	Paris 7	48.856860	2.320032
7	75008	Paris 8	48.877364	2.317352
8	75009	Paris 9	48.872598	2.340453
9	75010	Paris 10	48.871792	2.357372

	Postal Code	Neighborhood	Latitude	Longitude
0	1000	Bruxelles	50.846714	4.352514
1	1020	Laeken	50.876340	4.347956
2	1030	Schaerbeek	50.868056	4.373598
3	1040	Etterbeek	50.834770	4.387934
4	1050	Ixelles	50.832551	4.367482
5	1060	Saint-Gilles	50.824793	4.346348
6	1070	Anderlecht	50.839148	4.328931
7	1080	Molenbeek-Saint-Jean	50.854850	4.340254
8	1081	Koekelberg	50.860935	4.331102
9	1082	Berchem-Sainte-Agathe	50.864812	4.294890

(a) Paris and its neighbourhoods.

(b) Brussels and its neighbourhoods.

In order to characterise these neighbourhoods, we'll user the Foursquare API to register the venues. This is a good indicator of the economic, social and cultural life of a neighbourhood. I chose a maximum of 100 venues per neighbourhood and used a radius of 500 around the geographical centre.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Paris 1	48.860074	2.341092	Cour Carrée du Louvre	48.860360	2.338543	Pedestrian Plaza
1	Paris 1	48.860074	2.341092	Place du Louvre	48.859841	2.340822	Plaza
2	Paris 1	48.860074	2.341092	Église Saint-Germain-l'Auxerrois (Église Saint...	48.859520	2.341306	Church
3	Paris 1	48.860074	2.341092	Coffee Crêpes	48.858841	2.340802	Coffee Shop
4	Paris 1	48.860074	2.341092	Boutique yam'Tcha	48.861710	2.342380	Chinese Restaurant

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Bruxelles	50.846714	4.352514	Grand Place / Grote Markt (Grote Markt)	50.846776	4.352481	Plaza
1	Bruxelles	50.846714	4.352514	AB Ancienne Belgique	50.847143	4.349485	Concert Hall
2	Bruxelles	50.846714	4.352514	Galerie de la Reine / Koninginnegalerij (Konin...	50.847297	4.354601	Shopping Mall
3	Bruxelles	50.846714	4.352514	Aux Merveilleux de Fred	50.848117	4.352141	Dessert Shop
4	Bruxelles	50.846714	4.352514	Mary Chocolaterie	50.847541	4.354785	Chocolate Shop

I obtained 199 categories of venues in Paris and 186 in Brussels.

3. Methodology

3.1. Classification Models

In order to find the neighbourhoods of both cities that are similar and segment them in cluster we'll use the k-means classification model. The criteria for segmenting these neighbourhoods is the average of each.

Thus I carried a one hot coding of each category of each city.

	Neighborhood	Afghan Restaurant	African Restaurant	American Restaurant	Antique Shop	Arepa Restaurant	Argentinian Restaurant	Art Gallery	Art Museum	Arts & Crafts Store	...	Vegetarian / Vegan Restaurant	Video Game Store	Video Store
0	Paris 1	0	0	0	0	0	0	0	0	0	...	0	0	0
1	Paris 1	0	0	0	0	0	0	0	0	0	...	0	0	0
2	Paris 1	0	0	0	0	0	0	0	0	0	...	0	0	0
3	Paris 1	0	0	0	0	0	0	0	0	0	...	0	0	0
4	Paris 1	0	0	0	0	0	0	0	0	0	...	0	0	0

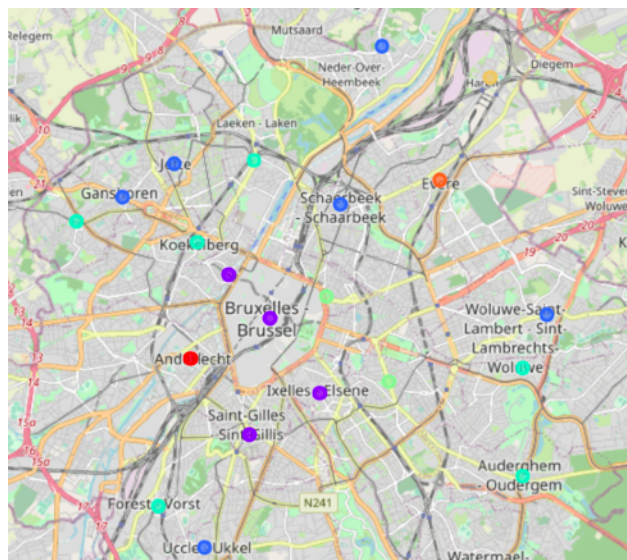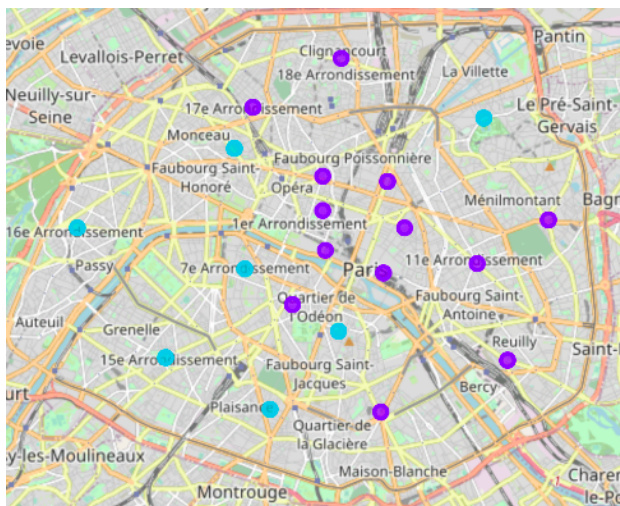|	Neighborhood	Afghan Restaurant	African Restaurant	American Restaurant	Antique Shop	Arepa Restaurant	Argentinian Restaurant	Art Gallery	Art Museum	Arts & Crafts Store	...	Vegetarian / Vegan Restaurant	Video Game Store
0	Anderlecht	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	...	0.086957	0.000000
1	Auderghem	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	...	0.000000	0.000000
2	Berchem-Sainte-Agathe	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	...	0.000000	0.000000
3	Bruxelles	0.000000	0.000000	0.010000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	...	0.000000	0.000000
4	Etterbeek	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	...	0.000000	0.000000

I then merged all the data and determined the average of each venue type per neighbourhood.

	Neighborhood	Afghan Restaurant	African Restaurant	American Restaurant	Antique Shop	Arepa Restaurant	Argentinian Restaurant	Art Gallery	Art Museum	Arts & Crafts Store	...	Vegetarian / Vegan Restaurant	Video Game Store	Video Store
0	Anderlecht	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	...	0.086957	0.0	0.0
1	Auderghem	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	...	0.000000	0.0	0.0
2	Berchem-Sainte-Agathe	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	...	0.000000	0.0	0.0
3	Bruxelles	0.0	0.0	0.01	0.0	0.0	0.0	0.0	0.0	0.0	...	0.000000	0.0	0.0
4	Etterbeek	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	...	0.000000	0.0	0.0

	Neighborhood	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	Italian Restaurant	Vegetarian / Vegan Restaurant	Food Court	Convenience Store	Metro Station	Belgian Restaurant	Farmers Market	Supermarket	Sandwich Place	Brasserie
1	Auderghem	Fast Food Restaurant	Thai Restaurant	Italian Restaurant	French Restaurant	Snack Place	Middle Eastern Restaurant	Pizza Place	Bar	Sushi Restaurant	Insurance Office
2	Berchem-Sainte-Agathe	Greek Restaurant	Snack Place	Burger Joint	Restaurant	Gym	Park	Bar	Supermarket	Pharmacy	Sports Club
3	Bruxelles	Beer Bar	Bar	Chocolate Shop	Coffee Shop	Gay Bar	Plaza	Sandwich Place	Clothing Store	Bookstore	Hotel
4	Etterbeek	Italian Restaurant	Pizza Place	Bar	Bakery	Thai Restaurant	Greek Restaurant	Snack Place	Plaza	French Restaurant	Concert Hall

4. Results

I segmented the 42 neighbourhoods of both cities into 8 clusters. Paris has only two clusters whereas Brussels has 7 clusters. Brussels is thus a more varied city as we'll discuss next.

5. Discussion

Paris is a very dense, homogeneous city very oriented to tourism, entertainment and social life. The neighbourhoods differ very few and form two very similar clusters. On the other hand Brussels is a very varied city with three clusters formed only one neighbourhood.

6. Conclusion

Only four neighbourhoods of Brussels have a "parisien life style": Brussels, Ixelles, Saint-Gilles and Molenbeek. The other neighbourhoods are very different from Paris offering a more family-oriented life style.

7. Future Directions

The neighbourhoods were characterised all types of venues existing. However, since our case is where someone should live, we should refine our model in order to give more weight to the types of venues that really matter when choosing where to live. This choice is also different for different profiles of peoples: age, with or without kids, etc. Therefore a model could be fine tuned for each profile of person.