The Best Neighborhoods for Expats to Live in Brussels

Welcome on board! We will take you on a nice tour of the Brussels region and its neighborhoods, with delicious Belgian chocolates and waffles nearby, or even some world-famous Belgian beer, if you would like to.

And let's invite the famous little boy Julianske to be our tour guide. Here we go!

Part 1: Introduction/Business

1.1 Background

Let's briefly introduce Brussels: The beloved "Capital of Europe', and the new homes for thousands of expats from all over the world.

Brussels is officially the Brussels-Capital Region, which comprising 19 municipalities, including the City of Brussels, which is the capital of Belgium. The Brussels-Capital Region is located in the central portion of the country and is a part of both the French Community of Belgium and the Flemish Community. Brussels has about 1.2 million inhabitants. [1]

Brussels has become the administrative center of many international organizations.

The European Union (EU), the North Atlantic Treaty Organisation (NATO) , the World Customs Organization and EUROCONTROL, as well as many international corporations.

The presence of the EU and the other international bodies has led to there being more ambassadors and journalists in Brussels than in Washington D.C. The "international community" in Brussels numbers at least 70,000 people. [1]

1.2 Business Problem

Brussels is the capital of the Europe, a very busy city and have attracted thousands of internationals people, and especially, expats to stay.

Those expats are from different countries and have strong requests to find a comfortable, safe and affordable neighborhood to stay in.

1.3 Interests/Stakeholders

International People, especially the expats.

Stakeholders also include international organizations and companies, which have strong demands for housing in the Brussels region for their expats.

Part 2: Data

2.1 Data Sources:

- *Background / Municipalities/Postal code Data:*

  To achieve a general understanding of Brussels: the municipalities, the population size, and the postal code of Brussels etc.

  Data Sources: Wiki [1] [2] and postal-codes.cybo.com [3]

- *Json file: Secondary and Fourth-Level Administrative Divisions, Belgium, 2015*

  To get the administrative divisions of Belgium.

  Level 2 divisions include the capital regions and the provinces. Level 4 divisions include Brussels' municipalities.

  Data Sources: Second-level Administrative Divisions, Belgium, 2015, from Spatial Data Repository of NYU [4] Fourth-level Administrative Divisions, Belgium, 2015 from Spatial Data Repository of NYU [5]

- *FourSquare API:*

  To explore neighborhoods of Brussels. The data will be used to compare, segment and cluster neighborhoods.

Data Sources: [FourSquare API [6]](#)

- *Brussels House Price, School Distributions, Crime Rates*

  House prices, school distributions and crime rats of the Belgium region. These data will be used to address **key factors** influencing expats' decision-making when choosing a neighborhood to live.

  Data Sources: [The Cost of Housing in Brussels, from KBCBrussles [7]](#) [Expats: Where should you live in Brussels? [8]](#) [Brussels Schools [9]](#) [Brussels Crime Rats[10]](#)

2.2 Data Selection

We dropped the Dutch names and keep the French name of the 19 municipalities of Brussels region, to avoid the possible name confusion. This selection also based that the Brussels region is a largely French speaking region. The only exception is the Crime Rate data, for which we used the Flemish name as the json file used Flemish name

We choose only to display the first rows of data due to the length of this report. For fully detailed data, please refer to the github page.

Part 3. Methodology and Analysis

3.1 Methodology

In this project, we will analyze the different neighborhoods of Brussels, and try to find which neighborhoods are the best matches for the expats in Brussels.

We need identify the key concerns from expats point of view and to establish the most important criteria they apply when choosing a neighborhood to live in.

In the first step, we collected the **Location data** of the 19 municipalities in the Brussels Region.

We also collected location and category data **[the most common avenues of different neighborhoods]** from **FourSquare.**

The Second step is the **Exploratory Analysis**, including to **cluster and segment** the neighborhoods.

We used **different Statistics, One-Hot Coding, K-Means machine leaning,** and different **Visualization Tools**, like **Folium Maps with clusters** and **Choropleth Maps,** to help us to cluster, segment, and visualize the neighborhoods.

The final step is to analyze and categorize the different neighborhoods in Brussels region. We **joined** different data, and **segmented** the neighborhoods in different categories based on the **key criteria** related to choosing a neighborhood to live in.

Application examples:

Json File: Since all the relevant data is in the [**feature**] key of [**Fourth level Administrative Divisions of the Brussel**], we cleaned and reduced the data and to define a new variable that includes this data.

Folium Map: We used Folium map intensively to show the different neighborhoods segments, and we also used the **Choropleth map** to produce the Brussels' neighborhood crime rate map.

Four Square API: To get [**the most common venues**] in different neighborhoods in the Brussels Region.

Machine Leaning**: K-Means:** We run the best K analysis with [**elbow method**] and it shows the K=3 is the optimum k of the K-Means

Others: We used [**geopy library**] to get the latitude and longitude values of the 19 municipalities of Brussels.

3.2 Data Analysis

3.2.1 A national view and the Capital Region

Since Brussels is the capital of Belgium, before we start our Brussels neighborhood tour, let' get an overall impression about Belgium as a country.

We get [**second level of administrative data**] from NYU Spatial Data Repository.[4]

After we reduced the **json file** to [**feature**] level, and define to a new variable, We can see Belgium has 3 regions: Brussles, Vlaanderen(Flemish speaking part), and Wallonie(French speaking part) (Figure 1)

Figure 1. Belgium

After the national impression, Let's focus on Brussels now.

We can see there are **19 municipalities/neighborhoods** in the Brussels Region. (Figure 2)

	Neighborhood	Postalcode	Population	Area	PopulationDensity
0	Anderlecht	1070	118241	2 (6.8 sq mi)	6680
1	Auderghem	1160	33313	2 (3.5 sq mi)	3701
2	Berchem-Sainte-Agathe	1082	24701	2 (1.1 sq mi)	8518
3	Ville de Bruxelles	1000	176545	2 (12.6 sq mi)	5415
4	Etterbeek	1040	47414	2 (1.2 sq mi)	15295

Figure 2. Brussels Overview

Each neighborhood of Brussels Region has its Flemish and French names. Since Brussels is a largely French speaking region, we will only keep the French name for this project. Here is a reference to the neighborhoods name, both in French and Flemish. (Figure 3)

	French name	Dutch name
0	Anderlecht	Anderlecht
1	Auderghem	Oudergem
2	Berchem-Sainte-Agathe	Sint-Agatha-Berchem
3	Ville de Bruxelles*	Stad Brussel*
4	Etterbeek	Etterbeek
5	Evere	Evere
6	Forest	Vorst
7	Ganshoren	Ganshoren

Figure 3. Brussels Municipalities Names

Let's check the largest groups of foreign residents in Brussels. (Figure 4)

People of foreign origin make up nearly 70% of the population of Brussels, and About 32% of city residents are of non-Belgian European origin and 36% are of another background.[1]
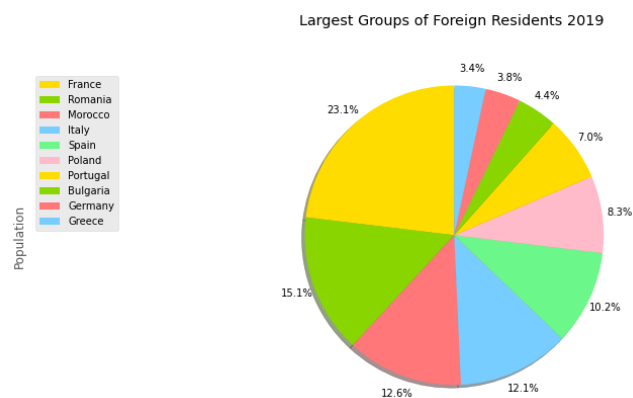

Figure 4. Brussels Foreign Residents

Next, Let's get the latitude and longitude of the 19 municipalities of Brussels from **geocoder** (Figure 5)

	Postalcode	Neighborhood	Municipalities	Latitude	Longitude
0	1070	Anderlecht	Anderlecht	50.828925	4.289680
1	1160	Auderghem	Auderghem	50.810671	4.437785
2	1082	Berchem-Sainte-Agathe	Berchem-Sainte-Agathe	50.865065	4.293591
3	1000	Ville de Bruxelles	Ville de Bruxelles	50.845973	4.366800
4	1040	Etterbeek	Etterbeek	50.834005	4.394064

Figure 5. Neighborhoods Geocoder

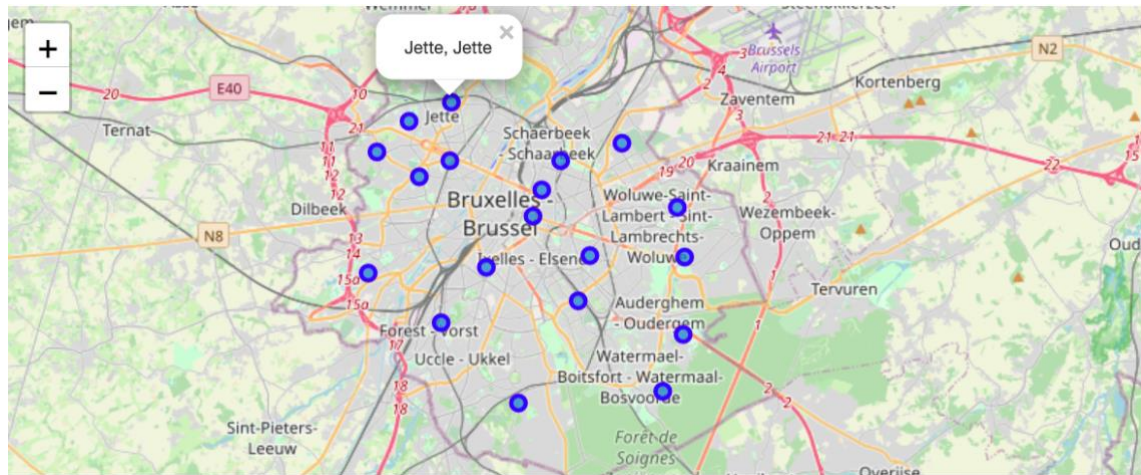We can visualize all neighborhoods with clusters (neighborhood name) over the Map of Brussels. (Figure 6)

Figure 6. Brussels Map

3.2.2 **FourSquare**:

With FourSquare API, we can explore each neighborhood to get the top 100 venues with a radius of 500 meters.

We know that all the information we need is in the items [**key**]. Here is a head of the list Venues name, category, latitude and longitude information from FourSquare API. (Figure 7)

`(521, 7)`

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Anderlecht	50.828925	4.28968	Gym Fit	50.827161	4.286132	Gym
1	Anderlecht	50.828925	4.28968	Boulangerie Sorgeloos	50.829891	4.287208	Bakery
2	Anderlecht	50.828925	4.28968	Parc Marius Renard	50.828202	4.285771	Park
3	Anderlecht	50.828925	4.28968	Physical Team/Krav Maga HQ	50.832094	4.292284	Martial Arts School
4	Anderlecht	50.828925	4.28968	L'Hydromel	50.827378	4.287711	Gastropub

Figure 7. Brussels Neighborhoods Venues

We can see there are total 521 venues returned and there are 145 unique categories. So Brussels is indeed a fun city!

Next, let's apply the **One Hot Encoding technique** to do further analyze. We will group rows by neighborhood and by taking the mean of the frequency of occurrence of each category. (Figure 8)

	Neighborhood	African Restaurant	Art Gallery	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	BBQ Joint	Bakery	Bar	Beer Bar	Beer Garden
0	Anderlecht	0.000000	0.00000	0.00000	0.000000	0.000000	0.000000	0.100000	0.000000	0.00000	0.000000
1	Auderghem	0.000000	0.00000	0.00000	0.000000	0.066667	0.000000	0.066667	0.000000	0.00000	0.000000
2	Berchem-Sainte-Agathe	0.000000	0.00000	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000	0.00000	0.000000
3	Etterbeek	0.000000	0.00000	0.00000	0.025000	0.025000	0.000000	0.025000	0.000000	0.00000	0.000000
4	Evere	0.000000	0.00000	0.00000	0.000000	0.103448	0.000000	0.000000	0.034483	0.00000	0.000000
5	Forest	0.000000	0.00000	0.00000	0.000000	0.000000	0.000000	0.000000	0.076923	0.00000	0.000000
6	Ganshoren	0.000000	0.00000	0.00000	0.000000	0.000000	0.000000	0.055556	0.111111	0.00000	0.000000
7	Ixelles	0.000000	0.00000	0.00000	0.025000	0.000000	0.000000	0.000000	0.125000	0.00000	0.000000

Figure 8. One-Hot-Encoding

We created the new dataframe to display the top 10 venues for each neighborhood. (Figure.10)

	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
0	Anderlecht	Park	Bus Stop	Supermarket	Tram Station	Bakery	Convenience Store	Soccer Field	Notary
1	Auderghem	Soccer Field	Track	Brasserie	Tennis Court	Belgian Restaurant	French Restaurant	Plaza	Garden
2	Berchem-Sainte-Agathe	Greek Restaurant	Supermarket	Tram Station	Notary	Snack Place	Gym	French Restaurant	Restaurant
3	Etterbeek	Plaza	Pizza Place	Snack Place	Park	Gym / Fitness Center	Supermarket	Indian Restaurant	Concert Hall
4	Evere	Athletics & Sports	Park	Hockey Field	Bus Stop	Tram Station	Stadium	Supermarket	Sports Bar
5	Forest	Park	Steakhouse	Movie Theater	Supermarket	Brasserie	Music Venue	Chinese Restaurant	Tennis Court
6	Ganshoren	Bus Station	Bar	Plaza	Friterie	Boutique	Pizza Place	Deli / Bodega	Pharmacy

Figure 10. Neighborhoods Top 10 Avenues

3.2.3 Cluster Neighborhoods

K-Means Machine Learning

K-Means algorithm is one of the most common cluster method of **unsupervised learning**.

First, let's run the best K analysis with elbow method and it shows the K=3 is the optimum k of the K-Means. (Figure 11)
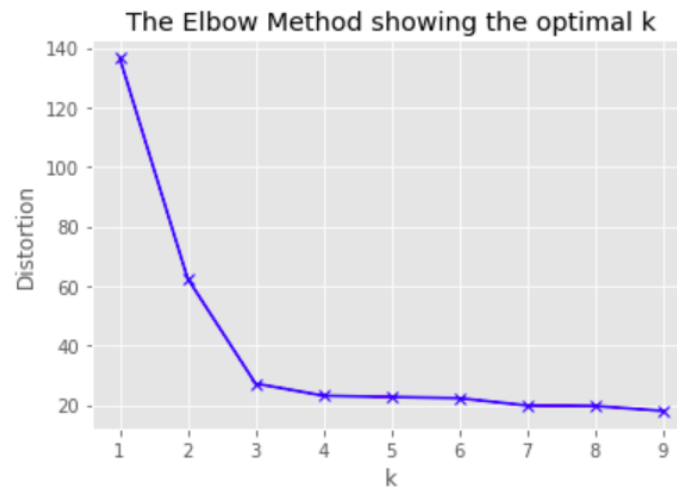

Figure. 11 Elbow

We are able to create a new dataframe that includes the cluster as well as the top 10 venues for each neighborhood. (Figure.10)

	Postalcode	Neighborhood	Municipalities	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue
0	1070	Anderlecht	Anderlecht	50.828925	4.289680	2	Park	Bus Stop	Supermarket
1	1160	Auderghem	Auderghem	50.810671	4.437785	0	Soccer Field	Track	Brasserie
2	1082	Berchem-Sainte-Agathe	Berchem-Sainte-Agathe	50.865065	4.293591	1	Greek Restaurant	Supermarket	Tram Station
3	1000	Ville de Bruxelles	Ville de Bruxelles	50.845973	4.366800	1	Italian Restaurant	Sandwich Place	Hotel
4	1040	Etterbeek	Etterbeek	50.834005	4.394064	1	Plaza	Pizza Place	Snack Place
5	1140	Evere	Evere	50.867645	4.408936	2	Athletics & Sports	Park	Hockey Field

Figure. 12 Top 10 Venues with Cluster

Now we can Finally visualize each neighborhood with clusters over the map: (Figure. 13)
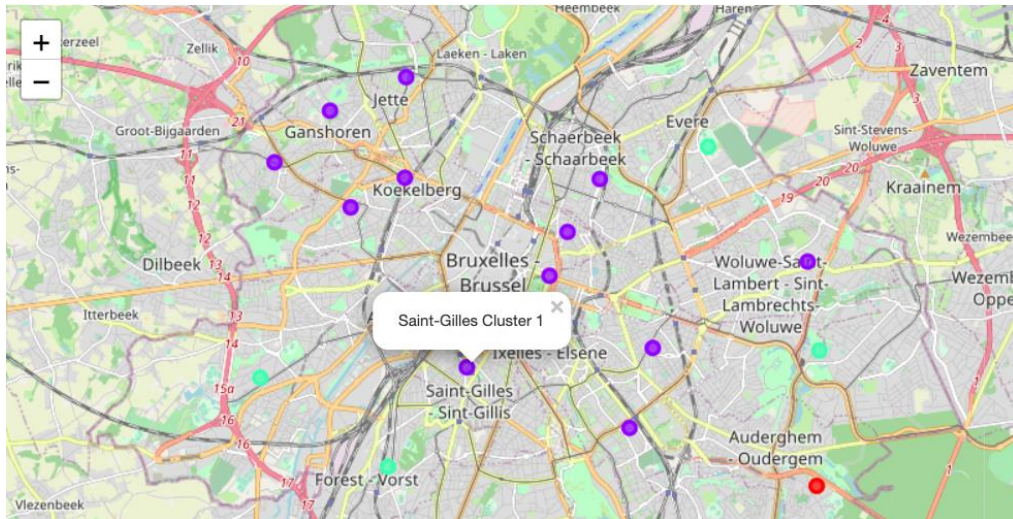
Figure.13 Neighborhood with Clusters

Since there are totally 3 cluster groups [0, 1, 2], We examine each cluster group one by one , to prepare for the future results analysis.(Figure 14)

	Neighborhood	Cluster Labels	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
2	Berchem-Sainte-Agathe	1	Greek Restaurant	Supermarket	Tram Station	Notary	Snack Place	Gym	French Restaurant	Restaurant
3	Ville de Bruxelles	1	Italian Restaurant	Sandwich Place	Hotel	Belgian Restaurant	Thai Restaurant	Restaurant	Pizza Place	Plaza
4	Etterbeek	1	Plaza	Pizza Place	Snack Place	Park	Gym / Fitness Center	Supermarket	Indian Restaurant	Concert Hall
7	Ganshoren	1	Bus Station	Bar	Plaza	Friterie	Boutique	Pizza Place	Deli / Bodega	Pharmacy
8	Ixelles	1	Bar	Vietnamese Restaurant	French Restaurant	Italian Restaurant	Thai Restaurant	Women's Store	Salad Place	Food Service

Figure 14. Neighborhoods_Cluster1

Part 4. Results

After the tour of Brussels region, we have made all of the **data collocation**, **clusters, folium maps, visualizations, and machining leaning analysis,** let's check the results.

Target Analysis:

Based on the research we have done, [**house prices, neighborhood safety, school distributions, along with green space and sports facilities**] are the key criteria used by expats, when choosing a neighborhood to live in.

4.1 Green Neighborhoods

Many expats enjoy the neighborhoods with **green areas**, so let's check which neighborhoods enjoy the parks most.

By **selecting** the related venues from [**the most common venues**] from **FourSquare**. We are able to find which neighborhoods enjoy **Park** most.

We decided to choose the top 6 most common avenues as our check points. (Figure.15)

	Postalcode	Neighborhood	Municipalities	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue
0	1070	Anderlecht	Anderlecht	50.828925	4.289680	2	Park	Bus Stop	Supermarket	Tram Station
4	1040	Etterbeek	Etterbeek	50.834005	4.394064	1	Plaza	Pizza Place	Snack Place	Park
5	1140	Evere	Evere	50.867645	4.408936	2	Athletics & Sports	Park	Hockey Field	Bus Stop
6	1190	Forest	Forest	50.814050	4.323961	2	Park	Steakhouse	Movie Theater	Supermarket

Figure.15 Park Clusters

Let's visualize our results of park neighborhoods: (Figure.16)(Figure.17)
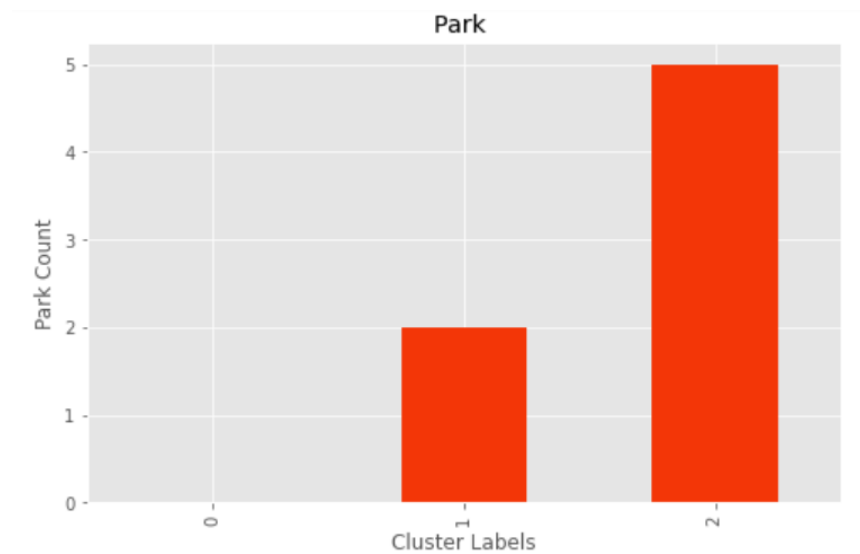

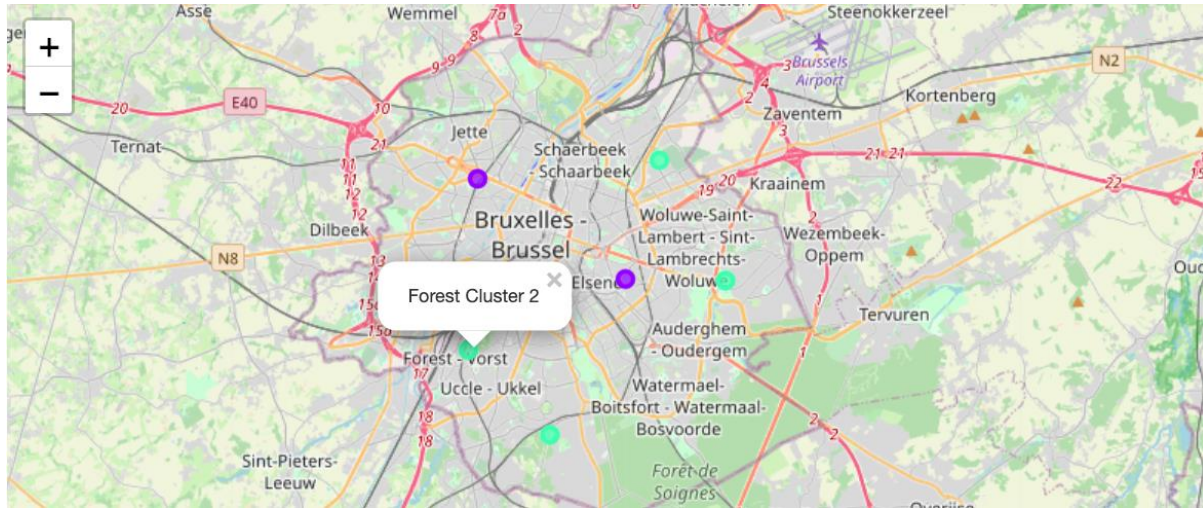Figure.16 Neighborhoods_Park

Figure 17. Park Map

*It clearly shows **Cluster 2** Neighborhoods enjoy the **park** most!*

4.2 Sports Neighborhoods

Since many expats spend their leisure time in sports, let's check which neighborhoods enjoy Gym, Soccer, Golf etc most.

Again, we are able to find which neighborhoods enjoy **Sports Fields** most, from the data of the [**most common venues**] from **FourSquare**. We decided to choose the top 6 most common avenues as our check points. (Figure. 18)

	Postalcode	Neighborhood	Municipalities	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue
2	1082	Berchem-Sainte-Agathe	Berchem-Sainte-Agathe	51	4	1	Greek Restaurant	Supermarket	Tram Station	Notary
10	1081	Koekelberg	Koekelberg	51	4	1	Gym	Bar	French Restaurant	Park

Figure.18 Sports Clusters

Let's visualize our results of sports neighborhoods: (Figure.19)

Figure.19 Sports Map

*It shows **Cluster 1** Neighborhoods enjoy **sports** most!*

4.3 Gourmet Neighborhoods

Everyone loves a good restaurant, bar, or a nice coffee shop, so do expats!
Let's check which neighborhoods enjoy bars, restaurants, and coffee shops most.

We are able to find which neighborhoods enjoy **Gourmet Fields** most, from the data of [**the most common venues**] from **FourSquare**. We decided to choose the top 6 most common avenues as our check points. (Figure. 20)

	Postalcode	Neighborhood	Municipalities	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue
1	1160	Auderghem	Auderghem	51	4	0	Soccer Field	Track	Brasserie	Tennis Court
3	1000	Ville de Bruxelles	Ville de Bruxelles	51	4	1	Italian Restaurant	Sandwich Place	Hotel	Belgian Restaurant
6	1190	Forest	Forest	51	4	2	Park	Steakhouse	Movie Theater	Supermarket
7	1083	Ganshoren	Ganshoren	51	4	1	Bus Station	Bar	Plaza	Friterie
8	1050	Ixelles	Ixelles	51	4	1	Bar	Vietnamese Restaurant	French Restaurant	Italian Restaurant
9	1090	Jette	Jette	51	4	1	Platform	Bar	Gastropub	Snack Place

Figure.20 Gourmet Clusters

Let's visualize our results of gourmet neighborhoods of gourmet neighborhoods:
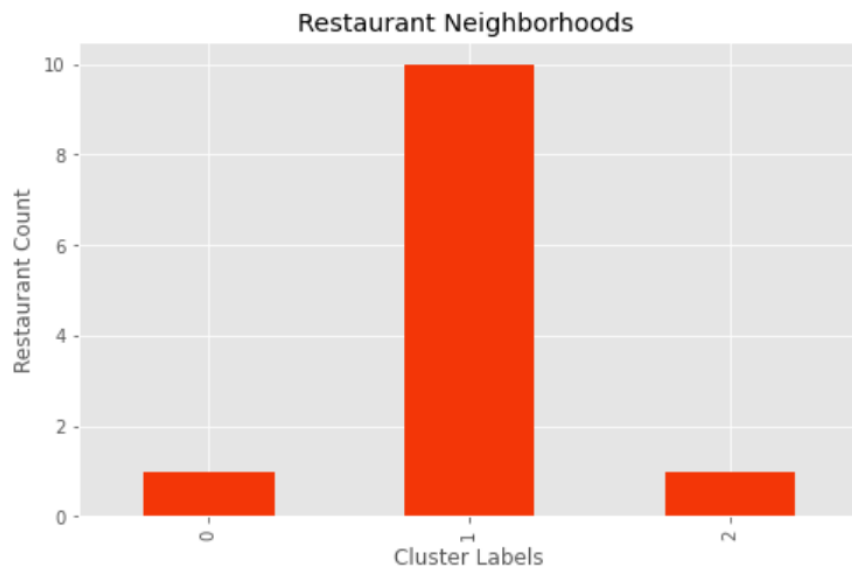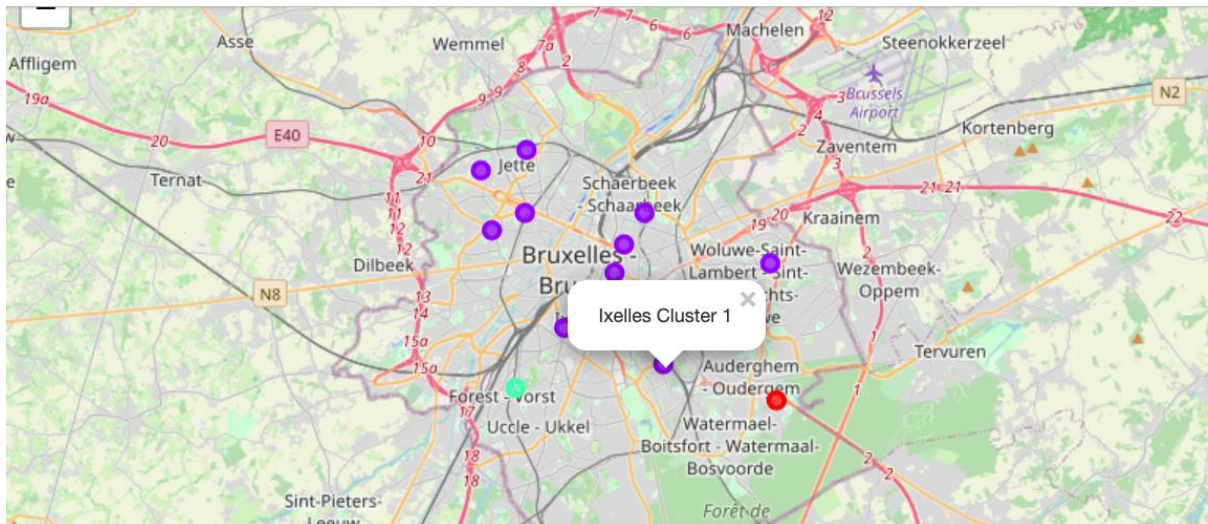(Figure.21)(Figure.22)

Figure.21 Gourmets Map

Figure 22. Gourmets Map

We can clearly see that "Cluster 1" groups also enjoy the Restaurant and Bar most.

*The **Gourmets winner** is **Cluster 1** again!*

3.4 Culture Neighborhoods

A nice neighborhood with good museums, book stores, and concert halls is A plus!
Let's check which neighborhoods enjoy those culture avenues most.

We are able to find which neighborhoods enjoy **Culture Spots** most, from the data of [**the most common venues**] from **FourSquare**. We decided to choose the Top 6 most common avenues as our check points. (Figure. 23)

	Postalcode	Neighborhood	Municipalities	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	
13	1210	Saint-Josse-ten-Noode	Saint-Josse-ten-Noode	51	4	1	Italian Restaurant	Concert Hall	Pizza Place	Sandwich Place	R
17	1200	Woluwe-Saint-Lambert	Woluwe-Saint-Lambert	51	4	1	Clothing Store	Brasserie	Plaza	Bakery	B
18	1150	Woluwe-Saint-Pierre	Woluwe-Saint-Pierre	51	4	2	Park	Bus Stop	Grocery Store	Toy / Game Store	

Figure.23 Culture Clusters

Let's visualize our results of culture neighborhoods: (Figure.24)
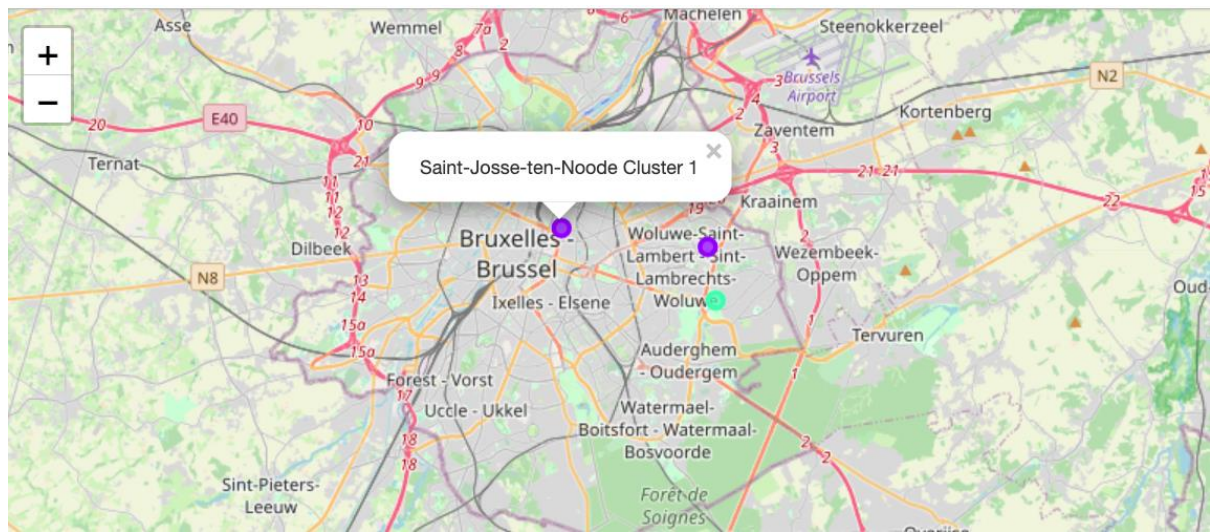
Figure.24 Culture Map

*Unbelievable, **Cluster 1** is **the winner of the Culture Neighborhood** again!*

3.5 House Prices

House price is one of the most important criteria when people choose a neighborhood to live in, and certainly is also one of most important criteria for expats to consider also.

We got the house price 2018 and 2019 in Brussels region from The Cost of Housing in Brussels, from KBC Brussels.[7]

We cleaned the data and sorted the house price and identified the top 10 expensive neighborhoods in Brussels Regions. We can see these top expensive neighborhoods are also corresponds with those preferred by expats, according to KBC Brussels.[8]

So, let's focus on the top 10 most expensive neighborhoods. (Figure.25)

Neighborhoods	2018	2019
Ixelles	€550.00	€635.00
Woluwe-St-Pierre	€568.00	€582.50
Etterbeek	€517.50	€542.50
Woluwe-St-Lambert	€499.00	€525.00
Uccle	€499.00	€525.00
Watermael-Boitsfort	€475.00	€492.50
Auderghem	€447.50	€468.50
Saint-Gilles	€410.00	€452.50
Forest	€395.00	€430.00
Schaerbeek	€350.00	€400.00

Figure 25. Top House Price

To get a deeper insight, let's visualize our results.

This bar chart shows the house prices of different neighborhoods in 2018 and 2019. (Figure.26)
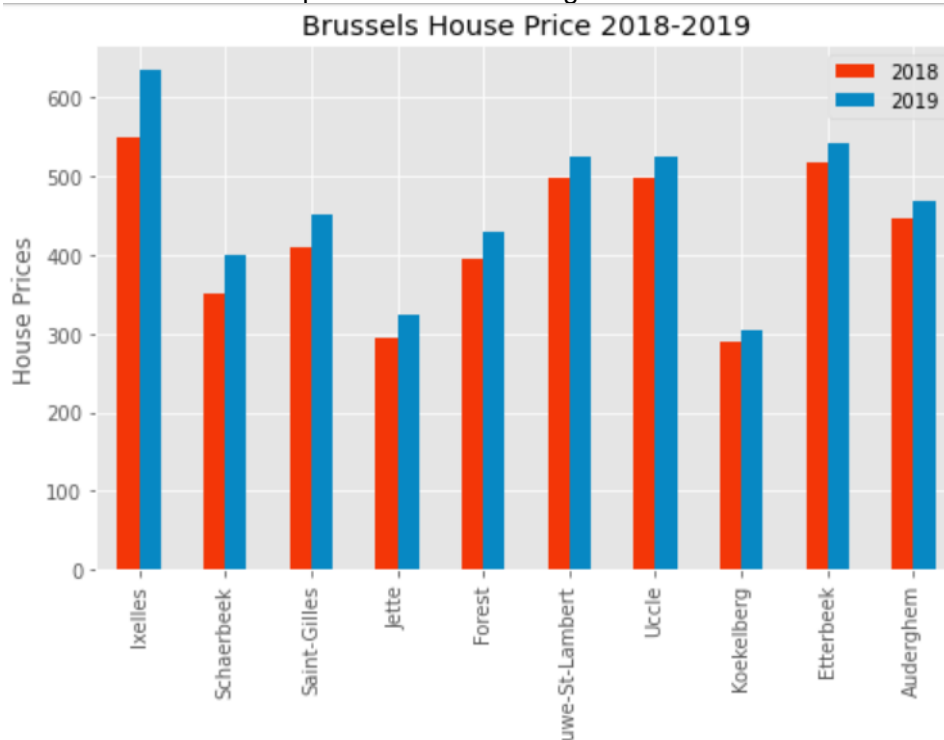
Figure 26. House Price_Bar

A box plot is a way of statistically representing the distribution of the data through five main dimensions: (Figure. 27)
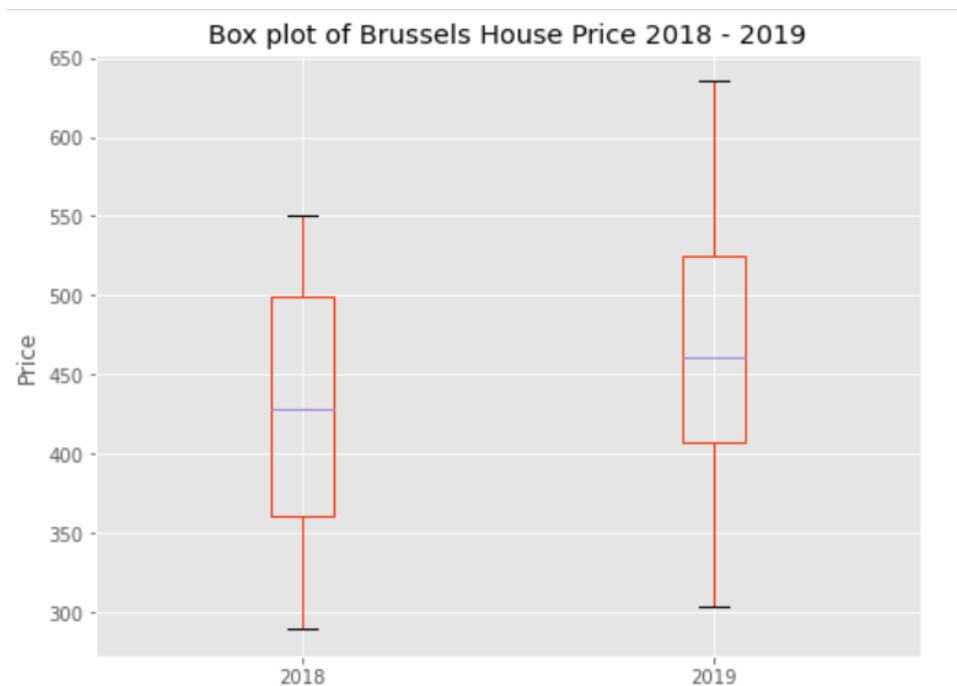
16

Figure. 27 House Price_Box

We can immediately make a few **key observations** from the house price box plot above: [Figure. 27]

2018:

The minimum number of house price in 2019 is around 280 (min), maximum number is around 550, (max), and median number is around 430 (median).

25% of the years for period 2018 had house prices of ˜360 or fewer (First quartile).
75% of the years for period 2018 had house prices of ˜490 or fewer (Third quartile).

2019:

The minimum number of house price in 2019 is around 310 (min), maximum number is around 640, (max), and median number of house prices is around 460 (median).

25% of the years for period 2018 had house prices of ˜410 or fewer (First quartile).
75% of the years for period 2018 had house prices of ˜530 or fewer (Third quartile).

We can also easily to see the **house prices in 2019 incraised** compared to 2018: 2018 min is 280, 2019 min is 310; 2018 max is 550, 2019 max jumped to 640; 2018 median is 430, 2019 median is 460.

3.6 School Distribution

For the expats with young kids, schools are important criteria for them to choose a neighborhood to live in.

We got the Brussels Region primary school data from http://www.enseignement.be/ [9]

First, let's check the numbers of schools in each neighborhood. [Figure.28]

	Neighborhood	Count
0	ANDERLECHT	39
1	SCHAERBEEK	36
2	BRUXELLES	34
3	UCCLE	30
4	MOLENBEEK-SAINT-JEAN	27
5	LAEKEN	22
6	WOLUWE-SAINT-LAMBERT	20
7	FOREST	18
8	JETTE	16

Figure 28. School List

We can further visualize it with a histogram chart.

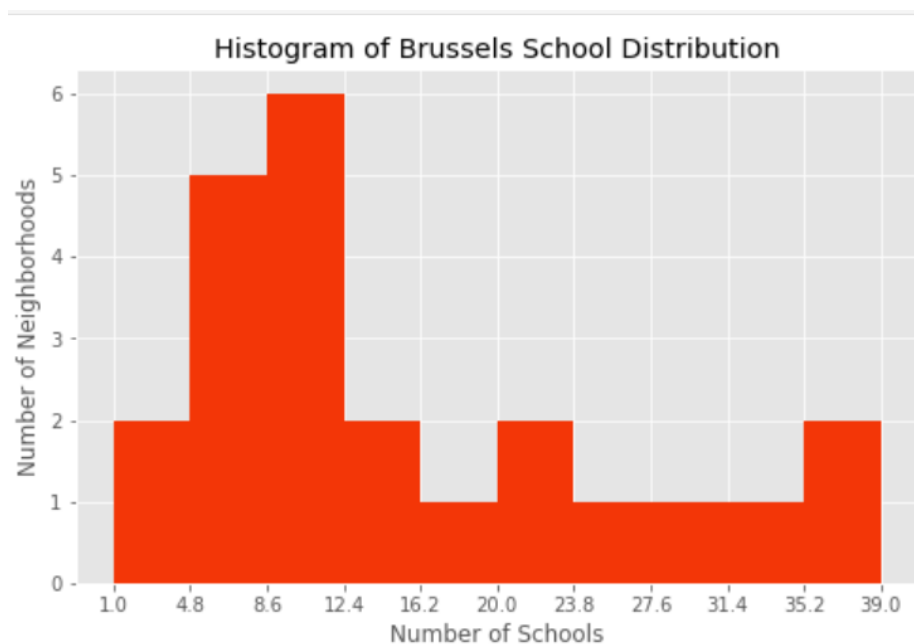The y-axis of this histogram is the frequency or the number of neighborhoods in each bin.
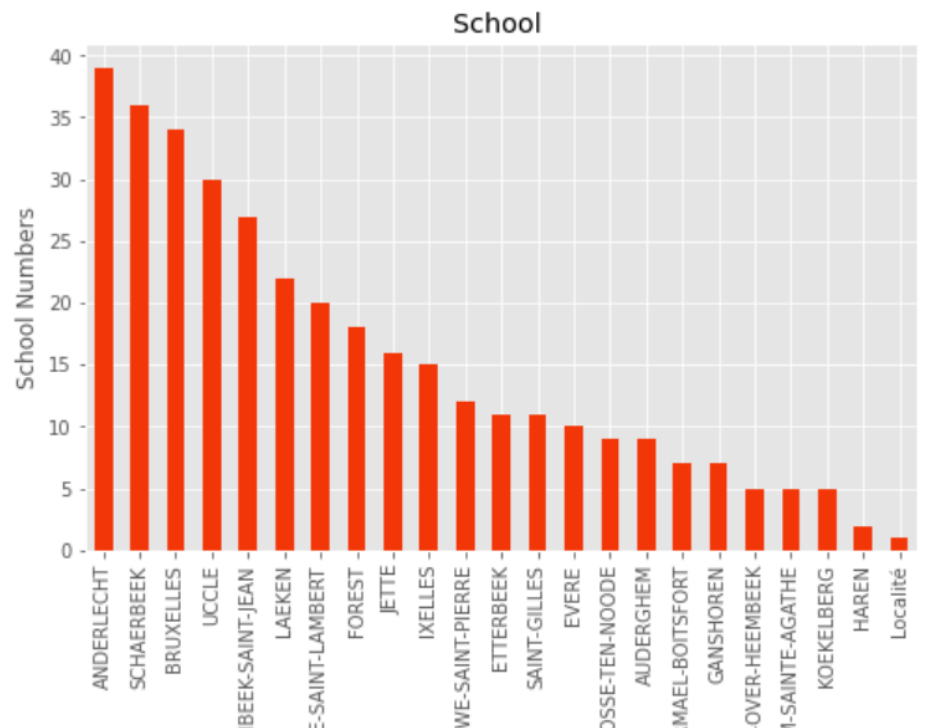
Figure 29. School Histogram

Figure 30. School Bar Chart

We can see that most neighborhoods have 5-12 schools. [Figure. 29]

Anderlecht, Schaerbeek, Bruxelles, Uccle and Molenbeek-Saint-Jean have more than 20 schools. [Figure. 30]

3.7 Neighborhoods Safety

The safety of neighborhoods is an ultra-important criterion when choosing to live in. And especially in a big international city as Brussels.

We downloaded the Brussels crime data 2019 from BISA.brussels.[10]

Here is the Top 5 crime rate per neighborhoods. [Figure 31]

Neighborhood	Total
Brussel	3697
Anderlecht	1634
Schaarbeek	1294
Elsene	1158
Sint-Jans-Molenbeek	969

Figure.31.Top Crime Rate

Visualizing the crime rates in Brussels Region: (Figure.31)
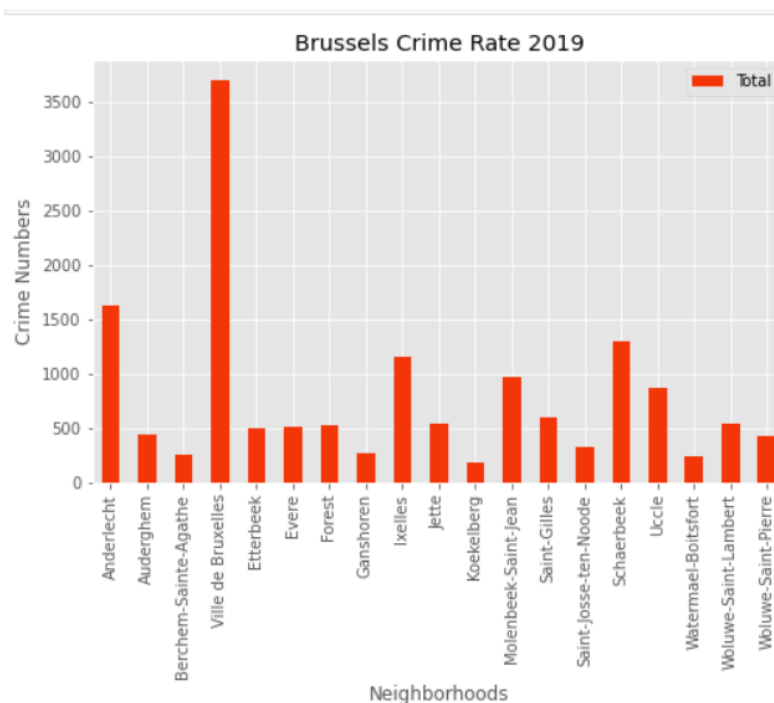

Figure 31. Crime Rate 2019

We can easily spot **Brussels city center has the highest crime rat**e from above bar chart.

Let's further visualize Brussels crime rate in 2019 by the choropleth map.

This choropleth map provides an easy way to show the level of crime rate variability within the Brussels region. (Figure. 32)
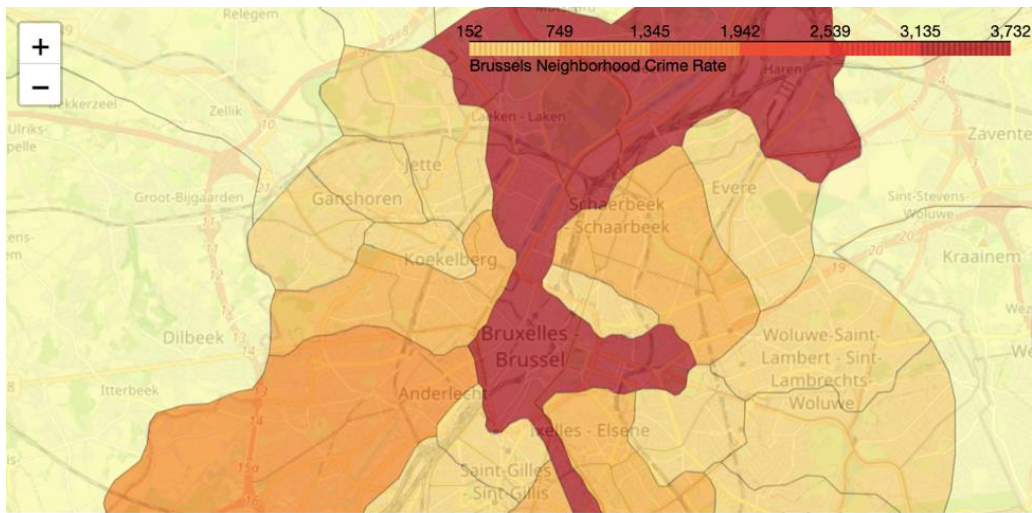
Figure 32. Crime Rate Choropleth

Again, we can spot Brussels city center area has the most intensive high crime rates.

Part 5 Discussion

After a nice tour all over the 19 Brussels Municipalities neighborhood areas. What do we know now?

A. We can see all featured neighborhoods, **Green/Sporty/Gourmet/Culture neighborhoods** as following: (Figure.33)

	Neighborhoods	Custer
Green Neighborhoods	[Anderlecht, Etterbeek, Evere, Forest, Koekelberg, Uccle, Woluwe-Saint-Pierre]	2
Sporty Neighborhoods	[Berchem-Sainte-Agathe, Koekelberg]	1
Gourmet Neighborhoods	[Auderghem, Ville de Bruxelles, Forest, Ganshoren, Ixelles, Jette, Koekelberg, Molenbeek-Saint-Jean, Saint-Gilles, Saint-Josse-ten-Noode, Schaerbeek, Woluwe-Saint-Lambert]	1
Culture Neighborhoods	[Saint-Josse-ten-Noode, Woluwe-Saint-Lambert, Woluwe-Saint-Pierre]	1

Figure.33 Featured Neighborhoods

B. We know the **Top Expensive neighborhoods** in house prices. (Figure.34)

	Neighborhoods
Top House Expensive Neighborhoods	[Ixelles, Woluwe-St-Pierre, Etterbeek, Woluwe-St-Lambert, Uccle, Watermael-Boitsfort, Auderghem, Saint-Gilles, Forest, Schaerbeek, Bruxelles, Evere, Berchem-Ste-Agathe, Laeken, Ganshoren, St-Josse-ten-Noode, Jette, Koekelberg, Neder-Over-Heembeek, Anderlecht, Molenbeek-St-Jean]

Figure 34. Expensive House Neighborhoods

C. We know the **Top Crime** neighborhoods. (Figure. 35)

	Neighborhoods
Top Crime Rate Neighborhoods	[Brussel, Anderlecht, Schaarbeek, Elsene, Sint-Jans-Molenbeek]

Figure 35 Top Crime Rate Neighborhoods

D. We know those neighborhoods have more schools than other neighborhoods. (Figure. 36)

	Neighborhoods
Neighborhoods with most school choices	[Brussel, Anderlecht, Schaarbeek, Elsene, Sint-Jans-Molenbeek]

Figure.36 School Neighborhoods

<u>Recommendations:</u>

So we hope that you already get some important insights into the neighborhoods of Brussels.

The **Green Neighborhoods** are recommended for expats who are looking for green areas **Sports Neighborhoods** are recommended for expats who enjoy sports activities most, and the **Gourmet Neighborhoods** are recommended for expats who enjoy food. **Culture neighborhoods** are best-suited for expats who love cultural events.

Overall, **Cluster 2** neighborhoods are recommended for expats based on the analysis here-above.

***Further Discussion*:**

Machine Leaning:

There are always different approaches applying Machine Leaning, we can apply more Machine Leaning methods to compare/combine with the results we got from K-Means Machine Leaning.

For example, since House Price is a key criterion when it comes to choosing a neighborhood, we can build a model to predict the evolution of house prices in the coming years.

Neighborhoods Segments

As Brussels is a big region, we can further segment the 19 municipalities/neighborhoods into smaller neighborhoods for a more detailed neighborhood analysis.

To even better suit the international expats interests, we can also segment schools into French Schools, Dutch Schools, and International Schools. For international schools, we can also segment into English Schools, German Schools, Japanese Schools etc.

Part 6 Conclusion

In this project, we analyzed the **Location Data, the House Prices, the School Distribution and the Crime Rates data** of the Brussels Region.

→ We **Clustered and Segmented** all neighborhoods of Brussels Region into different **Clusters**. We analyzed **the most common venues** of different neighborhoods, along with the different **venues categories**.

→ We created different **Folium maps** with **neighborhoods' clusters** over the maps for **visualization**.

→ We identified the **Green Neighborhoods, Sports Neighborhoods, Gourmet Neighborhoods, Culture Neighborhoods** that the expats may interested in.

→ We also identified the **Most Expensive Neighborhoods** as a reference for expats' consideration, and we identified the **Top Crime Rate Neighborhoods** for safety concerns.

→ We also provide Brussels Region **School Distributions** in different neighborhoods.

Analysis Tools

→ We downloaded and reduced the **json flies** in to key [feature], to get the data we need.

→ We used **Folium map** intensively for visualization and the Fourth level Administrative Divisions of the Brussels[5] to create **Choropleth map**, to visualize the crime rate levels of Brussels region.

→ **Machine Leaning:**

we used **unsupervised K-Means**, **One Hot Encoding** technique to analyze the neighborhoods data.

Our analysis provides **expats** a very helpful insight. E**xpats can benefit** from our analysis, when choosing a neighborhood to live in.

The **international organizations/companies can also benefit** from above analysis, e.g., the HR offices can use above info to search locations for their expats to live in.

Of course, besides the expats, all people can benefit the above analysis, to decide which neighborhoods to live in.

Let's end of this report by a Data Scientist way! An Alice WordCloud by Brussels Wiki [1]

To the Future and A Happy New Year of 2021!

References:

[1] https://en.wikipedia.org/wiki/Brussels
[2] https://en.wikipedia.org/wiki/List_of_municipalities_of_the_Brussels-Capital_Region
[3] https://postal-codes.cybo.com/belgium/brussels/#listcodes
[4] https://geo.nyu.edu/catalog/stanford-jp810pg7549
[5] https://geo.nyu.edu/catalog/stanford-xq068cy0042
[6] https://foursquare.com/
[7] https://www.kbcbrussels.be/retail/en/home/the-cost-of-housing-in-brussels.html
[8] https://www.kbcbrussels.be/retail/en/expats/prepare-for-your-arrival-in-the-capital/where-should-you-live-in-brussels.html
[9] http://www.enseignement.be/index.php?page=25932&act=search&check=&nive=110%2C111&geo_mots=&geo_type=1&geo_prov=B&geo_cp=&geo_loca=&rese=tous&opt_spe_type=#resultats
[10] https://ibsa.brussels/themes/securite/interventions-du-siamu

Bonus:

As a big chocolate lover, I would like to share some tips for Belgian chocolates.

You might know Godiva, as the world famous Belgian chocolate brand. In Belgium, Marcolini is the new legend, the top of the top! .Pierre Marcolini was awarded prize for "Best Pastry Chef in the World" in 2020.

My personal favor is Delrey, which only has one chocolate shop in Antewerp; another one is a traditional brand: Neuhaus. Both are delicious and right flavors for all most everyone! Many of my friends tried my recommendations, and they all love these two brands' chocolates! Some even claimed these chocolates are the best chocolates they ever tried!

By Elizabeth Shen

elizabeshen@gmail.com
https://www.linkedin.com/in/elizabethshen66/

17 Dec, 2020