City and Neighborhood Comparison

in Vancouver, British Columbia and Paris, France

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1. Introduction
   1.1. Background

With many baby boomers entering retirement and the world becoming more accessible through globalization, people have more options on where they decide to live and retire. There are a wealth of data and knowledge on parameters about world cities and neighborhoods, such that it can be overwhelming to sift through and objectively identify specific areas within cities that are well-suited to oneself and their family.

This report will analyze where one might want to settle in and retire through a city comparison in multiple dimensions.

To start, this takes on two very popular destinations for city dwellers: Vancouver, Canada and Paris, France.

Vancouver

- Vancouver has the highest population density in Canada, with over 5,400 people per square kilometer.
- Because of its proximity to both mountains and ocean, Vancouver is famous for offering every kind of outdoor sport and adventure, from skiing and snow sports in the winter to kayaking and water sports in the summer, and hiking, camping, and biking year-round. Also fishing, scenic golf courses, and mountain ziplining.
- Vancouver is consistently named as one of the top five worldwide cities for livability and quality of life.

Paris

- Paris is the capital and most populous city of France, with an estimated population of 2,175,601 residents as of 2018, in an area of more than 105 square kilometers (41 square miles).
- In 2018, Paris was the second most expensive city in the world, after Singapore.
- Since the 17th century, Paris has been one of Europe's major centers of finance, diplomacy, commerce, fashion, gastronomy, science and arts.
- It was ranked as the second most visited travel destination in the world in 2019, after Bangkok and just ahead of London.

Similarities

- Both are the most expensive cities to live in within their respective countries.
- Both cities have the highest population density in their respective countries.

- Both have an overall climate throughout the year as mild and moderately wet.

1.2. Problem

These cities are arguably two of the best cities in the world. There are many opinions on various blogs of which location is the better place to live in. There are also ranks such as Global Livability Ranking, an annual assessment published by the Economist Intelligence Unit (EIU), who incorporates infrastructure, schooling, culture, healthcare, and stability. Its top 10 cities vary year over year. Our analysis goes to the next level of detail of looking into the neighborhoods of the two cities. In addition, we will compare using a weighting considering the author's preference.

How do we objectively decide which neighborhood in which city is the better place to live?

1.3. Goal

This report aims to help people better understand what both cities have to offer in a data-supported analysis.

2. Data acquisition and cleaning

2.1. Data sources

The city, neighborhood, and postal code data comes from Wikipedia and World Postal Codes. The location coordinators are then added using geocoders of geopy. The nearby venues are incorporated using the Foursquare developer API. Population count are sourced from Statistics Canada. Cost of living comes from Numbeo at a comparison in Canadian dollars to maintain the same standard of life assuming one rents in both cities. This assumes net amount, which already excludes tax.

2.2. Data cleaning

Data scraped and downloaded from respective sources were merged into Vancouver and Paris data frames, then joined to perform the final scoring.

To start, I leveraged Beautiful Soup to ingest the British Columbia neighborhood data and decided to filter the dataset to Cities that contained the string "Vancouver". Then I grouped the data by Postal Code and City in case there were duplicates.

For the Paris data, I ingested a comma-separated values (CSV) file that has the following data:

Postal Code	Neighborhood	City	Latitude	Longitude	Population	Density	Cost of Living
75001	1er Arrondissement	Paris	48.85599658	2.337998648	25049	17924	7334
75002	2eme Arrondissement	Paris	48.8676	2.3439	25049	17924	7334
75003	3eme Arrondissement	Paris	48.8635	2.3591	25049	17924	7334
75004	4eme Arrondissement	Paris	48.8566	2.3522	25049	17924	7334

Then using geocoders, the latitude and longitude are added to the Vancouver data frame. There were missing coordinators but the majority of the neighborhoods were found.

The Davie Village neighborhood was also located in an inaccurate location on the map after visualization; therefore, corrected this to be closer to the Davie Village manually using the Google Maps coordinates.

The next data addition was finding all the nearby venues based on the latitude and longitude coordinates. This resulted in having 100 plus venue categories for each of the cities, which is not useful for analysis; therefore, I simplified the list of categories to a unique list of less than 25.

3. Exploratory Data Analysis

3.1. Visualizing the Neighborhoods

Using Folium's map, I visualized Vancouver's and Paris' neighborhoods to verify the locations of each.

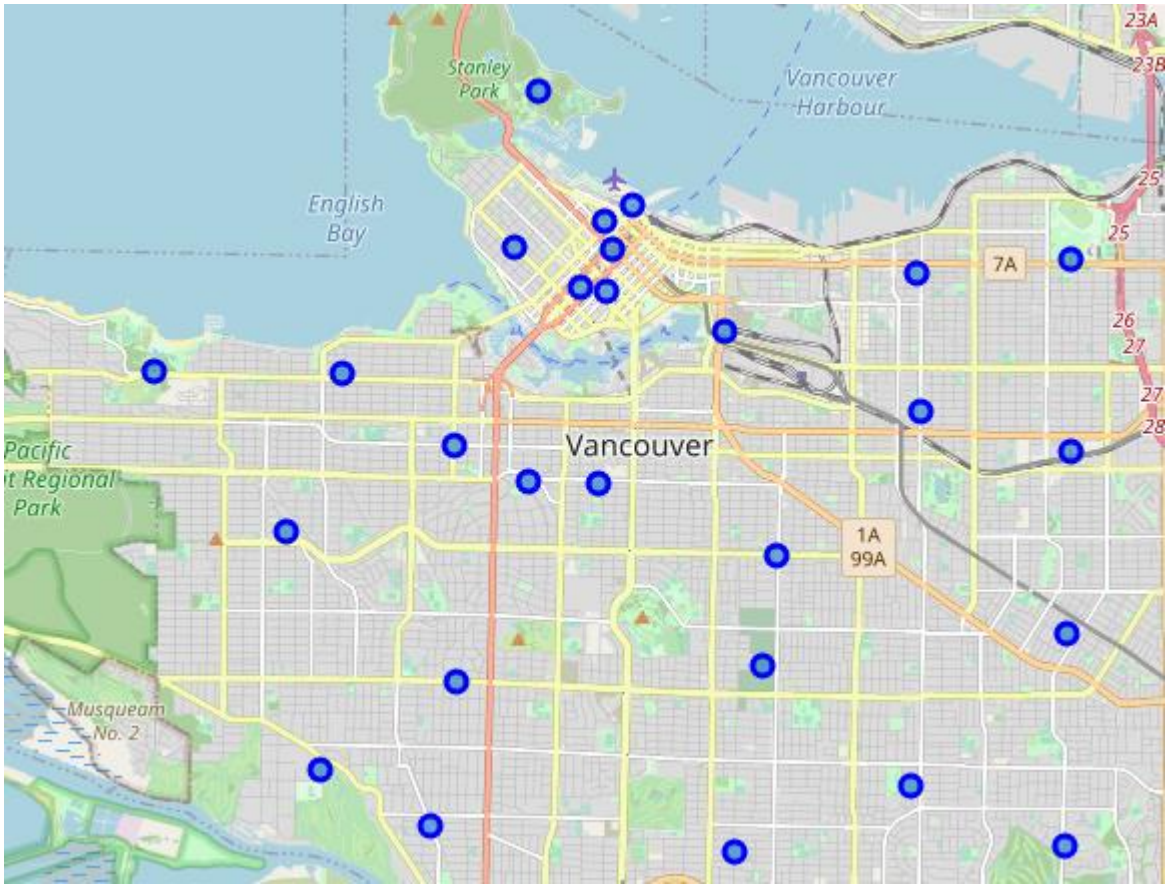

Figure 1. Vancouver neighborhoods

Figure 2. Paris neighborhoods

3.2. Visualizing the Number by Venue Category

A key parameter in deciding where to live is having easy access to food, healthcare, transit, community activities, and more. I used the venues and its categories as an indicator of these ease of access.

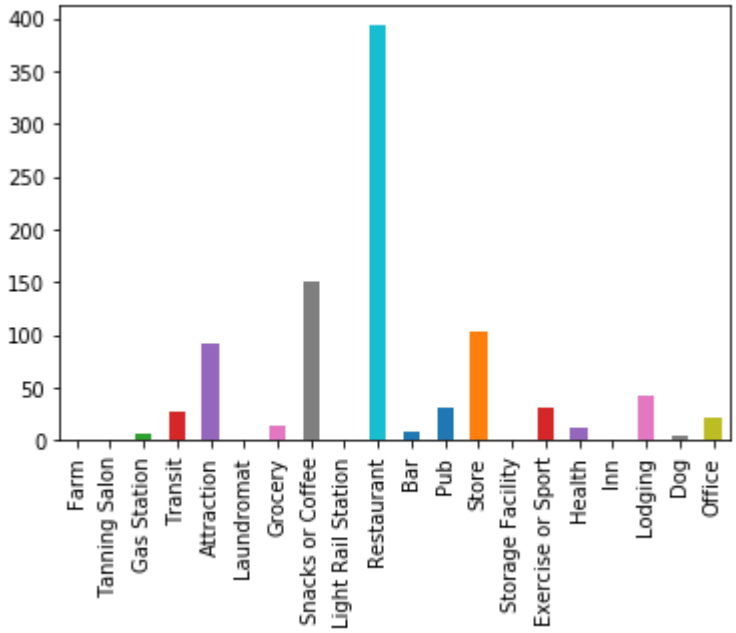

Figure 3. Vancouver's venue category count

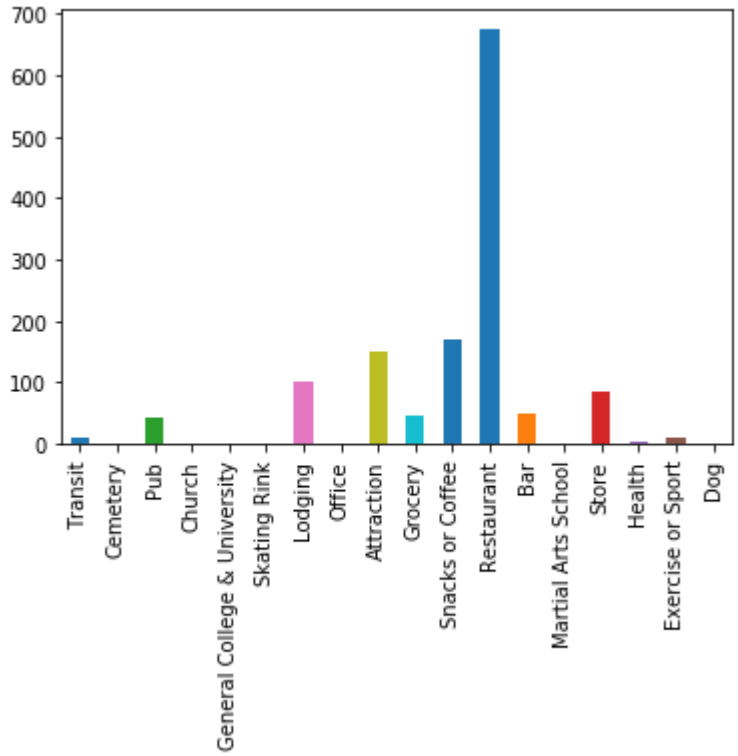

Figure 4. Paris' venue category count

3.3. Visualizing the Venue Count per neighborhood

I wanted to determine where most of the venues are located and if there are non-central areas that have a high number of venues. This next two maps show that expectedly most venues can be found in the center.

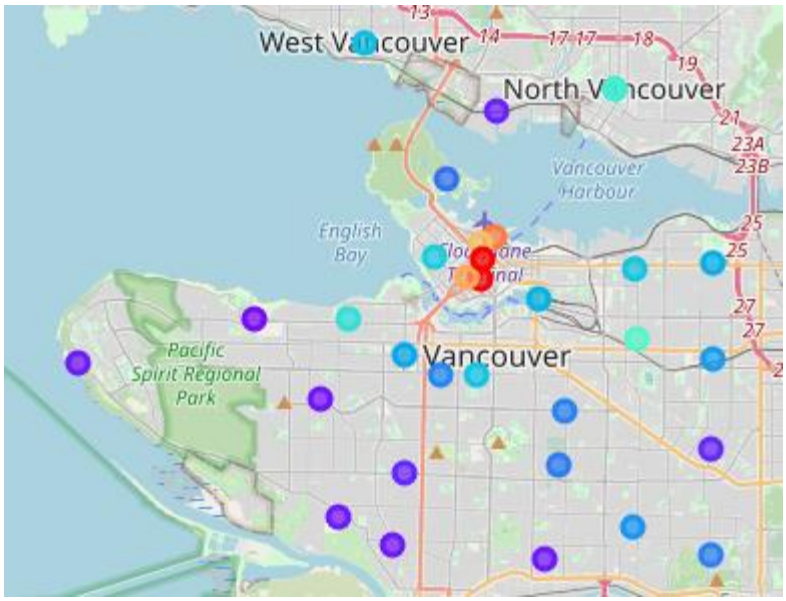

Figure 5. Vancouver's venue count

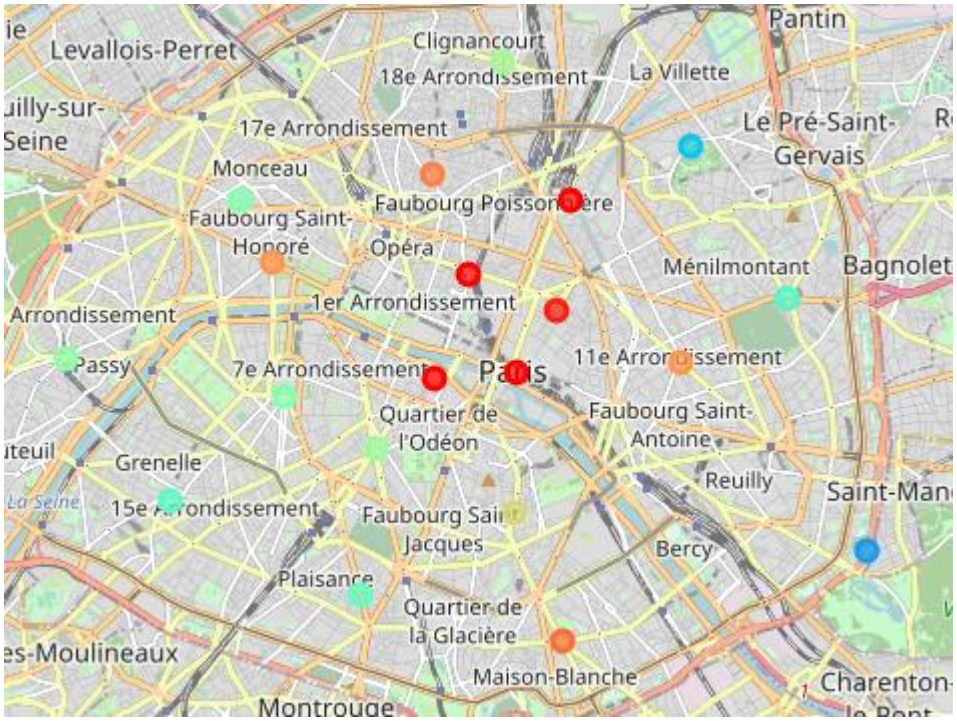

Figure 6. Paris' venue count

4. Clustering

Through the visualization of the neighborhoods, Vancouver is less evenly distanced between its neighborhoods. Leveraging K-means unsupervised algorithm, there were neighborhoods that could be considered as single clusters. After visualizing, the outer neighborhoods can be considered one cluster. The neighborhoods close to the Vancouver downtown are more distinct that they make up four of the clusters.

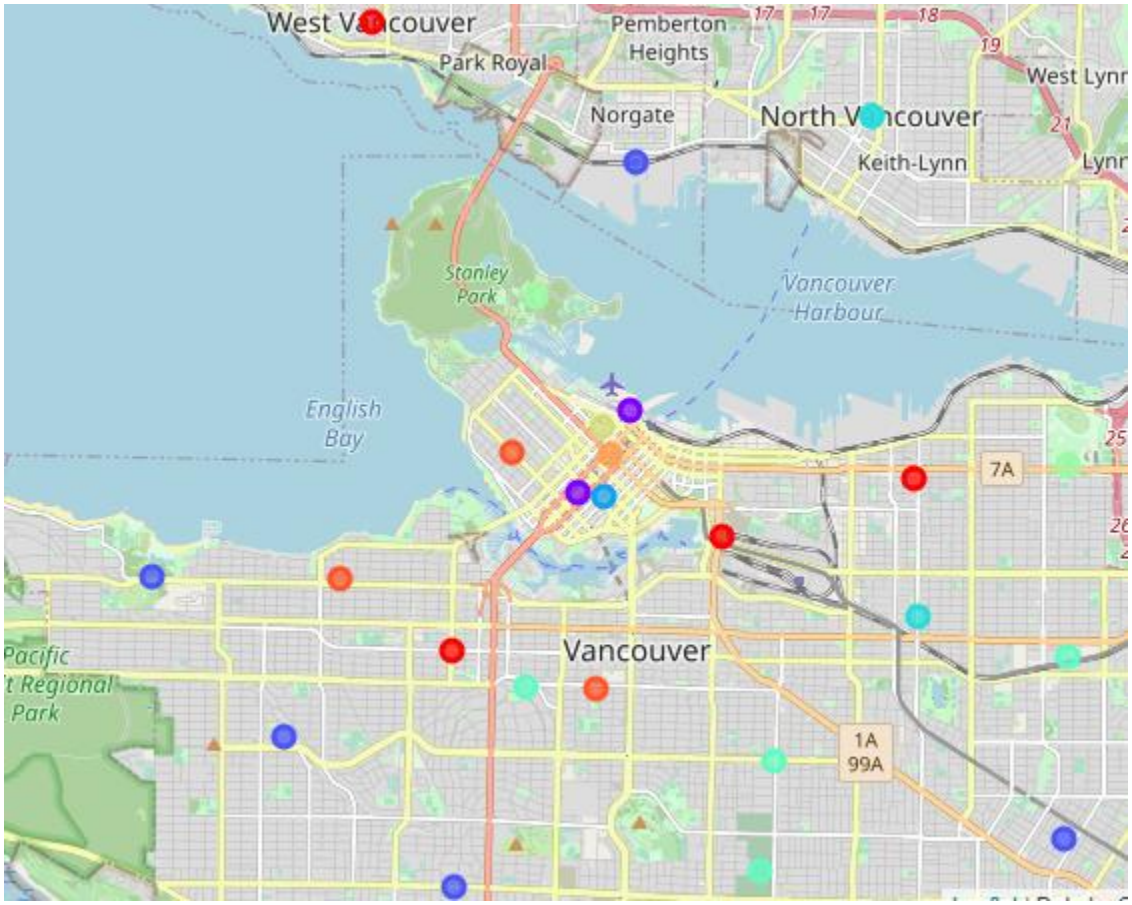

Figure 7. Vancouver neighborhood clusters

5. Scoring

The scoring is based on the population count, venue count, and cost of living for each of the neighborhood, currently weighting as 30%, 30%, and 40%. The cost of living was made inversely proportional to the high score. Each of the parameters are normalized using min-max scalar to ensure that population or cost of living does not skew the score because of units.

The red markers show the higher score or rank based on criteria of what makes a more livable neighborhood, compared to dark blues (lower score). Scoring was calculated across both cities. A significant impact to the ranking was the difference in the respective cost of living, which is higher in Paris.

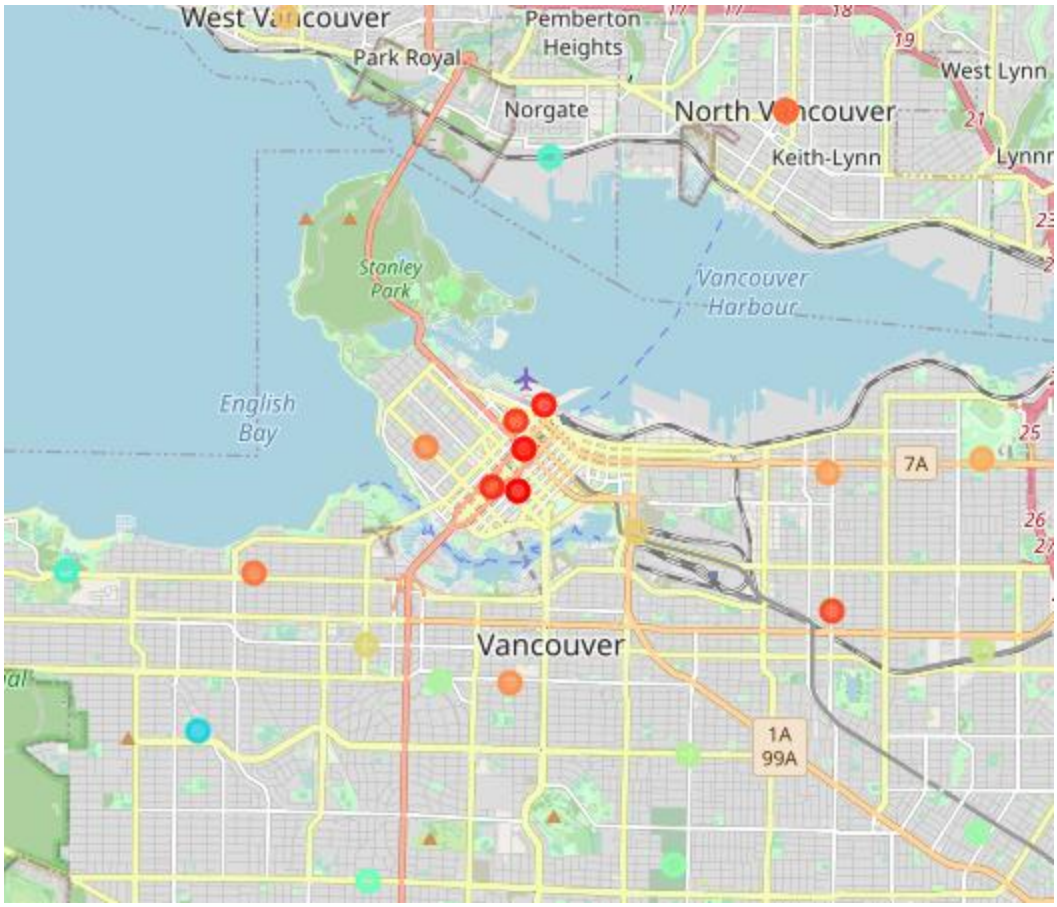

Figure 8. Vancouver's livable score

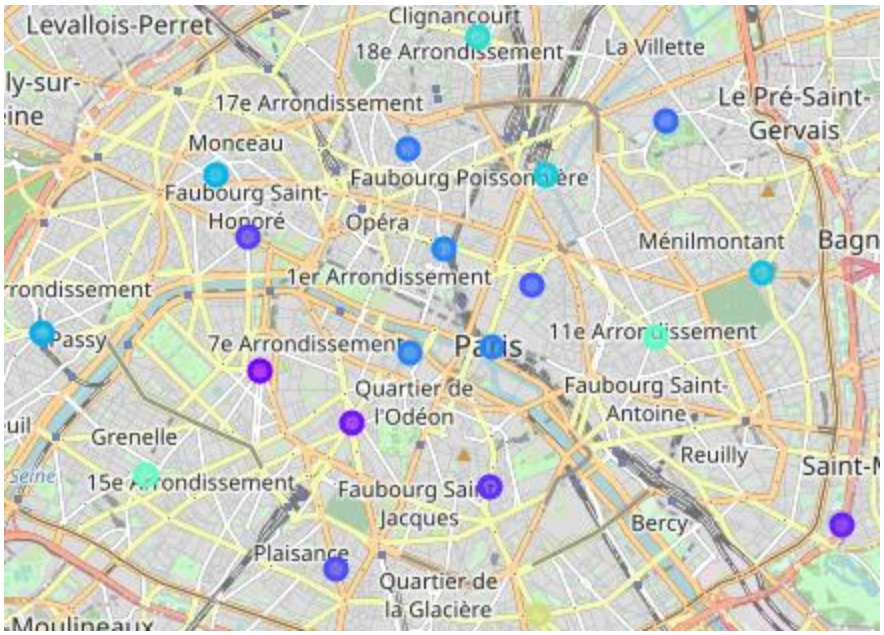

Figure 9. Paris' livable score

6. Conclusions

   The best neighborhoods are identified by areas that have access to a variety of venues, with a population that can sustain the economy, while having a lower cost of living.

   After the comparative analysis, the resulting outcome is that the city of Vancouver and neighborhood of (NE Downtown / Gastown / Harbour Centre / International Village / Victory Square / Yaletown) is the better place to live between these two cities.

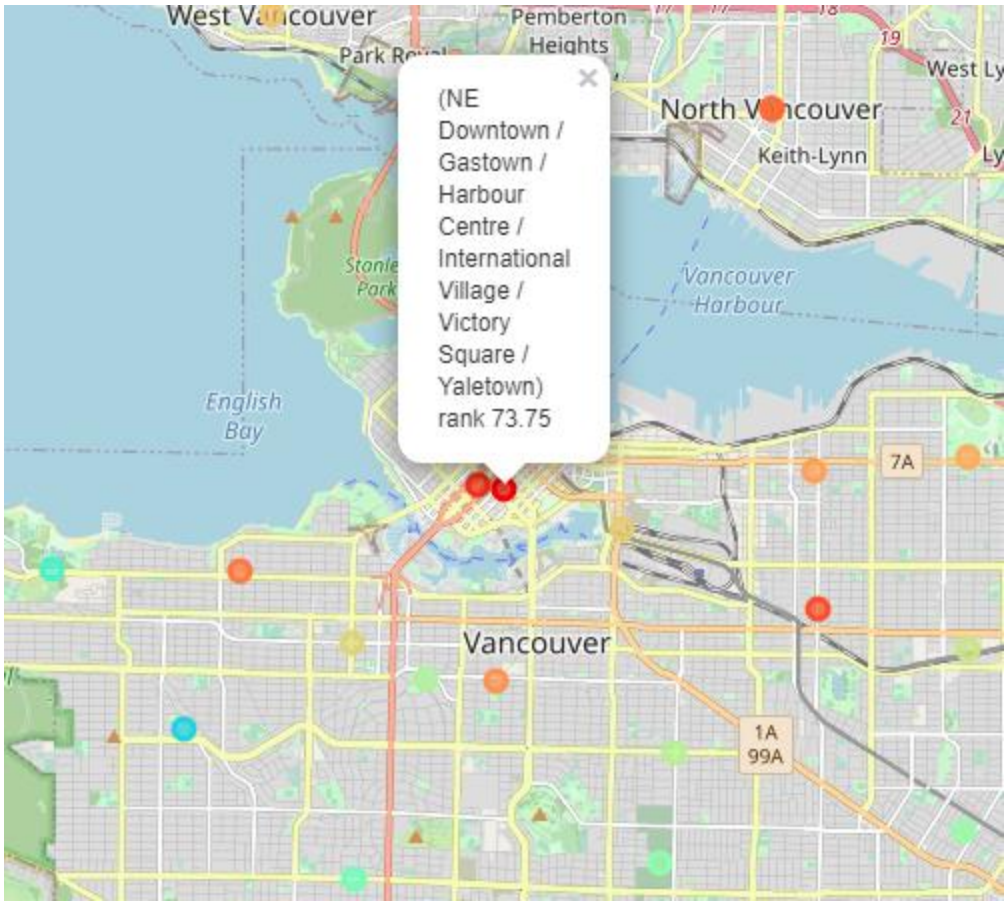

Figure 10. Neighborhood with the Highest Score

7. Future potential

I was able to analyze and conclude where one might want to settle in and retire through a city comparison in multiple dimensions. The analysis can help people better understand what both cities have to offer in a data-supported analysis.

However, there are still many dimensions that can be included that influence people's decision to live in a particular neighborhood such as density, culture, foreign languages, closeness to family and friends, personal background to the area, and more. These additional parameters can be difficult to find, measure, and/or collect. This model can be expanded further to support more retirees or groups of people in their decision making.

References

- https://www.tourismvancouver.com/
- https://en.wikipedia.org/wiki/Vancouver
- https://en.wikipedia.org/wiki/Paris
- https://www.lonelyplanet.com/france/paris