Battle of the Neighborhoods: Vancouver vs Toronto

Coursera Capstone project

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Introduction

- This project will analyze neighborhoods between Vancouver and Toronto Canada. An IT startup company is looking to move its office from New York City to either Vancouver or Toronto.
- The company needs to determine which city better suits the living standards of its employees.

Data

- Data sources used:
  - Vancouver data portal
  - Toronto web portal
  - Geopy library
  - Foursquare
  - Wikipedia
  .

Methodology

- After the data is collected, it will be preprocessed into pandas dataframes and explored.
- The Geopy library will be used to collect the geographical coordinates of Vancouver and Toronto. In order to have a clear idea on the number and distribution of the neighborhoods in the cities,
- Folium Python visualization library will be imported to visualize the neighborhoods distribution over the maps of the two cities.
- Slicing the dataframes to concentrate on the neighborhoods of interest

Methodology

- An exhaustive analysis of Downtown Vancouver and Central Toronto,, exploring the number and categories of the venues in the central neighborhoods of the two cities.
- Onehot encoding will be used to analyze each of the neighborhoods, and 10 ten venues for each neighborhood will be obtained.
- Finally, unsupervised machine learning algorithm k-means clustering will be applied to form the clusters of different categories of places in the above neighborhoods and visualize the data.

Results: slicing

- Vancouver: out of total 22 neighborhoods, it was decided to focus our analysis on 8 neighborhoods in the downtown Vancouver, namely: Kitsilano, Mount Pleasant, Downtown, West Point Grey, Fairview, Grandview-Woodland, Strathcona and West end.
- Toronto, the Central Toronto area included the following neighborhoods (grouped into 9 groups on the basis of their postal codes): Davisville, Davisville North, Forest Hill, Lawrence Park, Moore Park, North Toronto West, Roselawn, Summerhill West, The Annex, North Midtown, Yorkville.
- The rest of the neighborhoods were dropped from the dataframe and did not participate in the analysis.

Results: k-means

- The k-means algorithm clustered the Downtown Vancouver neighborhoods in 3 clusters.
- Cluster_0 - 6 neighborhoods where the most common venues are coffee-shops, different food places and parks.
- Cluster_1 - 1 neighborhood which has a lot of places to eat, but no gym.
- Cluster_2 - 1 neighborhood with prevailing coffee-shops and restaurants, but no gyms.
- Total of 306 venues in 8 Downtown Vancouver neighborhoods; plenty of places to eat in all three clusters, but only 7 parks and 3 gyms, all of which are concentrated in cluster_0.

Results: k-means

- The clustering in Central Toronto is very similar to the one in Downtown Vancouver.
- Cluster_0 : 7 neighborhoods with most common values of coffee-shops, different food places and restaurants.
- Cluster_1 : 1 neighborhood which has a garden and a pool and no places to eat and no gyms.
- Cluster_2 : 1 neighborhood with one gym, but no food places.
- Total of 109 venues in 9 Central Toronto neighborhoods, out of which most are different restaurants and food places; there are 6 parks and 3 gyms.

Discussion

- The segmentation and clustering of the cities of Vancouver and Toronto provided very similar results.
- In the central parts of the cities, 8 neighborhoods were compared and analyzed in Vancouver and 9 in Toronto.
- According to the data provided by Foursquare, there are 306 venues in Vancouver and 109 in Toronto, the venue categories being very similar, with prevailing coffee shops, different kinds of restaurants and places to eat, entertainment, parks etc.
- The clustering of the two cities also showed similar results, where most of the neighborhoods were clustered in one cluster (6 in Vancouver and 7 in Toronto) with the remaining two clusters having one neighborhood each.

Conclusion

- Since there are considerably more venues in Downtown Vancouver (306) as compared to Central Toronto (109), our recommendation to the IT startup will be to move the office to one of the neighborhoods shown in cluster_0 in Downtown Vancouver.


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