Exploring Ottawa Neighbourhood Amenities

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Overview

Introduction

- The City of Ottawa is a culturally diverse place. It is the capital of Canada. It deserves more attention!
- Ottawa's real estate market is country's one of the hottest one. Homebuyers are interested to know about amenities around neighbourhoods.
- Development authorities and entrepreneurs need to know about amenities for their future projects.
- This project aims to explore Ottawa's neighbourhoods and their amenities to deliver reliable information to the interested stakeholders.

Data

Sources

Neighbourhood data: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_K and https://www.geonames.org.
Amenities data: Foursquare API (https://developer.foursquare.com) .

Cleaning, Filtering, and Feature Extraction

- Text matching and removal are required.
- Amenity features are extracted from search results. Catergory specific search has been performed for Ottawa's 41 neighbourhoods using Foursquare's root categories.
- Explored ∼3500 venues. Amenity specific 73 unique categories are selected and then reduced to 26 by adjustment.

Methodology

Amenity Ranking of Neighbourhoods

- Amenities are located within 1 km radius from the geocoordinate.
- MinMax scaling is applied to normalize amenity data.
- A metric named 'Amenity Score' is defined for the ranking.

Amenity Clustering of Neighbourhoods

- The k-means clustering method is selected.
- The optimal value of 'k' is detemined by the Elbow method.
- A visualization of clustered neighbourhoods is to determine their geographic proximity.

Results: Initial Visualization of Neighbourhoods

Ottawa's 41 neighbourhoods:

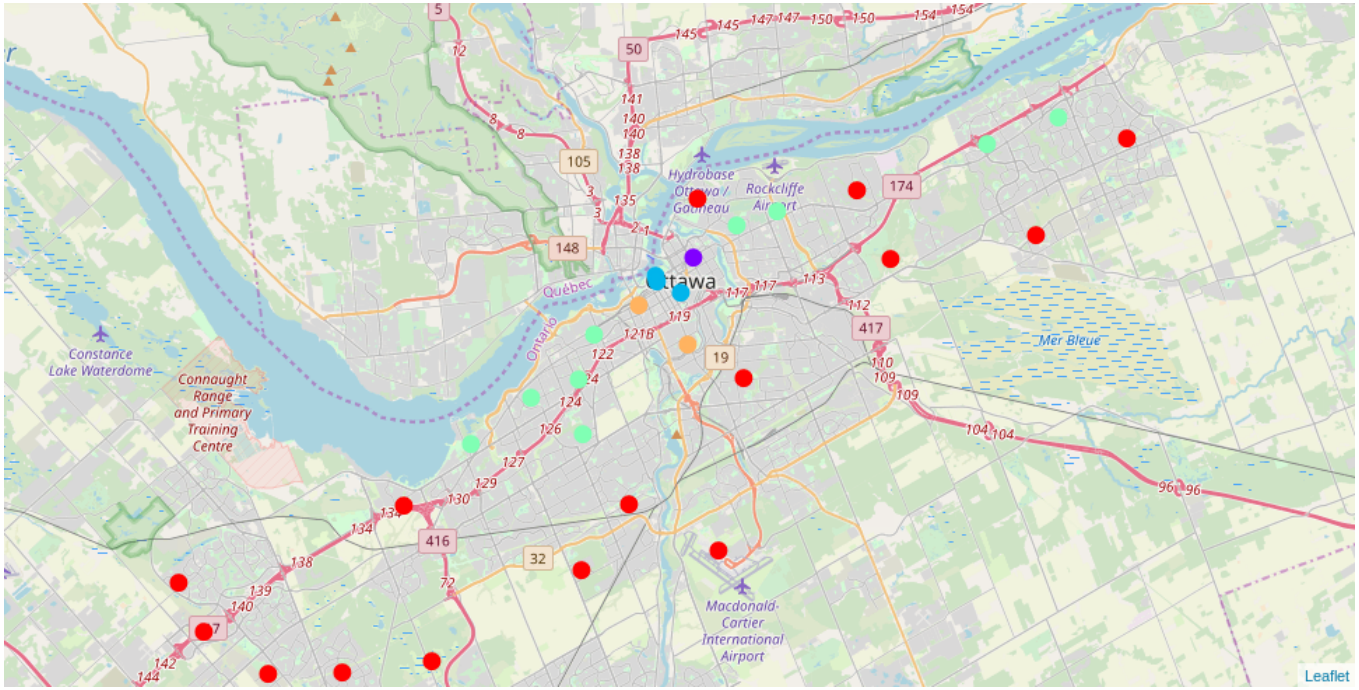
Results: Amenity Ranking

Rank#	Neighbourhood	Amenity Score
1	Centretown	16.658950
2	Government of C. office ...	15.947554
3	Lower Town / Byward Market ...	14.791857
4	Downtown	14.346140
5	Dalhousie Ward	10.434267
6	Civic Hospital / Island Park ...	9.044369
7	The Glebe / Old Ottawa S. ...	8.921706
8	Westboro / Carlington	7.982408
9	Vanier, McKay Lake area	6.494166
10	Queenswood	5.695661

Table: Top 10 neighbourhoods in Ottawa

Results: Amenity Clustering

Ottawa's clustered neighbourhoods:



Results: Average Amenity Score

Cluster Label	Size	Average Amenity Score
0	17	1.437103
1	1	14.791857
2	3	15.650881
3	10	5.686335
4	2	9.677986

Table: Clusters and amenity

Discussion

- The results are obtained based on Foursquare's response for the timestamp of 12:10 am - 01:00 am, Sept. 8th, 2019. In that time, data regarding 8 neighbourhoods were unavailable. Moreover, Foursquare's response highly depends on the time instance. Therefore, results could vary if data were collected in another moment. This is the main drawback here.
- Most of the Foursquare's venues are related to restaurants or foods. For this reason, category-specific search is preferred in this project. However, only few root categories are searched due to the daily limit of usage.
- Ottawa's amenities are heavily concentrated in the downtown and centretown areas.
- Results show clusters mainly reflect amenity scores.

Conclusion and Future Directions

- This project has successfully clustered the Ottawa city areas based on neighbourhood amenities. It identified the least amenity neighbourhoods as 'cluster label 0' and most amenity neighbourhoods as 'cluster 1' and 'cluster 2'.
- This project has also published an amenity ranking of Ottawa's neighbourhoods.
- The results obtained in this project can be useful to the real estate industry, homebuyers, development authorities, and entrepreneurs.
- There are two possible future directions: (i) Use of other sources to capture amenity data. and (ii) Use of multiple metrics instead of the frequency of features/categories.

Thank You!