Identifying Viable Location(s) to Open a Department Store in Toronto

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Introduction

1.1. Background

Most investors would ordinarily engage in an environmental scanning both physical and economical before embarking on any business project. In a lot of businesses, the impact of the location could determine the viability of that business in the long-run. This is even more so for retail businesses whose location is central to its performance

1.2. Problem
The business problems pertain to identifying, from a myriad of locations or neighborhoods in Toronto, the top locations where to open a Department store.

To understand the business problem, there are a few factors to consider in citing a Department store:

1. Population of persons in the neighborhood
2. Competition (other department stores or retail store type establishment)
3. Surrounding businesses/venues or "Neighbors"
4. Accessibility or Traffic
5. Location cost
6. Personal factors (consumer behavior)

The idea is that the interplay of these factors should yield optimum conditions for the launching of a Department Store.

1.3. Interest
Investors in the retail space will obviously be interested in the solution for a business problem like this. Or it may also interest retail chains who already have stores in different locations and are willing to expand to other viable locations.

2. Data Acquisition & Cleaning
2.1. Data Sources
Data on Neighborhoods sourced from Wikipedia with their corresponding zip coded. The zip code served as a unique identifier to merge other data sources to the Neighborhood data frame and can be accessed here

Also geodata on Locations and Latitudes of locations on venues where sourced from previous IBM Data Science professional certificate modules. (http://cocl.us/Geospatial_data)

Previous research was considered on Priority Investment Neighborhood (PINs) in Toronto. This served as the bedrock upon which further analysis were carried out. The PINs research had previously considered the key factors affecting investment in a location. This subsequently reduced the quantity of data wrangling for the project and provided clearer direction as to the target locations. The report can be found here for the **13 PINs.** These narrowed down our analysis of the locations from over 100 neighborhoods to 13 neighborhoods of choice

Foursquare API served as the ultimate source of all venues data (www.foursquare.com)

2.2. Data Cleaning & Structuring

Data was scrapped from Wikipedia and read as a pandas data frame. The data frame was merged with geo-coordinates data frame using zip code as the unique identifier. A dictionary of the 13 PINS were created with Postal Code and Neighborhood as the keys and joined to the data frame on Postal Code. Using Four square API, calls were made to the database to retrieve venues data for the PINS and joined to the data frame on the coordinates.

3. Methodology

3.1. Exploratory Data Analysis _Frequency of venues

The frequency of venues per PIN were calculated to obtain insight characteristics of the neighborhood. The neighborhoods with the highest number of venues signified a lot of business activity already ongoing in the area and may somewhat be indicative on the cosmopolitan nature of the neighborhood as this would influence the performance of a department store.

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue
Crescent Town	100	100	100
Dorset Park	95	95	95
Eglinton East-Kennedy Park	58	58	58
Flemingdon Park-Victoria Village	95	95	95
Jane-Finch	48	48	48
Kingston-Galloway	39	39	39
Lawrence Heights	100	100	100
Malvern	49	49	49
Scarborough Village	77	77	77
St.Jamestown	100	100	100
Steeles-L'Amoreaux	74	74	74
Westminster-Branson	100	100	100

Considered as well was the 10 most frequent venues in each of the 13 Neighborhoods.

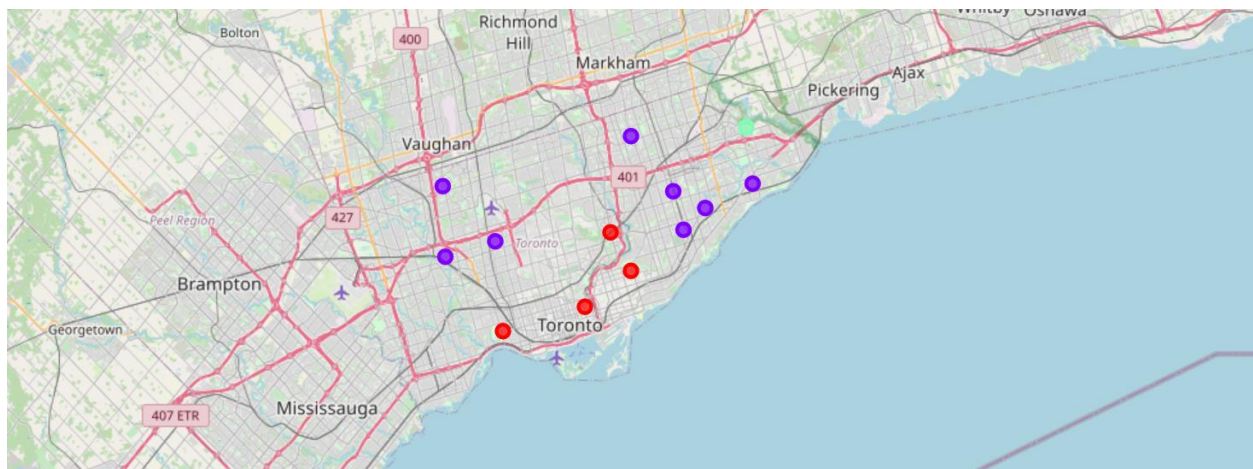| Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
Crescent Town	Park	Coffee Shop	Gastropub	Café	Pizza Place	Thai Restaurant	Ice Cream Shop	Ethiopian Restaurant	Pharmacy	Bar
Dorset Park	Coffee Shop	Fast Food Restaurant	Sandwich Place	Pizza Place	Restaurant	Breakfast Spot	Bank	Gas Station	Pharmacy	Pet Store
Eglinton East-Kennedy Park	Coffee Shop	Fast Food Restaurant	Grocery Store	Chinese Restaurant	Pharmacy	Beer Store	Bank	Sandwich Place	Discount Store	Pizza Place
Flemingdon Park-Victoria Village	Coffee Shop	Restaurant	Japanese Restaurant	Park	Gym	Middle Eastern Restaurant	Pizza Place	Sandwich Place	Pharmacy	Bank
Jane-Finch	Coffee Shop	Pizza Place	Fast Food Restaurant	Gas Station	Hotel	Grocery Store	Pharmacy	Smoothie Shop	Tea Room	Kitchen Supply Store
Kingston-Galloway	Pizza Place	Breakfast Spot	Fast Food Restaurant	Bank	Coffee Shop	Park	Greek Restaurant	Fried Chicken Joint	Sandwich Place	Juice Bar

Also the frequency of competition type businesses (e.g. other department store, clothing store, accessory store, Electronics store etc.) which may affect revenues of the upcoming department store were investigated and affected our choice of a location.

For instance, of the 13 Neighborhoods, Lawrence Heights already had a department store (though not the most frequent venues, had competition type businesses or stores usually found in department stores) and was excluded from the locations in consideration.

	Coffee Shop	Pizza Place	Fast Food Restaurant	Gas Station	Hotel	Grocery Store	Pharmacy	Smoothie Shop	Tea Room	Kitchen Supply Store
Jane-Finch	Coffee Shop	Pizza Place	Fast Food Restaurant	Gas Station	Hotel	Grocery Store	Pharmacy	Smoothie Shop	Tea Room	Kitchen Supply Store
Kingston-Galloway	Pizza Place	Breakfast Spot	Fast Food Restaurant	Bank	Coffee Shop	Park	Greek Restaurant	Fried Chicken Joint	Sandwich Place	Juice Bar
Lawrence Heights	Clothing Store	Coffee Shop	Fast Food Restaurant	Furniture / Home Store	Vietnamese Restaurant	Grocery Store	Pizza Place	Jewelry Store	Pharmacy	Pet Store
Malvern	Zoo Exhibit	Fast Food Restaurant	Pizza Place	Zoo	Gas Station	Coffee Shop	Restaurant	Greek Restaurant	Caribbean Restaurant	Skating Rink
Scarborough Village	Coffee Shop	Fast Food Restaurant	Pizza Place	Sandwich Place	Grocery Store	Pharmacy	Big Box Store	Beer Store	Ice Cream Shop	Bank
St.Jamestown	Park	Coffee Shop	Café	Bakery	Diner	Japanese Restaurant	Restaurant	Thai Restaurant	Italian Restaurant	Gastropub
Steeles-L'Amoreaux	Chinese Restaurant	Coffee Shop	Park	Bakery	Sandwich Place	Pizza Place	Pharmacy	Bank	Japanese Restaurant	Athletics & Sports
Westminster-Brownson	Café	Coffee Shop	Bakery	Park	Italian Restaurant	Bar	Restaurant	Gastropub	Eastern European Restaurant	Breakfast Spot

3.2. Clustering & Visualization

The 13 PINs were clustered in 3 segments using the K-Means algorithm. The logic behind is to segment these neighborhoods by their characteristics and group similar neighborhoods together. These clusters were visualized on the map of Toronto by importing the folium library on python.

3.3. Exploring the Clusters

The 3 resulting clusters were explored to the see the characteristics and the results discussed in the results section. See clusters below:

Cluster 1 (4 Neighborhoods)

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	9th Most Common Venue	10th Most Common Venue
Crescent Town	0	Park	Coffee Shop	Gastropub	Café	Pizza Place	Thai Restaurant	Ice Cream Shop	Ethiopian Restaurant	Pharmacy	Bar
Flemingdon Park-Victoria Village	0	Coffee Shop	Restaurant	Japanese Restaurant	Park	Gym	Middle Eastern Restaurant	Pizza Place	Sandwich Place	Pharmacy	Bank
St.Jamestown	0	Park	Coffee Shop	Café	Bakery	Diner	Japanese Restaurant	Restaurant	Thai Restaurant	Italian Restaurant	Gastropub
Westminster-Brownson	0	Café	Coffee Shop	Bakery	Park	Italian Restaurant	Bar	Restaurant	Gastropub	Eastern European Restaurant	Breakfast Spot

Cluster 2 (8 Neighborhoods)

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	9th Most Common Venue	10th Most Common Venue
Eglinton East-Kennedy Park	1	Coffee Shop	Fast Food Restaurant	Grocery Store	Chinese Restaurant	Pharmacy	Beer Store	Bank	Sandwich Place	Discount Store	Pizza Place
Dorset Park	1	Coffee Shop	Fast Food Restaurant	Sandwich Place	Pizza Place	Restaurant	Breakfast Spot	Bank	Gas Station	Pharmacy	Pet Store
Jane-Finch	1	Coffee Shop	Pizza Place	Fast Food Restaurant	Gas Station	Hotel	Grocery Store	Pharmacy	Smoothie Shop	Tea Room	Kitchen Supply Store
Kingston-Galloway	1	Pizza Place	Breakfast Spot	Fast Food Restaurant	Bank	Coffee Shop	Park	Greek Restaurant	Fried Chicken Joint	Sandwich Place	Juice Bar
Lawrence Heights	1	Clothing Store	Coffee Shop	Fast Food Restaurant	Furniture / Home Store	Vietnamese Restaurant	Grocery Store	Pizza Place	Jewelry Store	Pharmacy	Pet Store
Scarborough Village	1	Coffee Shop	Fast Food Restaurant	Pizza Place	Sandwich Place	Grocery Store	Pharmacy	Big Box Store	Beer Store	Ice Cream Shop	Bank
Steeles-L'Amoreaux	1	Chinese Restaurant	Coffee Shop	Park	Bakery	Sandwich Place	Pizza Place	Pharmacy	Bank	Japanese Restaurant	Athletics & Sports
Weston-Mt.Dennis	1	Coffee Shop	Grocery Store	Sandwich Place	Pharmacy	Pizza Place	Bank	Gas Station	Fried Chicken Joint	Vietnamese Restaurant	Train Station

Cluster 3 (1 Neighborhood)

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	9th Most Common Venue	10th Most Common Venue
Malvern	2	Zoo Exhibit	Fast Food Restaurant	Pizza Place	Zoo	Gas Station	Coffee Shop	Restaurant	Greek Restaurant	Caribbean Restaurant	Skating Rink

4. Results

In exploring the 3 clusters the following insights were obtained.
- Cluster 1 – Semi Urban Neighborhood
- Cluster 2 – Full Urban Neighborhood
- Cluster 3 – Suburban type neighborhood

The **semi-urban** neighborhood is characterized by the predominance of coffee places and restaurants, however, quite a number of parks are common showing that even though the neighborhood is urban there is still some type residential flavor to it.

The **Full Urban** neighborhood has a preponderance of coffee shops, restaurants and shops of all types as well as office type (Bank) outlets observed. This is the choice area for a Department Store because of the footfall.

The **Suburbs** are characterized by the presence of Zoo and Zoo exhibit, which happens to be the most occurring places in the neighborhood.

5. Discussion

From our introduction, we identified the factors affecting launching a retail shop. An interplay of these factors have been considered to arrive at the 13 PINs used in our analysis. We have further segmented the 13 PINs to have a better understanding of their characteristics. We equally considered the presence of competition to arrive at our top or priority location where one can launch a department store and our findings are recorded in the results.

In arriving at our top 3 locations, the following were considered:
- Preference for Cluster 2 whose attributes are defined above
- Presence [or absence] of a Department store or retail type outlet
- Presence or absence of a Bank

Because all 8 neighborhoods are good locations for a retail store, the odds can be improved by isolating the neighborhoods with the above characteristics.

Lawrence Heights and Scarborough village were eliminated as a location because of having a department store, as well as quite a number of retail outlets. Even though a very good location, the competition may stifle business. Kingston-Galloway, Weston Mt. Denis and Dorset Park were considered for this project to be the locations of choice. They have fewer retail type outlets but the presence of Banks signifying office presence and possible footfalls which support retail behavior.

6. Conclusion

From this study, the below appear to be the top three neighborhoods for a department store in Toronto, everything having been considered:
- Kingston-Galloway
- Weston Mt. Denis
- Dorset Park