Buying a First Home in Toronto, Canada

1.0 Introduction

1.1 Business Problem

A common problem many future first-time homeowners face is where they should buy their home. Where is the ideal location to put forth one of their largest investments?

My goal is to arrive at a recommendation as to where a first-time homeowner should purchase their first home, based on a few assumptions I think first-home owners would look for when buying a house.

1.2 The targeted demographic

The targeted demographic for my study are **young** first-time homeowners that are interested in buying their first home. As a result, I will be making the following assumptions, in accordance with their first-home preferences.

My "simplified and targeted" first-time homeowner looks for the following things when looking to buy a home:

1. Must be affordable and within their budget
2. Wants to be close to as many venues and services as possible (i.e. gym, supermarket, coffee shops, etc.)
3. Wants to be close to public transportation or have easy access to highways
4. Wants to be close to downtown as possible
5. Wants to be near some of the best restaurants.

1.3 The Interest

First-time homeowners would be very interested to identify a house location that offers affordability, proximity to valuable services, close to downtown and has some of the best restaurants in its area.

2.0 Data Aquisition and Cleaning

2.1 Data Sources

In order to come up with a recommendation to answer the question of where "my targeted" first-time homeowner should buy their home. The following data points will be needed in order to accommodate their purchasing needs.

1. Toronto Neighborhood locations
2. Restaurant locations within Toronto
3. Subway locations in Toronto

With all this data, the goal would be to find a location that best meets our targeted consumer's requirements being that it is close to a subway line, has many restaurants and is in the heart of downtown

This will be done by clustering

2.2 Data Cleaning

2.2.1 Toronto Neighborhood Locations Data

The dataset had many "Not assigned" boroughs and as a result, had to be cleaned by removing them from our data set. Including them within our data would have increased the errors we would face later on in our analysis.

In addition, many neighbourhoods had unassigned Boroughs, and as a result, they were cleaned by equating bother their Boroughs and Neighborhood names to the same value.

Finally, as we are only interested in neighbourhoods that are in Toronto, I filtered the data to only include neighbourhoods that were located strictly in Toronto.

2.2.2 Subway Locations Data

This data set was very clean and didn't need much cleaning. It was only missing headers for its respective columns and so those were added to increase the clarity of the information being stored.

2.2.3 Restaurants in Toronto Data

Using the **Foursquare API** I was able to gather all of the restaurants within a 500m radius of the Toronto neighbourhoods I gathered in 2.2.1.

3.0 Data Analysis Methodologies

In order to find the ideal location, we need to satisfy 3 conditions

1. We need to find a neighbourhood with a sufficient number of restaurants (25 to simplify)
In order to do this, we will need the **Foursquare** API to find the neighbourhoods with a sufficient number of restaurants.

2. We need to find a neighbourhood close to the subway line
We will use **folium** to construct a map with our subway data set in order to view where they lie on the *Toronto, map*

3. We need to find a neighbourhood that is classified under the "downtown" cluster
We will finally compare all of the above 2 conditions with the classified locations of downtown neighbourhoods

3.1 Neighborhoods with at least 25 restaurants within a 500m radius

In order to meet the criteria that the neighbourhood should be dense with restaurants, we group our restaurants' data set to find the locations with the max number of restaurants according to our max cap of 25.

Creating a Map Showing the Top Neighbourhoods according to our restaurant constraint.
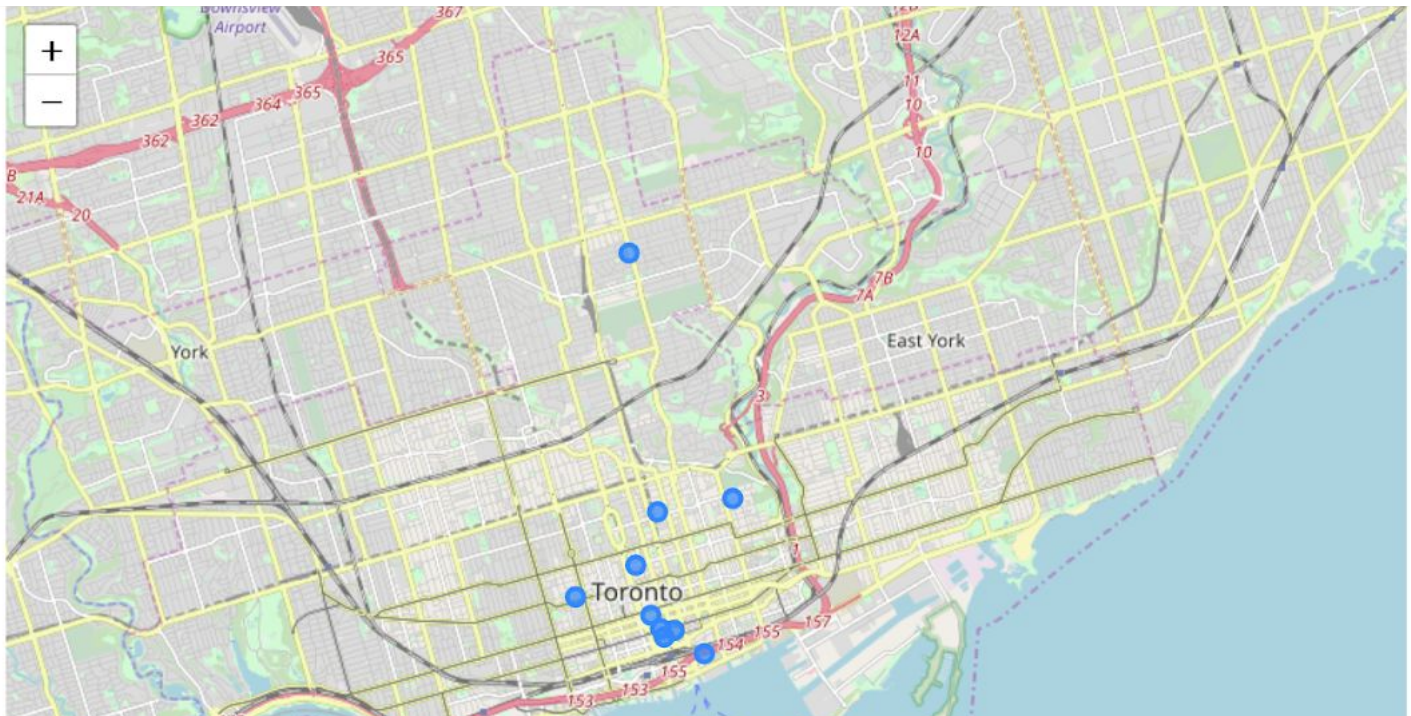
3.2 Identifying Subway Line Locations

Similar to the previous analysis, let's create a map showcasing all the major subway stations, this will help with future analysis when identifying neighbourhoods close to subway stations

3.3 Pinpointing the heart of downtown

Going back to our Toronto neighbourhood data set, we filter to only consider neighbourhoods in Toronto. Once we have that data, we once again build a map to showcase this information.
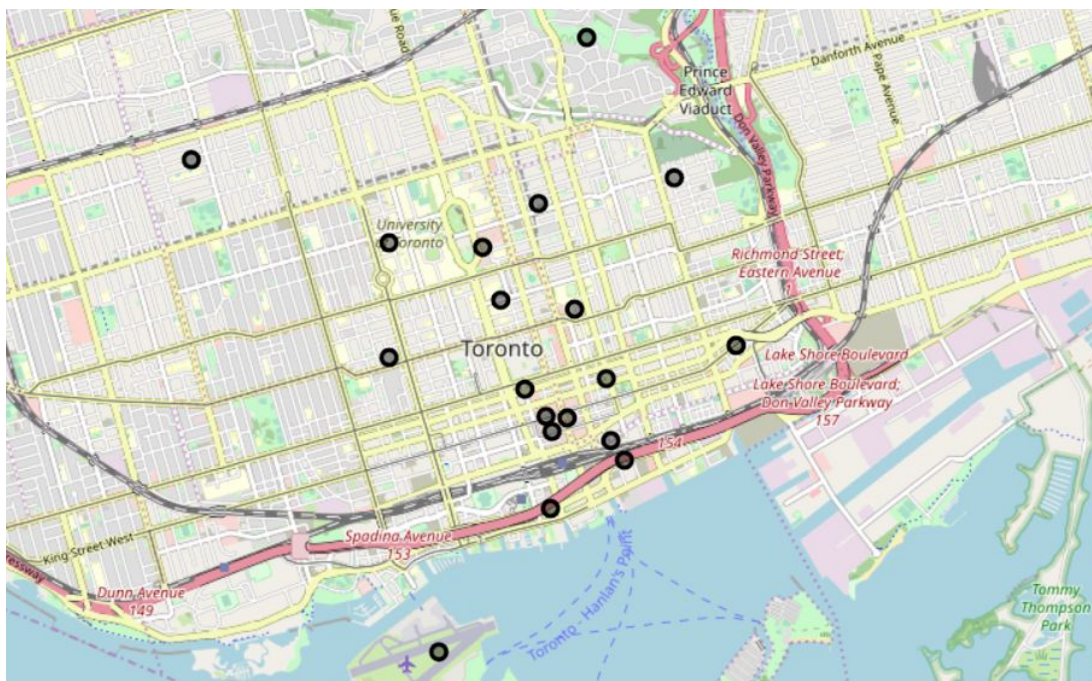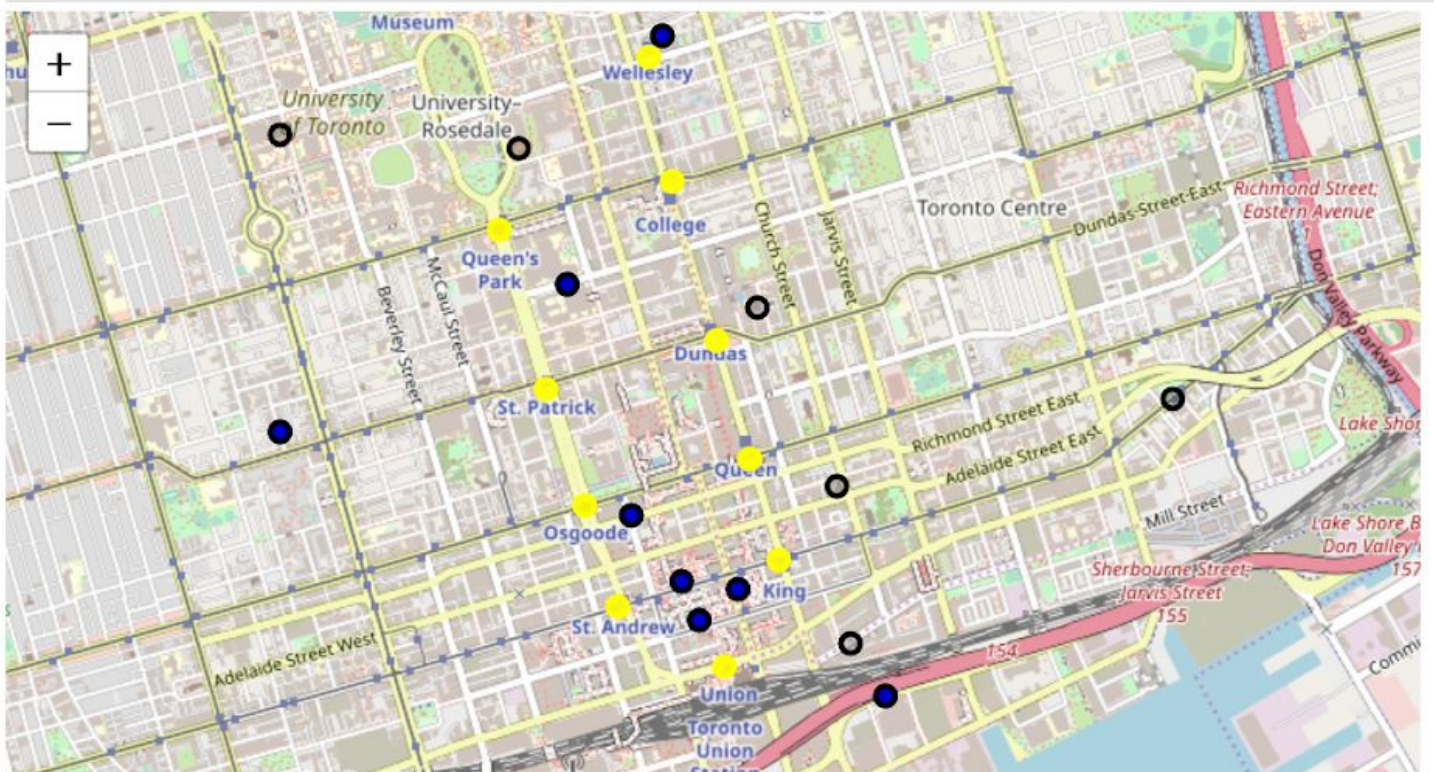
3.4 Final Analysis - Wrapping it all together

Just to quickly recap, we were able to identify the following
- All the neighbourhoods with at least 25 restaurants within a 500m radius
- All the subway locations
- Downtown locations

The objective is to find a neighbourhood that is **classified as being downtown** (black circle), has at **least 25 restaurants** within its radius (blue dots) and near to a subway station (**yellow dots**).

4.0 Results & Discussion

As a final observation, from our analysis, we are able to conclude that the **Adelaide, King, Richmond** neighbourhood is the best place for our "targeted" first-time homebuyer to buy their home.

This is as a result of it meeting all of our necessary criteria. The neighbourhood has 25 restaurants within a 500m radius, it is classified as being a downtown neighbourhood and it is the closest neighbourhood to the subway.

5.0 Conclusion

The problem I was solving was to identify the ideal location for a first-time homeowner in Toronto, Ontario This was achieved through using data that utilized subway location, restaurant location and downtown locations to satisfy our assumptions.

 I then analyzed the data and superimposed the information to view it on a map to conclude our final recommendation.

The final recommendation would be to look for a neighbourhood in Adelaide, King, Richmond neighbourhood.

Next Steps: Consider first-time first owners' annual income and finding a location that is also affordable.