Capstone Project - The Battle of Neighborhoods

Exploring Frozen Dessert Shops in Scarborough, Toronto using Foursquare

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Introduction

Scarborough, Toronto, is the most diverse and multicultural administrative division of Toronto, Canada. In addition, this multicultural city is full of parkland, safe and clean. Steadied by strong, highly regulated banks and buoyed by an educated workforce, this city provides a lot of business opportunities and a business-friendly environment. With a low net debt-to-GDP ratio, it has attracted many different players into the market. Hence, any new business venture or expansion is going to be highly competitive and needs to be analyzed carefully. The insights derived from analysis will give a good understanding of the business environment which help in strategically targeting the market. This will help in reduction of risk and the Return on Investment will be reasonable.

Problem Definition

Scarborough is known for its excellent cuisine and its food culture includes an array of international cuisines influenced by the city's immigrant history. Frozen dessert shops have become so popular in Toronto now it seems that there's one on every corner, not only in major cities but also in smaller cities. Starting a frozen dessert shop will be a good business opportunity, but you would like to tell yourself apart from others to enjoy long-term success.

If you intend a frozen dessert shop which will demand higher prices, you need to focus in neighborhoods and outlets that already attract sophisticated clients. If you intend an inexpensive buffet restaurant, point to the masses searching for affordable high-traffic locations with large shopping centers and other local points of interest.

For this analysis, I plan to focus on the Scarborough area, as my father intends to open his business in that borough. We typically define potential neighborhoods based on the number of frozen dessert Shops which are operating right in each neighborhood. Scarborough has full potential but is also a really challenging district to open a business due to high competition. New frozen dessert Shop should be open in a vicinity that's an inadequate neighborhood, so that the shop can attract more customers. Therefore, this analysis is critical to confirm that we would attract enough customers and not very near to other frozen dessert Shops.

Data

Data Link: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M

Foursquare API Data: The retrieved data from Foursquare contained venue information of the longitude and latitude of the zip code (within the chosen 100 meters distance). The information obtained per venue as follows:

1. Neighborhood

2. Neighborhood Latitude

3. Neighborhood Longitude

4. Venue

5. Venue Latitude

6. Venue Longitude

7. Venue Category

Methodology

As a first step, I retrieve the venues in Scarborough from Foursquare. I extract the location data from the Foursquare API for all venues up to a distance of 5000 meter radius from the center of Scarborough. Using this, I fetch the venue information including coordinates.

Using data cleaning, the dataset from the API will be analysed based on the Neighborhood,venue names, latitude, and longitude values. The final data will include the venue name, category, address, latitude and longitude.

Using this dataset, I begin by analyzing the top venue types that exist in Scarborough. I will then explore the venues on maps. This will allow us to better understand the location of various venues and the places where many venues co-exist and identify places worth for business. The venues will be plotted using proper color coding such that a simple glance at the map would reveal the location of the venues as well as give information about them. I aim to identify places which can be recommended based on their demand. I'll also use the "**clustering ML approach**" on the venues and see if we can draw meaningful information out of what kind of venues exist in Scarborough.

As a final step, I will analyse these plots and try to draw conclusions on what places can be recommended to start the business. I'll discuss my findings and any inferences I can draw.
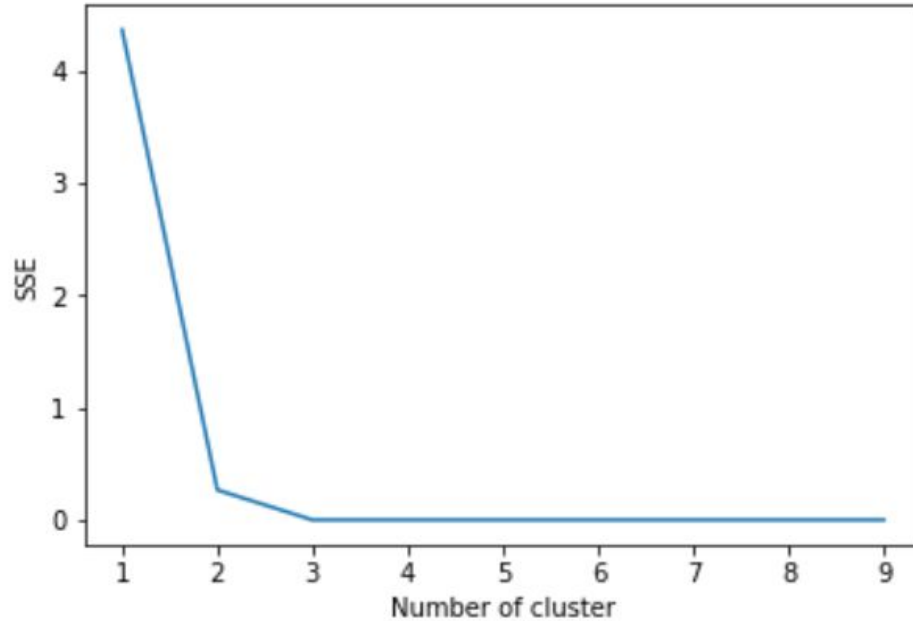
Exploratory Data Analysis

Distribution of Frozen Dessert Shop across the Neighborhoods
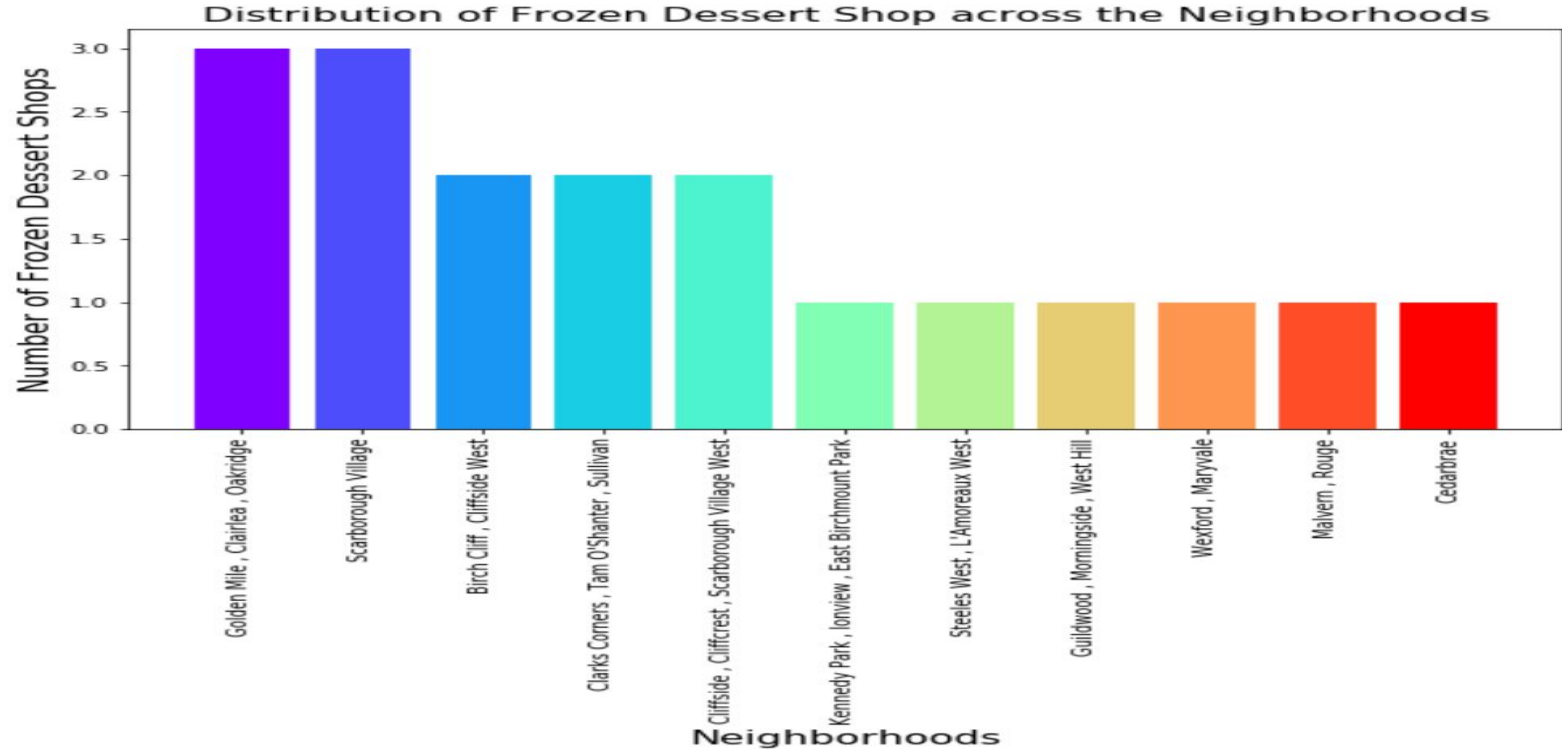
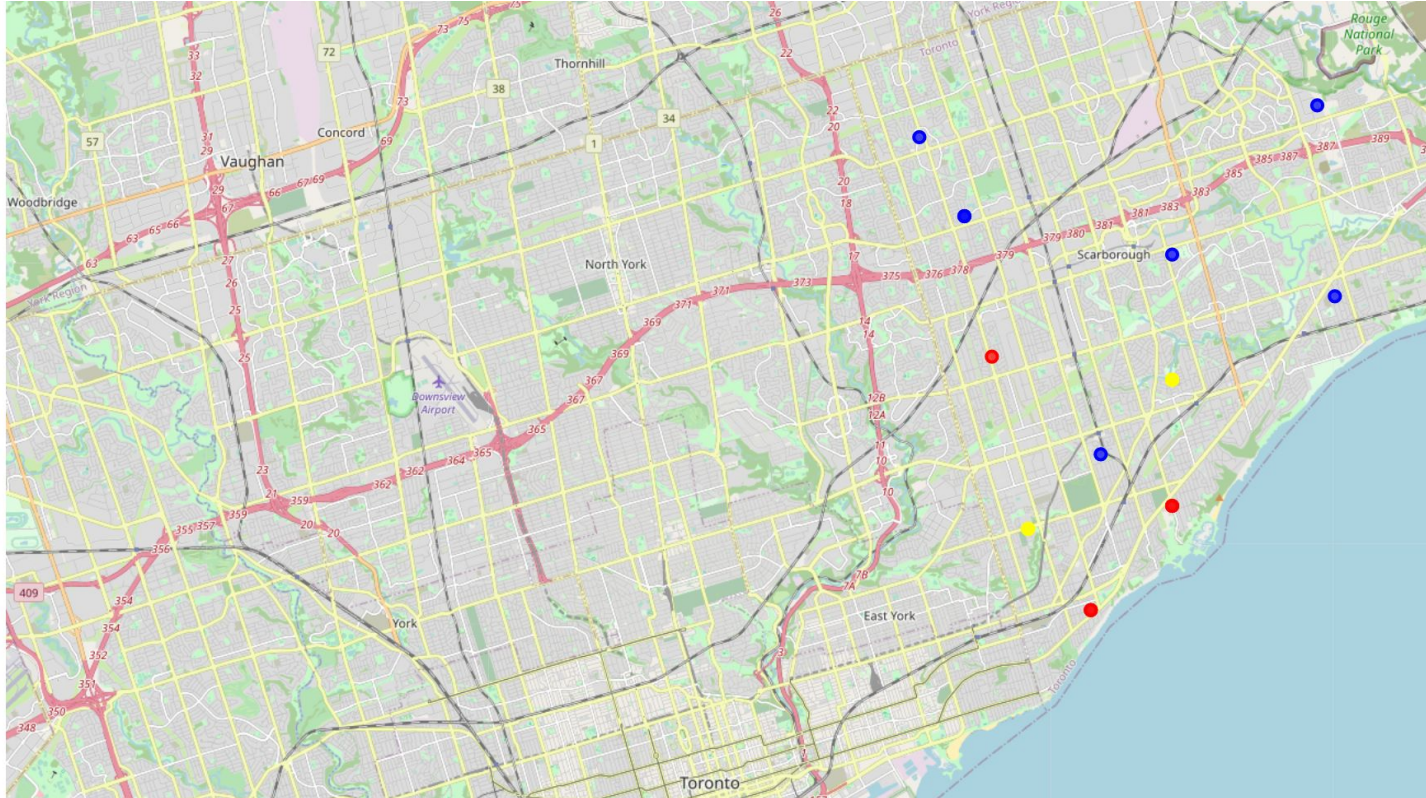Map to display Scarborough - Venues were returned by Foursquare
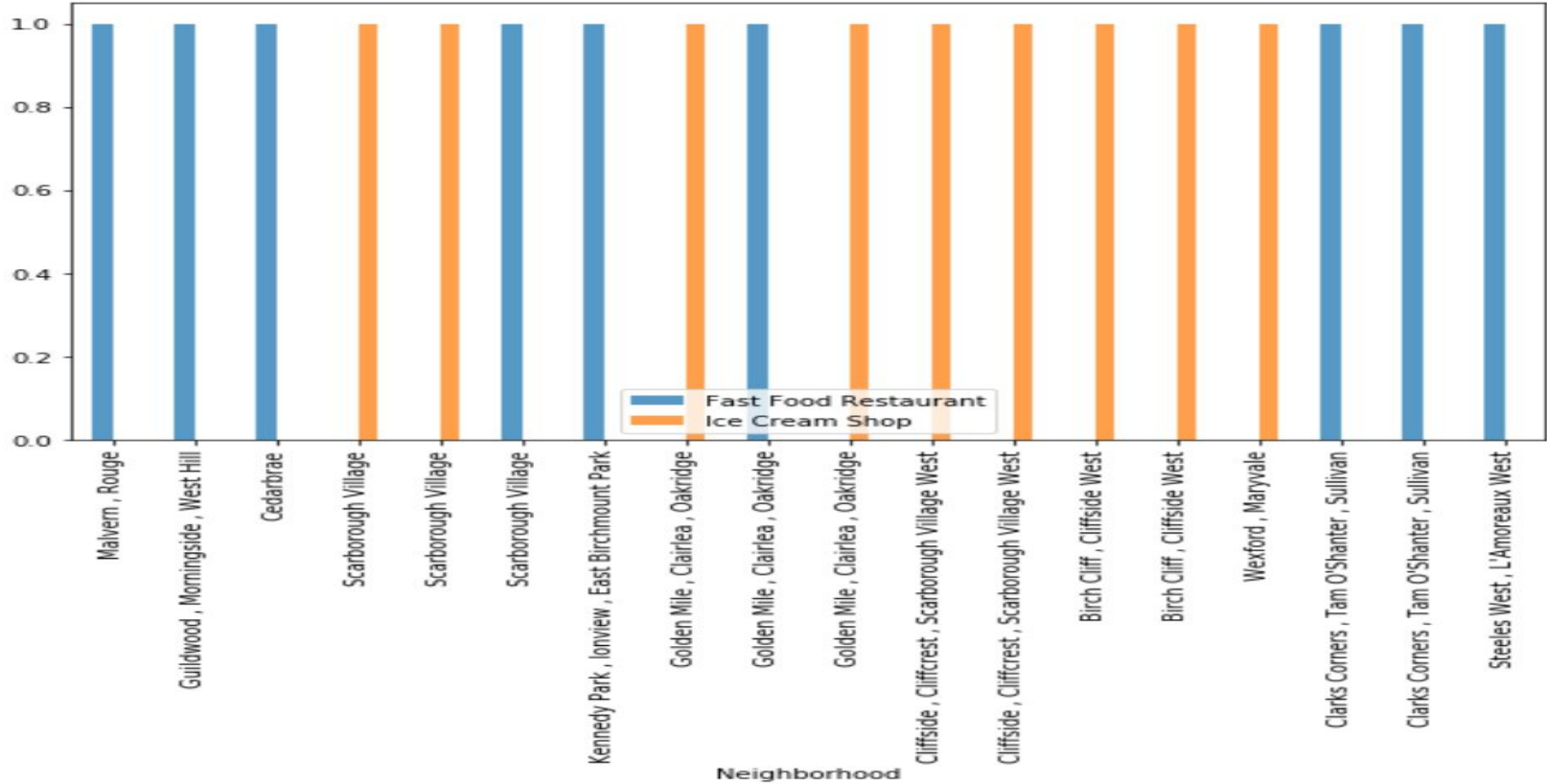
Find optimal k for the clustering process

Most Common Venues near Neighborhood Using Clustering

Discussion

After collecting data from the Foursquare, we got a list of 18 different venues. We also had to inspect their latitude and longitude values as well as their names.

We identified that from the total set of venues, the majority of them were Fast Food Restaurant and Ice Cream Shop. A visitor who loves Ice Cream dessert would surely benefit from coming to Scarborough.

When we plot these venues on the map, we discover that there are clusters of venues around Warden Avenue, Morningside Park and Kingston Subdivision Transit. Out of these clusters, Kingston Subdivision Transit has more number of venues.

On plotting the venues based on their location on the map, and deciding to use "Hotelling's Model of Spatial Competition" then opening in Kingston Subdivision Transit makes sense. However, if we need to avoid competition then less dense Morningside Park clusters should be tried. Warden Avenue cluster neither has a lot of competitors nor less dense.

Finally, through clusters we identified that there are many venues which are relatively located closer and some are located apart. Anybody can use this information to decide where a Frozen dessert shop can be opened.

Conclusion

The purpose of this project was to explore the places where a Frozen Dessert shop can be started. The venues have been identified using Foursquare API and have been plotted on the map. The map reveals that there are three major areas available to start the business: Warden Avenue, Morningside Park and Kingston Subdivision Transit. Based on the investor's preferences, he/she can choose amongst the three places.

This project only considers the density of the venues as criteria to start the business. However, this can be further extended to consider the price of the frozen dessert and user ratings.

References

https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M

https://en.wikipedia.org/wiki/Postal_codes_in_Canada#Forward_sortation_areas