Identifying Location for Restaurant

Kyle McLester

April 5, 2021

1. Introduction

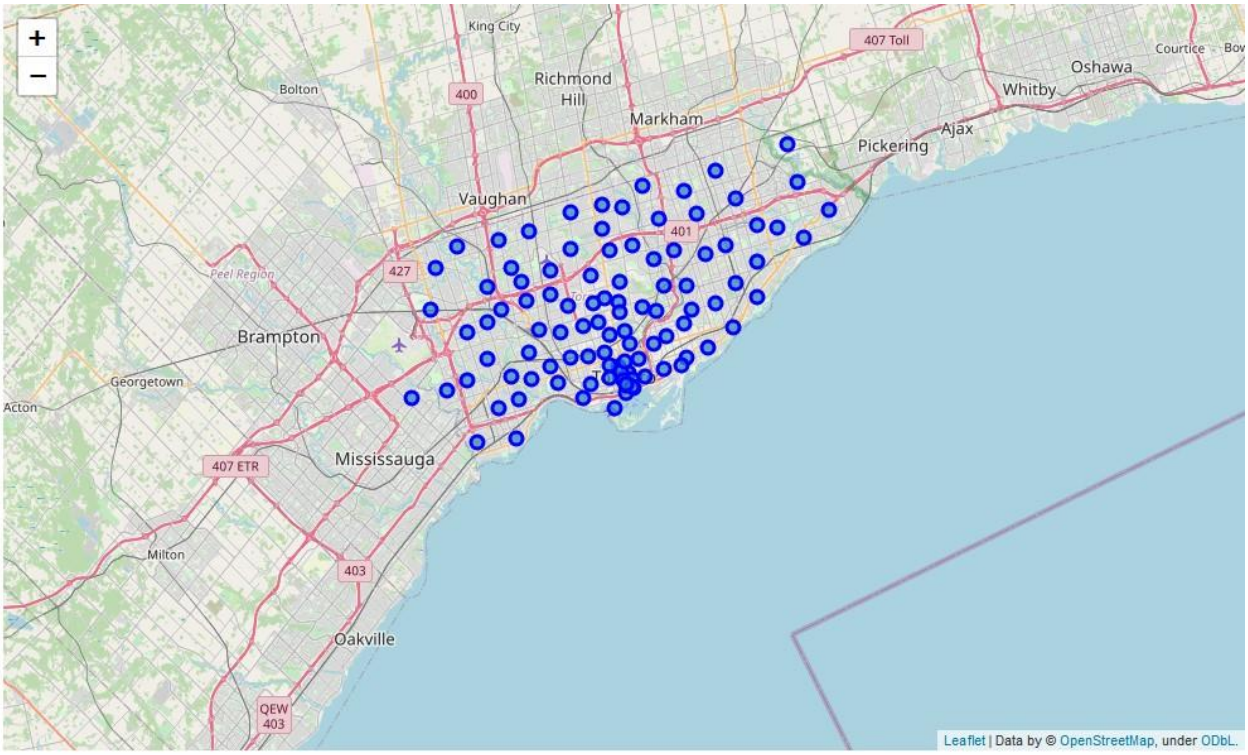
This project aims to identify the optimal location for a restaurant. Specifically, this report will be targeting foreign stakeholders interested in opening a Chinese restaurant in Toronto, Canada. Due to the vast array of restaurants already populating Toronto, I will try to locate areas that are lacking Chinese restaurants and are in close proximity to other shops (i.e. shopping centers or malls). Since the stakeholders are not local to the other and have no prior business dealings in Canada, they do not understand the market and which locations are currently experiencing economic success. I will use data science to generate a list of several areas that are prime candidates for this new restaurant.

2. Data

The data was both downloaded and scraped from several sources. A Wikipedia page for Toronto, CA postal codes contained a table of postal codes, neighborhoods, and boroughs which Ire scraped and loaded into a table. A CSV consisting of postal codes and their corresponding latitudinal and longitudinal coordinates was provided for the activity – this was then merged with the Wikipedia table to form a complete table with both lat/long coordinates and borough/neighborhood names. This was the main table that was operated on for the report. I then created a table using information from the Foursquare API about the given area consisting of venue name, type, and location. This was used for clustering and map rendering.

3. Methodology

In order visually explore the datasets, I rendered a map of all Toronto neighborhoods using Folium in conjunction with the data provided by the Foursquare API. One can select a point and see the neighborhood name and borough.



This was then combined with a search radius about each point to find all of the different types of venues in a given area – these later are compiled and added to a dataframe for clustering. I then created a table of the unique venue types and stored a count of each appearance. Afterwards, one hot encoding was used to determine the frequency with which a specific venue will be in any given neighborhood/borough. This enabled me to compile a list of the top 10 most common venues for each neighborhood. I then used k-means clustering to group the most similar regions based on their top 10's list.

	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
0	Berczy Park	Coffee Shop	Bakery	Cocktail Bar	Seafood Restaurant	Restaurant	Beer Bar	Pharmacy	Farmers Market	Cheese Shop	Beach
1	Brockton, Parkdale Village, Exhibition Place	Café	Breakfast Spot	Coffee Shop	Gym / Fitness Center	Gym	Pet Store	Performing Arts Venue	Nightclub	Music Venue	Italian Restaurant
2	CN Tower, King and Spadina, Railway Lands, Har...	Airport Lounge	Airport Service	Airport Terminal	Boat or Ferry	Harbor / Marina	Rental Car Location	Coffee Shop	Plane	Bar	Sculpture Garden
3	Central Bay Street	Coffee Shop	Sandwich Place	Italian Restaurant	Café	Salad Place	Bubble Tea Shop	Burger Joint	Thai Restaurant	Miscellaneous Shop	Japanese Restaurant

Cluster 2

```
In [57]: toronto_merged.loc[toronto_merged['Cluster Labels'] == 1, toronto_merged.columns[[1,2] + list(range(5, toronto_merged.shape[1]))]]
```

Out[57]:

	Borough	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
21	Central Toronto	Forest Hill North & West	1	Park	Trail	Jewelry Store	Sushi Restaurant	Wings Joint	Discount Store	Event Space	Ethiopian Restaurant	Escape Room	Electronics Store
33	Downtown Toronto	Rosedale	1	Park	Playground	Trail	Wings Joint	Dessert Shop	Ethiopian Restaurant	Escape Room	Electronics Store	Eastern European Restaurant	Dumpling Restaurant

Cluster 3

```
In [58]: toronto_merged.loc[toronto_merged['Cluster Labels'] == 2, toronto_merged.columns[[1,2] + list(range(5, toronto_merged.shape[1]))]]
```

Out[58]:

	Borough	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
3	East Toronto	The Beaches	2	Pizza Place	Asian Restaurant	Health Food Store	Trail	Pub	Donut Shop	Discount Store	Distribution Center	Dog Run	Doner Restaurant

Cluster 4

```
In [59]: toronto_merged.loc[toronto_merged['Cluster Labels'] == 3, toronto_merged.columns[[1,2] + list(range(5, toronto_merged.shape[1]))]]
```

Out[59]:

	Borough	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
29	Central Toronto	Moore Park, Summerhill East	3	Gym	Tennis Court	Diner	Falafel Restaurant	Event Space	Ethiopian Restaurant	Escape Room	Electronics Store	Eastern European Restaurant	Dumpling Restaurant

4. Observations and Conclusion

The ideal location to open the proposed Chinese restaurant would be in areas that are lacking multi-cultural cuisine. In this case, those areas are the Eastern Toronto Business district or St. James Town and Cabbagetown in Downtown Toronto. These are the most popular areas that are also lacking in restaurants similar to the proposed. Their top 10 lists indicate they are popular

with standard to-go style restaurants which Asian restaurants traditionally have had success with. The notion that a to-go restaurant is preferred can also lead to the ability of opening multiple, smaller locations rather than one large establishment as the needs of to-go eateries are less than that of traditional sit-down locations.