

The Battle of Neighborhoods

Where Moonbucks should
located their coffeehouse?



Introduction



- Toronto is an **international centre** for business and finance.
- The city is an **important centre** for the media, publishing, telecommunication, information technology and film production industries.
- Although much of the region's manufacturing activities take place outside the city limits, Toronto continues to be a **wholesale and distribution point** for the industrial sector.
- The city's **population** grew by 4% (96,073 residents) between 1996 and 2001, 1% (21,787 residents) between 2001 and 2006, 4.3% (111,779 residents) between 2006 and 2011, and 4.5% (116,511) between 2011 and 2016.

Business plan



- **Moonbucks Co.** is an multinational coffee company and coffeehouse chain. It has thousands location worldwide at the end of 2018.
- **To compete with Starbucks**, it provides high perfect services as well as high quality coffee, initially distinguishing itself from other coffee-serving venues in the US by taste, quality, and customer experience while popularizing darkly roasted coffee.
- Moonbucks desires to choose a **location** with a density traffic but median cost of coffeeshop rental, to test their business first, then expands rapidly to dominate the market.

Data Source



- Demographic Data of Toronto come from [Wikipedia](#) and [Toronto Transit Blog](#)
- Postal Code and Borough of Toronto come from [Wikipedia](#).
- All venue's data come from API of [Foursquare.com](#).

P.S. In further researching, we still need to acquire more detailed demographic data of Toronto, such as the population density/traffic of each borough, and also the shop rental of each borough, in order to estimate the revenue and cost.

Methodology



- **Pandas** provide high-level data structures and a vast variety of tools for analysis. The data once sorted and filtered is put into Dataframes to perform further analysis and visualizations.
- **Matplotlib** is the most popular data visualization library in Python. It is used to create figures and plots.
- Geocoding refers to the conversion of addresses into coordinates and, vice versa (reverse geocoding). **Geopy** is an excellent Python library for (among others) geocoding and reverse geocoding that supports many APIs. In this project, the **Nominatim API**, which is based on OpenStreetMap (OSM) data, is necessary.
- **Folium** is a powerful data visualization library in Python that was built primarily to visualize geospatial data. With Folium, one can create a map of any location in the world if its latitude and longitude values are known. As these maps were interactive in nature, it was quite handy to zoom in and out locations once rendered.

Methodology

The first step in determining the solution to the given problem of what neighborhood should the client open a coffeehouse is to import our needed libraries, data about Toronto neighborhoods, and then clean the data. Here is an output of our cleaned data that contains information related to the neighborhoods that are found within the Toronto.

	Postcode	Borough	Neighbourhood
0	M1B	Scarborough	Rouge,Malvern
1	M1C	Scarborough	Highland Creek,Rouge Hill,Port Union
2	M1E	Scarborough	Guildwood,Morningside,West Hill
3	M1G	Scarborough	Woburn
4	M1H	Scarborough	Cedarbrae
5	M1J	Scarborough	Scarborough Village
6	M1K	Scarborough	East Birchmount Park,Ionview,Kennedy Park
7	M1L	Scarborough	Clairlea,Golden Mile,Oakridge
8	M1M	Scarborough	Cliffcrest,Clifftside,Scarborough Village West
9	M1N	Scarborough	Birch Cliff,Clifftside West
10	M1P	Scarborough	Dorset Park,Scarborough Town Centre,Wexford He...
11	M1R	Scarborough	Maryvale,Wexford
12	M1S	Scarborough	Agincourt
13	M1T	Scarborough	Clarks Corners,Sullivan,Tam O'Shanter
14	M1V	Scarborough	Agincourt North,L'Amoreaux East,Milliken,Steel...
15	M1W	Scarborough	L'Amoreaux West
16	M1X	Scarborough	Upper Rouge
17	M2H	North York	Hillcrest Village
18	M2J	North York	Fairview,Henry Farm,Oriole
19	M2K	North York	Bayview Village
20	M2L	North York	Silver Hills,York Mills

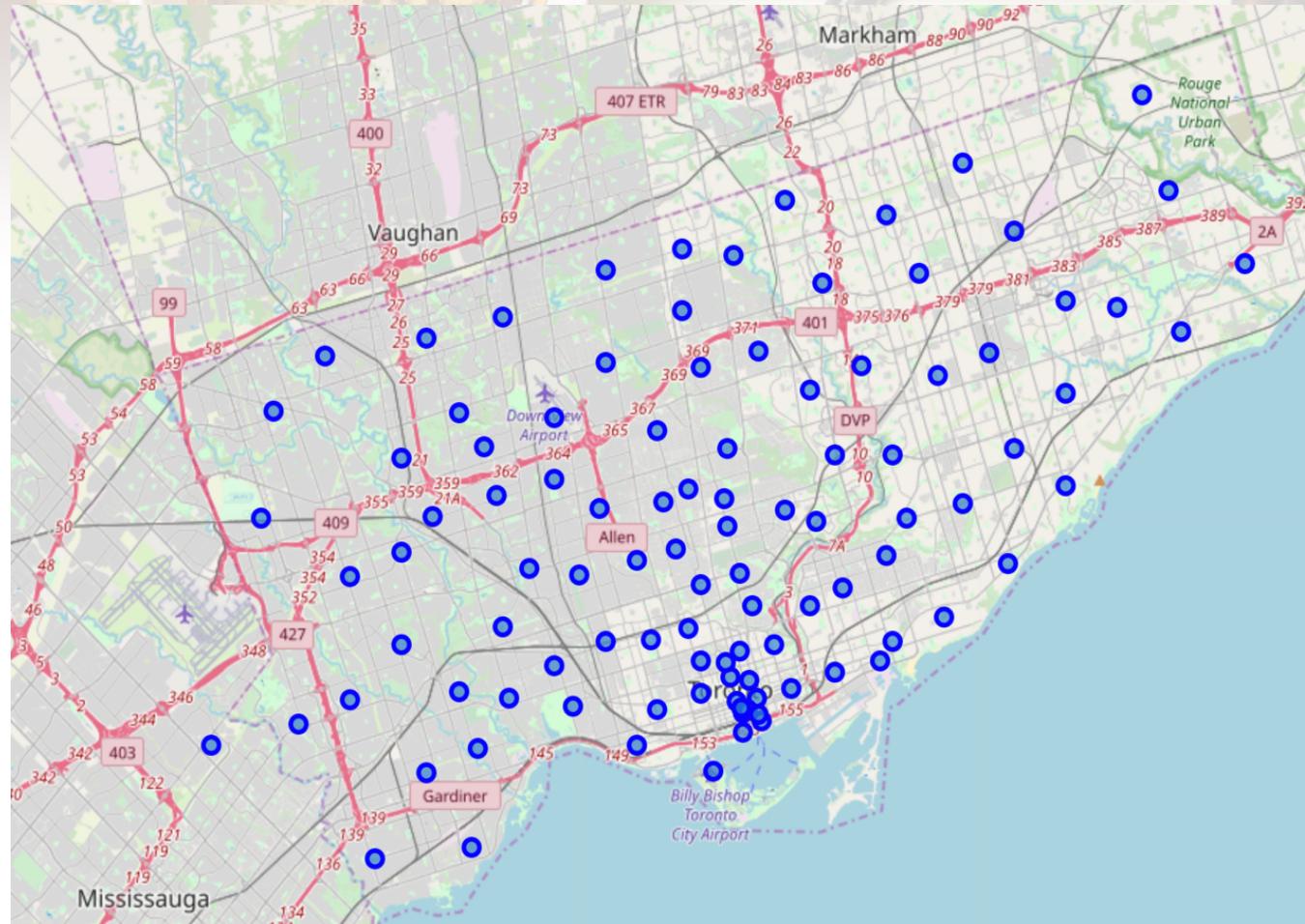
Methodology

Now that we have the neighborhood information, we will move on to getting the geo-spatial (Latitude and Longitude) information for the given neighborhoods.

	Postcode	Borough	Neighbourhood	Latitude	Longitude
0	M1B	Scarborough	Rouge,Malvern	43.806686	-79.194353
1	M1C	Scarborough	Highland Creek,Rouge Hill,Port Union	43.784535	-79.160497
2	M1E	Scarborough	Guildwood,Morningside,West Hill	43.763573	-79.188711
3	M1G	Scarborough	Woburn	43.770992	-79.216917
4	M1H	Scarborough	Cedarbrae	43.773136	-79.239476
5	M1J	Scarborough	Scarborough Village	43.744734	-79.239476
6	M1K	Scarborough	East Birchmount Park,Ionview,Kennedy Park	43.727929	-79.262029
7	M1L	Scarborough	Clairlea,Golden Mile,Oakridge	43.711112	-79.284577
8	M1M	Scarborough	Cliffcrest,Clifftside,Scarborough Village West	43.716316	-79.239476
9	M1N	Scarborough	Birch Cliff,Clifftside West	43.692657	-79.264848
10	M1P	Scarborough	Dorset Park,Scarborough Town Centre,Wexford He...	43.757410	-79.273304
11	M1R	Scarborough	Maryvale,Wexford	43.750072	-79.295849
12	M1S	Scarborough	Agincourt	43.794200	-79.262029
13	M1T	Scarborough	Clarks Corners,Sullivan,Tam O'Shanter	43.781638	-79.304302
14	M1V	Scarborough	Agincourt North,L'Amoreaux East,Milliken,Steel...	43.815252	-79.284577
15	M1W	Scarborough	L'Amoreaux West	43.799525	-79.318389
16	M1X	Scarborough	Upper Rouge	43.836125	-79.205636
17	M2H	North York	Hillcrest Village	43.803762	-79.363452
18	M2J	North York	Fairview,Henry Farm,Oriole	43.778517	-79.346556
19	M2K	North York	Bayview Village	43.786947	-79.385975
20	M2L	North York	Silver Hills,York Mills	43.757490	-79.374714

Methodology

Next, we will generate a folium map to show the neighborhoods within Toronto.



Methodology

Our next step is to use the FourSquare API to determine what types of business establishments are in each neighborhood. This will help determine our potential client and we will determine the traffic of our coffeehouse. By doing this we can start to collect the most popular venues in each borough as follows(e.g.).

----Berczy Park----

	venue	freq
0	Coffee Shop	0.09
1	Cocktail Bar	0.05
2	Seafood Restaurant	0.04
3	Steakhouse	0.04
4	Cheese Shop	0.04

----Caledonia-Fairbanks----

	venue	freq
0	Park	0.33
1	Women's Store	0.17
2	Market	0.17
3	Fast Food Restaurant	0.17
4	Pharmacy	0.17

----Agincourt----

	venue	freq
0	Sandwich Place	0.25
1	Lounge	0.25
2	Breakfast Spot	0.25
3	Chinese Restaurant	0.25
4	Yoga Studio	0.00

----Bayview Village----

	venue	freq
0	Café	0.25
1	Bank	0.25
2	Chinese Restaurant	0.25
3	Japanese Restaurant	0.25
4	Yoga Studio	0.00

----Adelaide,King,Richmond----

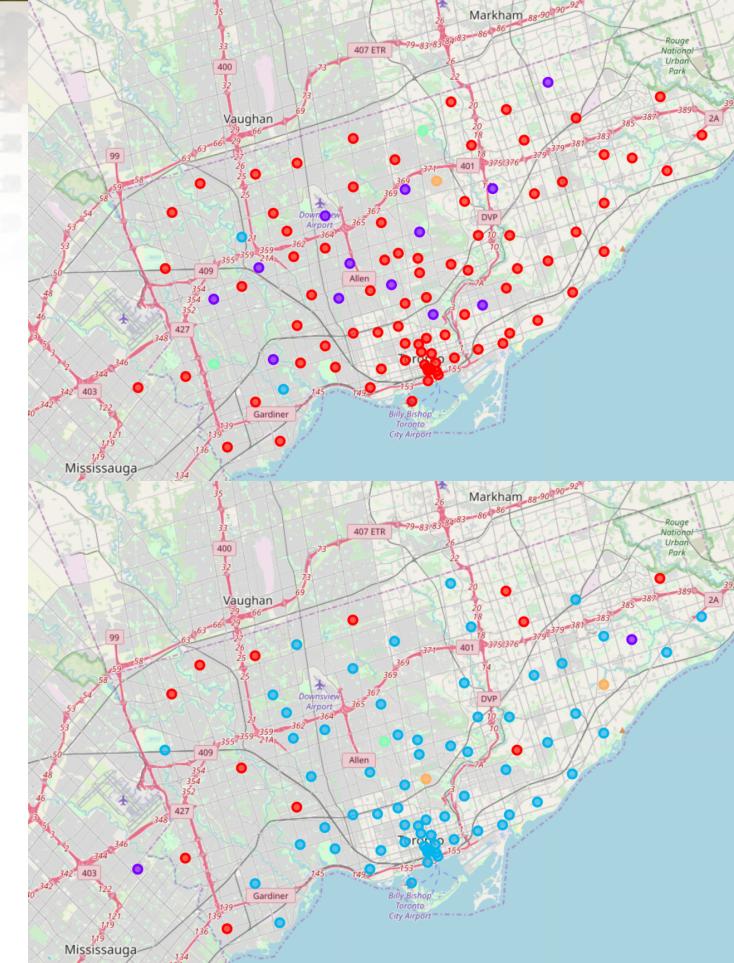
	venue	freq
0	Café	0.05
1	Coffee Shop	0.05
2	Bar	0.04
3	Steakhouse	0.04
4	American Restaurant	0.04

----Alderwood,Long Branch----

	venue	freq
0	Pizza Place	0.2
1	Skating Rink	0.1
2	Sandwich Place	0.1
3	Pub	0.1
4	Dance Studio	0.1

Methodology

- Our next step will be to use K-Clustering to determine, more in depth, where the best potential site will be located.
- The clustering shows in red indicates that there are a lot of boroughs located in Toronto are high traffic place for restaurant/coffeehouse. But the wide range of data is not precise enough for us to choose the location. So we refine the data by clustering again and see what happens.

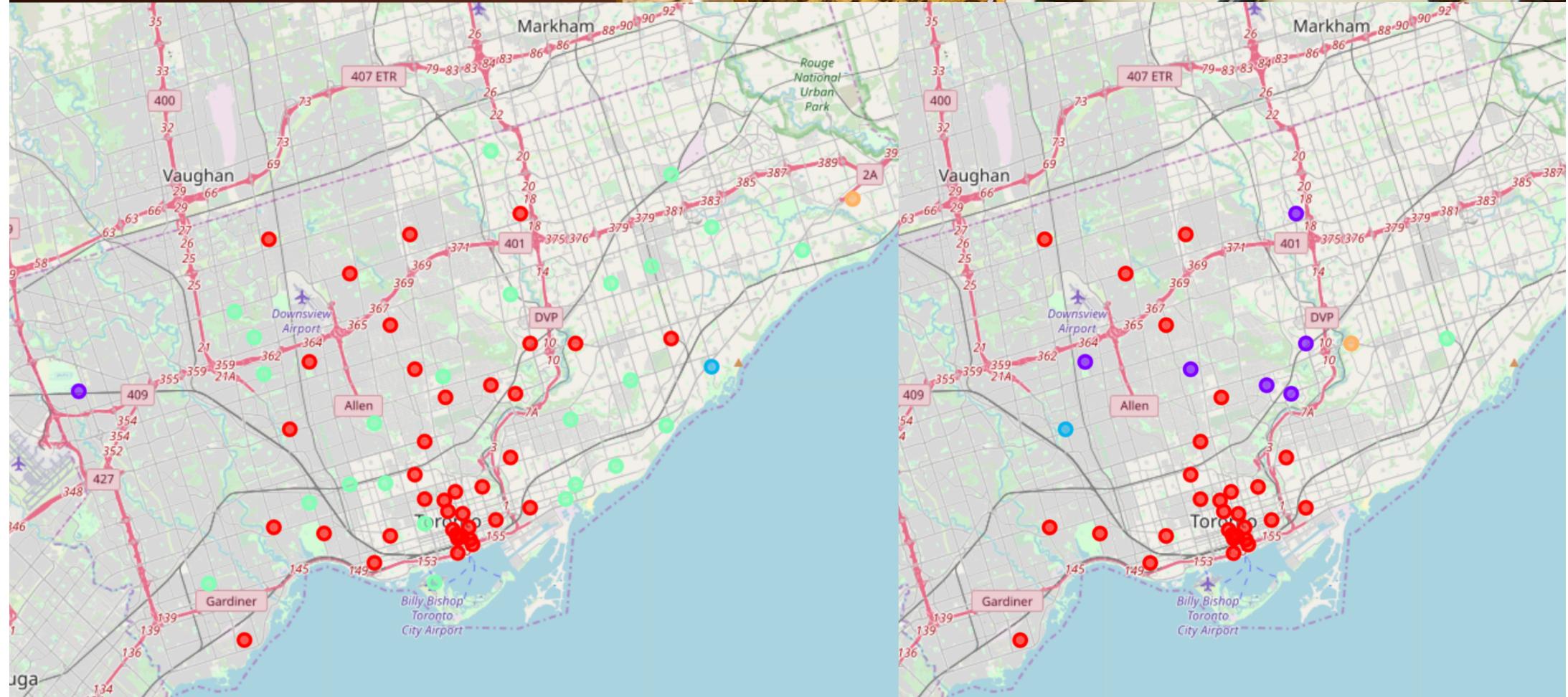


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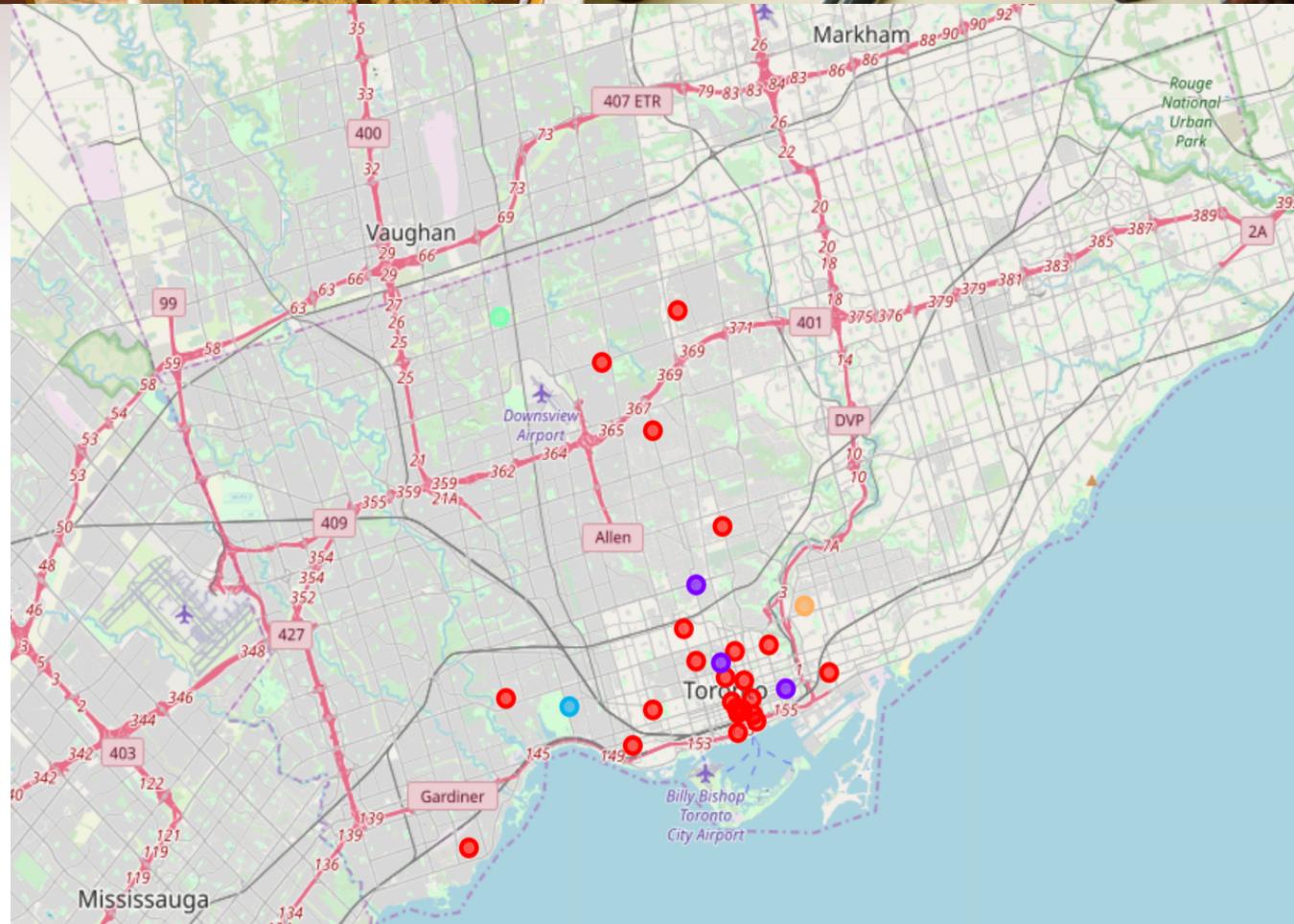
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Methodology



Methodology

To refine the data by clustering 4 more times, we eliminate the data into an acceptable size and the data show that most of the places we can choose are located in the Downtown Toronto, which also has a high rental.



Methodology

Borough	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
North York	0.0	Sushi Restaurant	Coffee Shop	Restaurant	Ramen Restaurant	Sandwich Place	Japanese Restaurant	Café	Steakhouse	Plaza	Lounge
North York	0.0	Coffee Shop	Pizza Place	Diner	Bridal Shop	Shopping Mall	Sandwich Place	Middle Eastern Restaurant	Fried Chicken Joint	Supermarket	Sushi Restaurant
East Toronto	0.0	Café	Coffee Shop	Gastropub	American Restaurant	Bakery	Italian Restaurant	Latin American Restaurant	Stationery Store	Bookstore	Middle Eastern Restaurant
Central Toronto	0.0	Pizza Place	Dessert Shop	Sandwich Place	Restaurant	Thai Restaurant	Italian Restaurant	Coffee Shop	Café	Sushi Restaurant	Flower Shop
Downtown Toronto	0.0	Coffee Shop	Restaurant	Pub	Café	Pizza Place	Bakery	Park	Italian Restaurant	Caribbean Restaurant	Liquor Store
Downtown Toronto	0.0	Japanese Restaurant	Coffee Shop	Sushi Restaurant	Gay Bar	Restaurant	Gastropub	Burger Joint	Pub	Café	Men's Store
Downtown Toronto	0.0	Coffee Shop	Clothing Store	Cosmetics Shop	Café	Middle Eastern Restaurant	Tea Room	Japanese Restaurant	Italian Restaurant	Diner	Pizza Place
Downtown Toronto	0.0	Café	Coffee Shop	Hotel	Restaurant	Clothing Store	Cocktail Bar	Bakery	Breakfast Spot	Cosmetics Shop	Gastropub
Downtown Toronto	0.0	Coffee Shop	Cocktail Bar	Italian Restaurant	Beer Bar	Steakhouse	Seafood Restaurant	Farmers Market	Café	Cheese Shop	Bakery
Downtown Toronto	0.0	Coffee Shop	Café	Italian Restaurant	Burger Joint	Middle Eastern Restaurant	Sandwich Place	Bubble Tea Shop	Japanese Restaurant	Bakery	Sushi Restaurant
Downtown Toronto	0.0	Coffee Shop	Café	Bar	American Restaurant	Steakhouse	Thai Restaurant	Hotel	Restaurant	Gym	Bakery
Downtown Toronto	0.0	Coffee Shop	Aquarium	Hotel	Café	Italian Restaurant	Restaurant	Bakery	Sporting Goods Shop	Scenic Lookout	Fried Chicken Joint
Downtown Toronto	0.0	Coffee Shop	Hotel	Café	Restaurant	Bakery	Deli / Bodega	Italian Restaurant	Gastropub	American Restaurant	Bar
Downtown Toronto	0.0	Coffee Shop	Café	Hotel	Restaurant	Steakhouse	American Restaurant	Gastropub	Seafood Restaurant	Italian Restaurant	Deli / Bodega

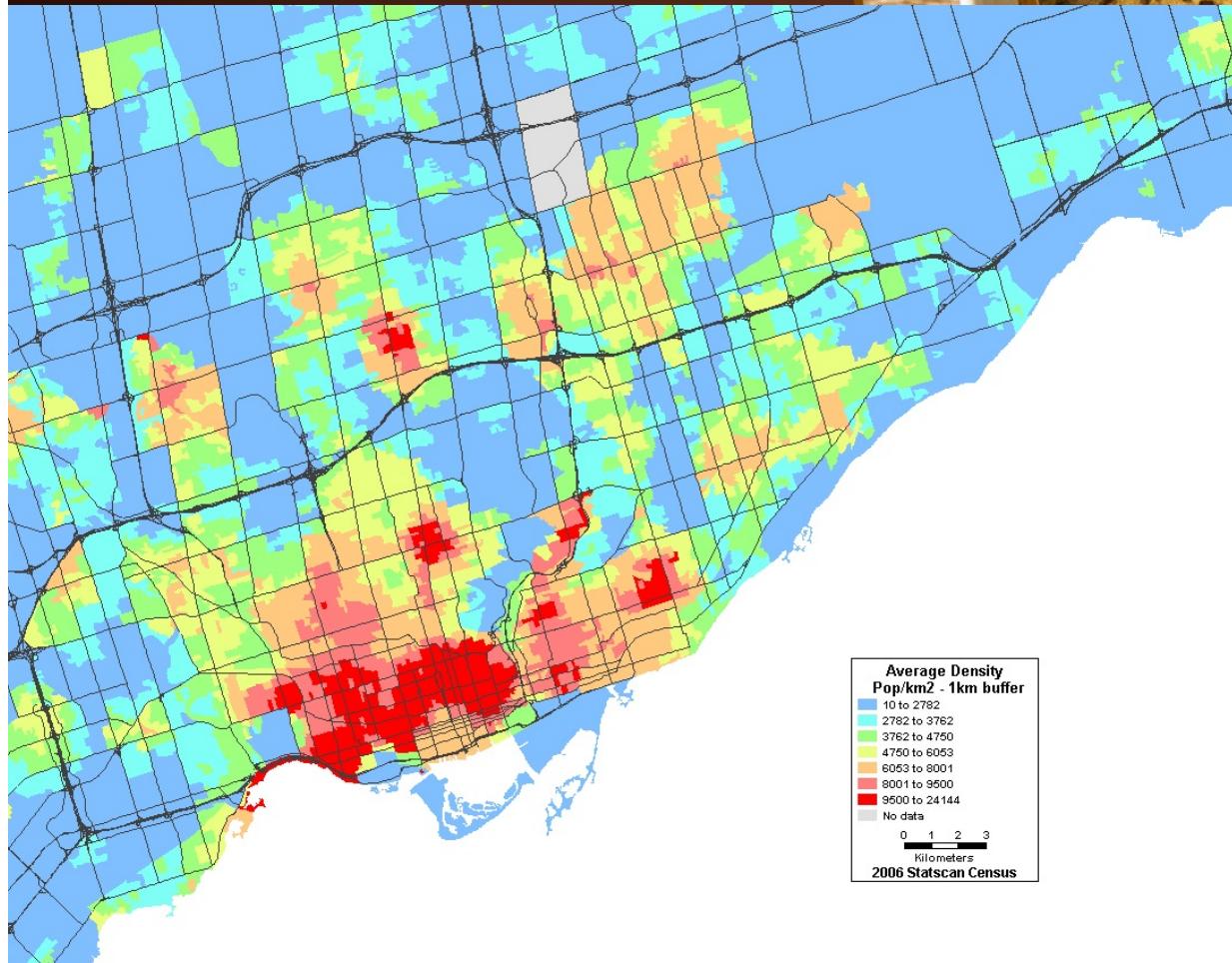


Result

From the result of clustering analysis, we can easily find that the best places for coffeehouse are in Downtown Toronto. Due to the last table, in Downtown Toronto, coffee Shop has a very high ranking in the most common venues. So it's a reasonable choice to open a coffee shop in Downtown Toronto.



Discussion



Is it true to open a coffee shop firstly in Downtown Toronto? Since we can get the conclusion that the most common venues in Downtown Toronto are coffee shops, we can also conclude that the coffee shops there are meeting a highly competition. So let's acquire some other information of Toronto to clarify if opening a coffeehouse in Downtown Toronto firstly is a good choice. Here is the population density of Toronto.

Discussion

From the graph above, we can see that the best places for coffee shop are highly correlated to the population density. Besides Downtown Toronto because of its highly competitiveness and high rental cost, we can choose to open a coffeehouse firstly in neighborhood Willowdale South, borough North York to test our business, then expand our business into Downtown Toronto.



Conclusion



This project was aimed to providing substantial data to support Moonbucks in selecting a neighborhood in Toronto for its investment. However, the final decision will depend on many other factors such as financial inputs, operational agreements & business-related terms and conditions agreed upon by all the stakeholders involved.

After all, the future of Moonbucks in Toronto would depend on how well it is able to sustain with the quality and service in addition to providing a unique experience to coffee lovers.