Identifying Neighbourhoods of Toronto to open a Coffee Shop in

Coursera Project

2019

“I have measured out my life with coffee spoons”

- T.S. Eliot

- Coffee shops are a very lucrative venue to open across the world, providing the public with a very desired resource
- Many new business owners tap into the coffee shop market in order to establish themselves and carve their own piece of the consumer industry
- But there are a lot of coffee shops in Toronto, so there needs to be a way to identify neighbourhoods such that
- - There are venues around the neighbourhood conducive to opening a coffee shop
- - There is not already enough coffee shops in the neighbourhood to oversaturate the market and make it difficult for a new owner to break in

Data Acquisition and Cleaning

- - Toronto neighbourhood data has been scraped from: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
- Geospatial data for these neighbourhoods was scraped from: http://cocl.us/Geospatial_data
- The FourSquare API was used for venue and neighbourhood data, the website of which is: https://developer.foursquare.com/
- This data was compiled into two main dataframes, one of which consisted of the longitude, latitude, neighbourhoods and boroughs while the other has neighbourhoods relevant to their venues contained within. The dataframes had the dimension (103, 5) and (100,275)) respectively.

Snapshot of the data in dataframes

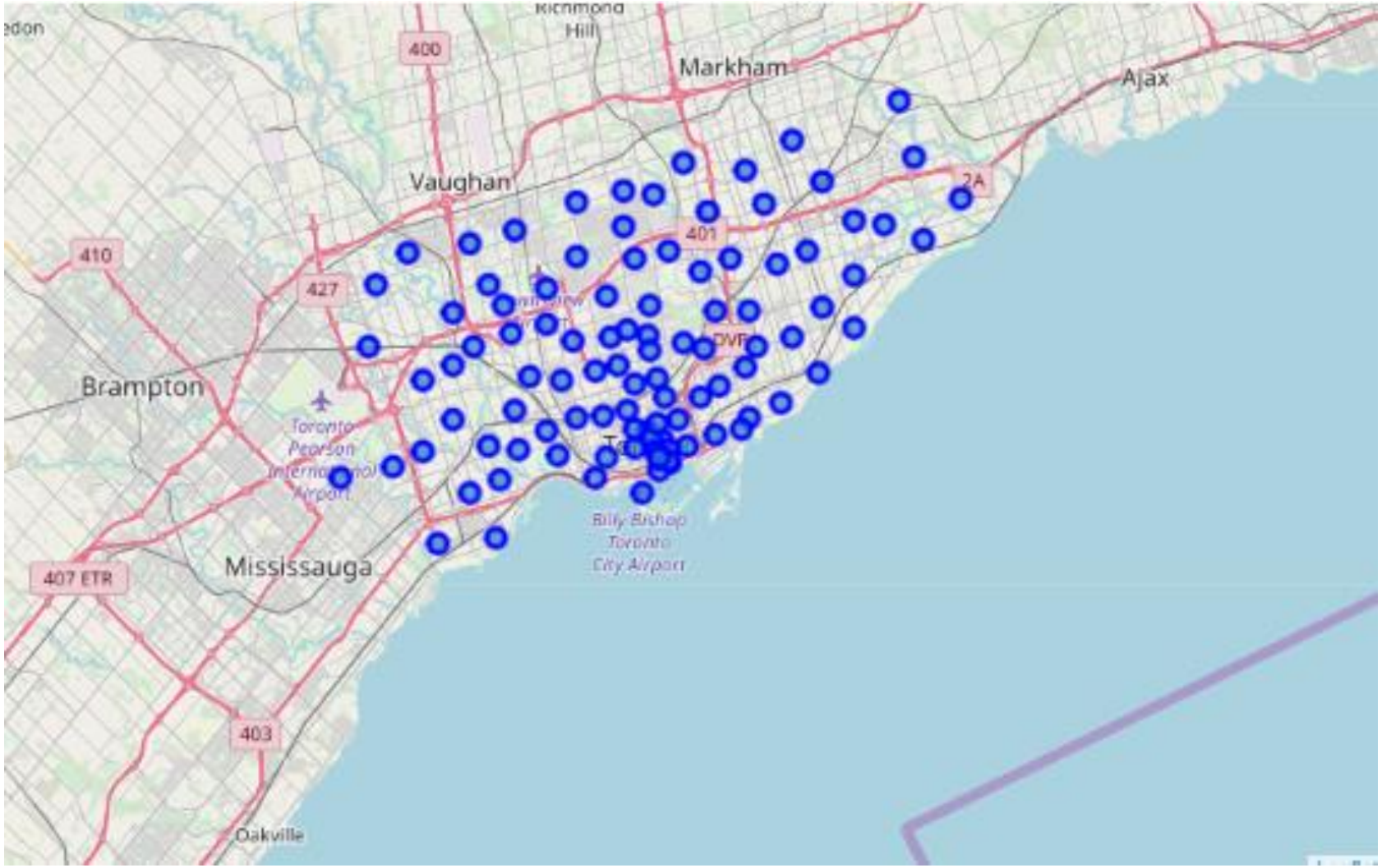
Coordinate data of Neighbourhoods in Toronto, CA

	Postal Code	Borough	Neighbourhood	Latitude	Longitude
0	M3A	North York	Parkwoods	43.753259	-79.329656
1	M4A	North York	Victoria Village	43.725882	-79.315572
2	M5A	Downtown Toronto	Harbourfront, Regent Park	43.654260	-79.360636
3	M6A	North York	Lawrence Heights, Lawrence Manor	43.718518	-79.464763
4	M7A	Queen's Park	Queen's Park	43.662301	-79.389494
5	M9A	Etobicoke	Islington Avenue	43.667856	-79.532242
6	M1B	Scarborough	Rouge, Malvern	43.806686	-79.194353
7	M3B	North York	Don Mills North	43.745906	-79.352188
8	M4B	East York	Woodbine Gardens, Parkview Hill	43.706397	-79.309937
9	M5B	Downtown Toronto	Ryerson, Garden District	43.657162	-79.378937

Comparison of Venues and Neighbourhoods in Toronto, CA

	Neighbourhood	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
0	Adelaide, King, Richmond	Coffee Shop	Café	Steakhouse	Thai Restaurant	American Restaurant	Clothing Store	Gym	Hotel	Bakery
1	Agincourt	Lounge	Breakfast Spot	Skating Rink	Clothing Store	Yoga Studio	Electronics Store	Doner Restaurant	Donut Shop	Drugstore
2	Agincourt North, L'Amoreaux East, Milliken, St...	Playground	Park	Yoga Studio	Eastern European Restaurant	Discount Store	Dog Run	Doner Restaurant	Donut Shop	Drugstore
3	Albion Gardens, Beaumond Heights, Humbergate, ...	Grocery Store	Pharmacy	Coffee Shop	Beer Store	Sandwich Place	Fried Chicken Joint	Fast Food Restaurant	Pizza Place	Construction & Landscaping
4	Alderwood, Long Branch	Pizza Place	Pub	Gym	Sandwich Place	Pharmacy	Coffee Shop	Skating Rink	Pool	Yoga Studio

Visualisation of Toronto Neighbourhoods



Comparison of correlation of other venues to coffee shops

Positive Correlation (as these increase in frequency, so do coffee shops)

- Coffee shop 1.000
- Korean Restaurant 0.560
- Nightclub 0.256
- Restaurant 0.245
- Diner 0.235
- Theatre 0.230
- French Restaurant 0.212
- Seafood Restaurant 0.211
- Salad Place 0.208
- Metro Station 0.185

Negative Correlation (as these increase in frequency, coffee shops decrease)

- Park -0.270
- Bus Line -0.199
- Playground -0.155
- Trail -0.152
- Home Service -0.149
- Athletics and Sports -0.124
- Shopping Mall -0.121
- Baseball Field -0.120
- Construction & Landscaping -0.120
- Fast Food Restaurant -0.119

Using KNN we create a neighbourhood then calculate the distance between this ideal neighbourhood and those already existing in Toronto

First, take the dummy neighbourhood made of the correlations

	Accessories Store	Adult Boutique	Afghan Restaurant	Airport	Airport Food Court	Airport Gate	Airport Lounge	Airport Service	Airport Terminal	American Restaurant	Antique Shop
0	0.036473	0.004574	0.004574	0.103727	0.087178	0.087178	0.087178	0.087178	0.087178	0.064398	0.063727

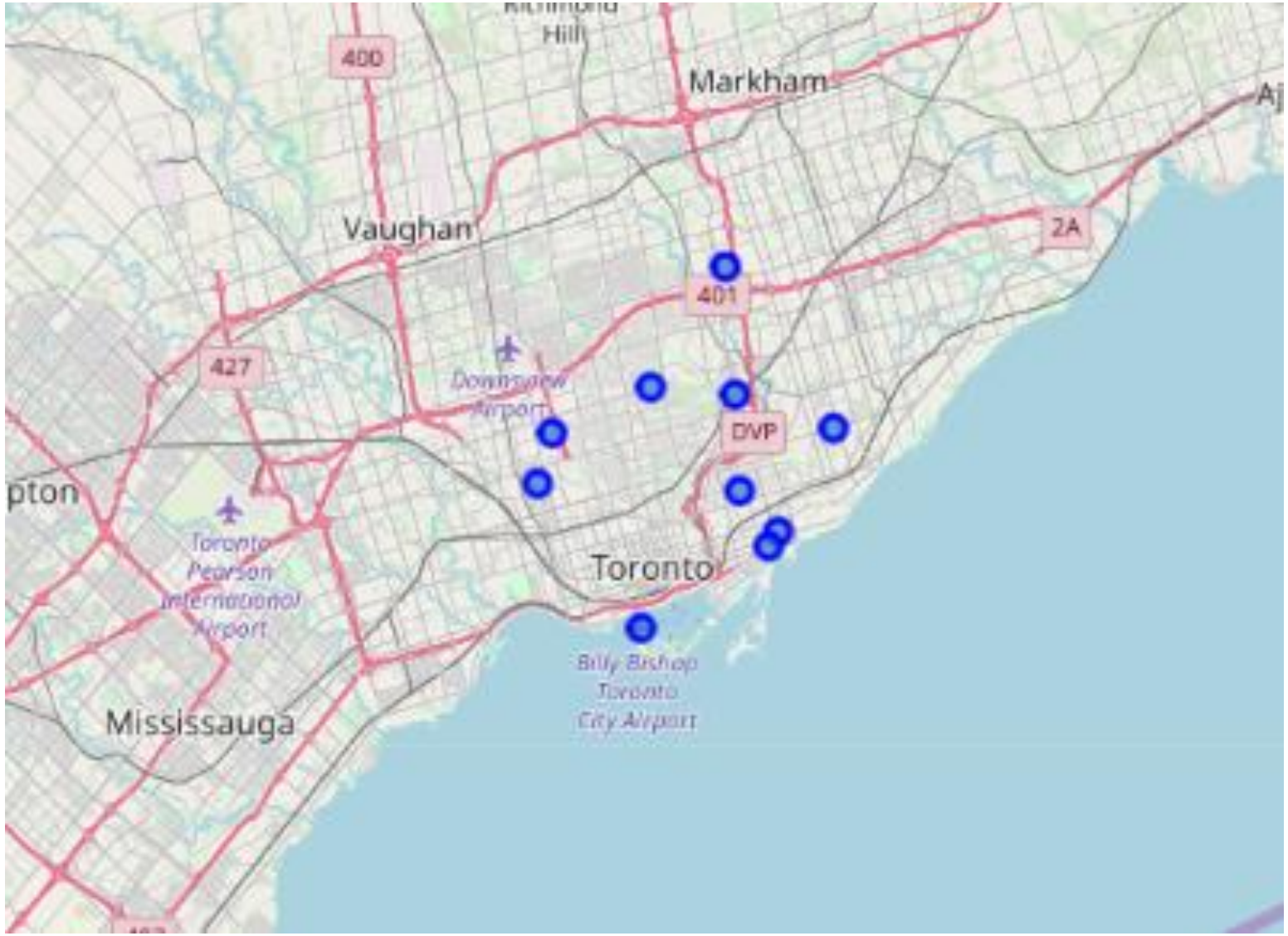
Then compare to the mean frequencies of venues in each neighbourhood to find closest matches

	Neighbourhood	Accessories Store	Adult Boutique	Afghan Restaurant	Airport	Airport Food Court	Airport Gate	Airport Lounge	Airport Service	Airport Terminal	American Restaurant
0	Adelaide, King, Richmond	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.03
1	Agincourt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
2	Agincourt North, L'Amoreaux East, Milliken, St...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
3	Albion Gardens, Beaumond Heights, Humbergate, ...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
4	Alderwood, Long Branch	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00

Ten neighbourhoods likely to provide success to a new coffee shop based on low competition and desirable co-venues

	Neighbourhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
85	The Beaches West, India Bazaar	Park	Sushi Restaurant	Brewery	Sandwich Place	Burger Joint
42	Fairview, Henry Farm, Oriole	Clothing Store	Fast Food Restaurant	Coffee Shop	Asian Restaurant	Bakery
23	Clairlea, Golden Mile, Oakridge	Bus Line	Bakery	Bus Station	Metro Station	Soccer Field
12	Business Reply Mail Processing Centre 969 Eastern	Yoga Studio	Garden Center	Smoke Shop	Farmers Market	Light Rail Station
46	Glencairn	Park	Italian Restaurant	Japanese Restaurant	Bakery	Arcade
14	CN Tower, Bathurst Quay, Island airport, Harbo...	Airport Lounge	Airport Terminal	Airport Service	Harbor / Marina	Boat or Ferry
62	Lawrence Park	Park	Dim Sum Restaurant	Swim School	Bus Line	Ethiopian Restaurant
40	East Toronto	Metro Station	Park	Coffee Shop	Convenience Store	Yoga Studio
44	Flemingdon Park, Don Mills South	Beer Store	Gym	Asian Restaurant	Coffee Shop	Bike Shop
16	Caledonia-Fairbanks	Park	Fast Food Restaurant	Market	Pharmacy	Women's Store

Visualisation of locations of the ten chosen neighbourhoods



Conclusion and Future Directions

- - Through using nearest neighbour and distance measures 10 neighbourhoods were identified where coffee shops could be successful based on their co-venues and their competition in the market
- This is a useful model as it could be applied to other cities or different types of venue within Toronto, such as restaurants, with little effort
- The model could be improved with more data to add a measure of classification rather than just clustering and distance
  - Financial data about success of cafes in neighbourhoods could be applied
  - Data from similar towns to Toronto could provide a more general model
  - Census data on populations of the neighbourhoods would enrich the dataset and give sociological reasoning to whether or not a coffee shop will be successful