

The Battle of the Neighbourhoods

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Problem Statement

- ▶ Manchester is an international university city with lots of students from different backgrounds who want to move to the world's financial centres for post-graduation employment. Everyone is different, but we all agree that the Mancunian social scene is great.
- ▶ I am looking to move to either Toronto or New York
- ▶ But how do I decide which city and, more specifically, which neighbourhood I want to live in?

Data

Data I used and the respective sources:

- ▶ Used mapawi to get Manchester postcodes and longitude/latitude data (<http://zip-code.en.mapawi.com/united-kingdom/2/greater-manchester/2/60/manchester/m1/25483/>)
- ▶ I will use Foursquare API to get the most common venues of given neighbourhoods in Manchester, Toronto and New York (<https://foursquare.com/developers/>)
- ▶ Toronto neighbourhood data taken from Wikipedia (https://en.wikipedia.org/wiki/List_of_neighbourhoods_in_Toronto)
- ▶ New York neighbourhood data taken from work completed on the IBM Data Science Professional Certificate

Methodology

Part A - Data Mining

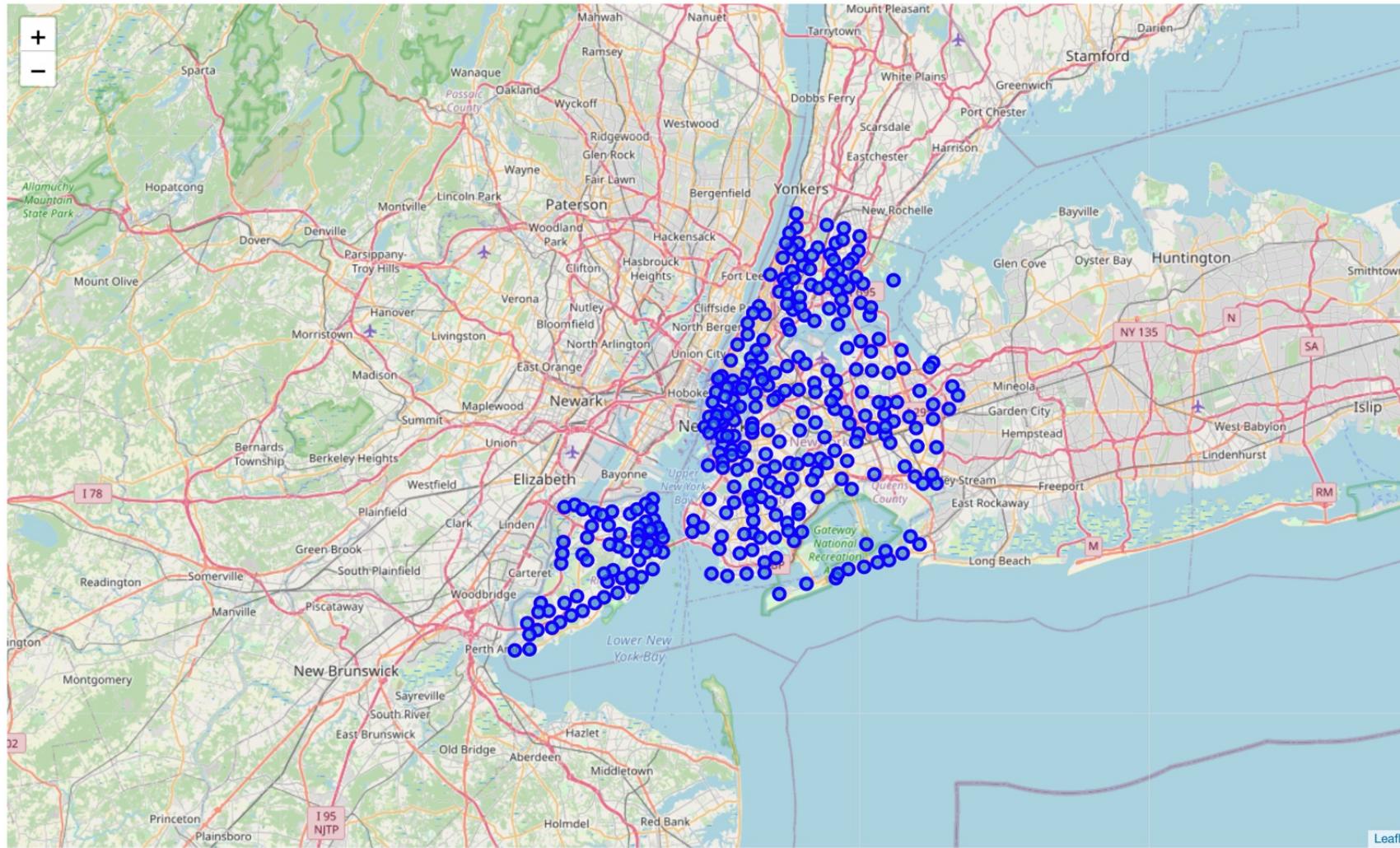
New York data -

- ▶ I used pre-existing New York location data that was used during week 3 of the capstone module
- ▶ Pandas and a loop helped me produce the following table:

ny_neighbourhoods.head()				
	Borough	Neighbourhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585

- ▶ There was a total of 5 boroughs and a total of 306 neighbourhoods.

New York Location Data Visualisation



Part A - Data Mining

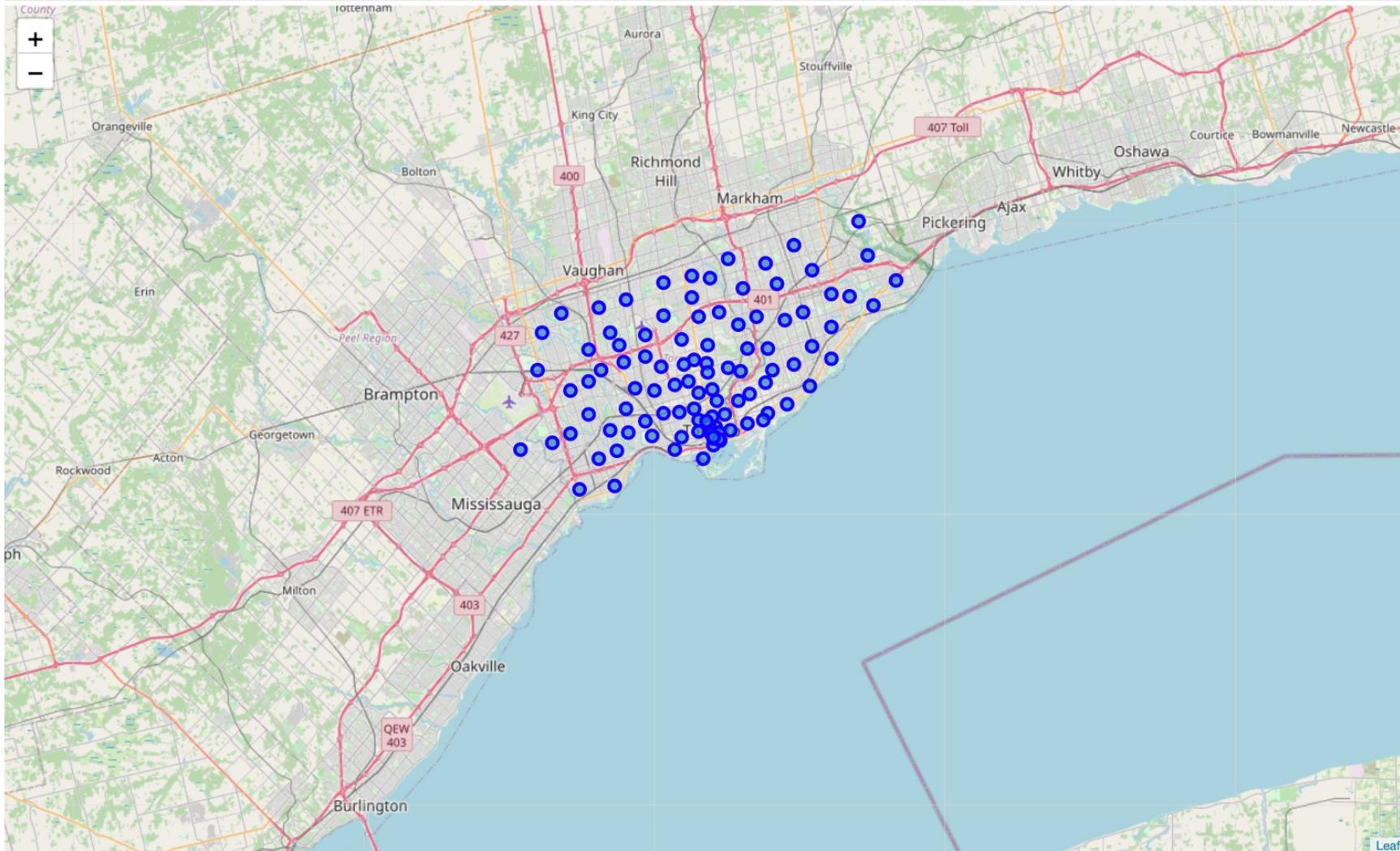
Toronto data -

- ▶ Again, this data was provided during the course, I amalgamated the neighbourhood data together with the latitude and longitude data in Excel

	Postal Code	Borough	Neighbourhood	Latitude	Longitude
0	M1B	Scarborough	Malvern, Rouge	43.806686	-79.194353
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	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

- ▶ In total there are 10 boroughs and 103 neighbourhoods.

Toronto Location Data Visualisation

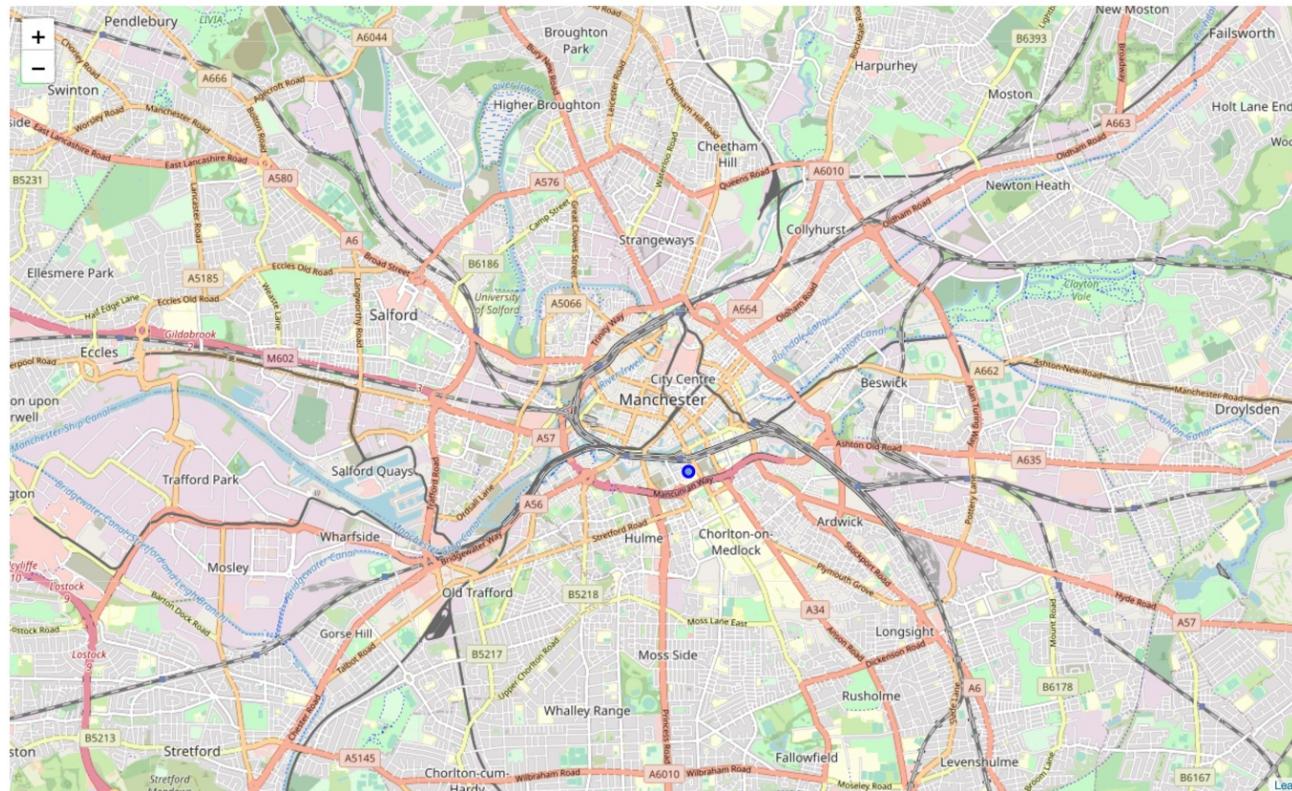


Part A - Data Mining

Manchester data -

- ▶ I went to a website called Mapawi for this data, cleaned in Excel so that I was left with just my home neighbourhood:

Postal Code	Borough	Neighbourhood	Latitude	Longitude
0	M1 5QD	Deansgate	53.472531	-2.240887



Part A - Data Mining

- ▶ The final step of this part was to amalgamate all the location data for Toronto, New York and Manchester onto one table:

	Borough	Neighbourhood	Latitude	Longitude
0	Deansgate	Oxford Road	53.472531	-2.240887
1	Scarborough	Malvern, Rouge	43.806686	-79.194353
2	Scarborough	Rouge Hill, Port Union, Highland Creek	43.784535	-79.160497
3	Scarborough	Guildwood, Morningside, West Hill	43.763573	-79.188711
4	Scarborough	Woburn	43.770992	-79.216917

Part B - Finding Venue Data

- I used the Foursquare API with a limit of 300 units
- After using one hot encoding and formatting I was able to produce the following dataframe

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	10th Most Common Venue
0 Agincourt	Breakfast Spot	Latin American Restaurant	Yoga Studio	Farmers Market	Entertainment Service	Escape Room	Ethiopian Restaurant	Event Service	Event Space	Eye Doctor
1 Alderwood, Long Branch	Pub	Coffee Shop	Pizza Place	Gym	Pharmacy	Yoga Studio	Factory	Empanada Restaurant	English Restaurant	Entertainment Service
2 Allerton	Pizza Place	Spa	Discount Store	Chinese Restaurant	Martial Arts School	Electronics Store	Bike Trail	Gas Station	Donut Shop	Fast Food Restaurant
3 Annadale	American Restaurant	Train Station	Yoga Studio	Farmers Market	English Restaurant	Entertainment Service	Escape Room	Ethiopian Restaurant	Event Service	Event Space
4 Arden Heights	Deli / Bodega	Coffee Shop	Bus Stop	Pharmacy	Yoga Studio	Farm	Entertainment Service	Escape Room	Ethiopian Restaurant	Event Service

- Quick sense-check on my neighbourhood:

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	10th Most Common Venue
248 Oxford Road	Pub	Bar	Coffee Shop	Burrito Place	Pop-Up Shop	Bakery	Indian Restaurant	Middle Eastern Restaurant	Fast Food Restaurant	Pool

- Looks like everything's in order!

k-Nearest-Neighbour Analysis

- ▶ I am not looking to segment these neighbourhoods as one would typically, but rather find 10-15 neighbourhoods in Toronto and/or New York that are similar to where I currently live.
- ▶ In total I did 6 rounds of k clustering, starting with k-clusters = 40. I found this number of clusters to be insufficient as I was left with over 100 neighbourhoods.
- ▶ For round 2 I increased the number of clusters to 80 and found the same problem as in round 1.
- ▶ In round 3 the number of clusters was 120 but still the same issue arose.
- ▶ From here I increased the number of clusters all the way up to 350 but found my neighbourhood to be in a cluster by itself which is also no good.
- ▶ Round 5 had 250 clusters and I was left with 14 similar neighbourhoods, but I felt I could refine the results a bit more.
- ▶ My final round, round 6, had 265 clusters. I will outline the results in the following section.

Results

	Borough	Neighbourhood	Latitude	Longitude	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
0	Deansgate	Oxford Road	53.472531	-2.240887	108.0	Pub	Bar	Coffee Shop	Burrito Place	Pop-Up Shop	Bakery	Indian Restaurant	Middle Eastern Restaurant	Fast Food Restaurant	Pool
78	West Toronto	Little Portugal, Trinity	43.647927	-79.419750	108.0	Bar	Asian Restaurant	Art Gallery	Theater	Bakery	Beer Store	Brewery	Cocktail Bar	Record Shop	Yoga Studio
153	Brooklyn	Greenpoint	40.730201	-73.954241	108.0	Bar	Coffee Shop	Cocktail Bar	Grocery Store	Mexican Restaurant	Supermarket	Spa	Café	Sushi Restaurant	Pizza Place
163	Brooklyn	Prospect Heights	40.676822	-73.964859	108.0	Bar	Cocktail Bar	Mexican Restaurant	Brewery	Thai Restaurant	Grocery Store	Greek Restaurant	Sushi Restaurant	Garden Center	Garden
165	Brooklyn	Williamsburg	40.707144	-73.958115	108.0	Taco Place	Pizza Place	Bar	Latin American Restaurant	Breakfast Spot	Lounge	Liquor Store	Grocery Store	Gym	Coffee Shop
166	Brooklyn	Bushwick	40.698116	-73.925258	108.0	Bar	Mexican Restaurant	Deli / Bodega	Coffee Shop	Thrift / Vintage Store	Sandwich Place	Liquor Store	Chinese Restaurant	Latin American Restaurant	Nightclub
191	Brooklyn	Boerum Hill	40.685683	-73.983748	108.0	Furniture / Home Store	Bar	Italian Restaurant	Thrift / Vintage Store	Sandwich Place	Men's Store	Kids Store	Concert Hall	Jewelry Store	Middle Eastern Restaurant
201	Brooklyn	South Side	40.710861	-73.958001	108.0	Pizza Place	Bar	Coffee Shop	Latin American Restaurant	Yoga Studio	American Restaurant	Dive Bar	Burger Joint	South American Restaurant	Deli / Bodega
207	Manhattan	Hamilton Heights	40.823604	-73.949688	108.0	Café	Mexican Restaurant	Yoga Studio	Bar	Donut Shop	Coffee Shop	Cocktail Bar	Caribbean Restaurant	Pizza Place	Deli / Bodega
209	Manhattan	Central Harlem	40.815976	-73.943211	108.0	Caribbean Restaurant	Deli / Bodega	African Restaurant	Fried Chicken Joint	French Restaurant	Gym / Fitness Center	Beer Bar	Library	Lounge	Breakfast Spot
222	Manhattan	East Village	40.727847	-73.982226	108.0	Bar	Korean Restaurant	Mexican Restaurant	Cocktail Bar	Vegetarian / Vegan Restaurant	Pizza Place	Ice Cream Shop	Wine Bar	Italian Restaurant	Ramen Restaurant
243	Queens	Long Island City	40.750217	-73.939202	108.0	Hotel	Bar	Coffee Shop	Café	Deli / Bodega	Bubble Tea Shop	Mexican Restaurant	Pizza Place	Mediterranean Restaurant	Donut Shop
317	Staten Island	Great Kills	40.549480	-74.149324	108.0	Bar	Italian Restaurant	Pizza Place	Japanese Restaurant	Sushi Restaurant	Train Station	Liquor Store	Cafeteria	Food & Drink Shop	Pharmacy
381	Queens	Sunnyside Gardens	40.745652	-73.918193	108.0	Bar	Pizza Place	Coffee Shop	Spa	Grocery Store	Pub	Donut Shop	Thai Restaurant	Bank	Dog Run

The common theme is a high prevalence of bars which is exactly what I was looking for. I am also incredibly happy with the awesome variety of places to eat (e.g. coffee shops, Italian restaurants, Mexican restaurants, etc.).

I think any university student from Manchester would be comfortable moving to these neighbourhoods.

Thank you for reading!!!