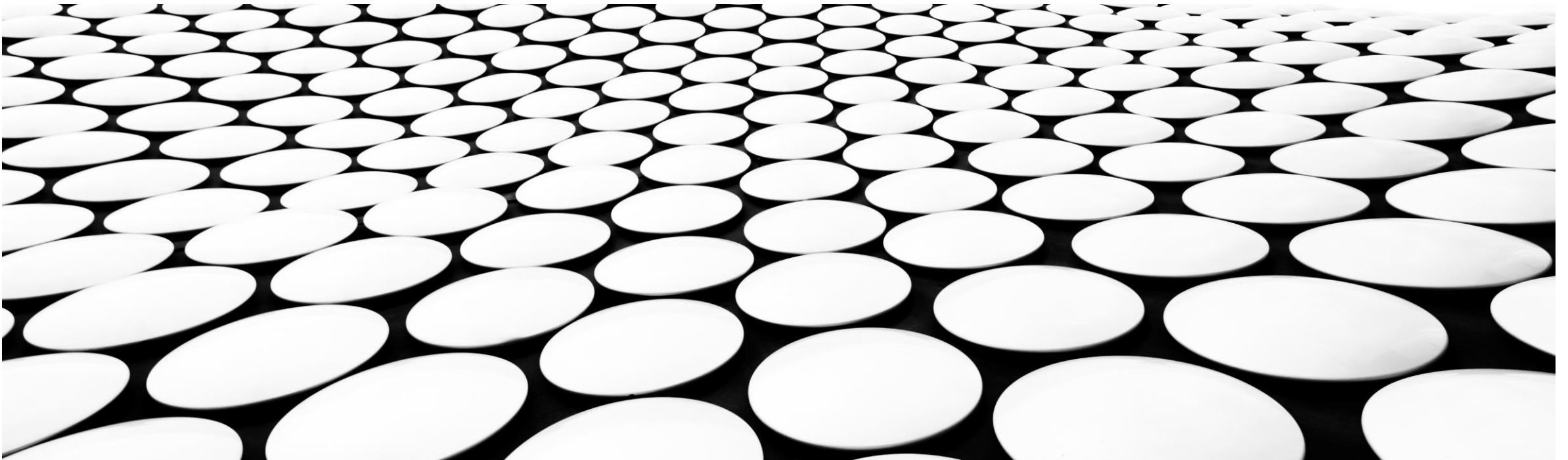

BATTLE OF NEIGHBORHOOD – CAPSTONE PROJECT

SHUANG LI



Battle of Neighborhood of Toronto by Clustering

- Study and analyze the neighborhoods of Toronto city and group them into similar clusters and, to analyze those clusters to gather meaningful information
- Information help people relocating for different interests of city or similar aspects of their existing neighborhood
- Interests/aspects include amenities, cuisine, pharmacies, gym, parks, schools etc.

Data Acquisition and Cleaning

- Postal Code of Toronto Neighborhood Data

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

- Coordinate data for each Neighborhood in Toronto

http://cocl.us/Geospatial_data

- Foursquare data for locational/user information

<https://api.foursquare.com/v2/venues/explore?xxx>

<https://api.foursquare.com/v2/venues/search?xxx>

<https://api.foursquare.com/v2/users/xxx>

Data Acquisition and Cleaning (Cont'd)

■ Postal Code Data

	Postalcode	Borough	Neighborhood
0	M3A	North York	Parkwoods
1	M4A	North York	Victoria Village
2	M5A	Downtown Toronto	Regent Park, Harbourfront
3	M6A	North York	Lawrence Manor, Lawrence Heights
4	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government

■ Coordinate Data

	Postal Code	Latitude	Longitude
0	M1B	43.806686	-79.194353
1	M1C	43.784535	-79.160497
2	M1E	43.763573	-79.188711
3	M1G	43.770992	-79.216917
4	M1H	43.773136	-79.239476

Exploratory Data Analysis

■ Venue Category of each Neighborhood

	Borough	Borough Latitude	Borough Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Scarborough	43.744734	-79.239476	McCowan Park	43.745089	-79.239336	Playground
1	Scarborough	43.799525	-79.318389	Price Chopper	43.799445	-79.318563	Grocery Store
2	North York	43.803762	-79.363452	New York Fries	43.803664	-79.363905	Fast Food Restaurant
3	Central Toronto	43.704324	-79.388790	Jules Cafe Patisserie	43.704138	-79.388413	Dessert Shop
4	Central Toronto	43.704324	-79.388790	Thobors Boulangerie Patisserie Café	43.704514	-79.388616	Café

■ Expanded one-hot view of Venue Category

	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
0	Central Toronto	Supermarket	Liquor Store	Furniture / Home Store	Dessert Shop	Park	Italian Restaurant	Coffee Shop	Seafood Restaurant	Bowling Alley
1	Downtown Toronto	Coffee Shop	Café	Performing Arts Venue	Gym	Deli / Bodega	Sushi Restaurant	Art Gallery	Concert Hall	Bakery
2	East Toronto	Trail	Yoga Studio	Diner	Coffee Shop	College Gym	Concert Hall	Cosmetics Shop	Dance Studio	Deli / Bodega
3	East York	Coffee Shop	Sporting Goods Shop	Sandwich Place	Housing Development	Indian Restaurant	College Gym	Concert Hall	Cosmetics Shop	Dance Studio
4	Etobicoke	Dance Studio	Coffee Shop	Pizza Place	Diner	College Gym	Concert Hall	Cosmetics Shop	Deli / Bodega	Dessert Shop

Modeling

■ K-mean Clustering of Neighborhoods

Neighborhood	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
The Beaches	43.676357	-79.293031	4	Trail	Health Food Store	Pub	Eastern European Restaurant	Discount Store	Dog Run	Doner Restaurant	Donut Shop
The Danforth West, Riverdale	43.679557	-79.352188	1	Greek Restaurant	Coffee Shop	Ice Cream Shop	Italian Restaurant	Furniture / Home Store	Pizza Place	Bookstore	Brewery
The Beaches West, India Bazaar	43.668999	-79.315572	5	Park	Gym	Pub	Liquor Store	Board Shop	Fast Food Restaurant	Burger Joint	Fish & Chips Shop
Studio District	43.659526	-79.340923	1	Café	Coffee Shop	Bakery	Italian Restaurant	American Restaurant	Yoga Studio	Comfort Food Restaurant	Seafood Restaurant
Lawrence Park	43.728020	-79.388790	0	Park	Swim School	Bus Line	Women's Store	Discount Store	Fast Food Restaurant	Farmers Market	Falafel Restaurant

■ Neighborhood Clustering on Map



Conclusion

- We can compare different/similar clusters, e.g. clusterID=4

	Cluster Labels	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	4	Berczy Park	Coffee Shop	Cocktail Bar	Beer Bar	Cheese Shop	Bakery	Restaurant	Farmers Market	Seafood Restaurant	Concert Hall	Liquor Store
1	4	Brockton, Parkdale Village, Exhibition Place	Café	Breakfast Spot	Nightclub	Coffee Shop	Pet Store	Climbing Gym	Burrito Place	Restaurant	Italian Restaurant	Stadium
2	4	Business reply mail Processing Centre, South C...	Light Rail Station	Auto Workshop	Pizza Place	Comic Shop	Restaurant	Burrito Place	Brewery	Skate Park	Spa	Farmers Market
3	4	CN Tower, King and Spadina, Railway Lands, Har...	Airport Service	Airport Lounge	Airport Terminal	Airport	Boutique	Sculpture Garden	Plane	Rental Car Location	Boat or Ferry	Harbor / Marina
4	4	Central Bay Street	Coffee Shop	Sandwich Place	Café	Italian Restaurant	Burger Joint	Bubble Tea Shop	Salad Place	Thai Restaurant	Restaurant	Portuguese Restaurant

- Results can provide guidance for people to relocate from one part of the city to another

Future Directions

- Inclusion of more features
- Automated feature selection/extraction
- More advanced clustering algorithms (e.g. DBSCAN)