

Your best location for your
restaurant in Toronto

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Restaurant location's key factor

- Visibility
- Accessibility
- Parking lot
- Customer source / Population base
- Material supply nearby

Foursquare data description

Foursquare

- Location data for many cities, countries around the world
- Explore / search nearby venues in hundreds [category](#)
- Easy to use API

Match venue category to our key factors

- Visibility: physically near Intersection, near popular spot online (most checked-in venue, for example)
- Accessibility: close to different kind of public transportation venues (bus, metro, light rail, train...)
- Parking lot: parking lot or even hotel / big building venue (as a resto can deal to share parking service with them)
- Customer source: should be near Residence area, shopping / Pedestrian Plaza, Office , College / University
- Material supply: not to far from market, supermarket, Farmers / Fish Market, butcher...

Build a dataframe for nearby venues data

- Toronto neighborhood location data from [wikipedia](#)
- Crawl different venue category data from Foursquare for each location
- Each venue category count is add to 1 dataframe columns

	PostCode	Borough	Neighborhood	Latitude	Longitude	MarketNearBy	SuperMarketNearBy	ButcherNearBy	FarmersMarketNearBy	FishMarketNearBy
0	M4E	East Toronto	The Beaches	43.676357	-79.293031	6	3	8	10	2
1	M4K	East Toronto	The Danforth West, Riverdale	43.679557	-79.352188	16	20	18	22	9
2	M4W	Downtown Toronto	Rosedale	43.679563	-79.377529	25	29	28	29	16
3	M4X	Downtown Toronto	Cabbagetown, St. James Town	43.667967	-79.367675	27	29	26	27	14
4	M4Y	Downtown Toronto	Church and Wellesley	43.665860	-79.383160	28	30	26	27	12

Methodology

- Preprocess feature nearby data: convert to binary value (upper / lower than mean())
- Sum up all feature nearby column value to form an overall score
- Use kmeans clustering to divide venues into group
- Set k=3 for 3 main groups: the most suitable, acceptable, poor choice
- Calculate overall scores per group to find the best one.

ClusterLabels	easy_view_score	parking_score	transport_score	customer_source_score	supply_score	overall_score
0	0.0	0.0	0.0	0.0	0.0	0.0
0	1.0	0.0	0.0	1.0	2.0	4.0
2	0.0	0.0	1.0	2.0	5.0	8.0
2	0.0	0.0	0.0	3.0	5.0	8.0
1	1.0	2.0	4.0	4.0	5.0	16.0
2	1.0	0.0	2.0	4.0	5.0	12.0
1	1.0	2.0	5.0	4.0	5.0	17.0
1	1.0	2.0	5.0	4.0	4.0	16.0
1	1.0	1.0	5.0	4.0	4.0	15.0
1	1.0	2.0	4.0	4.0	5.0	16.0

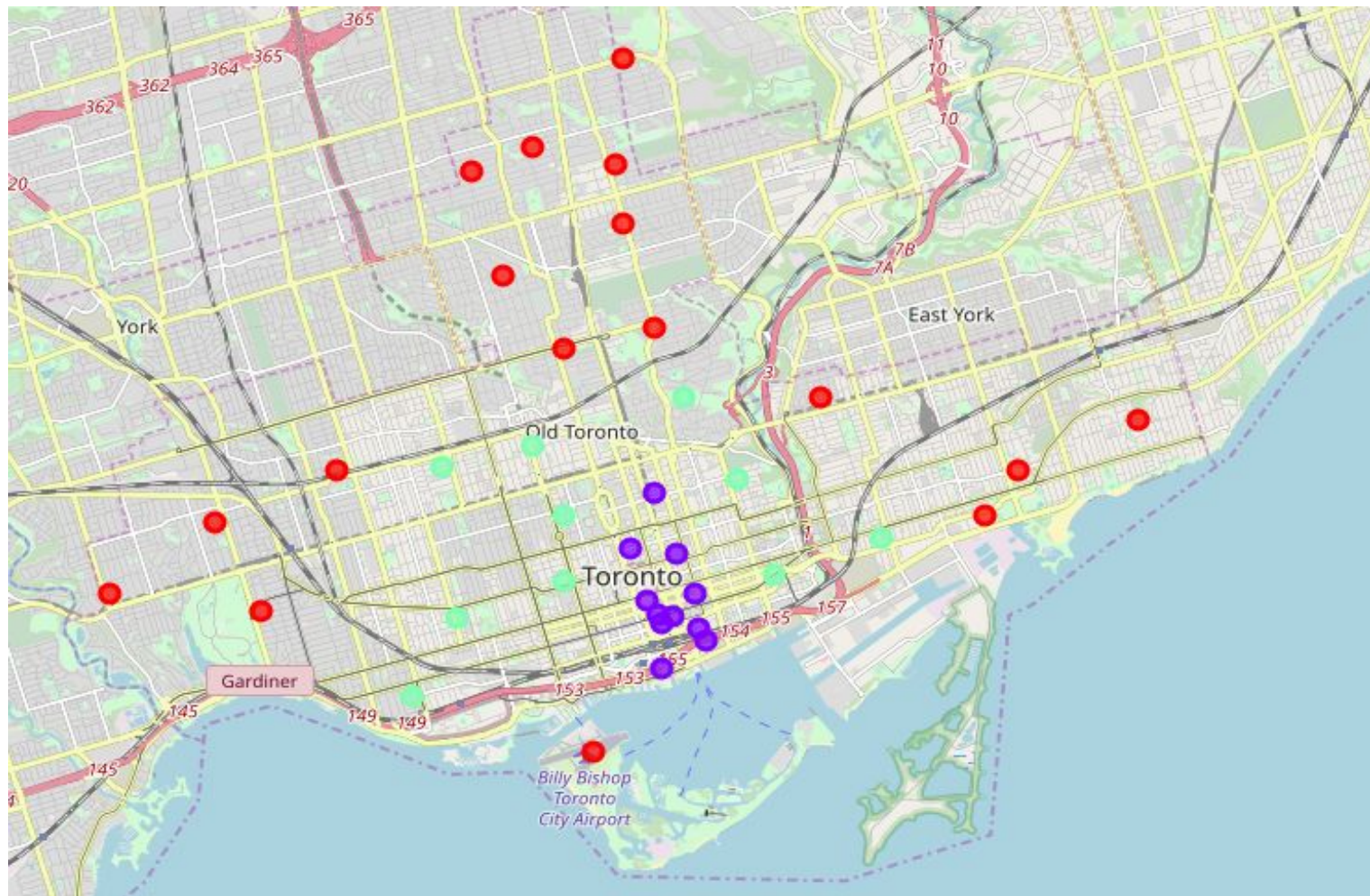
Label encoding

	easy_view_score	parking_score	transport_score	customer_source_score	supply_score	overall_score
ClusterLabels						
1	GOOD	GOOD	GOOD	GOOD	GOOD	16.0
1	GOOD	GOOD	GOOD	GOOD	GOOD	17.0
1	GOOD	GOOD	GOOD	GOOD	GOOD	16.0
1	GOOD	GOOD	GOOD	GOOD	GOOD	15.0
1	GOOD	GOOD	GOOD	GOOD	GOOD	16.0
1	GOOD	GOOD	GOOD	GOOD	GOOD	16.0
1	GOOD	GOOD	GOOD	GOOD	GOOD	15.0
1	GOOD	GOOD	GOOD	GOOD	GOOD	16.0
1	GOOD	GOOD	GOOD	GOOD	GOOD	17.0
1	GOOD	GOOD	GOOD	GOOD	GOOD	16.0

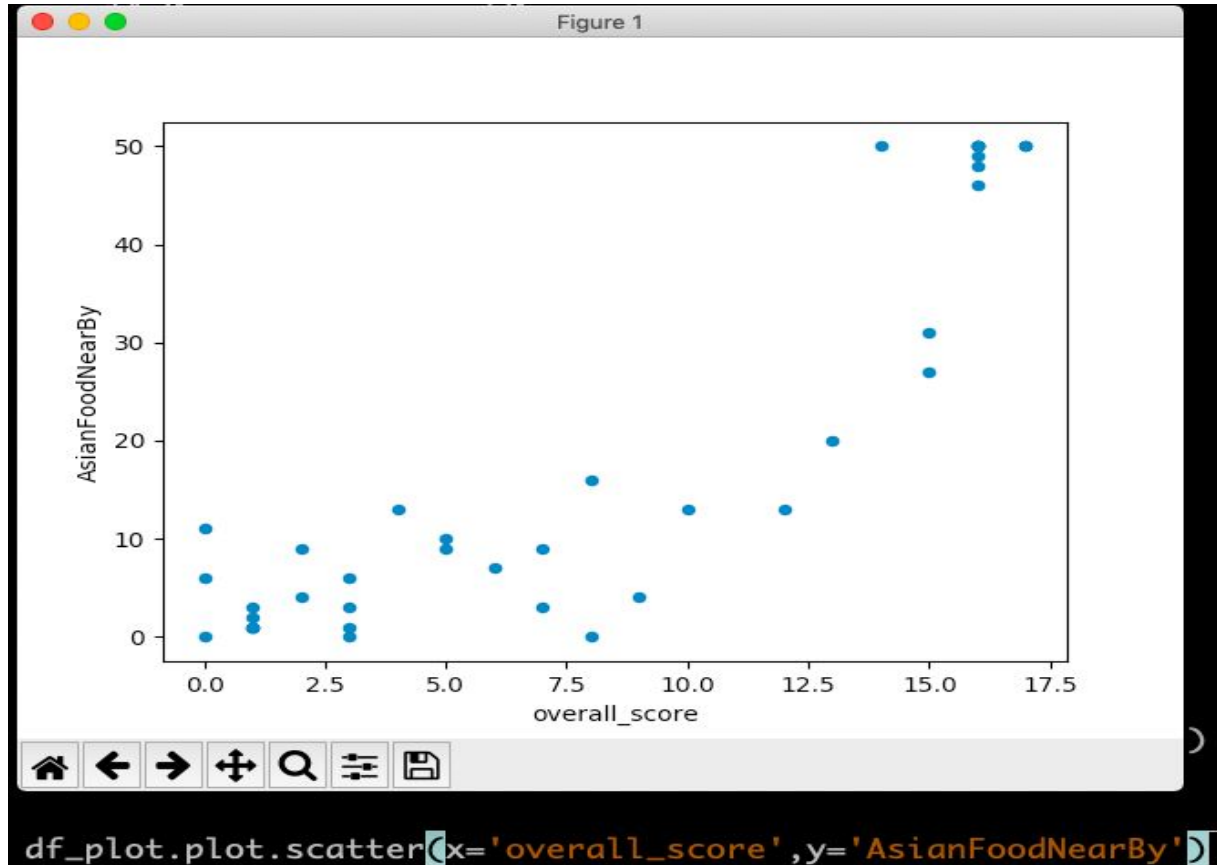
Map back the neighborhood / borough data with cluster and overall scores

Borough		Neighborhood	overall_score
ClusterLabels			
1	Downtown Toronto	Church and Wellesley	16.0
1	Downtown Toronto	Ryerson, Garden District	17.0
1	Downtown Toronto	St. James Town	16.0
1	Downtown Toronto	Berczy Park	15.0
1	Downtown Toronto	Central Bay Street	16.0
1	Downtown Toronto	Adelaide, King, Richmond	16.0
1	Downtown Toronto	Harbourfront East, Toronto Islands, Union Station	15.0
1	Downtown Toronto	Design Exchange, Toronto Dominion Centre	16.0
1	Downtown Toronto	Commerce Court, Victoria Hotel	17.0
1	Downtown Toronto	Stn A PO Boxes 25 The Esplanade	16.0
1	Downtown Toronto	First Canadian Place, Underground city	16.0

Visualize by folium



Venue's overall score vs number of existing restaurant nearby



Result and Discussion

Conclusion

- Following our model, Downtown Toronto is the most suitable area (which is very logical
- The 5 key factors theory works pretty well as it reflects the number of existing restaurant in the area linearly
- This technique should work well with other city location data as well.