Opening a Thai Restaurant in Toronto

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Introduction/ objective

- To explore the best neighborhood in Toronto to open a Thai restaurant

- The main issues to consider are:
  - the frequency of other existing restaurants
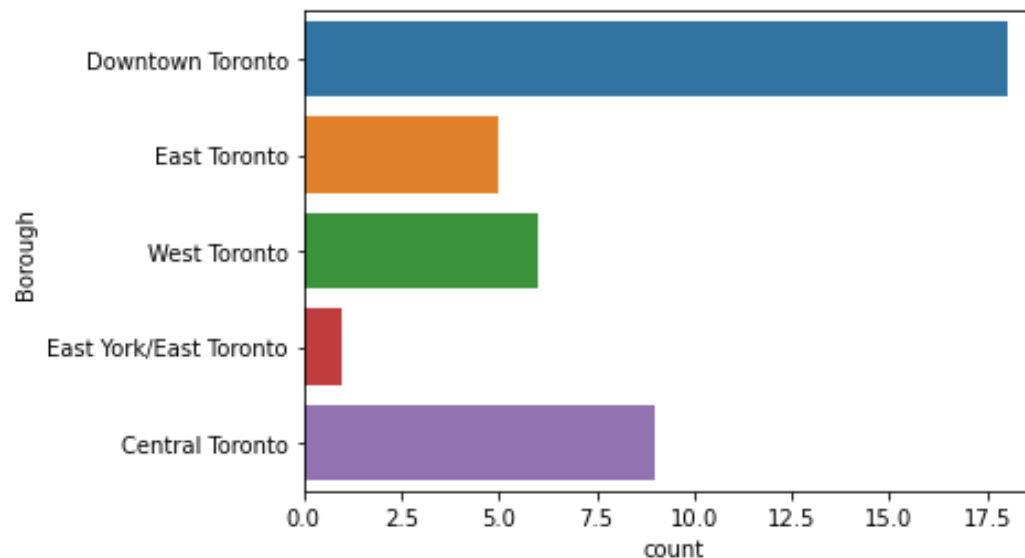 - safety of neighborhoods (e.g., low crime rates)

Data

- Toronto Neighborhoods information collected from Wikipedia page

- Geospatial Coordinates of neighborhoods

- Venue data on Thai Restaurants via Foursquare API

- Toronto crime data by each neighborhood

Analysis of Data

Neighborhoods with their Location

	PostalCode	Borough	Neighborhood	Latitude	Longitude
2	M5A	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636
9	M5B	Downtown Toronto	Garden District, Ryerson	43.657162	-79.378937
15	M5C	Downtown Toronto	St. James Town	43.651494	-79.375418
19	M4E	East Toronto	The Beaches	43.676357	-79.293031
20	M5E	Downtown Toronto	Berczy Park	43.644771	-79.373306

Analysis of Data

- There are 230 unique venues across the 39 neighborhoods
- 19 Thai restaurants already existing

```
print (toronto_venues['Venue Category'].value_counts())
```

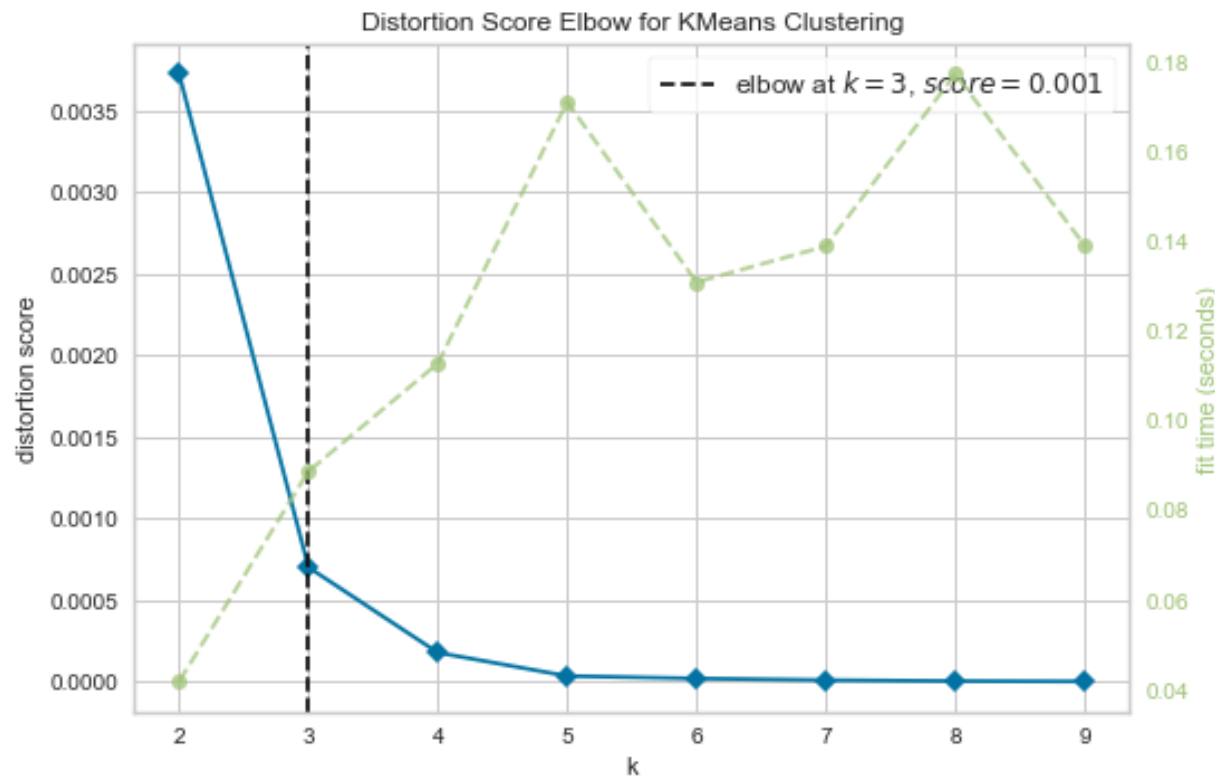|	
Coffee Shop	152
Café	82
Restaurant	50
Italian Restaurant	41
Hotel	39
Park	36
Japanese Restaurant	32
Bakery	30
Pizza Place	27
Gym	24
Seafood Restaurant	24
Clothing Store	23
Bar	23
Sushi Restaurant	22
Sandwich Place	20
Thai Restaurant	19
Pub	19
Cocktail Bar	18
Gastropub	18

Analysis of Data

Top 10 most common restaurant types in each neighborhood

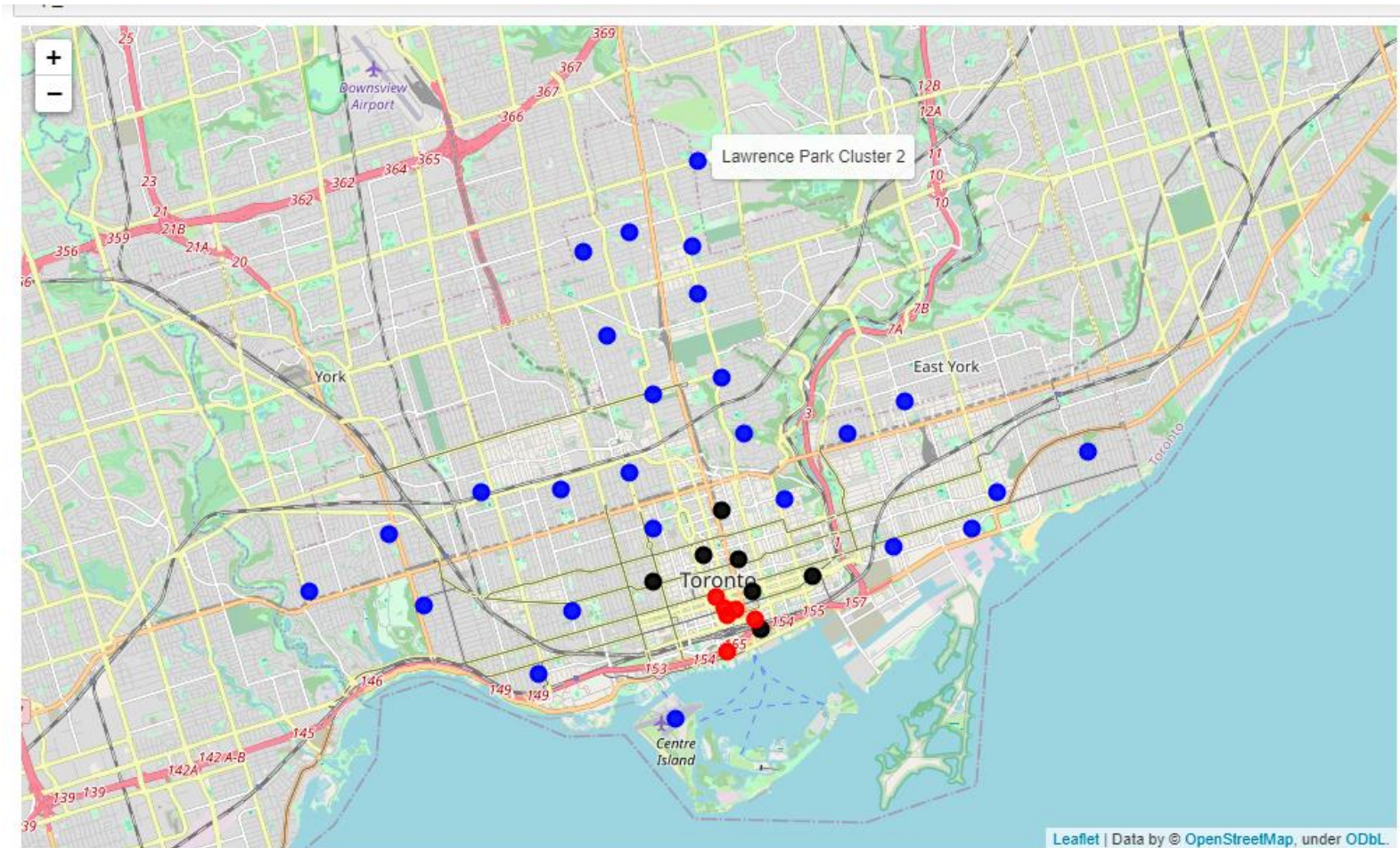|	Neighborhood	1st Most Common Cuisine	2nd Most Common Cuisine	3rd Most Common Cuisine	4th Most Common Cuisine	5th Most Common Cuisine	6th Most Common Cuisine	7th Most Common Cuisine	8th Most Common Cuisine	9th Most Common Cuisine	10th Most Common Cuisine
0	Berczy Park	Total Restaurants	Seafood Restaurant	Restaurant	Comfort Food Restaurant	Eastern European Restaurant	French Restaurant	Greek Restaurant	Japanese Restaurant	Indian Restaurant	Vegetarian / Vegan Restaurant
1	Brockton, Parkdale Village, Exhibition Place	Total Restaurants	Italian Restaurant	Restaurant	Doner Restaurant	German Restaurant	French Restaurant	Filipino Restaurant	Fast Food Restaurant	Falafel Restaurant	Ethiopian Restaurant
2	CN Tower, King and Spadina, Railway Lands, Har...	Total Restaurants	Doner Restaurant	Gluten-free Restaurant	German Restaurant	French Restaurant	Filipino Restaurant	Fast Food Restaurant	Falafel Restaurant	Ethiopian Restaurant	Eastern European Restaurant
3	Central Bay Street	Total Restaurants	Italian Restaurant	Thai Restaurant	Japanese Restaurant	Portuguese Restaurant	Falafel Restaurant	French Restaurant	Korean Restaurant	Middle Eastern Restaurant	Modern European Restaurant
4	Christie	Total Restaurants	Italian Restaurant	Restaurant	Doner Restaurant	German Restaurant	French Restaurant	Filipino Restaurant	Fast Food Restaurant	Falafel Restaurant	Ethiopian Restaurant

Analysis of Data

- *K*-means clustering using Elbow Method
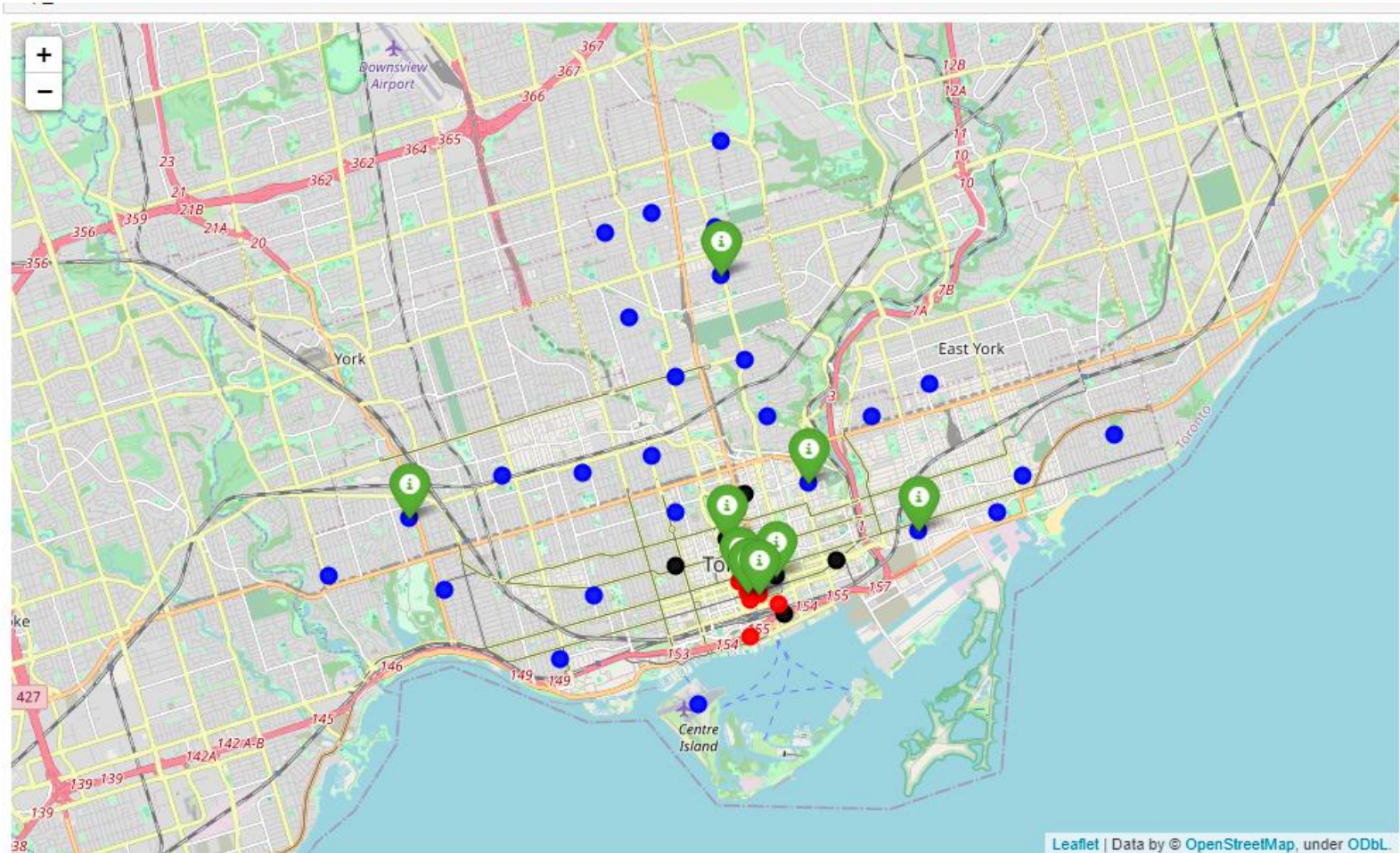

- The best $k = 3$

Mapping the Clusters

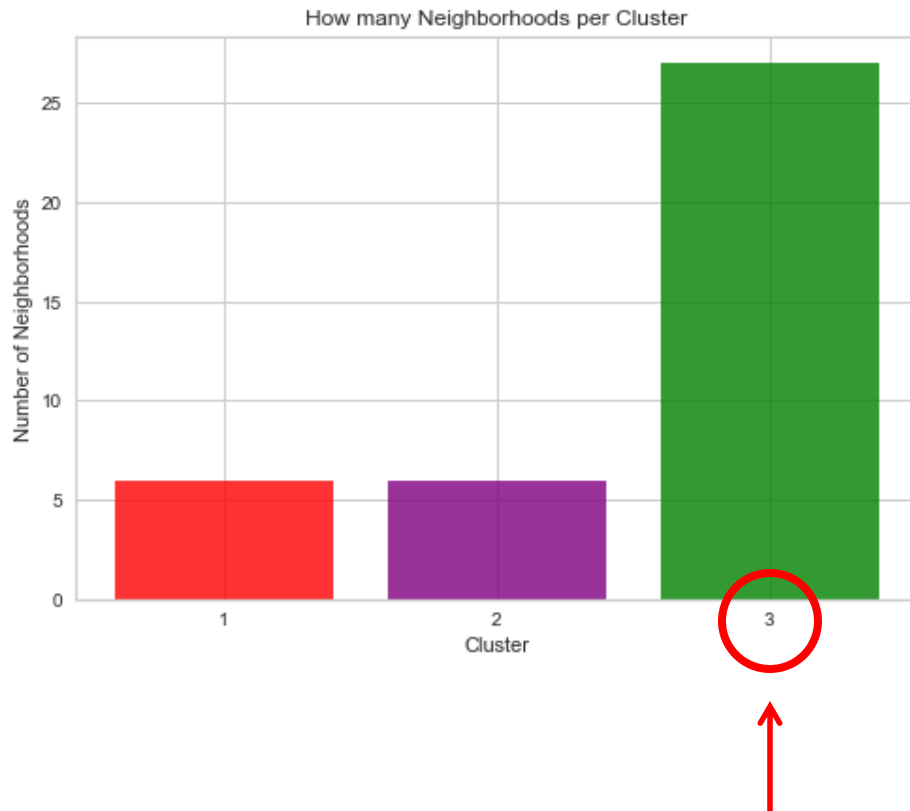- Folium map of Toronto for three clusters of neighborhoods

Mapping the Clusters

- Toronto neighborhoods map with existing Thai restaurants

Results

Number of neighborhoods per cluster vs. Thai restaurants per cluster

Results

Crime rates of Toronto neighborhoods

	Neighborhood	Crimes_Rate
126	Steeles	491.993422
0	Yonge, St.Clair	500.172143
36	Guildwood	563.262814
127	Lawrence Park North	571.106238
21	Centennial Scarborough	582.303423
124	Maple Leaf	622.680181
82	Eringate, Centennial, West Deane	625.138094
64	Edenbridge, Humber Valley	627.720897
113	Bayview Village	634.751809
135	Pleasant View	646.067931
137	Leaside, Bennington	661.711867
45	Bayview Woods, Steeles	662.532260
79	Agincourt North	669.637431
100	Mount Pleasant East	679.351487
92	Lambton Baby Point	680.050087
95	Willowdale East	681.214945
84	Banbury, Don Mills	682.906097
58	Humber Heights, Westmount	683.215860
42	Westminster, Branson	686.173577
9	Danforth East York	690.259810
30	Princess, Rosethorn	702.441273
55	Henry Farm	708.230413
70	High Park, Swansea	717.460890
10	Humewood, Cedarvale	721.457310
97	Rouge	723.635242
83	L'Amoreaux	723.951576
8	Thorncliffe Park	725.995132
112	Woodbine, Lumsden	730.393257
119	Lawrence Park South	734.898010
32	Etobicoke West Mall	735.410690
107	Parkwoods, Donalda	740.210424
125	Markland Wood	743.445932
4	Stonegate, Queensway	753.930820
29	Broadview North	783.114284
86	Alderwood	783.326559
71	Highland Creek	784.285678
25	Flemingdon Park	800.499160
117	Don Valley Village	801.504084
52	Kingsway South	802.100430
69	High Park North	814.287843
61	Hillcrest Village	816.651646
85	Bathurst Manor	817.005183
6	The Beaches	820.389906

Discussion and Conclusion

- When comparing among the clusters, the 3rd Cluster includes the most number of neighborhoods at 27, but has only 5 Thai restaurants

- Thus, cluster 3 seems to be the optimal candidate for exploring a Thai restaurant

- There would be less competition in that cluster

- We also looked into the crime rates, i.e., safety/security of the neighborhood

Discussion and Conclusion

• Based on both criteria, the recommendations of this project are:

  ❖The optimum location to open a quality Thai Restaurant seems to be in the neighborhood of 'Lawrence Park'

  ❖The second best neighborhood with great potential for growing a new Thai restaurant is 'The Beaches', and the third best is 'Rosedale'

  ❖All three of these locations have no Thai restaurants in it, and have relatively lower crime rate per 100,000 people

Suggestions For Future Improvement

- Real-time monitoring data of neighborhood locations

- Include other variables in the model, e.g.,
  - the relative cost of operating a restaurant in each neighborhood,
  - number of tourist attractions,
  - income level of residents,
  - the rating and tips of existing restaurants, etc.