

# Fast Food Restaurant Recommendation in Toronto

IBM Applied Data Capstone Project





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# Introduction

- Toronto is the financial capital of Canada, with lots of business opportunities.
- Business Problem
  - Which is the best neighbourhood to open a Fast Food Restaurant in Toronto city?
- Target Audience
  - Anyone who is willing to open a Fast Food Restaurant in Toronto city

# Data Description

- Data Requirements

- Neighbourhood Information
- Location Information
- Venue Information

- Data Sources

- Wikipedia
- GeoPy package
- Foursquare

The screenshot shows the Wikipedia page for 'Demographics of Toronto neighbourhoods'. The page includes a sidebar with navigation links, a main content area with a table of demographic data, and a warning banner about factual accuracy. The table lists various Toronto neighbourhoods with columns for Name, FM, Census Tracts, Population, Land area, Density, % Change in Population since 2001, Average Income, Transit Commuting %, % Renters, and Second most common language (after English) by name.

Name	FM	Census Tracts	Population	Land area (km2)	Density (people/km2)	% Change in Population since 2001	Average Income	Transit Commuting %	% Renters	Second most common language (after English) by name
Toronto CMA Average		All	5,113,149	5903.63	866	9.0	40,704	10.6	11.4	
Agincourt	S	0377.01, 0377.02, 0377.03, 0377.04, 0378.02, 0378.08, 0378.14, 0378.23, 0378.24	44,577	12.45	3580	4.6	25,750	11.1	5.9	Cantonese (19.3%)

	Neighbourhood	Population	Land Area	Density	Average Income	2nd Language	Latitude	Longitude
0	Old East York	52220	7.94	6577	33172	Greek (4.3%)	43.699971	-79.332520
1	Woburn	48507	13.34	3636	26190	Gujarati (9.1%)	43.759824	-79.225291
2	Elia (Jane and Finch)	48003	7.66	6267	22691	Vietnamese (6.9%)	43.757253	-79.517697
3	L'Amoreaux	45862	7.15	6414	26375	Unspecified Chinese (13.9%)	43.799003	-79.305967
4	Agincourt	44577	12.45	3580	25750	Cantonese (19.3%)	43.785353	-79.278549
5	Malvern	44324	8.86	5003	25677	Tamil (12.2%)	43.809196	-79.221701
6	Willowdale	43144	7.68	5618	39895	Cantonese (7.9%)	43.761510	-79.410923
7	Downsview	36613	16.13	2270	26751	Italian (11.7%)	43.749299	-79.462248
8	Newtonbrook	36046	8.77	4110	33428	Russian (8.8%)	43.793886	-79.425679
9	Smithfield	34996	6.45	5426	24387	Punjabi (11.8%)	43.631184	-79.485667
10	Fairbank	34121	4.42	7720	28403	Portuguese (11.3%)	43.695689	-79.450310
11	Riverdale	31007	3.99	7771	40139	Cantonese (6.7%)	43.665470	-79.352594
12	Don Valley Village	29740	5.16	5764	30442	Unspecified Chinese (9.7%)	43.792673	-79.354722
13	Bendale	28945	8.49	3409	29723	Tamil (3.7%)	43.753520	-79.255336
14	Parkdale	28367	2.03	13974	26314	Polish (2.9%)	43.640495	-79.436897



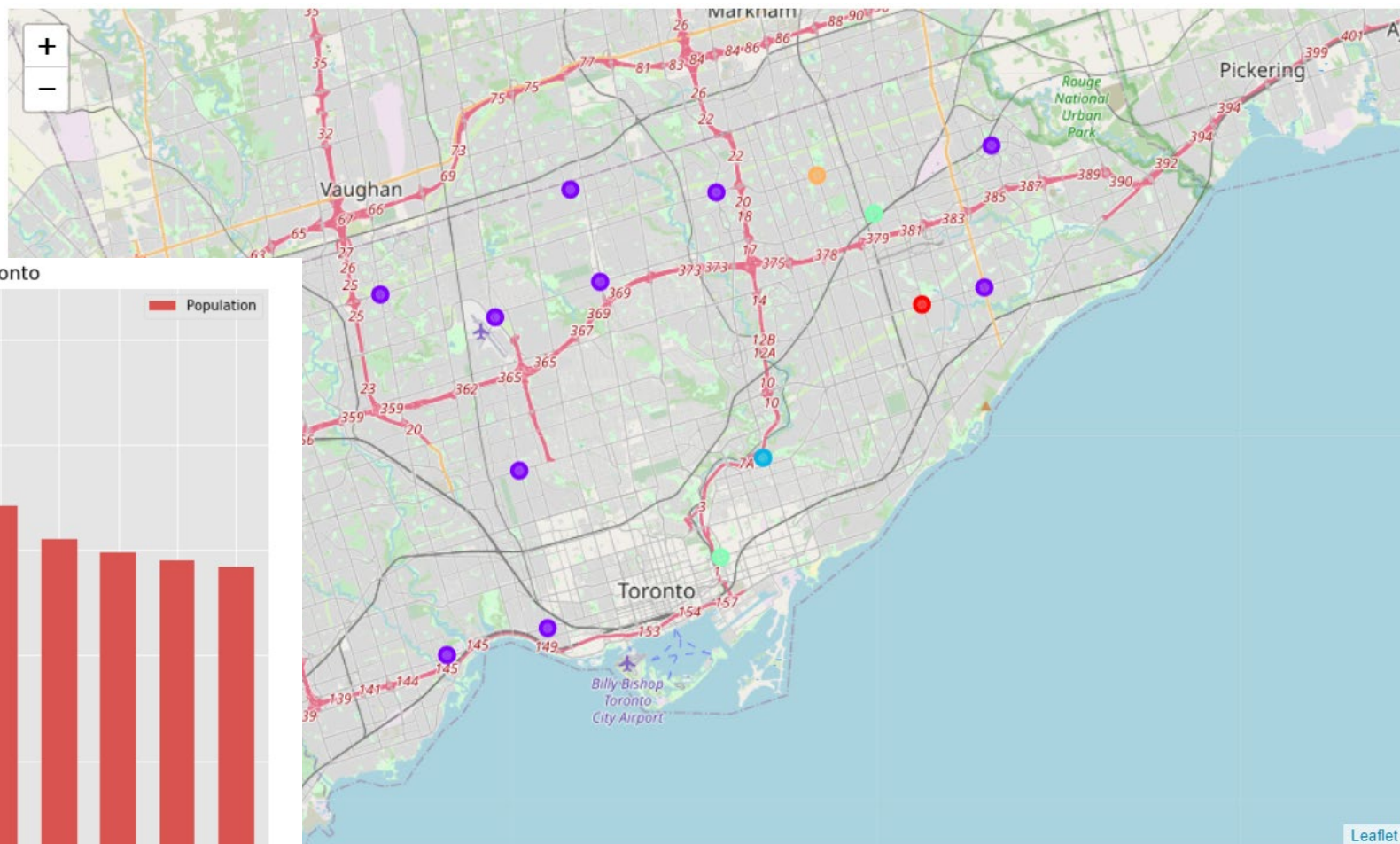
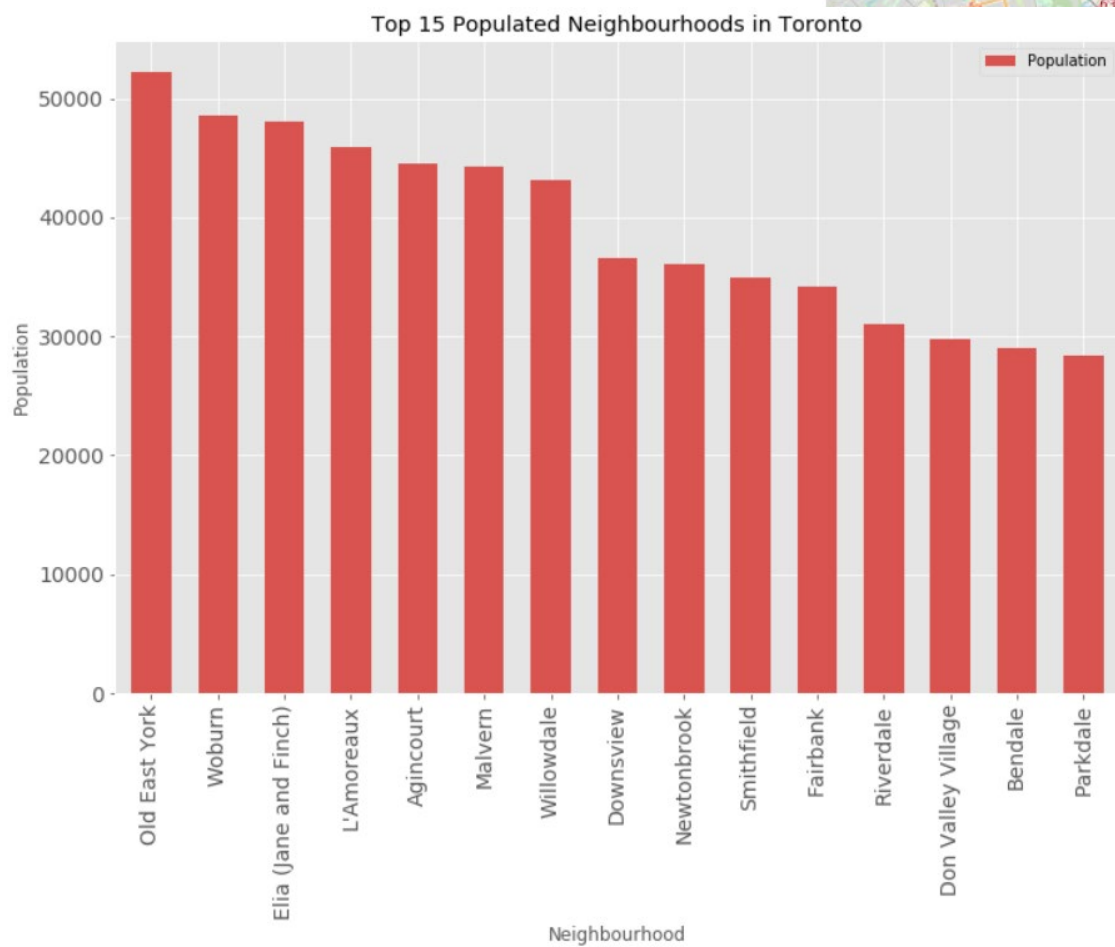
# Methodology

- Scraping Data Method
  - To scrape neighbourhood info from Wikipedia page by using **Beautifulsoup**
  - To convert data into structured format (dataframe)
- API calls
  - To retrieve venue information from Foursquare.com
- One-hot Encoding
  - To convert categorical variables into quantitative variable (dummy variables)
- k-Means Clustering (Unsupervised Machine Learning Technique)
  - Segment and Cluster neighbourhoods





# Results





# Discussion

- 2<sup>nd</sup> cluster has a higher number of neighbourhoods
- Within the second cluster, two neighbourhoods with Fast Food Restaurant as their 1st Most Common Venue namely *Woburn* and *Malvern*
- **Woburn** looks to be the best choice as it is the most populated in the 2<sup>nd</sup> cluster.
- Other observations:
  - 2<sup>nd</sup> Language of Woburn is Gujarati
  - Woburn and Malvern are nearby neighbourhoods
  - 2<sup>nd</sup> Language of Malvern is Tamil
  - encourage to offer Gujarati and South-Indian fast food

	Neighbourhood	Population	2nd Language	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
1	Woburn	48507	Gujarati (9.1%)	43.759824	-79.225291	1	Fast Food Restaurant	Coffee Shop	Discount Store	Bank	Beer Store	Hardware Store	Depa Store
2	Elia (Jane and Finch)	48003	Vietnamese (6.9%)	43.757253	-79.517697	1	Grocery Store	Fast Food Restaurant	Pizza Place	Discount Store	Shopping Mall	Sandwich Place	Beer
5	Malvern	44324	Tamil (12.2%)	43.809196	-79.221701	1	Fast Food Restaurant	Pizza Place	Pharmacy	Sandwich Place	Skating Rink	Bubble Tea Shop	Park
6	Willowdale	43144	Cantonese (7.9%)	43.761510	-79.410923	1	Coffee Shop	Grocery Store	Japanese Restaurant	Burger Joint	Sandwich Place	Fried Chicken Joint	Gas :
7	Downsview	36613	Italian (11.7%)	43.749299	-79.462248	1	Coffee Shop	French Restaurant	Gas Station	Outdoor Supply Store	Park	Gym / Fitness Center	Gym



# Conclusion

- Region: 2<sup>nd</sup> Cluster
- Best Neighbourhood: Woburn
- Target customers: Mainly for Gujarati people
- Additional considerations: Indian Fast Food (Mainly Gujarati food and South-Indian food)





Thank You