



# Application of Machine Learning in Restaurant Industry

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# INTRODUCTION

- Food industry in Canada has some of the lowest survival rates for new business.
- Maintaining a successful restaurant requires proof of concept, dedicated staffs, targeted marketing and realistic financial expectations.



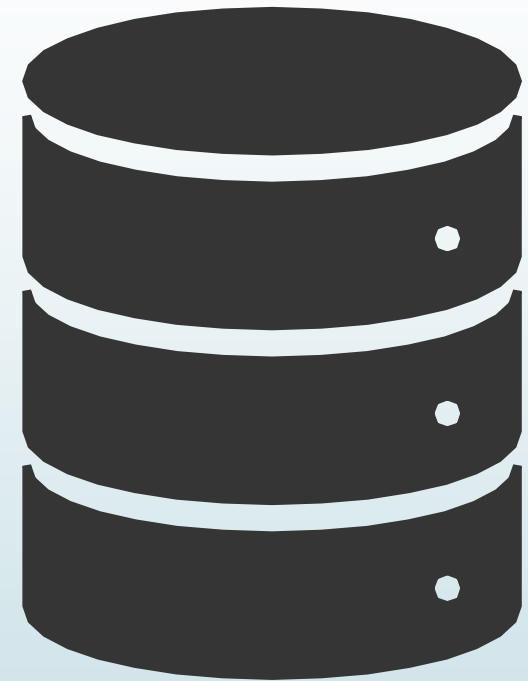
# INTRODUCTION

- Machine learning could provide insights when making business decisions,
- Use machine learning tools to study if there is a business opportunity in opening a new Chinese Restaurant in York Region, Ontario, Canada.



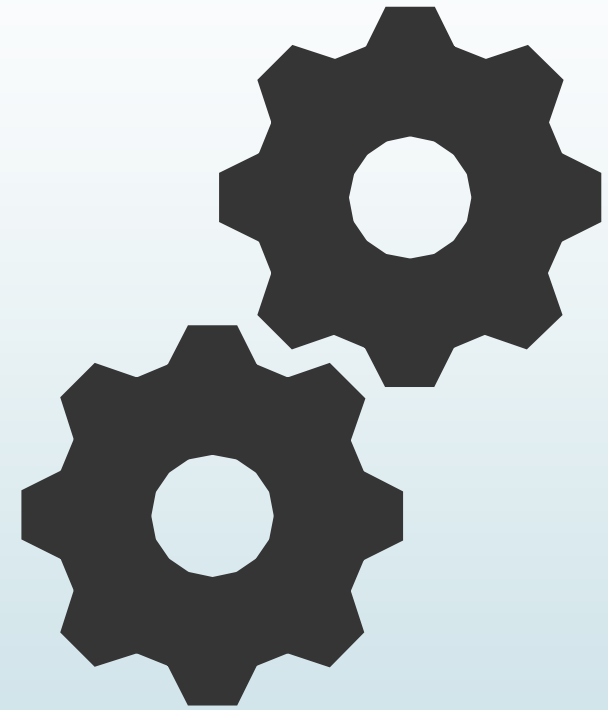
# DATA

- 2016 Census of Canada from Statistics Canada,
- Locations of malls and plazas in the city of interest,
- List of restaurants and their type and location from **Foursquare Places API**.



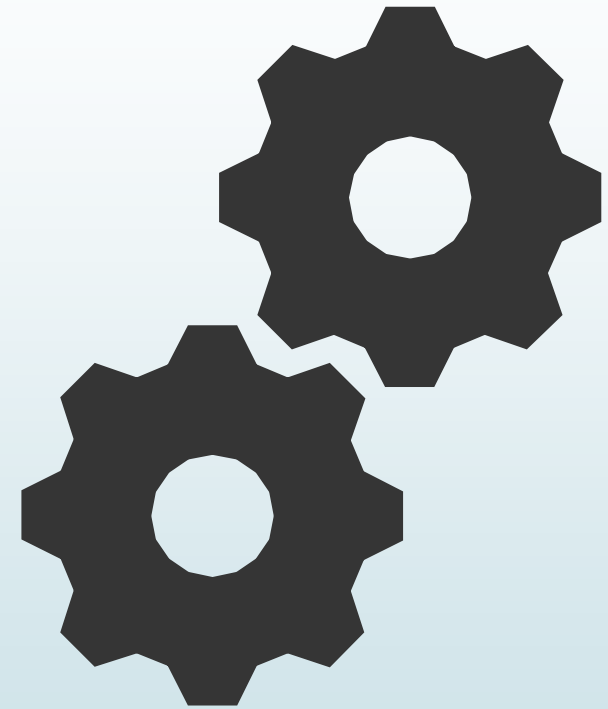
# METHODOLOGY

- Find the city with the largest Chinese community in York Region,
- Collect the locations of malls and plazas in the city of interest,
- Find venues, such as restaurants, parks and dessert places around the malls and plazas.



# METHODOLOGY

- Assign cluster labels to the malls and plazas based on their surrounding venues,
- Collect information of Chinese restaurants at the potential locations.



## RESULTS

- Markham has the largest Chinese community,
- Chinese restaurant at nine malls/plazas is the most common venue,
- These malls/plazas are also close to parks, gyms, stores and dessert places.

	Mall/plaza	CITY	ADDRESS	LATITUDE	LONGITUDE
0	Alderland Center	Markham	7102-7158 Warden Ave, Markham, ON	43.824235	-79.326603
1	First Markham Place	Markham	3255 Highway 7 East, Markham, ON	43.851747	-79.348356
2	Langham Square	Markham	8339 Kennedy Rd, Markham, ON	43.857400	-79.303767
3	Market Village	Markham	4390 Steeles Avenue East, Markham, ON	43.824568	-79.303737
4	Metro Square	Markham	3636 Steeles Ave E, Markham, ON	43.817998	-79.331931
5	New Kennedy Square	Markham	8360 Kennedy Rd, Markham, ON	43.859604	-79.302949
6	Pacific Mall	Markham	4300 Steeles Ave E, Markham, ON	43.825488	-79.306128
7	Peachtree Center	Markham	8392 Kennedy Rd, Markham, ON	43.861031	-79.305318
8	The Shops on Steeles and 404	Markham	2900 Steeles Ave E, Markham, ON	43.813388	-79.357184

# RESULTS

- Variety of Chinese cuisines served at these nine locations,
- There are still opportunities, and Client could decide which style of Chinese cuisine will be served.

	Alderland Center	First Markham Place	Langham Square	Market Village	Metro Square	New Kennedy Square	Pacific Mall	Peachtree Center	The Shops on Steeles and 404
Chinese Restaurant	8	1	4	7	10	4	7	4	2
Szechuan Restaurant	1	0	0	0	1	0	0	0	0
Asian Restaurant	1	1	0	2	3	0	4	0	1
Hong Kong Restaurant	1	1	1	3	1	1	3	1	0
Dim Sum Restaurant	1	0	1	1	1	1	1	1	0
Xinjiang Restaurant	1	0	0	0	1	0	0	0	0
Dumpling Restaurant	1	0	0	1	1	0	1	0	0
Hotpot Restaurant	1	0	1	0	1	1	0	1	0
Noodle House	1	1	2	1	0	2	1	2	0
BBQ Joint	0	1	0	0	1	0	0	0	1
Shanghai Restaurant	0	3	1	0	0	1	0	1	0
Taiwanese Restaurant	0	1	0	1	0	0	1	0	0
Cha Chaa Teng	0	1	0	0	0	0	0	0	0
Cantonese Restaurant	0	0	1	3	0	1	3	1	1



# CONCLUSION

- Machine learning could provide insights when making decision to open a new restaurant,
- There are opportunities to open a Chinese restaurant in York Region,
- This study is a starting point, and client could make a decision with more specific requirements.

