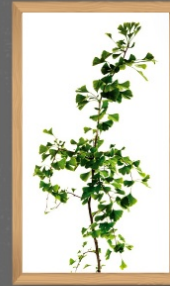# Week 5 - Battle of Neighbourhoods by How Chih Lee
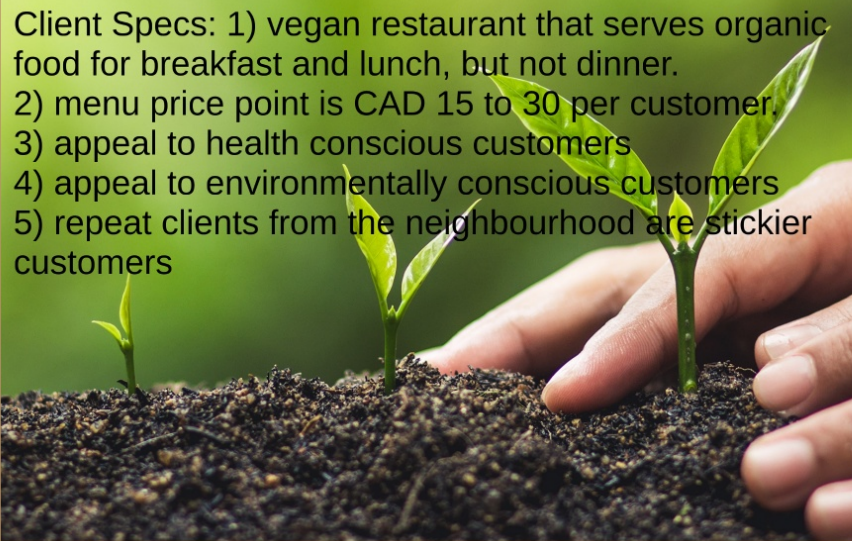
Solution for Client V -
1) Location for Vegan Restaurant in Toronto
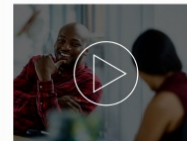**2) How to Promote with Other Venues and KOLs**

1.1 Background

We are a company that provides Software as a Service (SaaS) to SMEs in the Greater Toronto Area (GTA). Client V wants our advice on (i) where to locate her restaurant and (ii) how to promote it to ensure success

Client Specs: 1) vegan restaurant that serves organic food for breakfast and lunch, but not dinner.
2) menu price point is CAD 15 to 30 per customer.
3) appeal to health conscious customers
4) appeal to environmentally conscious customers
5) repeat clients from the neighbourhood are stickier customers

2.1 Data Sources

2.2 Data Cleaning

3.1 Feature Selection and Analysis for Part 1 - Location

3.2 Feature Selection and Analysis for Part 2 - Promotion
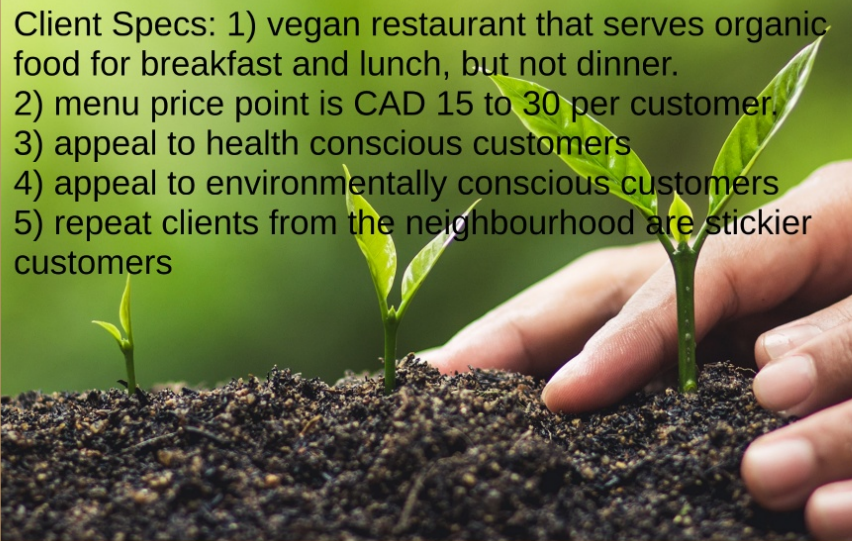
4. Results

5. Discussion

6. Conclusion
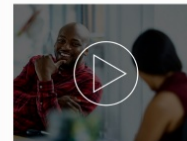
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2.1 Data Sources

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3.1 Feature Selection and Analysis for Part 1 - Location

3.2 Feature Selection and Analysis for Part 2 - Promotion

4. Results

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2.1 Data Source
Sourced from many channels:
- Foursquare : location based data
- Wikipedia : Postal Codes
- pgeocode API : geographical coordinates of each Postal Code
- Housingpricehub.com : AvHsePr

2.2 Data Cleaning
Need to Pre-Process, Convert to Numerical Values, Normalise and Visualise using BoxPlots

103 103 103

Out[14]:

	Postal Code	Borough	Neighbourhood	Neighbourhood Latitude	Neighbourhood Longitude
2	M3A	North York	Parkwoods	43.7545	-79.3300
3	M4A	North York	Victoria Village	43.7276	-79.3148
4	M5A	Downtown Toronto	Regent Park, Harbourfront	43.6555	-79.3626
5	M6A	North York	Lawrence Manor, Lawrence Heights	43.7223	-79.4504
6	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government	43.6641	-79.3889
8	M9A	Etobicoke	Islington Avenue, Humber Valley Village	43.6662	-79.5282
9	M1B	Scarborough	Malvern, Rouge	43.8113	-79.1930
11	M3B	North York	Don Mills	43.7450	-79.3590
12	M4B	East York	Parkview Hill, Woodbine Gardens	43.7063	-79.3094
13	M5B	Downtown Toronto	Garden District, Ryerson	43.6572	-79.3783

Text(0.5, 1.0, 'AvHsePr for M4P')
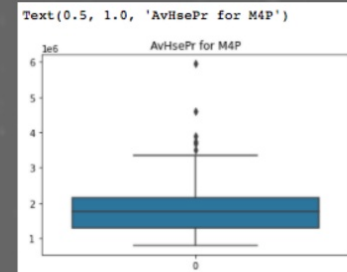
AvHsePr for M4P

```
sns.boxplot(data=AHP7nprice)
print(AHP7nprice.shape)
plt.title('AvHsePr for M4T')
```

(143,)
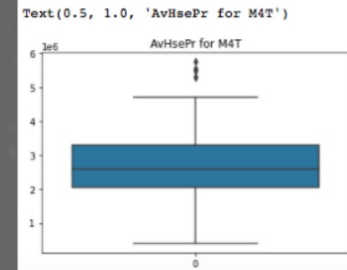
Text(0.5, 1.0, 'AvHsePr for M4T')

AvHsePr for M4T

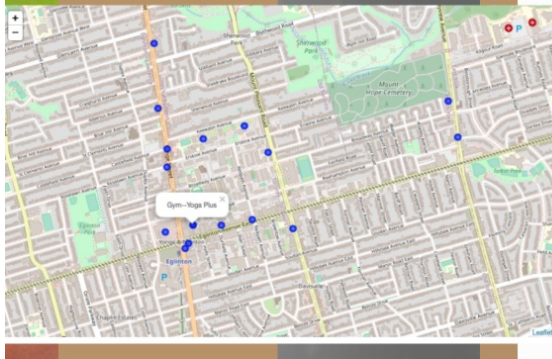|	Postal Code	Borough	Neighbourhood	Neighbourhood Latitude	Neighbourhood Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	M3A	North York	Parkwoods	43.7545	-79.3300	0	Park	Food & Drink Shop	Yoga Studio	Eastern European Restaurant	Flea Market
1	M4A	North York	Victoria Village	43.7276	-79.3148	1	French Restaurant	Hockey Arena	Park	Pizza Place	Financial or Legal Service
2	M5A	Downtown Toronto	Regent Park, Harbourfront	43.6555	-79.3626	1	Coffee Shop	Breakfast Spot	Restaurant	Yoga Studio	Distribution Center
3	M6A	North York	Lawrence Manor, Lawrence Heights	43.7223	-79.4504	1	Clothing Store	Coffee Shop	Women's Store	Restaurant	Cosmetics Shop
4	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government	43.6641	-79.3889	1	Sushi Restaurant	Gym	Italian Restaurant	Ramen Restaurant	Burrito Place

3.1 Feature Selection and Analysis for Part 1 - Location

- 99 neighbourhoods in the GTA with more than 2,150 venues
- Eight features selected from over Twenty
- Use OneHot encoding to return 5 Most Common Venues per Postal Code
- Use K-Means Clustering to return Target Cluster of Gym Venues with no Competing Restaurants
- Map Clusters and filter for AvHsePri,
- Chose 2 Locations: M4P and M4T
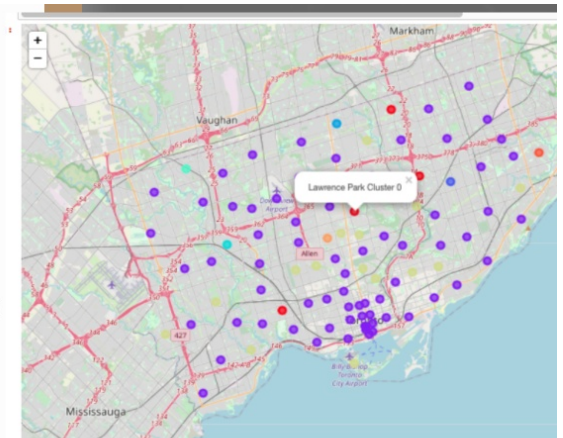
3.2 Feature Selection and Analysis for Part 2 - Promotion

-- From Location, 17 Other Venues identified
- Promotion Partners identified
- Other Venue : Gym Venues with Highest Rating
- KOLs with Highest AgreeCount and large following

	name	categories	address	crossStreet	lat	lng	labeledLatLngs	distance	formattedAddress	postalCode	
0	Crossfit Metric	Gym	756 Mt Pleasant Rd	Eglinton	43.707480	-79.389857	[{'label': 'display', 'lat': 43.70747956557104,...	676	[756 Mt Pleasant Rd (Eglinton), Toronto ON, Ca...	NaN	524ac4b1498e8498a174af
1	GoodLife Fitness Toronto Dunfield and Eglinton	Gym	110 Eglinton Ave E	at Dunfield Ave.	43.707645	-79.395303	[{'label': 'display', 'lat': 43.707645, 'lng':...	840	[110 Eglinton Ave E (at Dunfield Ave.), Toront...	M4P 1A6	4bd6e35d637ba5933ad3ff
2	Barreworks	Yoga Studio	2576 Yonge St	NaN	43.714070	-79.400109	[{'label': 'display', 'lat': 43.71407030751952...	920	[2576 Yonge St, Toronto ON, Canada]	NaN	51606062e4b0878cf5405f
3	GoodLife Fitness Toronto Yonge Eglinton Centre	Gym	2300 Yonge St	at Eglinton Ave. W	43.707276	-79.399562	[{'label': 'display', 'lat': 43.707276, 'lng':...	1115	[2300 Yonge St (at Eglinton Ave. W), Toronto O...	M4P 1E4	4e80de0930f9844fb2bd7f
4	Gym	Gym	140 Erskine	NaN	43.713126	-79.393537	[{'label': 'display', 'lat': 43.71312601210131...	391	[140 Erskine, Toronto ON, Canada]	NaN	4da99b34a86e771ea70e6
5	900 Mount Pleasant - Residents Gym	Gym / Fitness Center	900 Mount Pleasant Road	NaN	43.711671	-79.391767	[{'label': 'display', 'lat': 43.7116705660572...	319	[900 Mount Pleasant Rd, Toronto ON M4P 3J9,...	M4P 3J9	4c3f2724db3b1b8d635e6
6	Yoga Tree Midtown	Yoga Studio	40 Eglinton Ave. E	at Yonge St.	43.707642	-79.397472	[{'label': 'display', 'lat': 43.70754167668336...	960	[40 Eglinton Ave. E (at Yonge St.), Toronto ON...	M4P 3A2	4efa4c786c25c411edca5
7	Womens Fitness Clubs of Canada	Gym	1820 Bayview Ave Unit 1	NaN	43.712484	-79.377341	[{'label': 'display', 'lat': 43.71248363171391...	920	[1820 Bayview Ave Unit 1, Toronto ON M4G 4G7,...	M4G 4G7	4bc6f0b8b92b376b091d54
8	Yoga Plus	Gym	40 Eglinton Ave E	at Yonge	43.707674	-79.397478	[{'label': 'display', 'lat': 43.707674, 'lng':...	958	[40 Eglinton Ave E (at Yonge), Toronto ON, Can...	NaN	4b156d91f964a520b9ac2
9	CYCLEBAR	Gym	1866 Bayview Avenue, Suite 103	NaN	43.714468	-79.378066	[{'label': 'display', 'lat': 43.71446846114807...	862	[1866 Bayview Avenue, Suite 103, Toronto ON M4...	M4G 0C3	58cd57d92f91cb28ec3d6f
10	Anytime Fitness	Gym	2739 Yonge	NaN	43.717654	-79.400434	[{'label': 'display', 'lat':...	1051	[2739 Yonge St, Toronto ON M4N...	M4N 2H9	53bdcf7a498ed37c87ab9f

4. Results
1) Client V wants to open a vegan restaurant that serves organic food for breakfast and lunch,
==>There are no restaurants/cafes with competing cuisine in this Location,.
2) menu price point is CAD15 to 30 per customer
==> The Average Housing Price for the Neighbourhoods in Postal Code M4P is above the mean for Toronto, should offer customers with above average spending power in this Location
3) wants to appeal to health conscious customers who go to fitness centres, yoga studios or pools nearby
==> 17 Other Venues within 1200m radius and we identified one Gym - Yoga Plus as the most effective one with the highest user ratings
4) Environmentally conscious customers ==> Not analysed
5) believes that repeat clients from the neighbourhood are stickier
==> identified Judes C as top KOL with a good following that can help draw customers to Client V
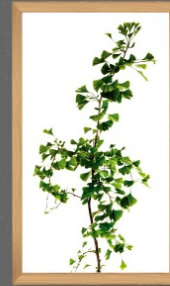
5. Discussion
- achieved significant results set out above
- limitations when using data analysis and machine learning associated with identifying the right source.
- need to expand search beyond location databases like Foursquare,
- include social media like Facebook or Reddit, which maintain databases according to interest groups
- bias inherent in clustering techniques
- uses least square of Euclidean distance techniques
- function finds a local minimum but may miss the global minimum
- "black swan" events are missed because they are not similar to past events

6. Conclusion
We have met 4 out of the 5 criteria set out by Client V.
Good Luck !

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**Solution for Client V -
1) Location for Vegan Restaurant in Toronto
2) How to Promote with Other Venues and KOLs**