IBM Data Science Professional Certificate

Opening a Portuguese Restaurant in Toronto

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Business Problem

- **Toronto**
  - 3 Million inhabitants
  - 16th place worldwide with 272 restaurants per 100.000 inhabitants
- **Portuguese community**
  - More than 170.000 people just in Toronto
  - Portuguese cuisine as one of the richest in the world
- **If na investor is looking to open a new Portuguese restaurant where would you recommend it?**

Data

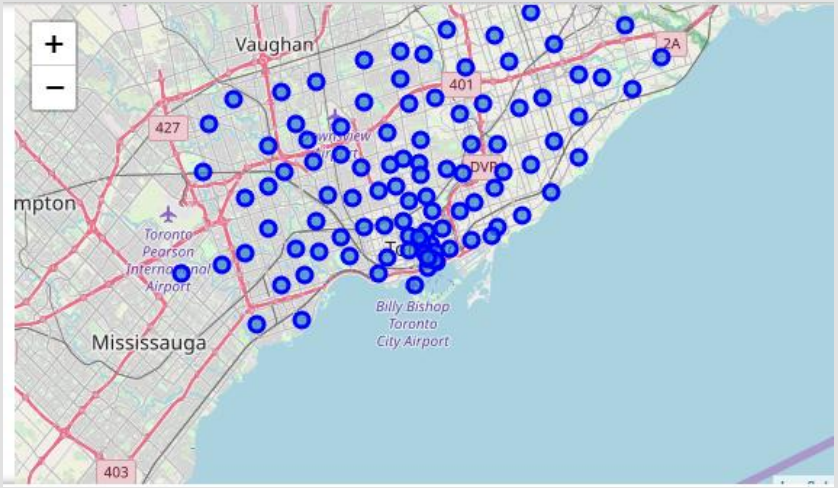
- **List of neighbourhoods in Toronto**
  - Boroughs and postal codes (Wikipedia)
  - Geo coordinates
- **Portuguese venues data**
  - Using Foursquare API
    - Category Id for Portuguese Restaurant

Methodology

Toronto Neighbourhoods Data Exploratory Analysis

- Using Wikipedia data and Coursera CSV

	PostalCode	Borough	Neighborhood	Latitude	Longitude
0	M1B	Scarborough	Rouge,Malvern	43.806686	-79.194353
1	M1C	Scarborough	Highland Creek,Rouge Hill,Port Union	43.784535	-79.160497
2	M1E	Scarborough	Guildwood,Morningside,West Hill	43.763573	-79.188711
3	M1G	Scarborough	Woburn	43.770992	-79.216917
4	M1H	Scarborough	Cedarbrae	43.773136	-79.239476

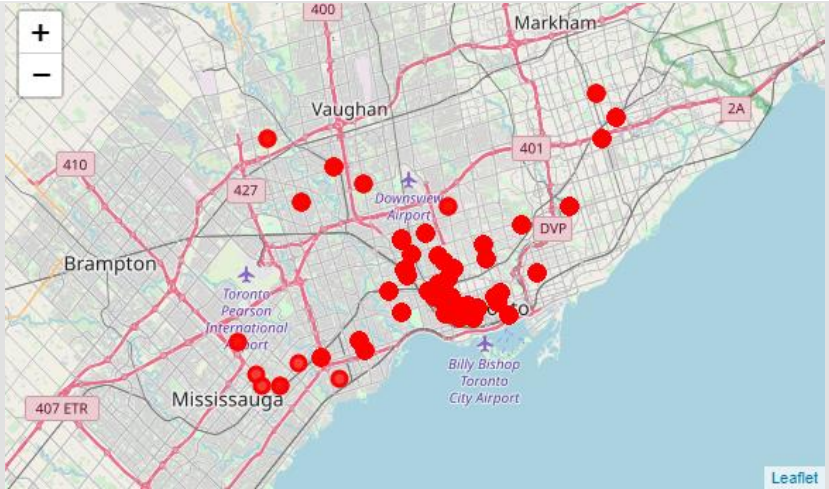


Methodology

Portuguese Restaurants Data Exploratory Analysis

- Using Foursquare we retrieved all venues per neighbourhood

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
1	Cedarbrae	43.773136	-79.239476	Nando's Flame-Grilled Chicken	43.773113	-79.281166	Portuguese Restaurant



Methodology

Data wrangling

– Create frequency based data frame per neighbourhood

	Neighborhood	Asian Restaurant	BBQ Joint	Bakery	Bar	Beer Bar	Café	Dessert Shop	Gay Bar	Italian Restaurant	Medit R
0	Adelaide,King,Richmond	0.000000	0.0	0.290323	0.032258	0.032258	0.0	0.0	0.032258	0.032258	
1	Agincourt	0.333333	0.0	0.333333	0.000000	0.000000	0.0	0.0	0.000000	0.000000	
2	Agincourt North,L'Amoreaux East,Milliken,Steel...	0.333333	0.0	0.333333	0.000000	0.000000	0.0	0.0	0.000000	0.000000	
3	Albion Gardens,Beaumond Heights,Humbergate,Jam...	0.000000	0.0	0.000000	0.000000	0.000000	0.0	0.0	0.000000	0.000000	
4	Alderwood,Long Branch	0.000000	0.0	0.250000	0.000000	0.000000	0.0	0.0	0.000000	0.000000	

Methodology

Data wrangling

– Create top venues data frame

	Neighborhood	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	
0	Adelaide,King,Richmond	Portuguese Restaurant	Bakery	Restaurant	Wine Bar	Sandwich Place	Mediterranean Restaurant	Italian Restaurant	
1	Agincourt	Portuguese Restaurant	Bakery	Asian Restaurant	Wine Bar	Seafood Restaurant	Sandwich Place	Restaurant	
2	Agincourt North,L'Amoreaux East,Milliken,Steel...	Portuguese Restaurant	Bakery	Asian Restaurant	Wine Bar	Seafood Restaurant	Sandwich Place	Restaurant	
3	Albion Gardens,Beaumond Heights,Humbergate,Jam...	Portuguese Restaurant	Wine Bar	Seafood Restaurant	Sandwich Place	Restaurant	Pizza Place	Mediterranean Restaurant	
4	Alderwood,Long Branch	Portuguese Restaurant	Restaurant	Bakery	Wine Bar	Seafood Restaurant	Sandwich Place	Pizza Place	M

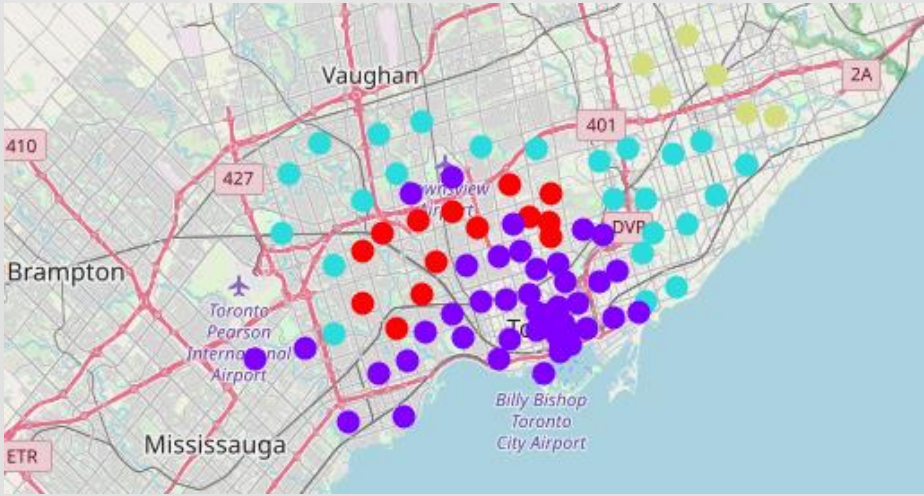
Methodology

- **K-Means**
  - To perform clustering on the neighbourhoods based on the venue frequency
- **DBSCAN**
  - To perform venue clustering based on concentration

Results

K-Means

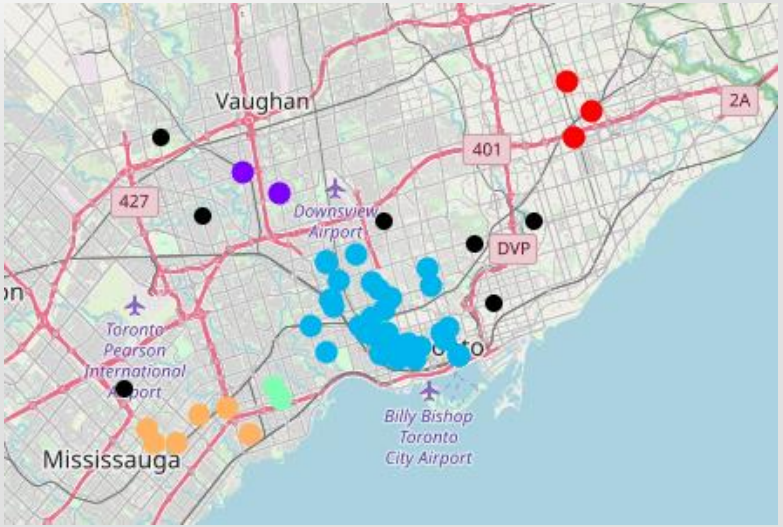
- With 4 clusters
  - Purple (high concentration)
  - Cyan (medium concentration)
  - Red (low concentration)
  - Green (low concentration)

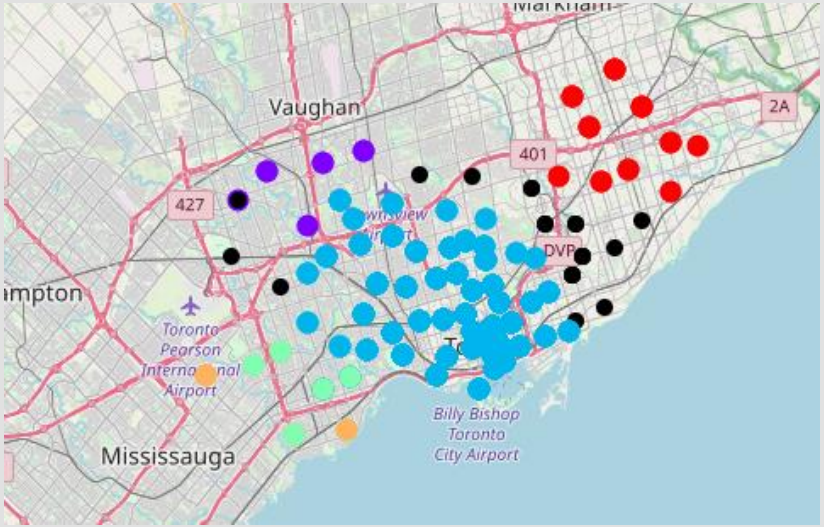


Results

DBSCAN

- Per venue location and applied to neighbourhoods shows density areas and outliers where there is little concentration





Discussion and Conclusion

Recommendation

- Avoid Central area with high density clusters on both K-means and DBSCAN
- Outliers areas in DBSCAN are a good bet
- Red and Green clusters in K-Means have less competition

Conclusion

- Good insight to avoid high competition areas
- More data would be useful (e.g. population density, transports, etc.)