Where to open a new restaurant in Toronto?

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Business Problem 1/2

- Opening a restaurant is a very challenging task. As a start, it is very important to decide the location wisely.
- Currently entrepreneur usually carelessly relies on domain knowledge to choose a restaurant spot.

Business Problem 2/2

A good in-general suggestion for a restaurant starter is:

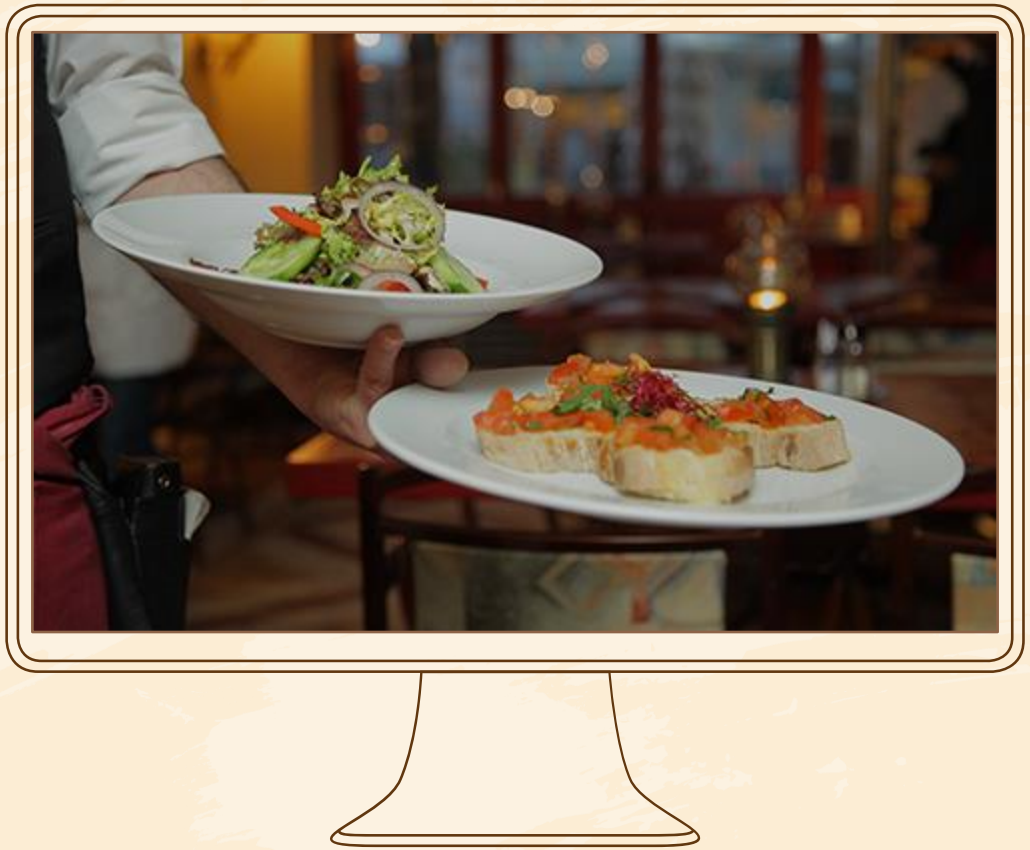
open a restaurant where it is surrounded by other restaurants to share customers

Solution

Where are most restaurants? How to find the ‘eating’ area?

Do the restaurants data analysis in Toronto and find the concentrated restaurants area for a new restaurant’s starter.

Our analysis will present:



A list

A list of neighborhoods that are closest to the restaurant-gathering-areas

A map

A map with location visualization to give you general ideas about where they are

This analysis is for

Investors, entrepreneurs, and chefs interested in opening a restaurant in Toronto

Data and Methods

What data do we need? How to analyze them?

Section 1 Toronto neighborhoods data

Using a table on https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M collect information about Toronto boroughs and locations and Postal Code.

Section 2 Toronto neighborhoods geographical locations

Use the Geopy and Folium library to get the coordinates of every locations and map geospatial data on a Toronto map

Section 3 collect all restaurants in Toronto

Use Foursquare API, collect the all restaurants names in Toronto and their location via an exploring query.

Data and Methods

What data do we need? How to analyze them?

Section 4 group restaurants

Group collected restaurants by their locations using K-mean algorithm and find out the cluster which has the most nodes. This cluster represents the busy restaurants area.

Section 5 locate neighborhoods that are closet to the biggest restaurant cluster

Calculate the distance (Euclidean distance) from each neighbourhood to the biggest cluster center and select a few neighbourhoods which have smaller distances than others. These boroughs will be my recommendations.

Section 6 visualizing results on map

Visualize clustering results and our recommended restaurants on the map

Methodology

Data acquisition – neighborhood data

By taking a table on https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M, and filling in the missing information, we can make a table of Toronto boroughs and neighbourhoods. Here is a snapshot of the first 5 rows of this table.

	PostalCode	Borough	Neighborhood
0	M3A	North York	Parkwoods
1	M4A	North York	Victoria Village
2	M5A	Downtown Toronto	Regent Park, Harbourfront
3	M6A	North York	Lawrence Manor, Lawrence Heights
4	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government

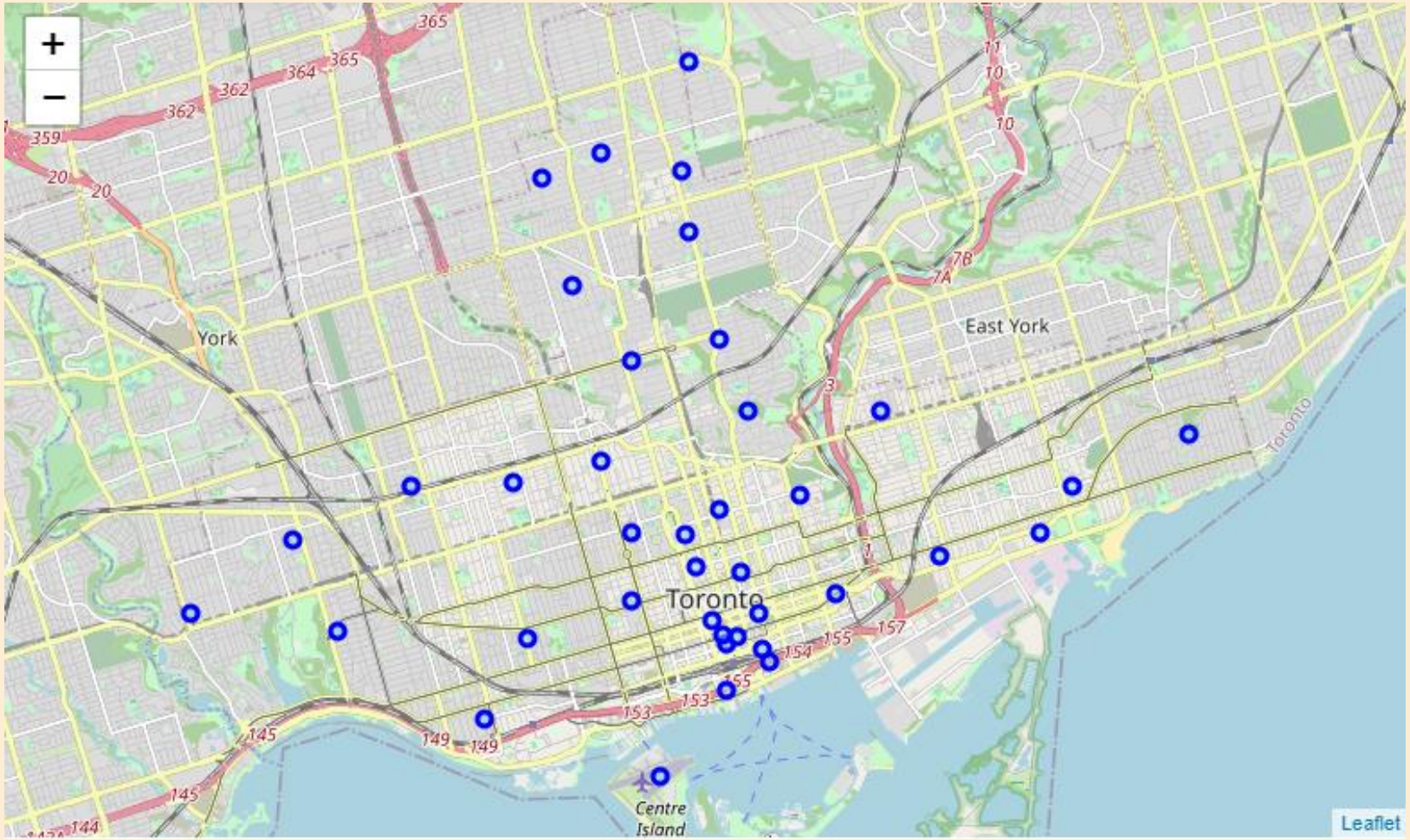
Methodology

Location visualization

Use Geopy and Folium library to get the coordinates of every locations and map geospatial data on a Toronto map.

To demonstrate our methods, we explore 'Downtown Toronto', 'East Toronto', 'West Toronto' and 'Central Toronto'.

The same method can apply to other boroughs.



Methodology

Data acquisition – restaurant data

Use Foursquare API, collect the all restaurants in Toronto and their location via an exploring query. Together with the Toronto boroughs table, we can see where the restaurants are.

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Little Portugal, Trinity	13	13	13	13	13	13
The Danforth West, Riverdale	12	12	12	12	12	12
University of Toronto, Harbord	10	10	10	10	10	10
Central Bay Street	9	9	9	9	9	9
Kensington Market, Chinatown, Grange Park	9	9	9	9	9	9
Stn A PO Boxes	9	9	9	9	9	9
Davisville	9	9	9	9	9	9
St. James Town, Cabbagetown	9	9	9	9	9	9
Richmond, Adelaide, King	9	9	9	9	9	9
First Canadian Place, Underground city	8	8	8	8	8	8

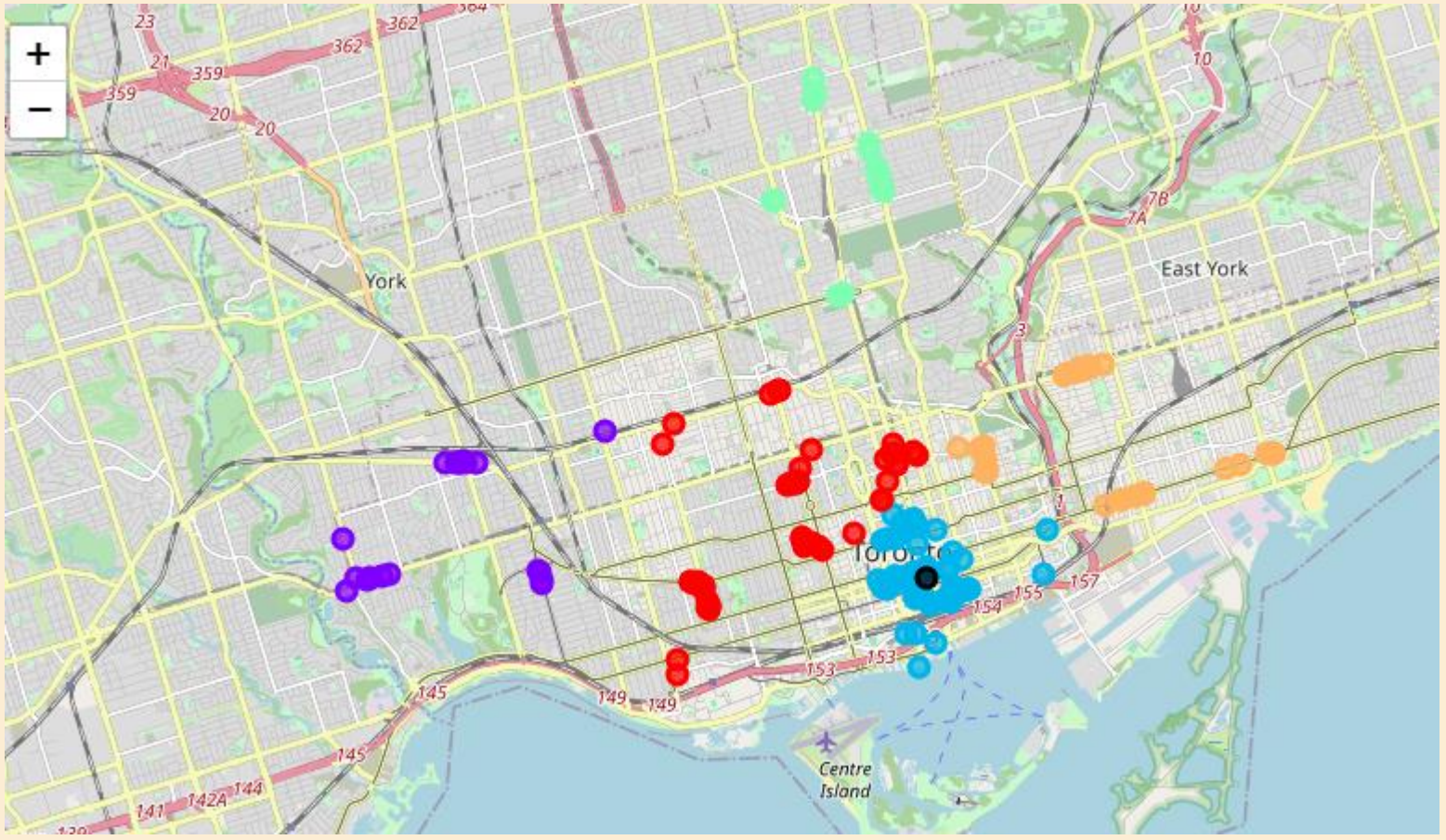
Methodology

Clustering restaurants

Group collected restaurants by their locations using K-mean algorithm and find out the cluster which has the most nodes. This cluster represents the busy restaurants area.

In the right map, cluster 1 (the blues) has the most nodes, in total 71.

The black dot is the center of this cluster



Result 1/2

Our promised list

Calculate the distance (Euclidean distance) from each borough to the biggest cluster center and select a few boroughs which have smaller distances than others.

This is our recommendation list.

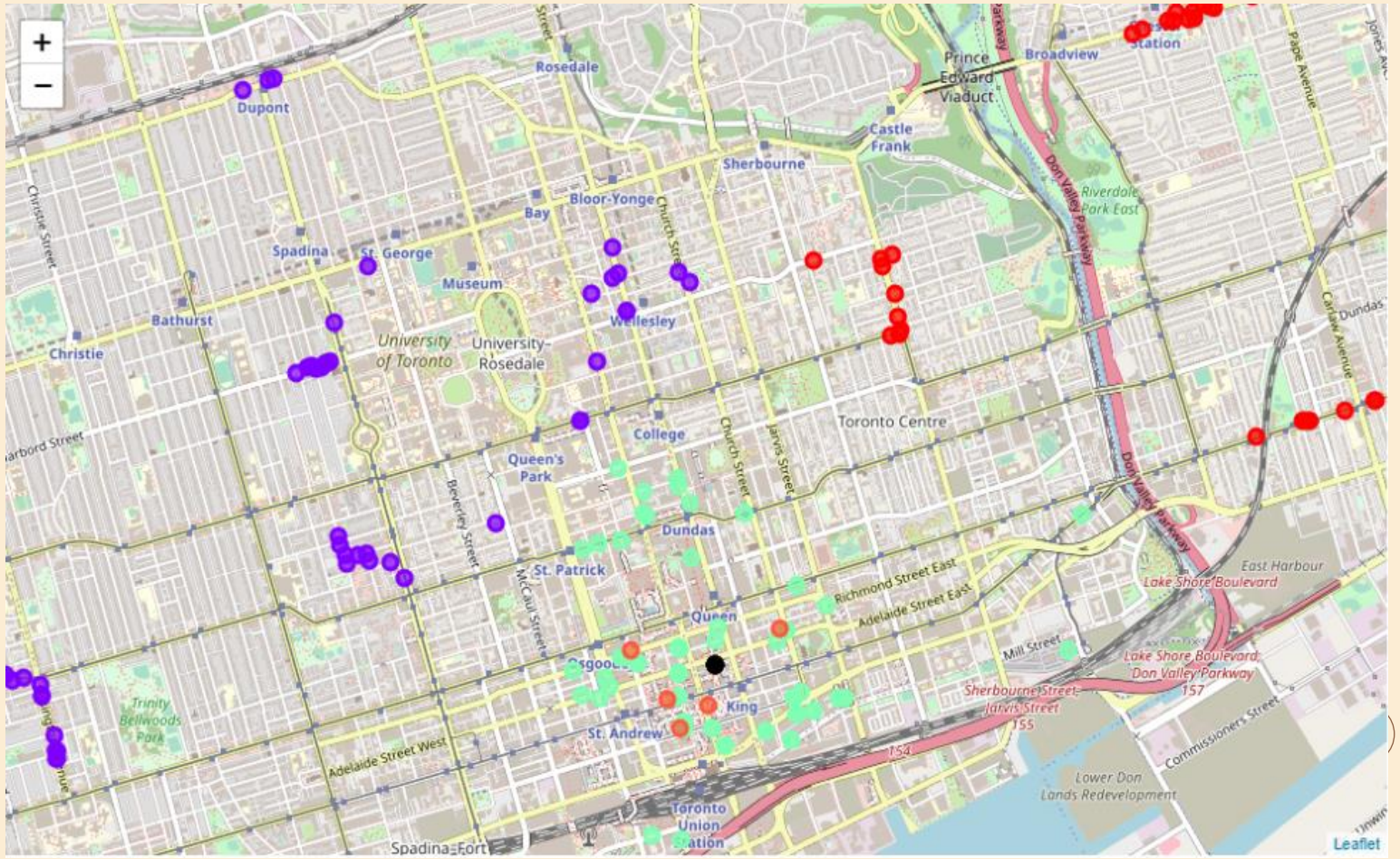
	Latitude	Longitude	Neighborhood
16	43.648198	-79.379817	Commerce Court, Victoria Hotel
36	43.648429	-79.382280	First Canadian Place, Underground city
13	43.647177	-79.381576	Toronto Dominion Centre, Design Exchange
3	43.651494	-79.375418	St. James Town
8	43.650571	-79.384568	Richmond, Adelaide, King

Result 2/2

Our promised map

Recommended restaurant locations on map

See the oranges? That is where we suggest to start with once you want to open a new restaurant.



Discussion

SECTION 1

- 5 neighbourhoods that suitable for a start-up restaurant business. Our methodology is that the more restaurants the neighbourhood is surround by, the more customers the restaurants will have.

SECTION 2

- The future question will be what type of restaurant to open. This question requires more domain knowledge on restaurant business.

SECTION 3

- Where to grow bigger and bigger? Future locations?
- Another analysis of BIG restaurants locations.

Conclusions

- We worked out a methodology to determine where are the best locations for opening a new restaurants.
- We collected information about Toronto restaurants and neighbours from Wikipedia, and using Foursquare API. We also clustered restaurants by the k-means algorithm and find out where the biggest cluster is located. Based on distance calculating we select top 5 neighbourhoods which are closet to this cluster. Eventually we visualized our results on the map
- This type of analysis can be applied to any city of and to any type of venue (shopping, clubs, etc.) that is available in Foursquare database.