

# Capstone project Battle of Neighborhoods

## Introduction

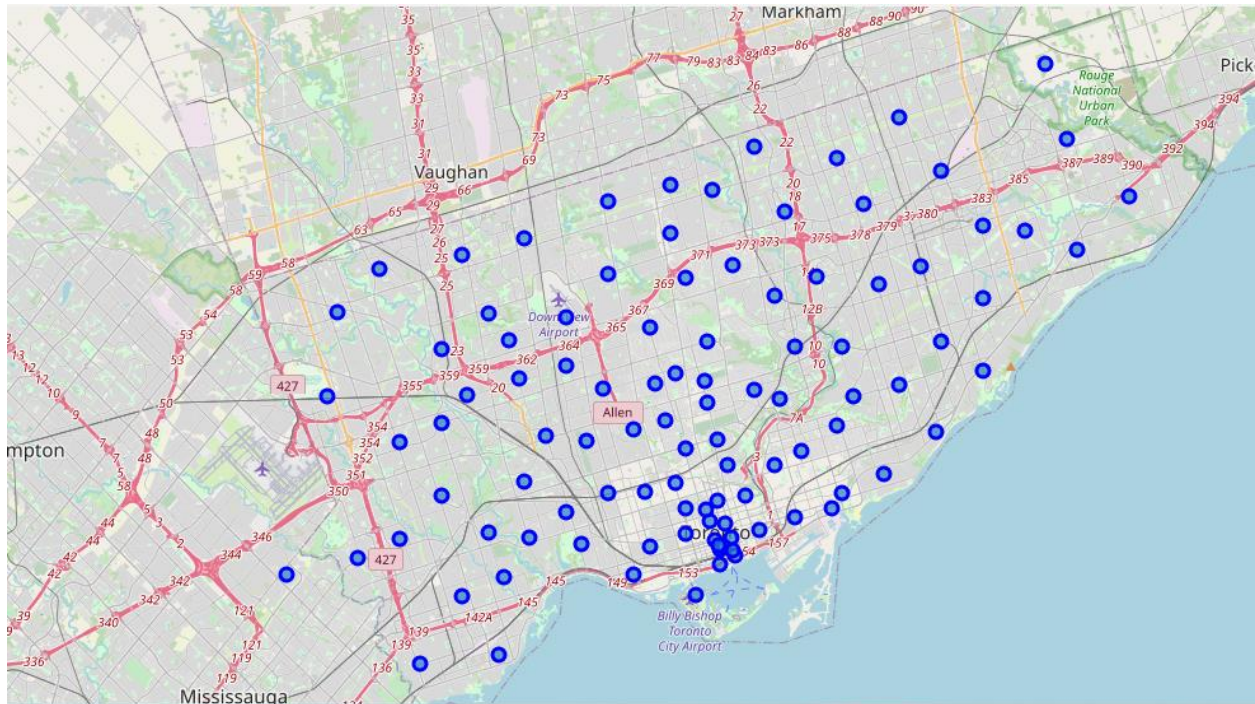
Toronto is Canada's biggest city. There are almost 3 million people living there and is the financial center of Canada. Every year there are multitudes of people from all over the world visiting this city. Immigration to Toronto from various continents is very high. Therefore Toronto has become one of the most multicultural and multiracial cities in the world. This has had a great effect on the cuisine of Toronto and made it very diverse and multicultural. Locals have hunger for ethnic foods and the restaurant owners have found this as a great opportunity to open new restaurants. However the biggest problem to discover which neighborhood is the best place in this giant city to open a restaurant? In this work we would like to focus our analysis on opening a Mediterranean restaurant. In our analysis we have to consider various factors or features that would play a major role to a solution. Therefore the question that needs to be answered is what dataset and what data content do we need to find the ideal place for a Mediterranean restaurant.

## Data

Toronto Neighborhood and Borough Data from "list of postal codes of Canada" Wikipedia will be used. Then we will consider various neighborhoods and parts in the city for this project.

PostalCode	Borough	Neighborhood
M1B	Scarborough	Malvern, Rouge
M1C	Scarborough	Rouge Hill, Port Union, Highland Creek
M1E	Scarborough	Guildwood, Morningside, West Hill
M1G	Scarborough	Woburn
M1H	Scarborough	Cedarbrae
M1J	Scarborough	Scarborough Village
M1K	Scarborough	Kennedy Park, Ionview, East Birchmount Park
M1L	Scarborough	Golden Mile, Clairlea, Oakridge
M1M	Scarborough	Cliffside, Cliffcrest, Scarborough Village West
M1N	Scarborough	Birch Cliff, Cliffside West
M1P	Scarborough	Dorset Park, Wexford Heights, Scarborough Town...
M1R	Scarborough	Wexford, Maryvale

In order to get better understanding, neighborhoods of Toronto we plot Geo-special data by Folium map. This map shows us the potential of opening a Mediterranean restaurant successfully in different boroughs.



Finally we will collect data by using Foursquare API to learn about restaurants in specifically with Mediterranean cuisine in different parts of the city. This dataset will provide us the rating data for different restaurants of Toronto, areas with highest number of restaurants, ethnic foods in different Boroughs etc. By analyzing such data we will be able to recommend an ideal and lucrative location for a Mediterranean restaurant.

## Methodology

The first step is to acquire venue data which are in distance of 1000 meters from various neighborhoods of Toronto by employing Foursquare API. As can be seen below these data are including borough, neighborhood, geo-data of neighborhood, venue name, venue geo-data, and venue category information.

As our main intention is to analyze data for Mediterranean cuisine we filter the data for such category and use Foursquare API to get venue data for each Venue ID.

	Borough	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Vennue ID	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Scarborough	Malvern, Rouge	43.806686	-79.194353	4b6718c2f964a5203f3a2be3	Harvey's	43.800020	-79.198307	Restaurant
1	Scarborough	Malvern, Rouge	43.806686	-79.194353	579a91b3498e9bd833afa78a	Wendy's	43.802008	-79.198080	Fast Food Restaurant
2	Scarborough	Malvern, Rouge	43.806686	-79.194353	4bb6b9446edc76b0d771311c	Wendy's	43.807448	-79.199056	Fast Food Restaurant
3	Scarborough	Malvern, Rouge	43.806686	-79.194353	4c6ac7de35d3be9a50bf2206	RBC Royal Bank	43.798782	-79.197090	Bank
4	Scarborough	Malvern, Rouge	43.806686	-79.194353	4b914562f964a520d4ae33e3	Caribbean Wave	43.798558	-79.195777	Caribbean Restaurant

The picture below shows the filtered venue data along with corresponding rating and price category information

	Borough	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Vennue ID	Venue	Venue Latitude	Venue Longitude	Venue Category	Venue Rating	Price Category
0	Scarborough	Malvern, Rouge	43.806686	-79.194353	4b60878af964a520d9eb29e3	Mr. Greek	43.799853	-79.198234	Greek Restaurant	nan	2
1	Scarborough	Rouge Hill, Port Union, Highland Creek	43.784535	-79.160497	4bccf9bf511f9521ce0eb4c7	Fratelli Village Pizzeria	43.784008	-79.169787	Italian Restaurant	7.7	2
2	Scarborough	Guildwood, Morningside, West Hill	43.763573	-79.188711	4c7ee2efd860b60c915d5f9d	Taste Of Greek Cuisine	43.768259	-79.189608	Greek Restaurant	5.9	2
3	Scarborough	Dorset Park, Wexford Heights, Scarborough Town...	43.757410	-79.273304	4bf32a9594af2d7fd4363972	Nova Ristorante	43.749434	-79.277630	Italian Restaurant	7.2	2
4	Scarborough	Wexford, Maryvale	43.750072	-79.295849	4b0f355bf964a5206a6023e3	Ibrahim BBQ	43.744474	-79.297500	Middle Eastern Restaurant	7.7	2
5	Scarborough	Wexford, Maryvale	43.750072	-79.295849	4b4cb66cf964a52065bb26e3	Shawarma Empire	43.743405	-79.303649	Middle Eastern Restaurant	8.5	1
6	Scarborough	Wexford, Maryvale	43.750072	-79.295849	4dfd66db8877e9c47496660b	Nasib's Shawarma & Falafel	43.743512	-79.302300	Middle Eastern Restaurant	7.5	1
7	Scarborough	Wexford, Maryvale	43.750072	-79.295849	4e0e43f3fa76d62f444738eb	Sequoia Lounge	43.745645	-79.295737	Middle Eastern Restaurant	nan	2
8	Scarborough	Agincourt	43.794200	-79.262029	5330a297498e0af77483884b	Borsalino	43.788121	-79.265049	Mediterranean Restaurant	6	2

As the next step for data preparation is to drop the “NaN” values to clean our dataset. The rating values for some venues are missing therefore we drop this rows for our dataset. In this way we can get a perfect insight of restaurants rating average per neighborhoods or boroughs.

# Interest

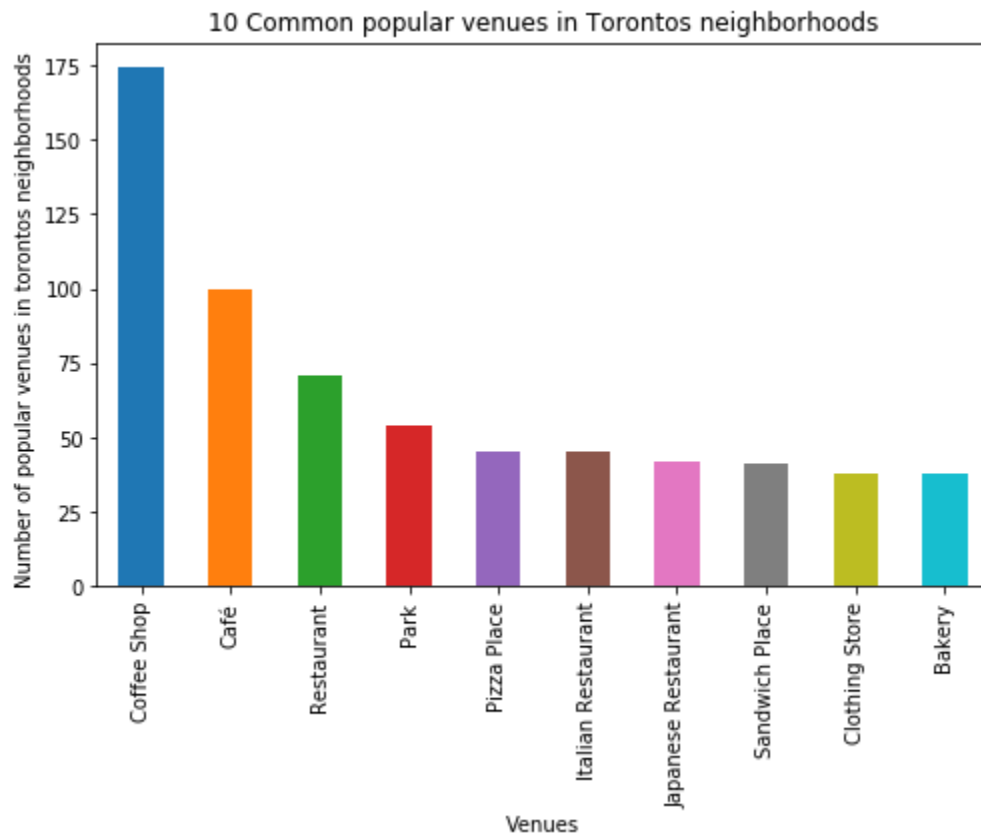
Our desire in this analysis is to find the best and lucrative location for a Mediterranean restaurant of in the city of Toronto. In order to find the best place we consider an array of criteria for our suggestion. These are including the following:

- 1- Popularity of Mediterranean restaurant among residents of Toronto
- 2- Number of neighborhoods in each borough
- 3- Neighborhoods with most of Mediterranean cuisine.
- 4- Neighborhoods with less restaurants
- 5- Average rating of Mediterranean restaurant in various neighborhoods of Toronto

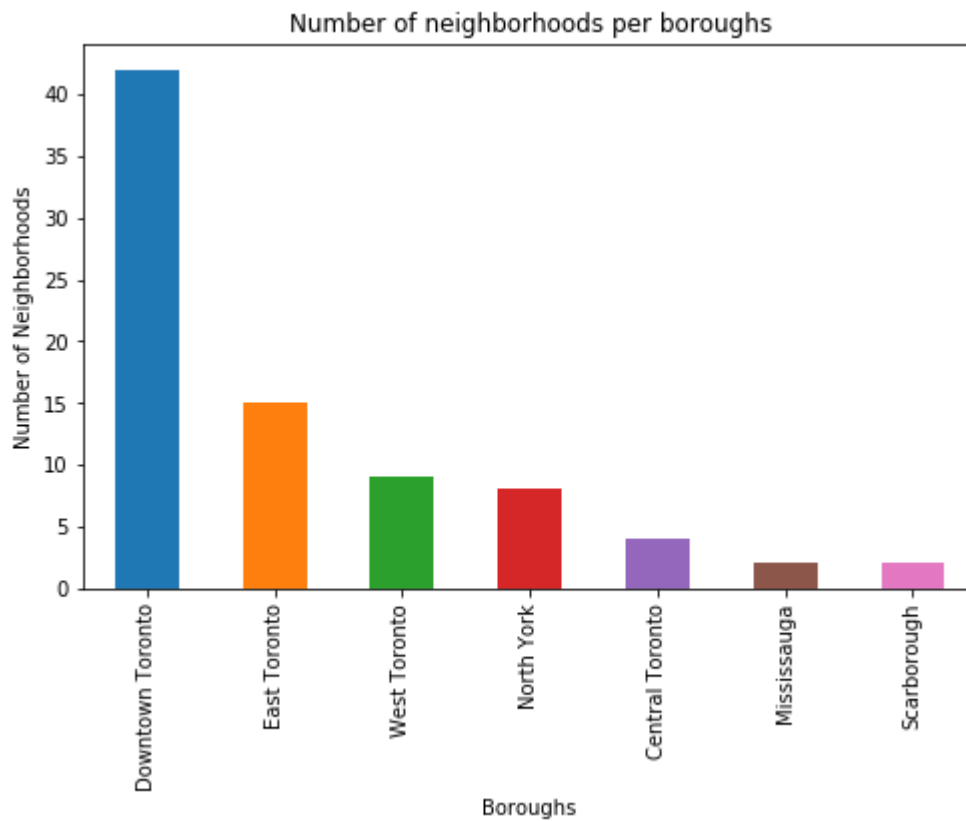
In order to get a better insight of the problem I have prepared some bar charts to describe the criteria above.

## Results

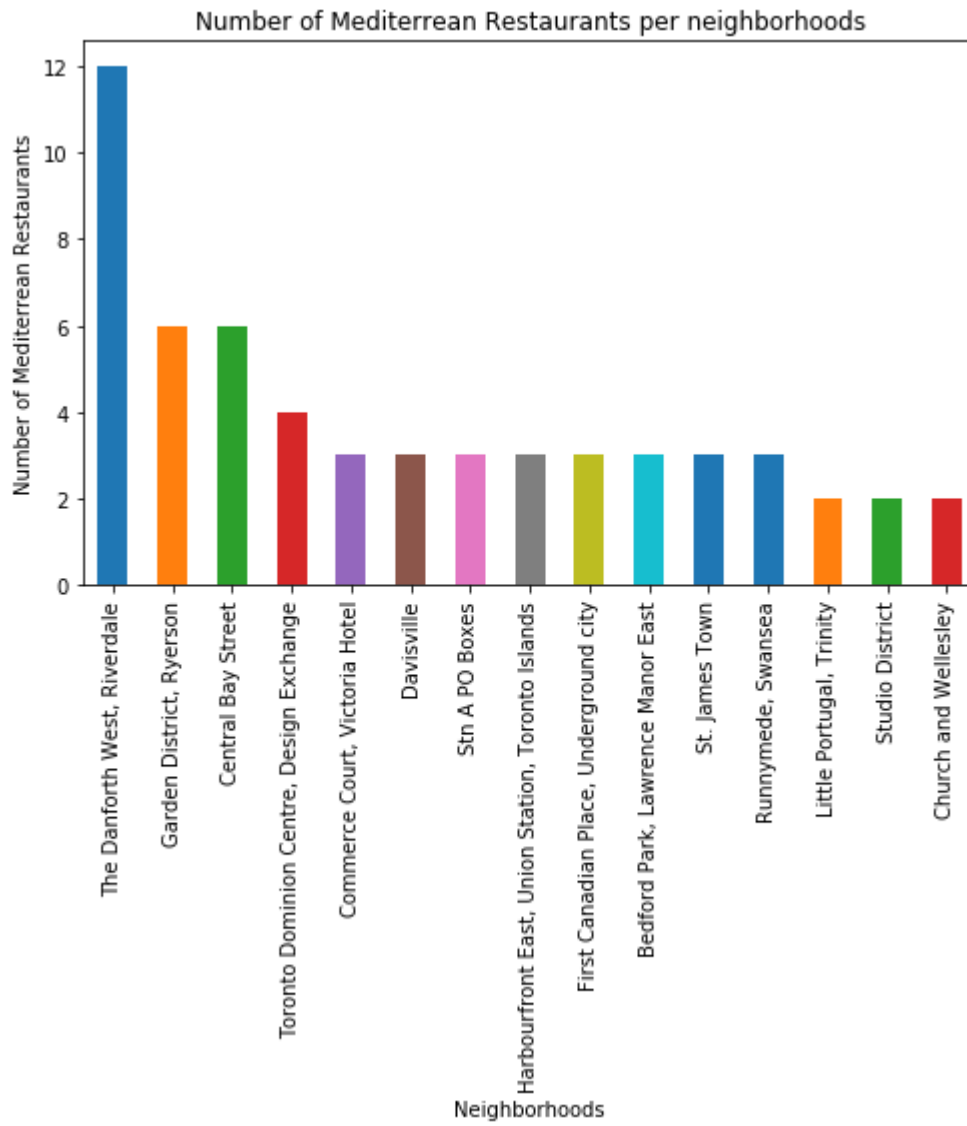
As we can see in the chart below Italian and pizzerias are among popular cuisine in various neighborhoods. This chart shows the 10 most prevalent venues in the neighborhoods of Toronto:



As we consider Italian and pizzerias as Mediterranean cuisine we can assume that this type of restaurant is very common in most of neighborhoods. This shows that opening such a restaurant would be successful.



In the figure above we can see the number of neighborhoods per each borough. This would help us to understand which boroughs has more population than others



The figure above shows us the number of Mediterranean restaurants in various neighborhoods.

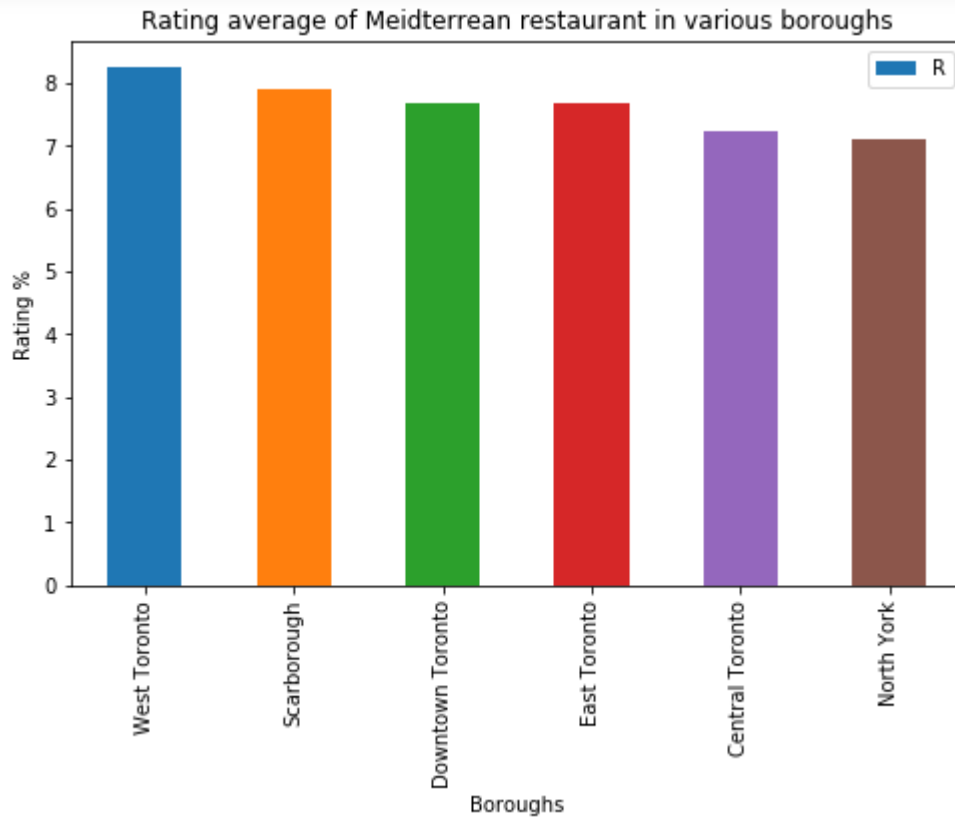
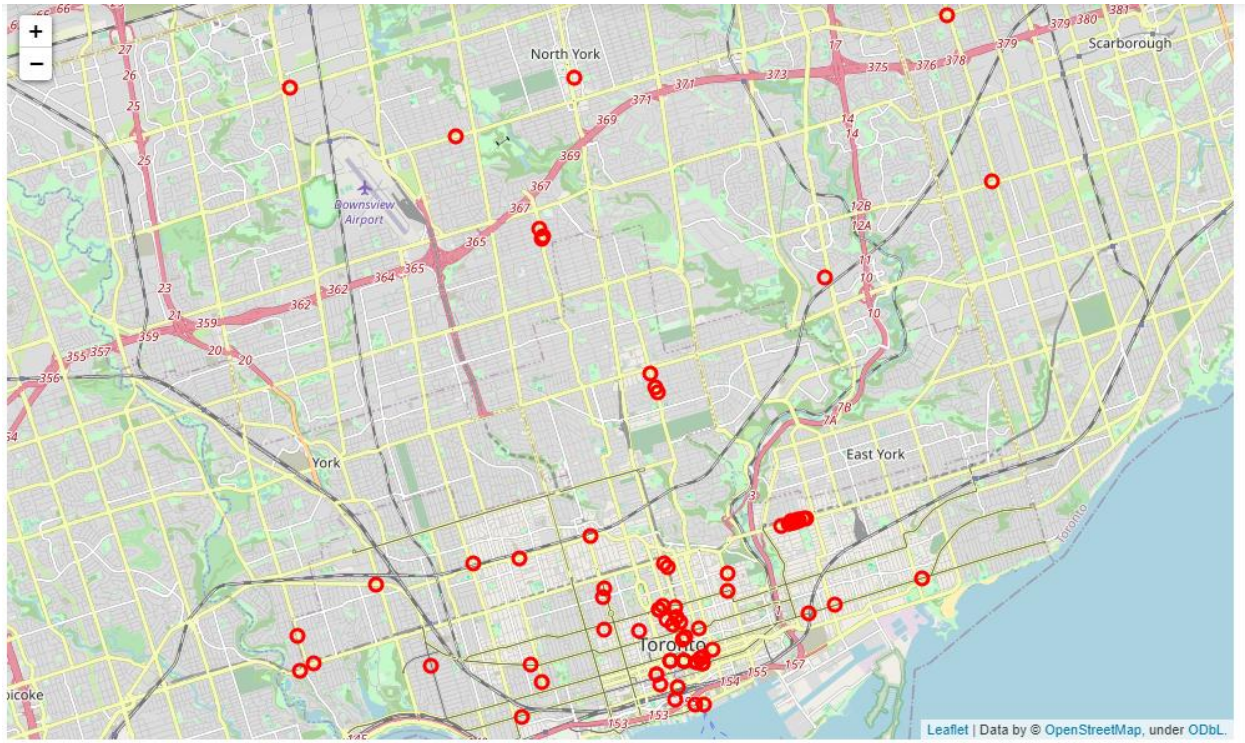


Figure above shows us the average rating of Mediterranean restaurants in 6 boroughs

In order to get a visual insight of distributions of Mediterranean restaurants in Toronto, I generated the map below which shows us how restaurants are spread out in the city

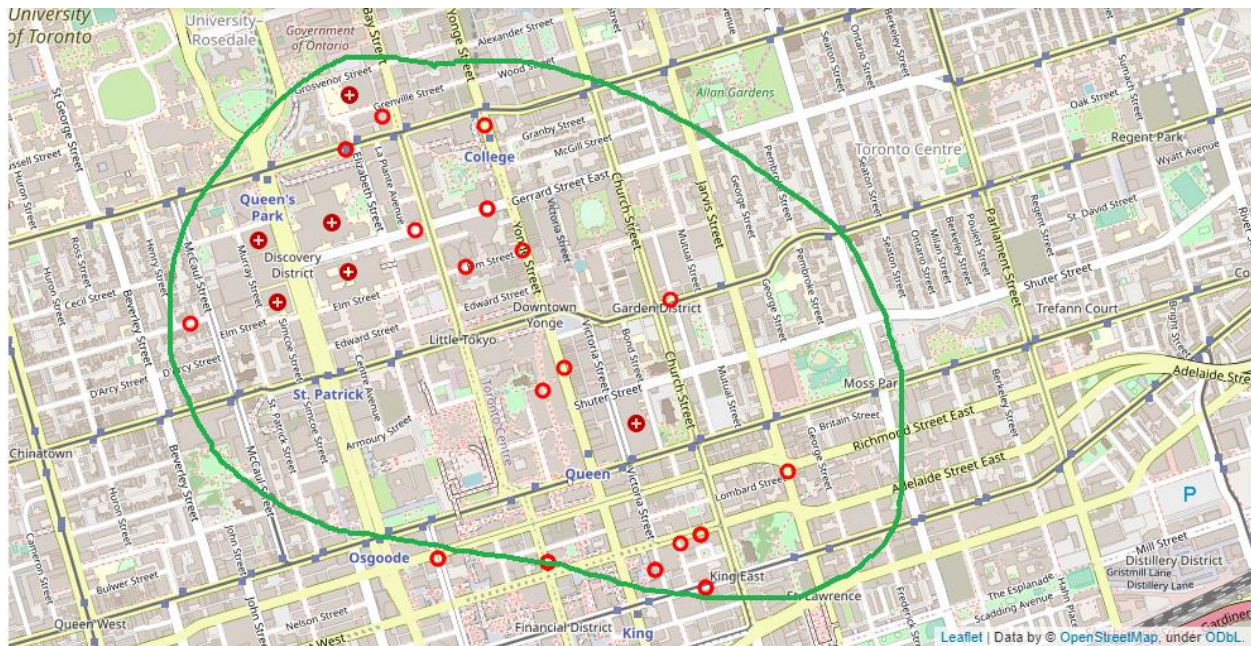
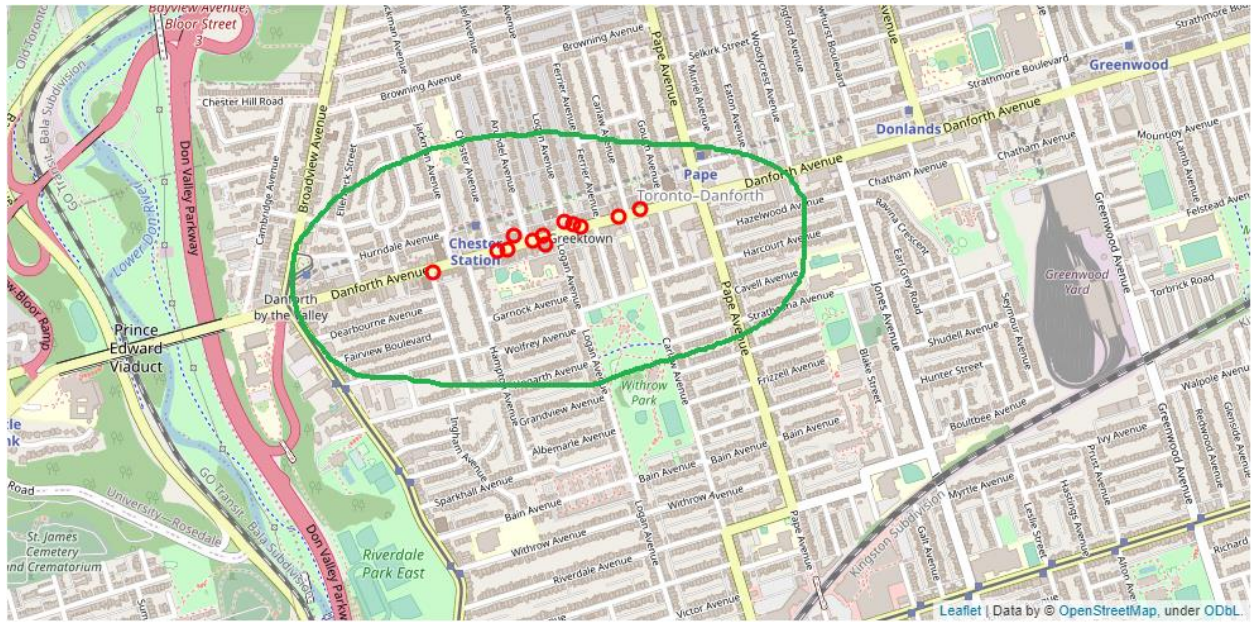




## Discussion

Based on our interests, we observe that Mediterranean food is among popular cuisines which people of Toronto loves the most. Therefore this increases our chance of having a successful business. Regarding, number of neighborhoods per borough we observe that Downtown Toronto and East Toronto are among more populated areas, therefore this can be a good approach to narrow down our search areas only to those boroughs. As we can see in the number of Mediterranean restaurants per each neighborhoods chart, **The Danforth West, Riverdale** neighborhoods have most of the Mediterranean restaurants. With respect to rating average of restaurants in each borough we observe that Downtown Toronto and East Toronto have almost the same rating average. In conclusion, our suggestion for opening a restaurant is **The Danforth West in East Toronto** as circled in the map below. However, regarding the popularity of Downtown Toronto **Garden District** can be our second suggestion for opening a restaurant.





## Conclusion

In this analysis, in order to suggest an ideal location for a Mediterranean restaurant we considered boroughs and neighborhoods population demography, Toronto's favorite venues, Average rating of Mediterranean restaurant in various neighborhoods of Toronto. We gathered these data from Foursquare database and Wikipedia's list of boroughs and neighborhoods. Through various data science methodology such as data visualization using Folium maps and pandas bar charts we concluded that **The Danforth West in East Toronto** would be our first

ideal area to open a Mediterranean restaurant in Toronto and **Garden District in Downtown Toronto** as our second suggestion.