Capstone Project - Finding the right location to open a Gym at Toronto

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1. Introduction

1.1 Background

Toronto is the capital city of Ontorio with a population close to 3 million. It is the most populous city in Canada. It is an international centre for business, finance and arts. We want to open a gym in Toronto. We want to find the right spot to open the gym such that it will give us maximum returns.

1.2 Business Problem

In this project, we will use the power of data science to find the right spot to open a gym at Toronto city. There are a lot of gyms and fitness centres in Toronto. Our aim is to find the optimal location so that we can maximize the return on investment, which is based on the location, its popularity and nearby competitors.

We will also prefer to open the gym within the city limits. We shall analyse the advantage of each area, and the number of gym venues in each area to find the right spot

2. Data

For this project, the following factors will influence our decision

- number of existing gyms and fitness centres in the neighborhood
- popularity and population of the neighborhood
- distance of neighborhood from Toronto downtown

2.1 Data Sources

We will use the following data sources to extract/generate the required information:

- Neighborhood, postal codes and boroughs of Toronto city will be taken from Wikipedia (https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M)
- Geographical coordinates of each postal code are taken from this link.
- Number of gyms and fitness centres, their type, location and details in every neighborhood will be obtained using **Foursquare API**

2.2 Data Cleaning

We will use BeautifulSoup to extract the data from [Wikipedia](). Then clean the data by removing the row that has 'Not assigned' value for borough. If borough has value but neighborhood has 'Not assigned', then neighborhood will have same value as borough. Finally, we create a Dataframe with the data.

	PostalCode	Borough	Neighborhood
0	M1B	Scarborough	Malvern, Rouge
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek
2	M1E	Scarborough	Guildwood, Morningside, West Hill
3	M1G	Scarborough	Woburn
4	M1H	Scarborough	Cedarbrae
5	M1J	Scarborough	Scarborough Village
6	M1K	Scarborough	Kennedy Park, Ionview, East Birchmount Park
7	M1L	Scarborough	Golden Mile, Clairlea, Oakridge
8	M1M	Scarborough	Cliffside, Cliffcrest, Scarborough Village West
9	M1N	Scarborough	Birch Cliff, Cliffside West
10	M1P	Scarborough	Dorset Park, Wexford Heights, Scarborough Town...

Then using [this link,]() we extract the geographical coordinates and add as columns to the above mentioned dataframe with columns as Longitude and Latitude.

	PostalCode	Borough	Neighborhood	Latitude	Longitude
0	M1B	Scarborough	Malvern, Rouge	43.806686	-79.194353
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	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
5	M1J	Scarborough	Scarborough Village	43.744734	-79.239476
6	M1K	Scarborough	Kennedy Park, Ionview, East Birchmount Park	43.727929	-79.262029
7	M1L	Scarborough	Golden Mile, Clairlea, Oakridge	43.711112	-79.284577
8	M1M	Scarborough	Cliffside, Cliffcrest, Scarborough Village West	43.716316	-79.239476
9	M1N	Scarborough	Birch Cliff, Cliffside West	43.692657	-79.264848
10	M1P	Scarborough	Dorset Park, Wexford Heights, Scarborough Town...	43.757410	-79.273304

We pass the above data to the Foursquare API, and use explore option to get required data of gym venues in neighborhoods of Toronto using the geographical coordinates. After getting the data from Foursquare API, we arrange the data in a data frame with columns Neighborhood, Venue, Venue Longitude, Venue Latitude, Venue Category, Venue Distance, Neighborhood latitude, Neighborhood longitude

	Neighborhood	Venue	Venue Latitude	Venue Longitude	Venue Category	Venue Distance	Neighborhood Latitude	Neighborhood Longitude
0	Cedarbrae	Fitness Distinction	43.774717	-79.239998	Gym / Fitness Center	180	43.773136	-79.239476
1	Cedarbrae	Xplosion Fitness Resolutions	43.775060	-79.239952	Gym	217	43.773136	-79.239476
2	Cedarbrae	Supreme Fitness	43.776590	-79.237579	Gym / Fitness Center	413	43.773136	-79.239476
3	Cedarbrae	Olympian Martial Arts Studio	43.774686	-79.240908	Martial Arts School	207	43.773136	-79.239476
4	Golden Mile, Clairlea, Oakridge	Leveled Fitness	43.714290	-79.281266	Gym	442	43.711112	-79.284577
5	Golden Mile, Clairlea, Oakridge	Warden Hilltop C.C. Weights Room	43.714257	-79.280644	Gym	471	43.711112	-79.284577
6	Dorset Park, Wexford Heights, Scarborough Town...	Tempus Performance	43.759552	-79.277403	Gym	406	43.757410	-79.273304
7	Dorset Park, Wexford Heights, Scarborough Town...	United Martial Arts Canada	43.759020	-79.268078	Martial Arts School	456	43.757410	-79.273304