IBM Applied Data Science Capstone –Wk4

Introduction

In the present, the young generations are increasingly becoming more conscious of their diet and activity. In an effort to reduce their risk of health care problems everyone is indulging in going to gym to fit their body fit. The instructions people receive at the gym makes them want to eat a healthy diet. This has led to the increase in people adopting plant based diet. Adopting a whole-foods, plant-based diet not only benefits your waistline, but it can also lower your risk and reduce symptoms of certain chronic diseases. Perhaps one of the most well-known benefits of plant-based diets is that they are heart-healthy. So we are going to figure out the neighbourhoods to in Canada if you are into plant based eating and gyms.

Target Audience

Hypothetically let's assume that a young man decides to move to Toronto for a prolonged stay due to work and is looking for a neighbourhood to rent an apartment. Some of his expectations for the neighbourhood are,

1. The neighbourhood should have gyms since our man is into the healthy lifestyle.
2. The neighbourhood should have plant based restaurants since our man doesn't know how to cook and orders in very frequently.

Business Problem

A neighbourhood that houses a sufficient number of gyms and a plant based or vegan restaurants needs to be identified in Toronto. Machine learning algorithms such as clustering needs to be performed to group neighbourhoods to identify which will be suitable for our hypothetical man here.

Data

To solve the problem, we will need the following data:

- List of neighbourhoods in Toronto: This is scraped from a Wikipedia page that contains a list of postal codes, boroughs, and neighbourhoods. https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
- Latitude and longitude coordinates of those neighbourhoods. This is required in order to plot the map and also to get the venue data. This is acquired through the Foursquare API.
- Venue data, particularly data around each neighbourhoods. We will use this data to perform clustering on the neighbourhoods.

Methodology

1. Firstly we need to get the list of all the neighbourhoods in the Toronto area. For this I used the Wikipedia page to scrape the data and convert into a table and use another csv file that contains all the latitude and longitude information necessary.
2. Then all the nearby venues in neighbourhoods in a radius of 2km is found. The data frame is then further processed for applying machine learning algorithms.

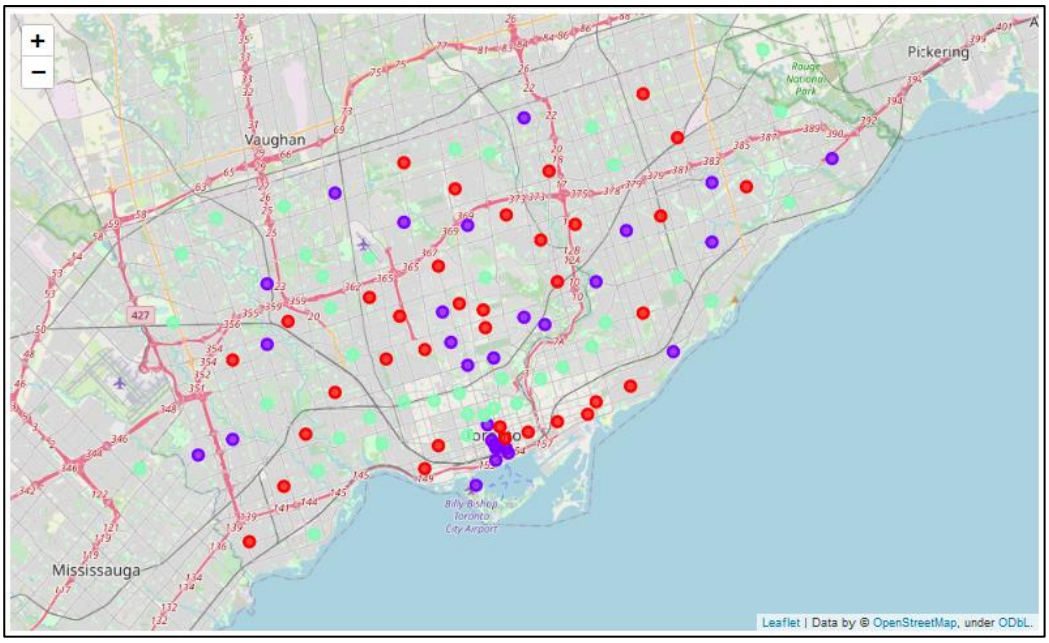
3. Three different scenarios are applied,
    a. In scenario 1 we take only the gyms in the neighbourhoods of Toronto and we cluster them into 3 different clusters based on the kmeans clustering algorithm to cluster the neighbourhoods.
    b. In scenario 2 we take only the vegan / vegetarian restaurants in the neighbourhoods of Toronto and we cluster them into 3 different clusters based on the kmeans clustering algorithm to cluster the neighbourhoods.
    c. In scenarios 3 we take both the gyms and vegan / vegetarians restaurants in the neighbourhoods of Toronto and we cluster them into 4 different clusters based on the kmeans clustering algorithm to cluster the neighbourhoods.

Results

By using the kmeans clustering technique I have clustered the neighbourhoods of Toronto for all the three different scenarios.

For the scenario 1 the neighbourhoods have been divided into three different clusters based on the gyms available in each neighbourhoods,

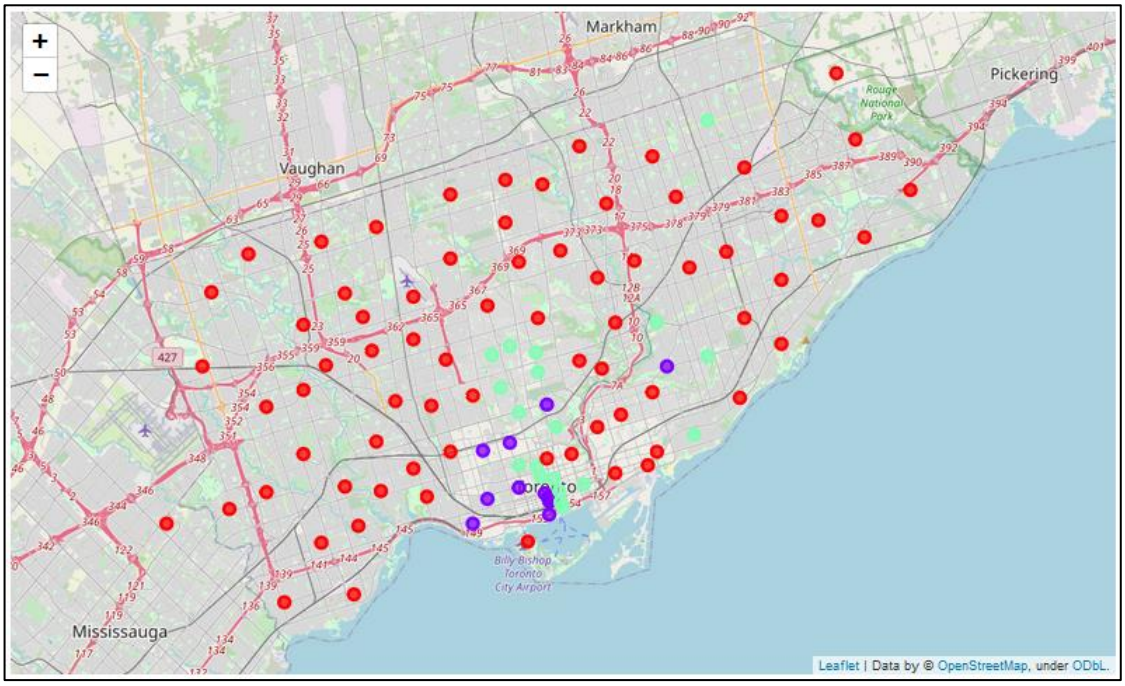
- Cluster 0 – This cluster neighbourhoods has the moderate number of Gyms
- Cluster 1 – The neighbourhoods in this clusters have a high number of Gyms
- Cluster 2 – This neighbourhoods barely has any Gyms



For the scenario 2 the neighbourhoods have been divided into three different clusters based on the Vegans / Vegetarians Restaurants available in each neighbourhoods,

- Cluster 0 – This cluster neighbourhoods have no Vegan / Vegetarian restaurants
- Cluster 1 – The neighbourhoods in this clusters have a high number of Vegan / Vegetarian restaurants

- Cluster 2 – The neighbourhoods in this cluster have a moderate number of Vegan / Vegetarian restaurants



For the scenario 3 the neighbourhoods have been divided into four different clusters based on the number of Gyms and Vegans / Vegetarians Restaurants available in each neighbourhoods,

- Cluster 0 – This cluster neighbourhoods have moderate number of Vegan / Vegetarian restaurants and Gyms
- Cluster 1 – The neighbourhoods in this clusters have a high number of Vegan / Vegetarian restaurants and a moderate number of Gyms.
- Cluster 2 – The neighbourhoods in this clusters have Vegan / Vegetarian restaurants but no gyms
- Cluster 3 – The neighbourhoods in this cluster have the highest number of gyms but have a low number of Vegan / Vegetarian restaurants