Capstone project battle of the Neighbourhoods

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Introduction/Business Problem

During this time of COVID-19 there has been a drastic shift in both our economies and communities. We have been forced to self-isolate/self-distant and many people have lost their jobs and ultimately had to alter their way of life. However, through these changes there has been an increase in activities that people are able to participate in, one for example is cycling/biking. Though there has been a massive economic hit to many sectors, recreational biking has increased substantially where bike shops cannot keep inventory in house, which suggests that there may be a real opportunity to open a new bike store location, this may interest big chain retailers if these are high density neighbourhoods or boutique stores for higher income and low population density. Therefore, in this project I will try to determine a suitable location in Toronto Ontario that would best situated to be economically viable, this criteria will be based on the income and population of each neighbourhood as well as the competitors already located in the surrounding regions.

Data

The data used to obtain the necessary information about population and income will be provided using the census data from https://open.toronto.ca/dataset/neighbourhood-profiles/ - Neighbourhood data 2001,2006,2011.xlsx. The data may be of an archive vintage but stores a well maintained and easy to use database of data that is easily accessible. Additionally a Json file https://raw.githubusercontent.com/jasonicarter/toronto-geojson/master/toronto_crs84.geojson was used to created choropleth maps. To determine the competitor locations in the surrounding regions the foursquare API technology as used to accurately and efficiently locate them based on the regions that show potential for a business.

Methodology

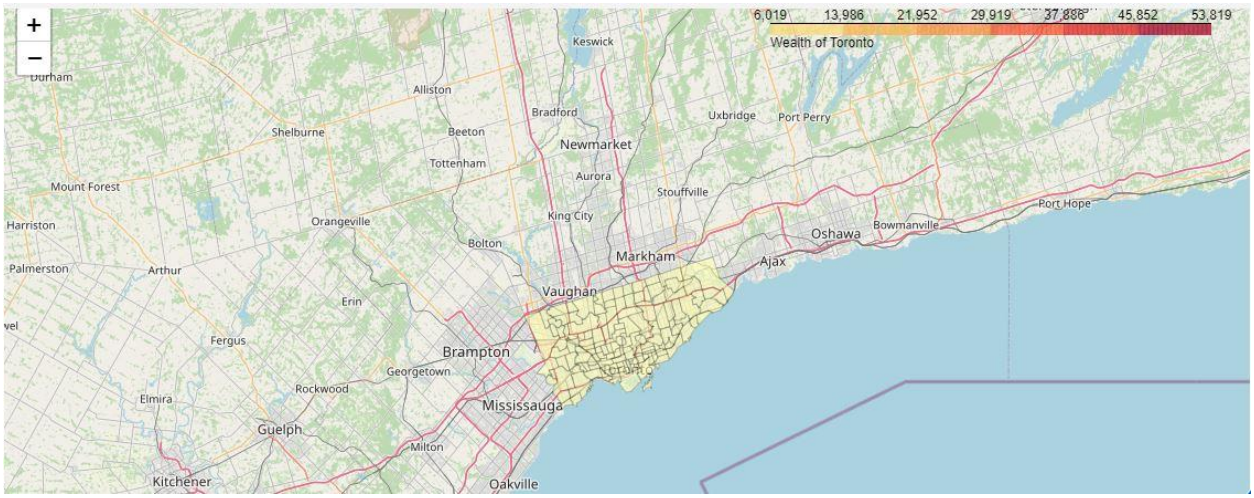
In order to make the census data effective for analysis purposes the data was read into a data frame using the pandas library and was later adapted by dropping several unwanted columns and rows while keeping and renaming the population in each neighbourhood as well as their average income to the data frame pictured below, where there are three main components, Neighbourhoods, population of 2011 and income 2011.

Data frame showing the population and income as a function of the neighbourhood stated

	Neighbourhood	Population 2011	Income 2011
0	Black Creek	22057.0	24154.0
1	Oakridge	13497.0	25013.0
2	Mount Olive-Silverstone-Jamestown	32788.0	25072.0
3	Glenfield-Jane Heights	31390.0	25726.0
4	York University Heights	27713.0	26759.0

To visualize the data better two choropleth maps were created to show the varying population density as well as the income density in each neighbourhood.

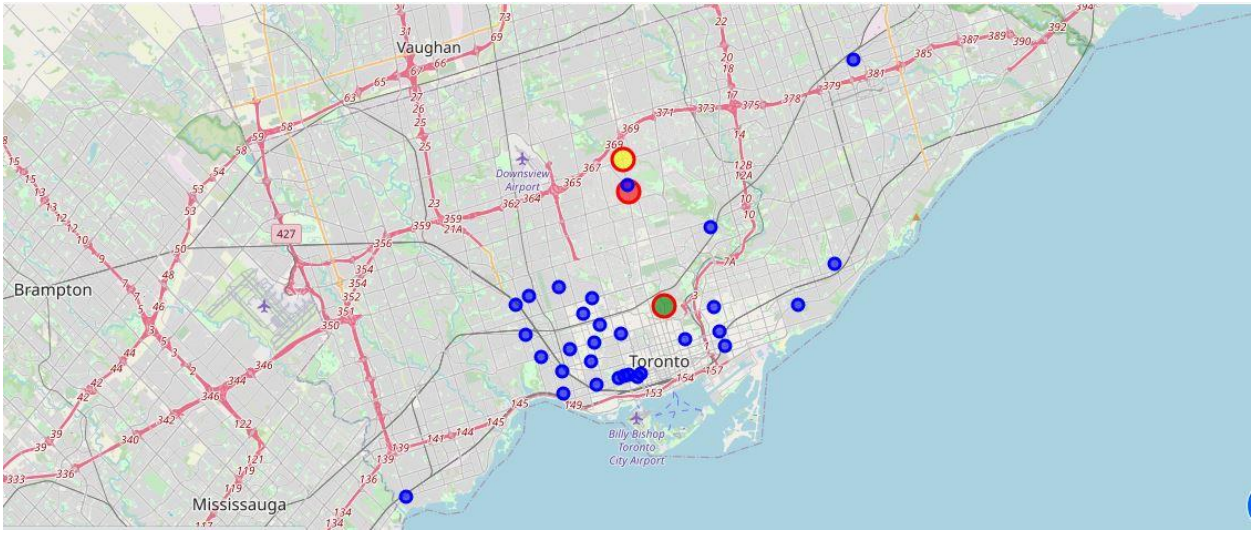
Choropleth map based on population density



Choropleth map based on income density

Due to the current times of the pandemic the choice was made to take three communities of the top wealthiest neighbourhoods pertaining to York-Mills, Rosedale and Lawrence Park South. Each neighbourhood was tested using the API foursquare technology to locate the region and the surrounding competitors. These were then combined in one image to better visualize the locations of the neighbourhoods in relation to each of the other regions as well, Shown in the image below.

Location map of neighbourhoods, yellow = York-Mills red = Rosedale green = Lawrence Park South



Results

As you can see in the choropleth figures the densities were unable to be visualized in the neighbourhoods effectively all though no error was produced and the correct data was entered, as seen by the legend. Although the choropleth maps created did not depict the high-density regions, through inspection of the data, in general the income in a community and population size were inversely related and as a result a higher population with lower income.

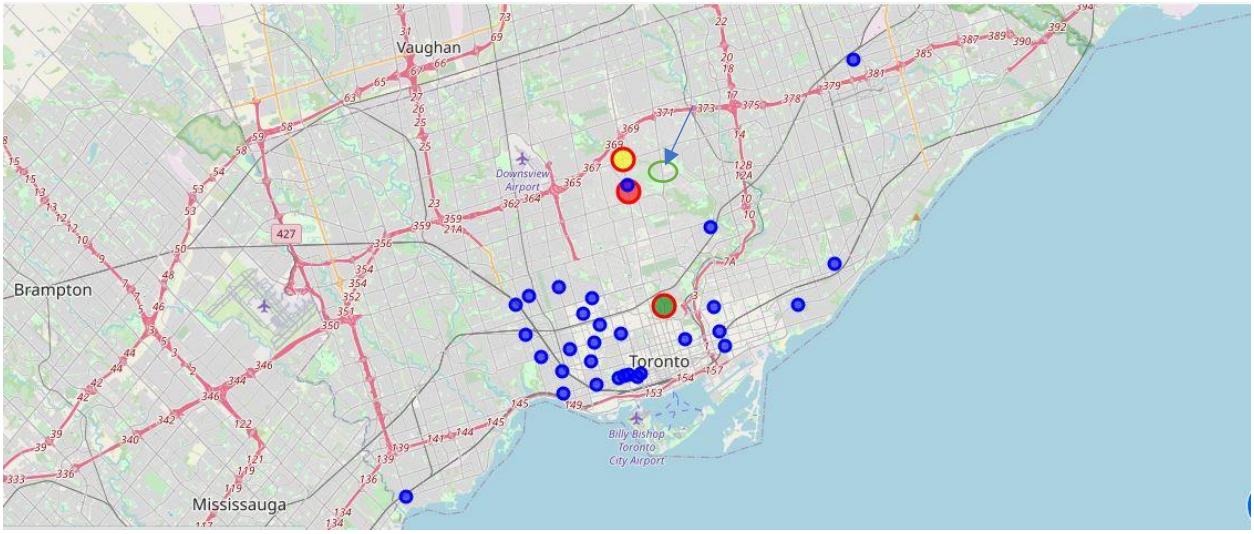
The map created through the API foursquare technology shows a higher number of cycle shops closer to the downtown core and less in the northern sections leading away from downtown, which when analysing the data coincides with the highest populated neighbourhoods. With busier neighbourhoods and a tightly situated downtown core, biking to and from locations may be a preferred method of travel when compared to vehicles for commuting, based on the amount of cycling shops present.

Discussion

The map created shows very few bike shops located in near the Rosedale and York-Mills communities while a highly populated area in the Lawrence Park South location. In addition to this surrounding the Rosedale and York-Mills community is a large park area with likely bike paths present in each. However, with a likely highly populated highway being located near the north western region of York-Mills as well as an airport, community travel to this region would more than likely be less prominent and less profitable region to place a new store location. Additionally, these communities are less populated than other neighbourhoods and with additional distance placed within them making biking as a form of commuting less likely and more likely would be used as a form of recreation.

Due to these factors; low population, located near park/bike path and more affluent neighbourhood, the suggested location would be on the eastern region located by the circle and arrow in the figure below

Final location map with building location



The choice of type of bike store would be a boutique shop as this could be better situated to make money with less foot traffic by offering more specialized higher quality products corresponding to the surrounding environment in the park.

Conclusion

The desire for this project was to determine a potentially profitable region for a bike store to open in the Toronto region and to determine whether a boutique or large chain store would be a better choice. To determine this, a map was created based on using the Toronto census data and API four square technology which showed the most profitable region to be located between the Rosedale and York-Mills neighbourhoods near the York-Mills Valley park.