

# Setting a bookstore in Toronto

# Business Problem

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- Student textbooks are quite expensive;
- Borrowing queue in university library are usually long;
- There are only few of used bookstores in Toronto
  - ➡ Setting up a used bookstore in Toronto
    - ➡ Recommend optimal location for the bookstore



# Criteria for the location

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- Near universities;
- In a medium to low income neighbourhood;
- In a high density of population neighbourhood.

# Methodology

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- K-mean Clustering: to segment and cluster Toronto neighbourhoods to understand their similarity.



# Toronto Map



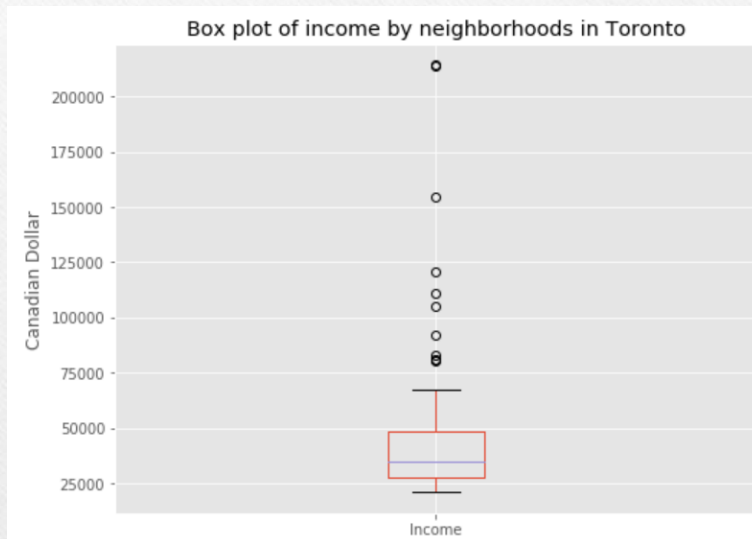
# Distance from each neighbourhood to each university in Toronto

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Neighbourhood	Distance to University of Toronto	Distance to York University	Distance to Ryerson University	Distance to OCAD University	Weighted average distance to universities
Yorkville	1.337243	13.901536	2.738225	2.440122	6.000037
The Annex	1.337243	13.901536	2.738225	2.440122	6.000037
Church and Wellesley	1.082338	15.587613	0.980255	1.525760	6.166043
Kensington Market	1.132020	15.972149	1.779208	0.714719	6.402278
Grange Park	1.132020	15.972149	1.779208	0.714719	6.402278
South Hill	2.627054	12.954531	3.628159	3.733671	6.447168
Deer Park	2.627054	12.954531	3.628159	3.733671	6.447168
Garden District	1.517025	16.561667	0.050568	1.072329	6.540446
Rosedale	2.369903	14.726337	2.441145	3.105851	6.742139
Moore Park	3.132830	13.610892	3.568207	4.068008	6.912217



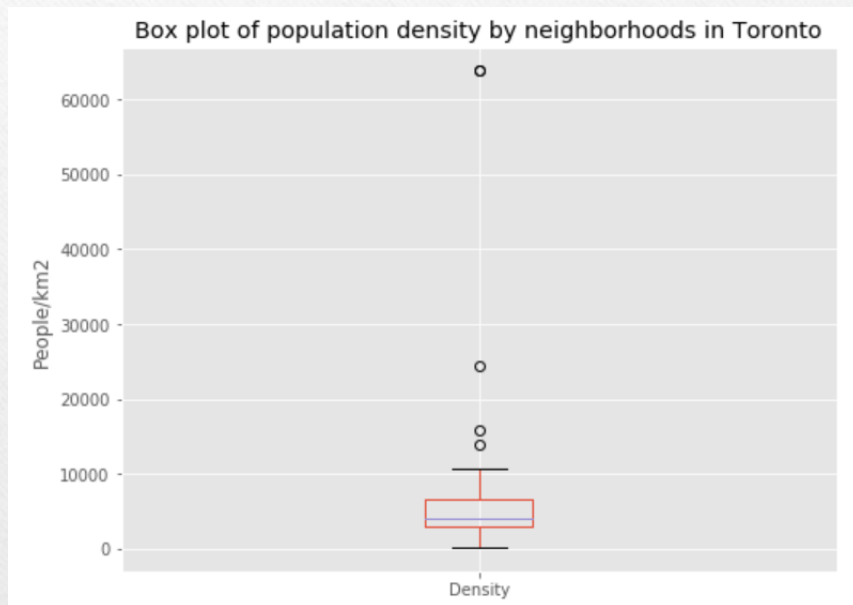
# Average Income by Neighbourhood



Income	
count	80.000000
mean	47151.425000
std	36281.688042
min	21155.000000
25%	27399.500000
50%	34997.000000
75%	48329.000000
max	214110.000000

-> We will choose a neighbourhood with average income of 34,997 CAD or less.

# Population Density by Neighbourhood

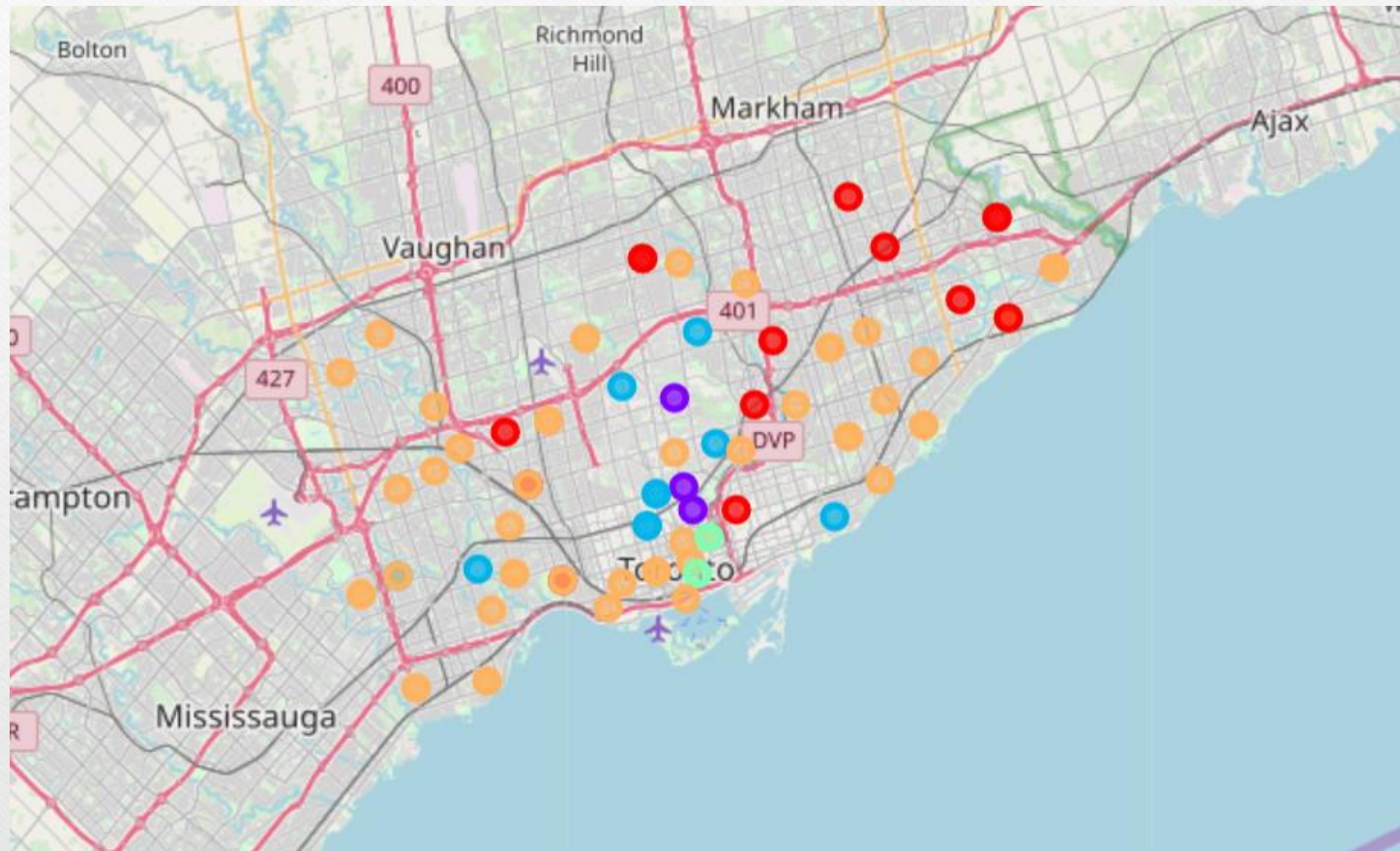


Density	
count	80.000000
mean	6679.112500
std	9902.481244
min	198.000000
25%	2964.750000
50%	4061.500000
75%	6601.500000
max	63765.000000

-> We will choose a neighbourhood with population density of 6602 people/km<sup>2</sup> or higher.



# Clustered Toronto Map



# Our recommendation

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- Our recommendation for the used bookstore location is in Kensington Market neighbourhood because:
  - Cluster presents high similarity between neighbourhoods;
  - Weighted average distance to universities is low;
  - Average income of the neighbourhood is lower than mean of the city;
  - Population density is higher than the 3<sup>rd</sup> quartile of the city.