Urban Planning of Financial Capitals: A Cluster Analysis of Neighbourhoods

Introduction

- Compares similarities, and dissimilarities between Inner Toronto, and Manhattan Island.
- Manhattan, being the financial capital of the world, can be development model for smaller national financial centres, such as Toronto.
- Will help in deciding if Manhattan's unsystematic approach to urban planning compared to Toronto's systematic approach

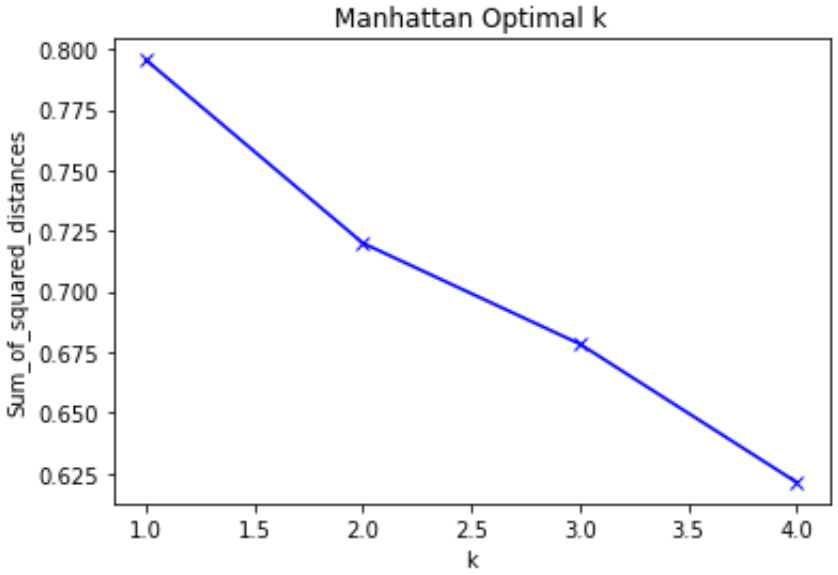
Data

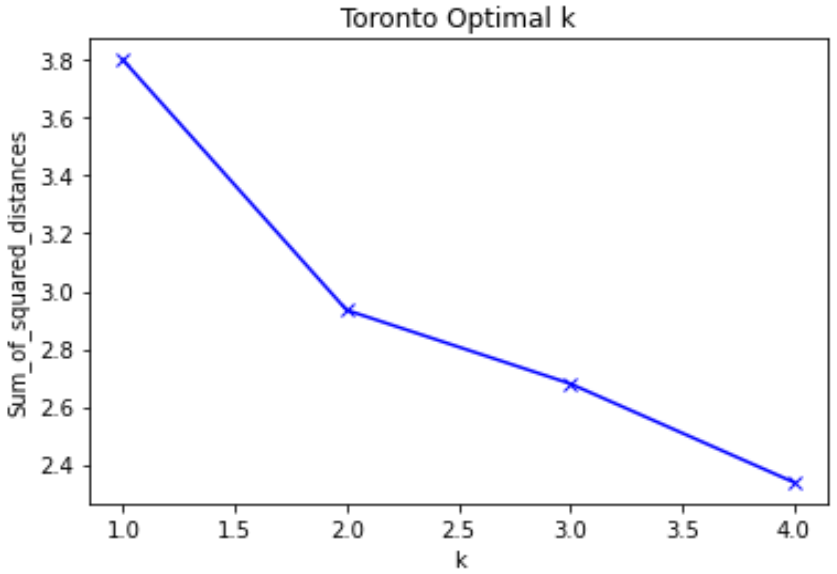
- Toronto neighbourhood, borough, and postcodes from this Wikipedia page.
- New York neighbourhood, borough, and postcodes from this database.
- Geolocation data obtained via Nominatim database.
- Venue information courtesy of Foursquare.
- The complete dataset totalled approximately 3,200 observed venues per city.
- The data was adjusted to only contain both city centres

Methodology and Models

- K-Means clustering –
  - *Appropriate for constructing clusters based on relative distance in similarities*
  - *Used to cluster neighbourhoods based on types of venues.*

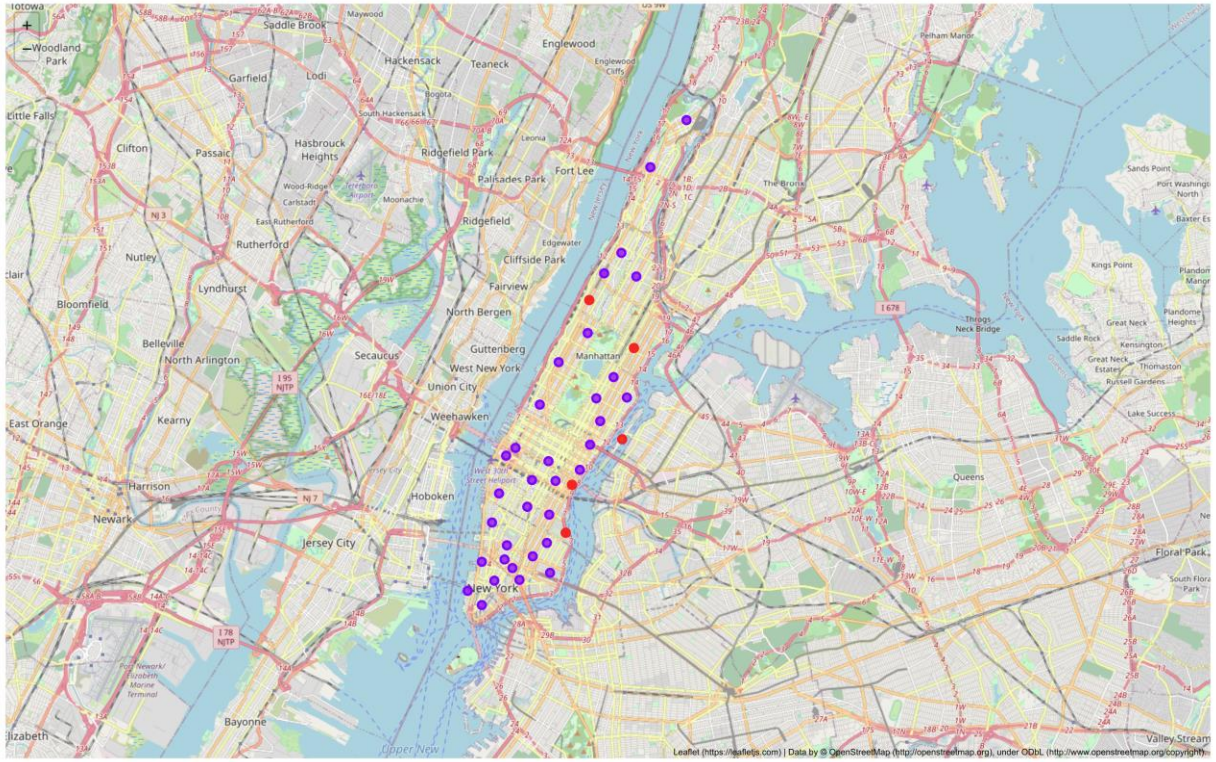
- Agglomerative clustering –
  - *Appropriate for clustering from the bottom-up and observe how data clusters.*
  - *Used to cluster neighbourhoods from the bottom-up based on venue type.*





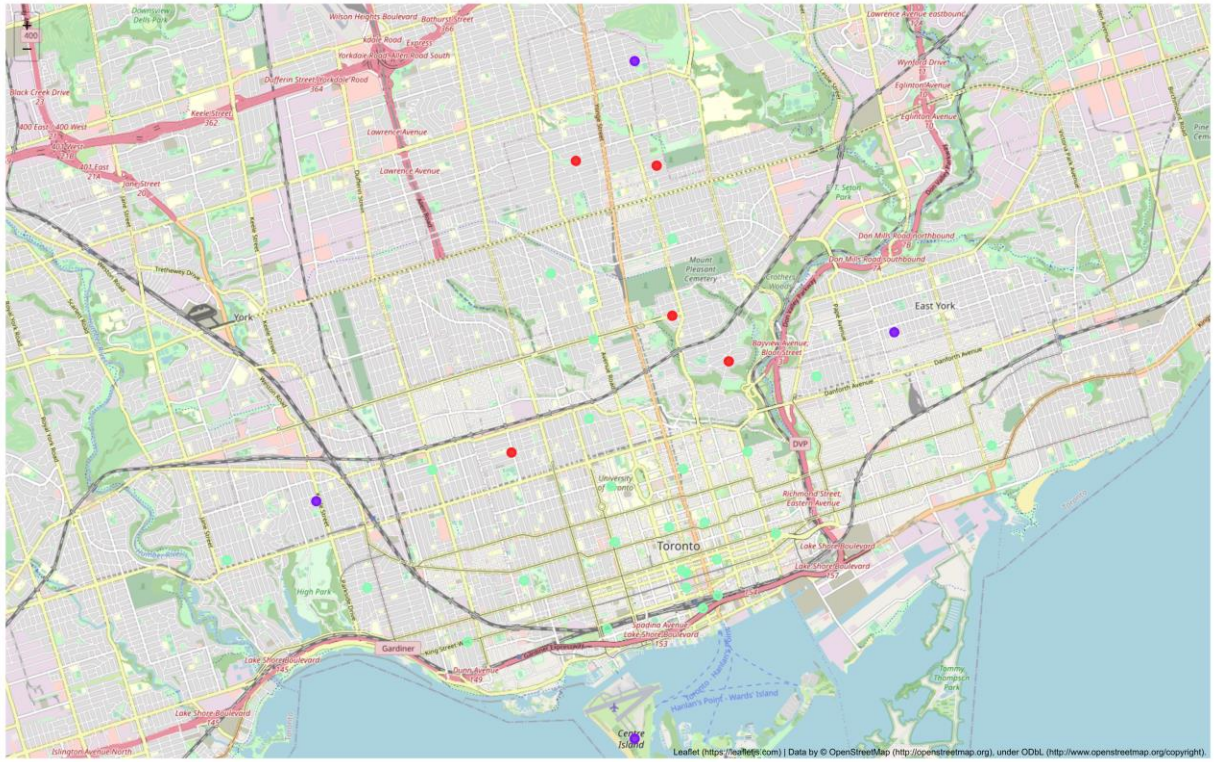
Determining Optimal Clusters

- Both cities do not have clearly defined clusters.
- A cluster number of 3 was decided based on the result of agglomerative clustering.



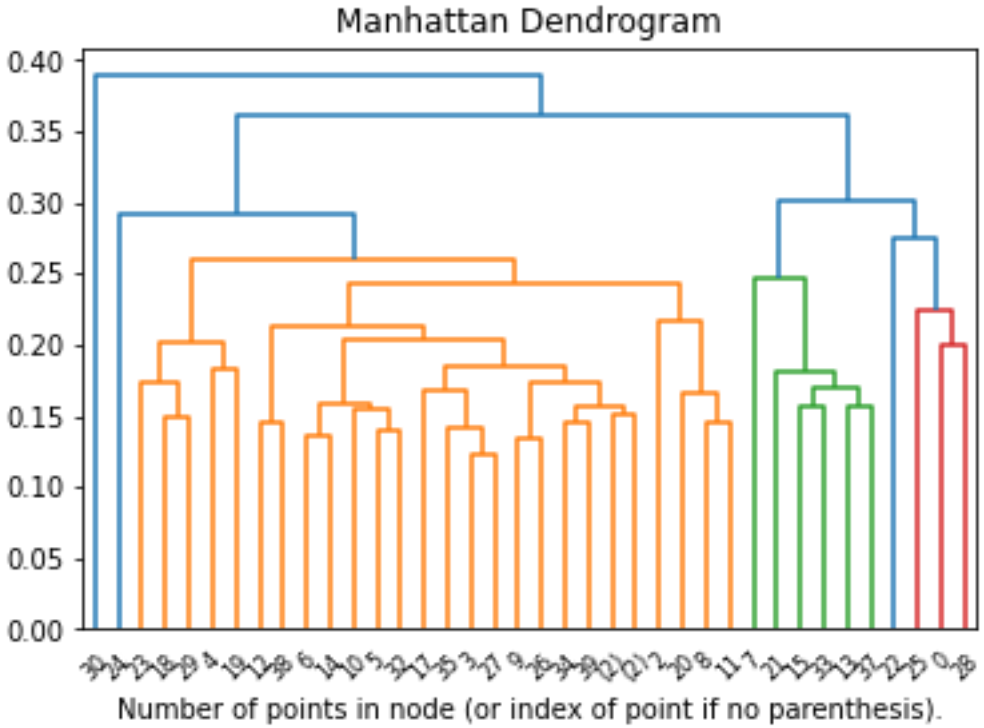
Manhattan Clusters

- Most neighbourhoods fall into a main clusters with a few exceptions.
- The main cluster consisted mostly of restaurants of differing cuisines, and entertainment venues.



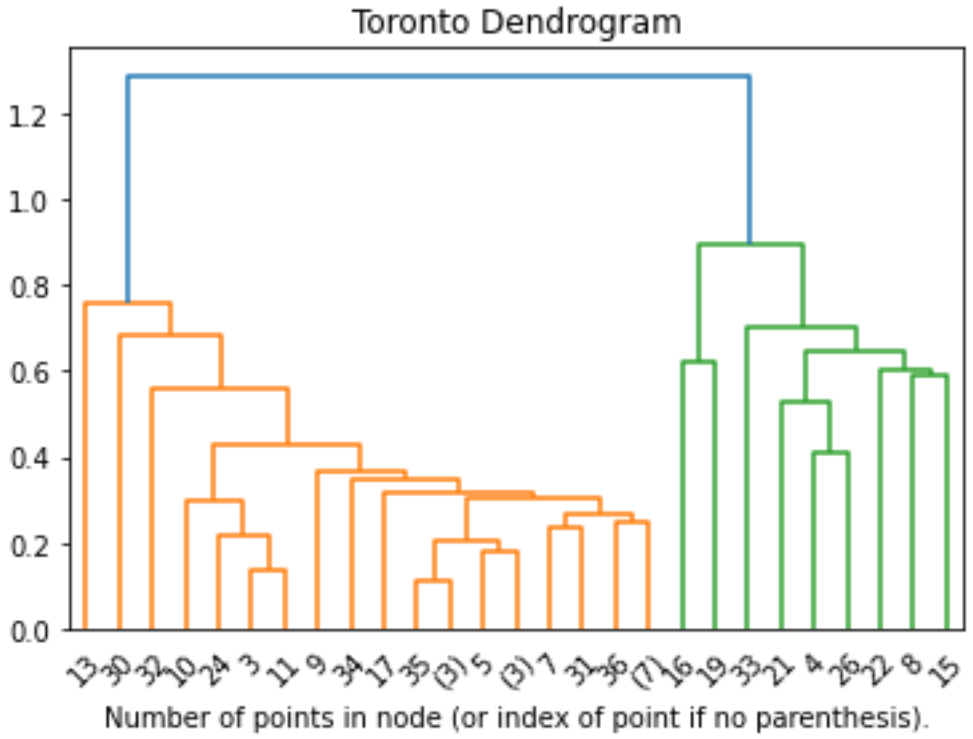
Toronto Clusters

- Similar clustering to Manhattan with a single main cluster.
- Neighbourhoods in the main cluster mainly contained coffee shops, and retail venues.



Manhattan Agglomerate Clusters

- Manhattan is typically homogeneous, with little distance between the various clusters.
- The main 3 clusters form at approximately 0.2 to 0.25 distance from their respective centres.
- The 3 unique neighbourhoods that don't fall neatly into the main clusters are Tribeca, Marble Hill, and Midtown South.



Toronto Agglomerate Clusters

- Observed stepwise clustering with the 2 overarching clusters at 0.8 distance from each others centres.
- Greater distance between the two main clusters suggest heterogeneity relative to Manhattan.

Discussions and Conclusions

- Manhattan neighbourhoods are more homogenous relative to Toronto neighbourhoods.
- Stepwise clustering of Toronto neighbourhoods suggest deliberate planning.
- Enforces hypothesis that Manhattan developed naturally, while Toronto's development was deliberately planned.
- Recommendation - Manhattan's success as a global financial centre suggest cities looking to emulate its success should approach development in iterative and local manner rather than through central planning.