

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

Jie Wu

Applied Data Science Capstone Project

in partial fulfillment of the IBM data science specialization certificate

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

OUTLINE:

- ▶ MOTIVATION
- ▶ METHODOLOGY
- ▶ RESULT
- ▶ CONCLUSION
- ▶ DISCUSSION

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

OUTLINE:

- ▶ MOTIVATION
- ▶ METHODOLOGY
- ▶ RESULT
- ▶ CONCLUSION
- ▶ DISCUSSION

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

MOTIVATION:

New York and Toronto are often compared in terms of

- ▶ employment and salary
- ▶ cost of living
- ▶ environment
- ▶ education
- ▶ ...

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

MOTIVATION:

New York and Toronto are often compared in terms of

- ▶ employment and salary
- ▶ cost of living
- ▶ environment
- ▶ education
- ▶ consumer business

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

MOTIVATION:

The goal is to answer the following two questions

- ▶ Is there any consumer business that one borough has but the other doesn't?
- ▶ For the consumer business that both boroughs have how is it developed and geographically distributed?

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

MOTIVATION:

The goal is to answer the following two questions

- ▶ Is there any consumer business that one borough has but the other doesn't?
- ▶ For the consumer business that both boroughs have how is it developed and geographically distributed?

⇒ Assess the prospect of starting or expanding a consumer business in New York or Toronto

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

OUTLINE:

- ▶ MOTIVATION
- ▶ METHODOLOGY
- ▶ RESULT
- ▶ CONCLUSION
- ▶ DISCUSSION

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

METHODOLOGY:

Choice of key borough

New York: Manhattan

Toronto: Toronto (East, West, Central and Downtown)

Number of neighborhoods

Manhattan: 40 neighborhoods

Toronto: 38 neighborhoods

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

METHODOLOGY:

data size: top 100 venues within 500 meters of each neighborhood

data type: venue categories and their mean occurrence frequencies

data source: Foursquare API

data analysis: K-means clustering

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

OUTLINE:

- ▶ MOTIVATION
- ▶ METHODOLOGY
- ▶ **RESULT**
- ▶ CONCLUSION
- ▶ DISCUSSION

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

RESULT:

- ▶ the variety of consumer business
- ▶ the distinguishing venue categories of neighborhood clusters
- ▶ the distribution of neighborhood clusters

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

RESULT: the variety of consumer business

Manhattan: 330 categories

Toronto: 238 categories

The difference is attributed to Manhattan's

- ▶ greater variety of restaurants, stores and entertainment
- ▶ geography (Manhattan beach)

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

RESULT: the distinguishing venue categories of neighborhood clusters

Manhattan	Toronto
park, hotel	park, playground, restaurant
theater	park, brewery, Yoga studio
restaurant	coffee shop, restaurant
boat/ferry, harbor/marina	trail, jewelry store, bus line
bar, shop/store	music venue, garden, restaurant

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

RESULT: the distinguishing venue categories of neighborhood clusters

Manhattan: fairly clear-cut, each neighborhood seems to have a business focus

Toronto: not clear-cut, vague business focus

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

RESULT: the distribution of neighborhood clusters

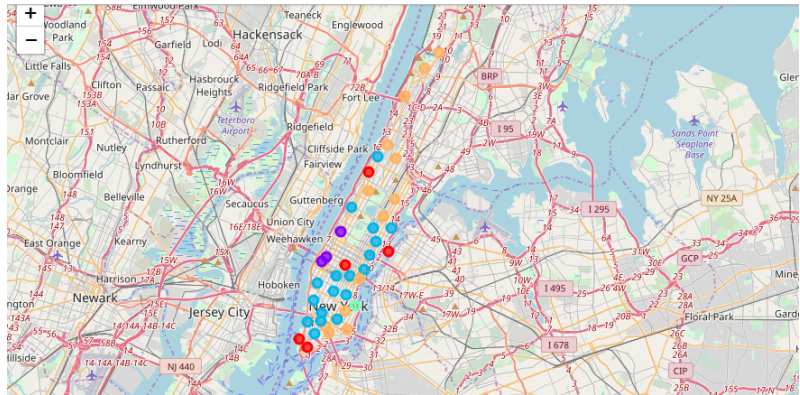


Figure: Neighborhood cluster distribution of Manhattan

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

RESULT: the distribution of neighborhood clusters

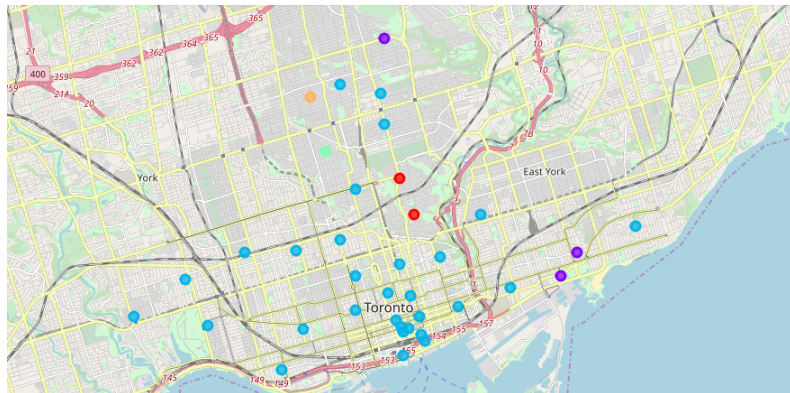


Figure: Neighborhood cluster distribution of Toronto

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

RESULT: the distribution of neighborhood clusters

Manhattan: wide spread restaurants and shops/stores, little void to fill

Toronto: aggregate in the outlier region except restaurants, a lot of void to fill (e.g. lack of jewelry stores and cocktail bars in downtown)

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

OUTLINE:

- ▶ THEORETICAL MODELING
- ▶ HOPF BIFURCATION
- ▶ ABSORPTIVE BISTABILITY
- ▶ CONCLUSION
- ▶ DISCUSSION

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

CONCLUSION:

Manhattan: more developed and well-rounded consumer business, fierce competition and fewer opportunities

Toronto: less developed and limited variety, more business opportunities

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

OUTLINE:

- ▶ THEORETICAL MODELING
- ▶ HOPF BIFURCATION
- ▶ ABSORPTIVE BISTABILITY
- ▶ CONCLUSION
- ▶ DISCUSSION

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

DISCUSSION: possible improvements to further study include

data attribute: three improvements

- ▶ discard venues offering public services
- ▶ include demographic data of each neighborhood
- ▶ higher level of categorification of venues to prevent excessive venue specialization

data source: popularity statistics over the trailing 12 months

data size: study all neighborhoods of the two cities instead of the key boroughs

algorithm: cluster cross-validation using DBSCAN

A Consumer Business Comparison of New York and Toronto Based on the Top Venues of Key Boroughs

THANK YOU!

Feedbacks and comments are very much welcome!

bayernscience[at]hotmail dot com