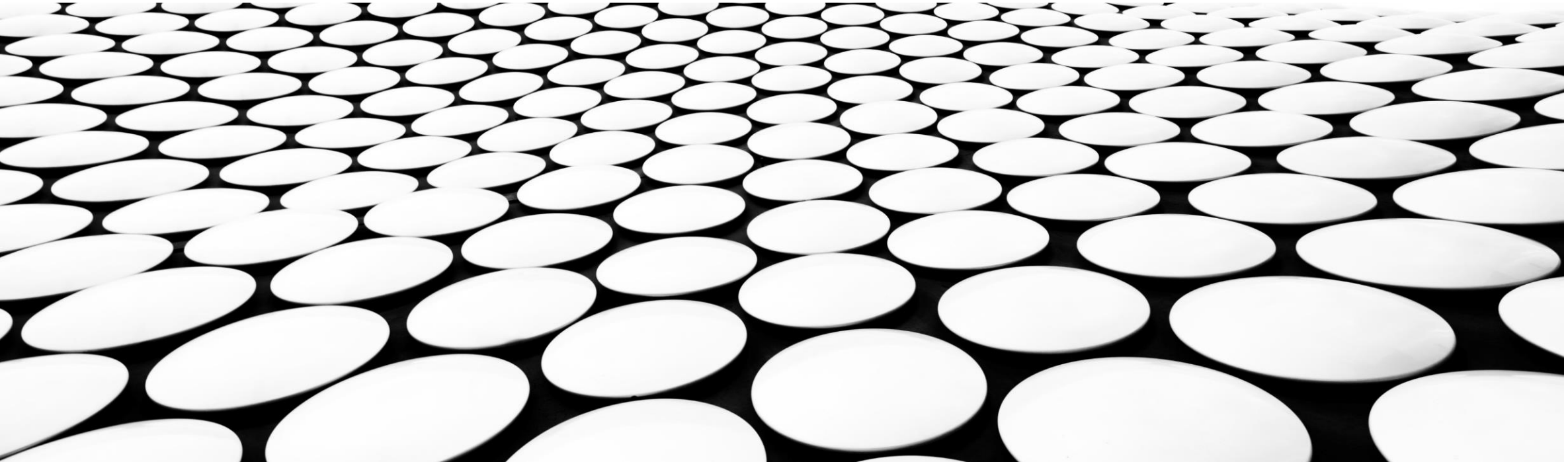


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# BALLTE OF THE BOROUGH

IBM DATA SCIENCE CAPSTONE PROJECT BY MALTE JÖRG



# INTRODUCTION

- Analysis and comparison of major boroughs
- Toronto
  - Canada's largest city
  - World leader in areas as business, finance, technology, ...
  - Large population of immigrants
- New York
  - Largest city in the U.S.
  - Financial powerhouse
  - Numerous museums, parks and neighborhoods



# INTRODUCTION

- Both cities located in western North America
- Venues are used to describe differences
  - Cultural aspects
  - Livability of a city
- Goal:
  - Select the two major boroughs of both cities
  - Analyze and compare both boroughs with their venue data
  - Determine cultural differences
  - Help for tourists with gained insights of the cities



# DATA DESCRIPTION

- Location Data
  - Provided by Coursera
  - Scraped via wikipedia page
  - Borough, Neighborhood, Location data as features
- Venue Data
  - Gathered via the Foursquare API
  - Name of venue, venue category and venue location as features
- Venue Category Data
  - From Foursquare
  - Provides a list of venue categories and sub-categories

# DATA EXAMINATION

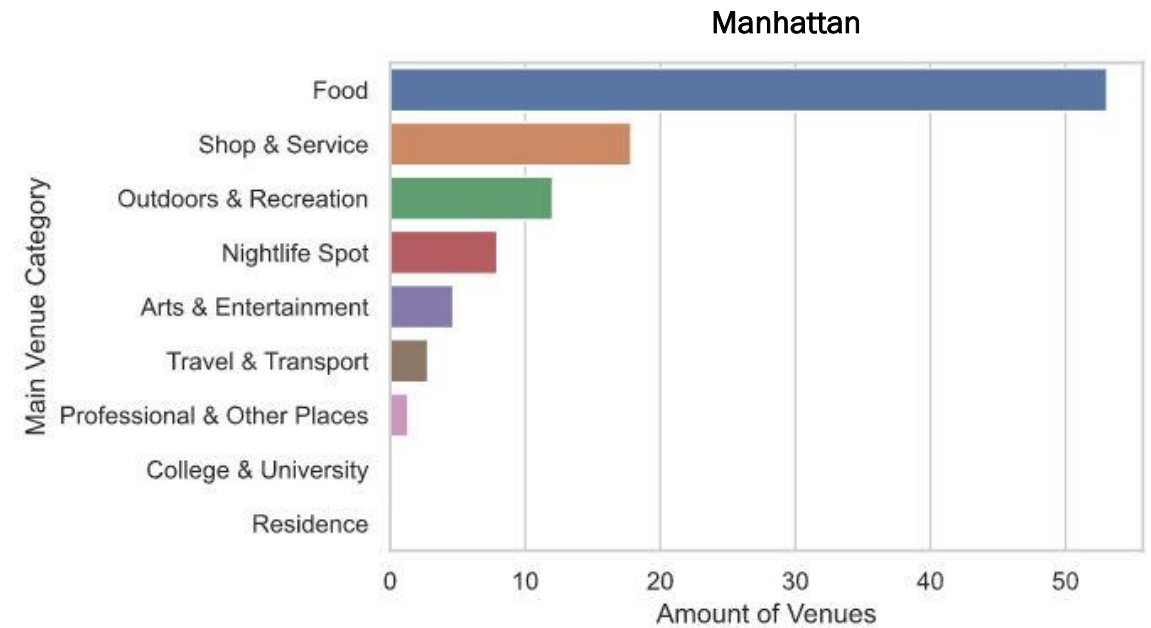
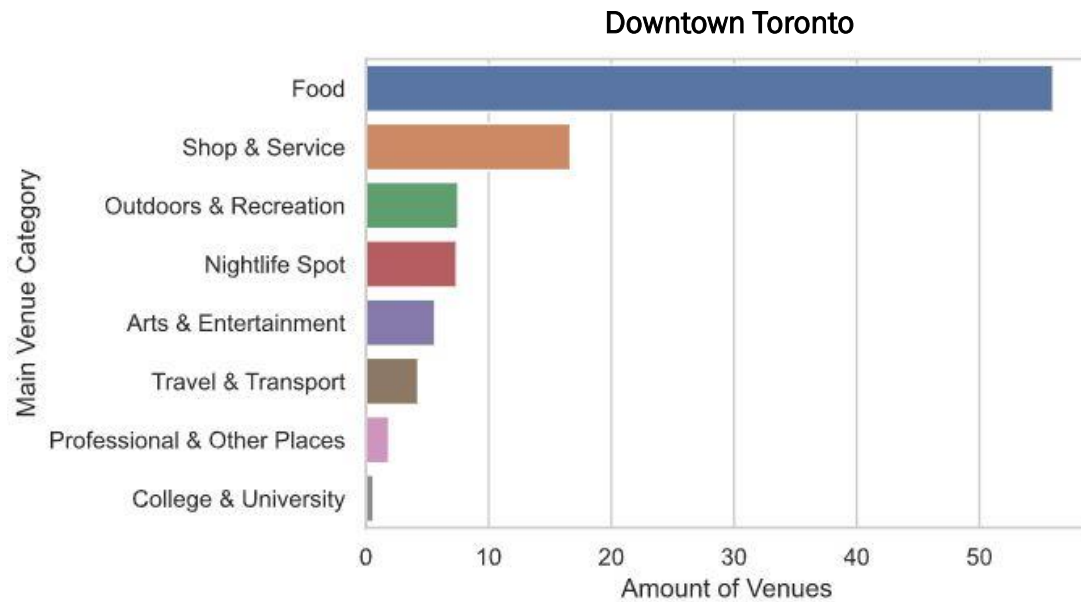
- Boroughs of the two cities
  - Toronto 9
  - New York 5
- Table shows amount of venues in each borough
- Select borough by maximum amount
  - Downtown Toronto
  - Manhattan

Toronto		New York	
Central Toronto	111	Bronx	1139
<b>Downtown Toronto</b>	<b>798</b>	Brooklyn	2507
East Toronto	128	<b>Manhattan</b>	<b>2924</b>
Etobicoke	66	Queens	2091
Mississauga	12	Staten Island	797
North York	19		
Scarborough	88		
West Toronto	158		
York	19		



# DATA EXAMINATION

- Relative amount of venues in boroughs



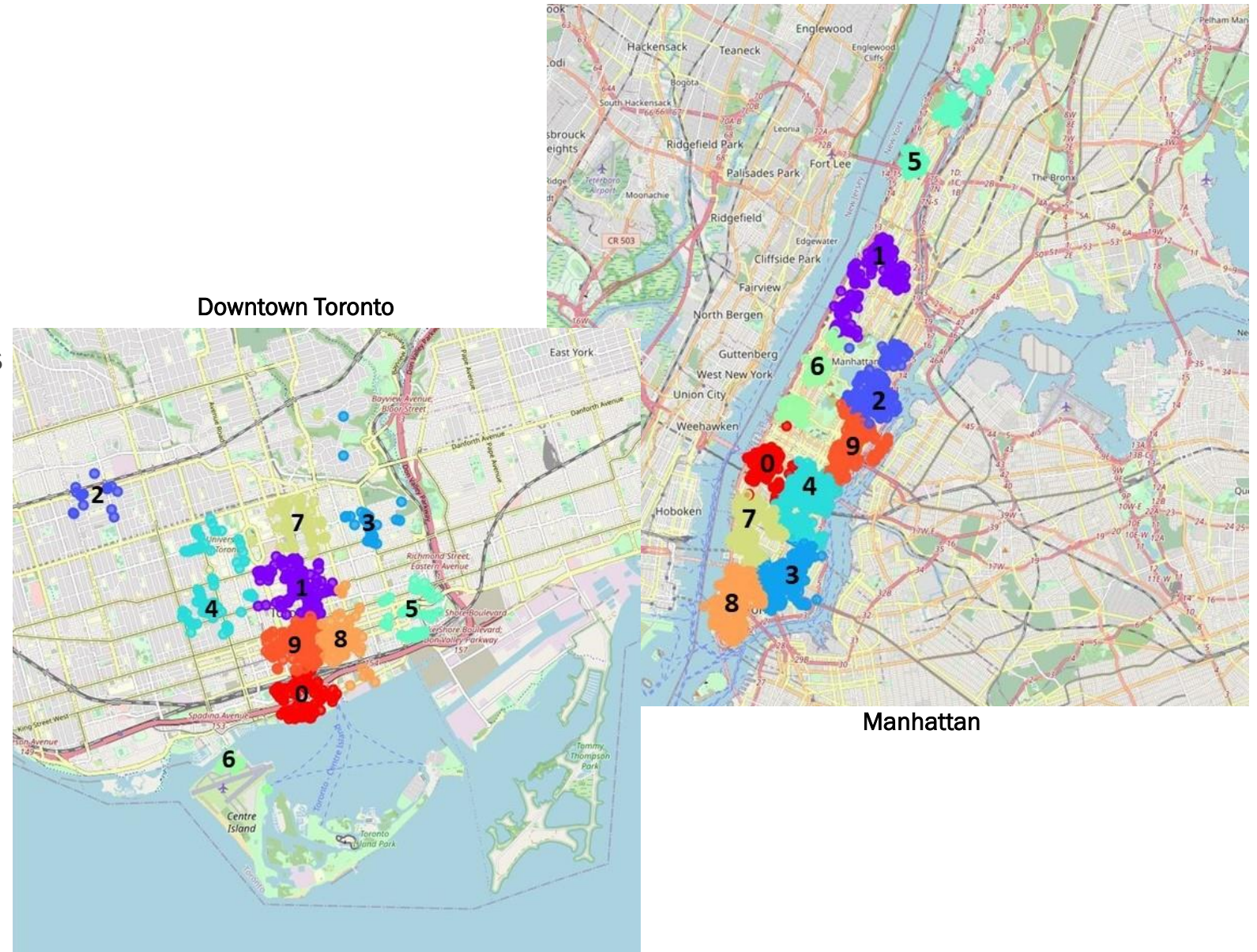
# DATA EXAMINATION

- Top 10 venue categories
- Coffee Shop is top category
- Downtown Toronto with more asian food places
- Manhattan more american and italian

Venue Category	Downtown Toronto	Manhattan
1.	Coffee Shop	Coffee Shop
2.	Café	Italian Restaunt
3.	Restaunt	Café
4.	Japanese Restaunt	Pizza Place
5.	Italian Restaunt	American Restaunt
6.	Hotel	Bakery
7.	Park	Park
8.	Bakery	Bar
9.	Sushi Restaunt	Hotel
10.	Pizza Place	Gym / Fitness Center

# MODELING

- Clustering of the two major boroughs
- kMeans clustering with 10 clusters
- Feature: Geographical Location
- Clusters are numbered from 0 - 9





# RESULTS

- Downtown Toronto
- Most common venues in each cluster

Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Coffee Shop	Aquarium	Café	Hotel	Sporting Goods Shop
1	Coffee Shop	Clothing Store	Sandwich Place	Café	Middle Eastern Restaurant
2	Grocery Store	Café	Park	Baby Store	Diner
3	Coffee Shop	Pizza Place	Chinese Restaurant	Restaurant	Pub
4	Café	Bakery	Bar	Coffee Shop	Japanese Restaurant
5	Coffee Shop	Bakery	Pub	Park	Breakfast Spot
6	Airport Service	Airport Lounge	Airport Terminal	Coffee Shop	Harbor / Marina
7	Coffee Shop	Sushi Restaurant	Japanese Restaurant	Restaurant	Park
8	Coffee Shop	Hotel	Restaurant	Café	Italian Restaurant
9	Coffee Shop	Restaurant	Café	Hotel	Gym

# RESULTS

- Manhattan
- Most common venues in each cluster

Cluster	Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0		Theater	Hotel	Italian Restaurant	American Restaurant	Sandwich Place
1		Coffee Shop	Pizza Place	Mexican Restaurant	Café	Deli / Bodega
2		Italian Restaurant	Coffee Shop	Gym	Bakery	Mexican Restaurant
3		Coffee Shop	Cocktail Bar	Italian Restaurant	Mexican Restaurant	Pizza Place
4		Coffee Shop	Hotel	Café	Pizza Place	Sandwich Place
5		Café	Bakery	Mexican Restaurant	Sandwich Place	Pizza Place
6		Italian Restaurant	Coffee Shop	Café	Wine Bar	Gym / Fitness Center
7		Italian Restaurant	Coffee Shop	American Restaurant	Art Gallery	Sushi Restaurant
8		Coffee Shop	Park	American Restaurant	Hotel	Italian Restaurant
9		Coffee Shop	Italian Restaurant	Gym / Fitness Center	Pizza Place	Park

# RESULTS

- Downtown Toronto
- Most common main venue category

Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue
0	Food	Arts & Entertainment	Outdoors & Recreation
1	Food	Shop & Service	Outdoors & Recreation
2	Food	Shop & Service	Outdoors & Recreation
3	Food	Shop & Service	Outdoors & Recreation
4	Food	Shop & Service	Nightlife Spot
5	Food	Shop & Service	Outdoors & Recreation
6	Travel & Transport	Outdoors & Recreation	Shop & Service
7	Food	Shop & Service	Outdoors & Recreation
8	Food	Shop & Service	Nightlife Spot
9	Food	Shop & Service	Outdoors & Recreation

# RESULTS

- Manhattan
- Most common main venue category

Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue
0	Food	Outdoors & Recreation	Arts & Entertainment
1	Food	Shop & Service	Outdoors & Recreation
2	Food	Shop & Service	Outdoors & Recreation
3	Food	Shop & Service	Nightlife Spot
4	Food	Shop & Service	Outdoors & Recreation
5	Food	Shop & Service	Outdoors & Recreation
6	Food	Shop & Service	Outdoors & Recreation
7	Food	Shop & Service	Outdoors & Recreation
8	Food	Outdoors & Recreation	Shop & Service
9	Food	Shop & Service	Outdoors & Recreation



# DISCUSSION

- Data gives a good outlook on the cities culture
- Some surprising findings in data
  - Chinatown in Manhattan New York
  - More italian places than expected
- Food and Coffee are superior venue categories
- More insights with more diverse venues like businesses
- Manhattan more livable
- Downtown Toronto more for businesses and tourists

**THANK YOU FOR YOUR ATTENTION**

