IBM Data Science Capstone Project
"The Battle of the Neighborhoods"

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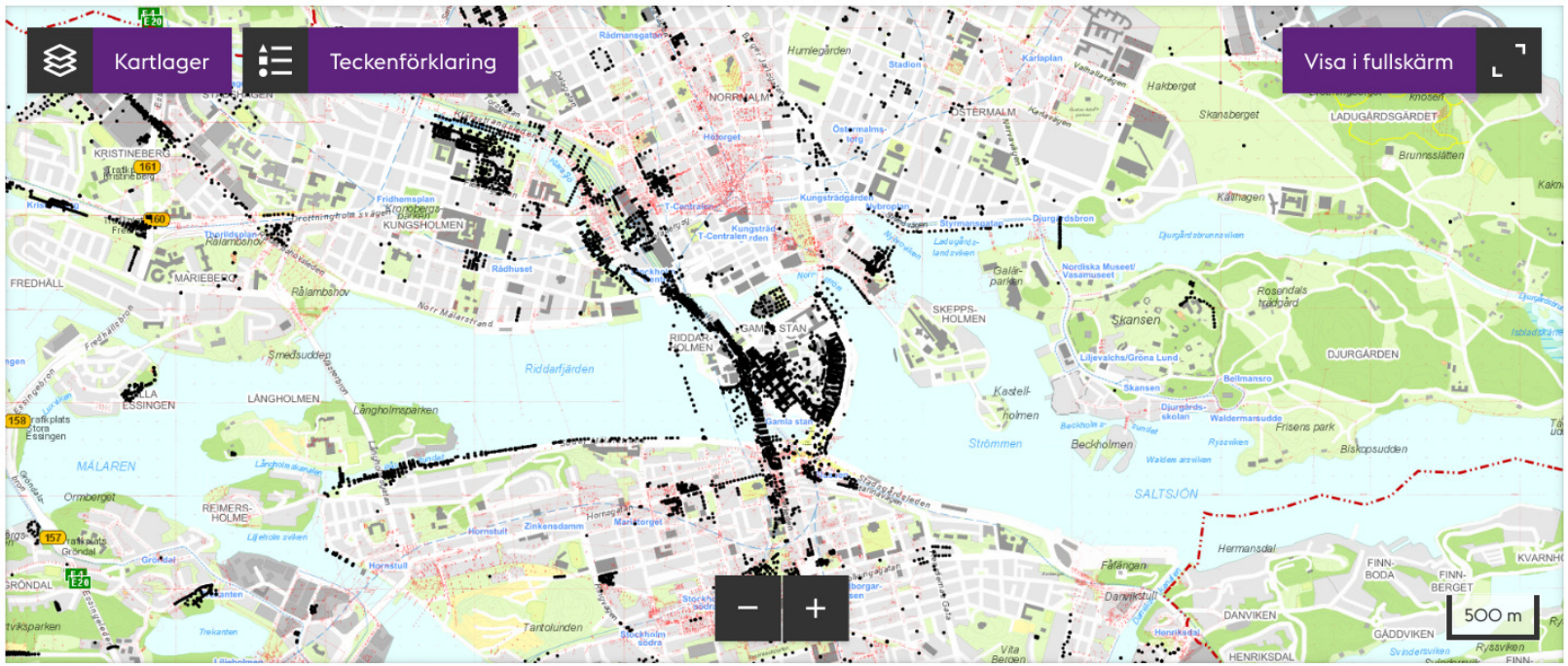
Finding Similar Neighborhoods Across Cities

- Scenario: We're moving from a neighborhood we love to a city we've never visited!
- Problem: How do we decide which neighborhoods to target living in?
- Example: Moving from Boston, MA, USA $\rightarrow$ Stockholm, Sweden

Get Neighborhood Data!

We obtain geographic data about neighboorhoods from the following sources:

- ARCGIS Neighborhood Data for Boston
- Stockholm Geoarkivet
- Nominatim OpenStreetMaps API (for latitude and longitude)



Combine our data to mark and label neighborhoods

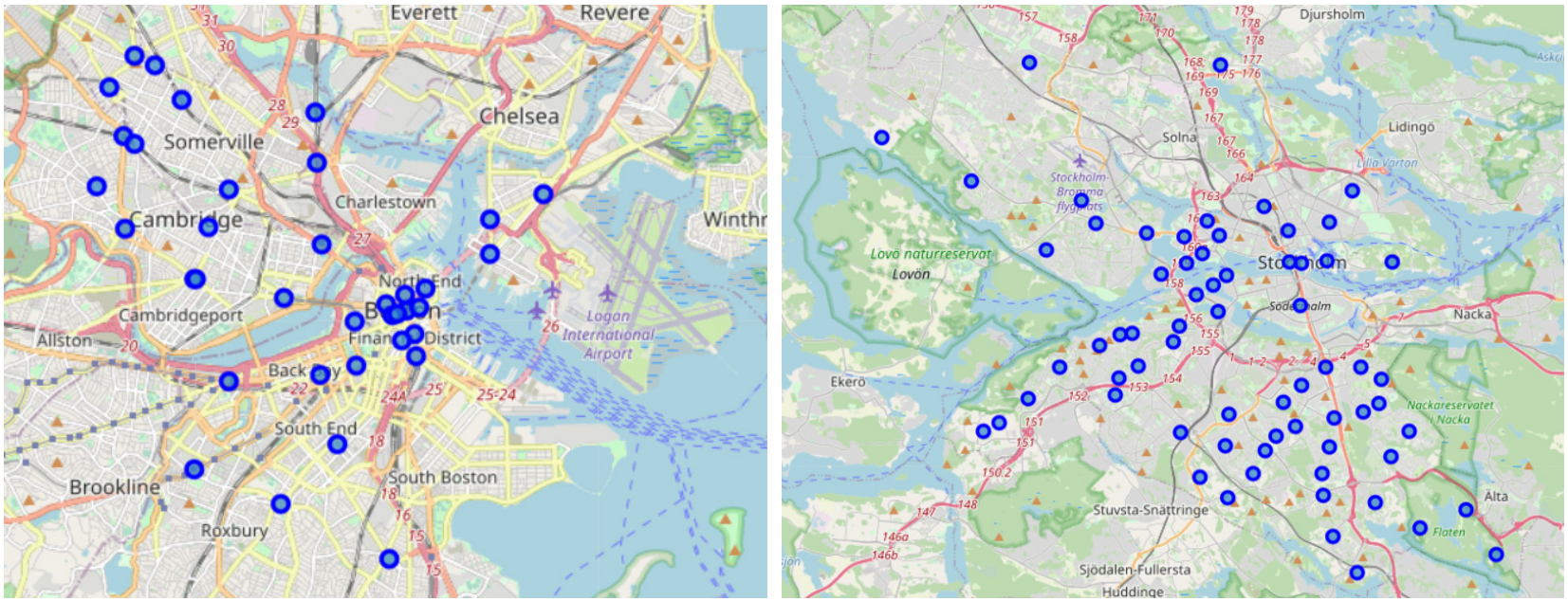


Figure: Boston (left) and Stockholm (right) enriched with neighborhood data

Popular Venues

We use Foursquare's Places API to grab lists of popular venues in each neighborhood in both cities!

	City	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Boston, MA	Boston City Hall Plaza	42.360401	-71.057682	Saus Restaurant	42.361076	-71.057054	Belgian Restaurant
1	Boston, MA	Boston City Hall Plaza	42.360401	-71.057682	Wachusett Boston Brew Yard at City Hall	42.359788	-71.057296	Beer Garden
2	Boston, MA	Boston City Hall Plaza	42.360401	-71.057682	The New England Holocaust Memorial	42.361059	-71.057179	Historic Site
3	Boston, MA	Boston City Hall Plaza	42.360401	-71.057682	Food Trucks at City Hall	42.359678	-71.057599	Street Food Gathering
4	Boston, MA	Bowdoin Square	42.361394	-71.062120	Target	42.361032	-71.062670	Convenience Store

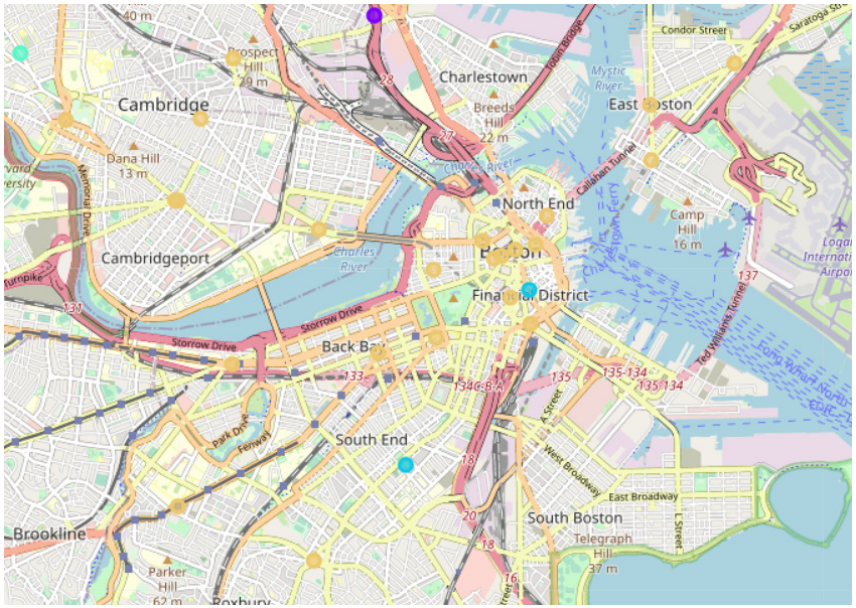
	City	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Stockholm, Sweden	Abrahamsberg	59.336468	17.953763	Abrahamsberg Sushi	59.336311	17.952846	Japanese Restaurant
1	Stockholm, Sweden	Abrahamsberg	59.336468	17.953763	Abrahamsbergsvägen / Drottningholmsvägen	59.337151	17.952862	Intersection
2	Stockholm, Sweden	Abrahamsberg	59.336468	17.953763	ICA Abrahamsberg	59.336172	17.952363	Grocery Store
3	Stockholm, Sweden	Abrahamsberg	59.336468	17.953763	Bonne Femme	59.336121	17.952388	Bakery
4	Stockholm, Sweden	Abrahamsberg	59.336468	17.953763	Abrahamsberg T-Bana	59.336617	17.953475	Metro Station

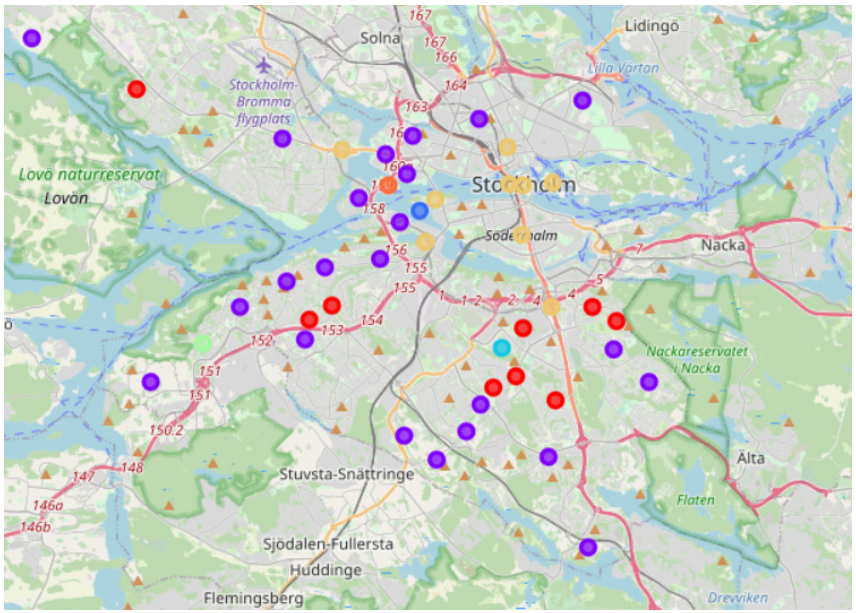
Popular Venues

	City	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Boston, MA	Boston City Hall Plaza	Historic Site	Belgian Restaurant	Street Food Gathering	Beer Garden	Yoga Studio
1	Boston, MA	Bowdoin Square	Japanese Restaurant	Donut Shop	Bar	Convenience Store	Dessert Shop
2	Boston, MA	Brigham Circle	Convenience Store	Pub	Sandwich Place	Sushi Restaurant	Food Truck
3	Boston, MA	Central Square	Pharmacy	Liquor Store	Fast Food Restaurant	Sandwich Place	Wings Joint
4	Boston, MA	Copley Square	Plaza	Bagel Shop	Farmers Market	Lounge	Gym
...	...	...	...	...	...	...	...
73	Stockholm, Sweden	Södermalm	Pizza Place	Indian Restaurant	Vietnamese Restaurant	Gym	Yoga Studio
74	Stockholm, Sweden	Tallkrogen	Metro Station	Indian Restaurant	Yoga Studio	Farmers Market	Food Truck
75	Stockholm, Sweden	Vasastan	Sushi Restaurant	Pizza Place	Pool Hall	Grocery Store	Gym / Fitness Center
76	Stockholm, Sweden	Västertorp	Metro Station	Yoga Studio	Farmers Market	Food Truck	Food
77	Stockholm, Sweden	Vårberg	Shopping Mall	Metro Station	Flea Market	Grocery Store	Yoga Studio

K-Means Clustering

We use k-means clustering with an optimized value of k in order to group all the venues into 8 different clusters based on the frequency of their most popular venues.





Most of Boston is in the yellow cluster, as is downtown Stockholm!

Similar Neighborhoods

We can see which neighborhoods in the destination city are most similar to any neighborhood from the origin city. For example, if our origin is Davis Square in Boston, the neighborhoods in Stockholm most similar are:

- Alvik
- Gamla stan
- Johanneshov
- Langholmen
- Liljeholmen
- Norrmalm
- Riddarholmen
- Skeppsholmen
- Sodermalm

Conclusions

- Even with rudimentary analysis and very simple distance metrics, k-means clustering can give us a good sense of similarities in cities on different continents!
- Future analyses should definitely explore other learning and regression algorithms, as well as other distance metrics.
- Potential uses include helping plan for relocation, planning business expansion, or even planning tourism.
- Thanks for grading my Capstone project, and congrats on finishing yours!