The Battle of Neighborhoods (Week 2)

PROBLEM & BACKGROUND (Introduction/Business Problem):

Toronto and Los Angels are located in North America. Both are multicultural as well as the financial hubs of their respective countries.

We want to explore how much they are similar or dissimilar in aspects from a tourist point of view regarding food, accommodation, beautiful places, and many more. Today Tourism is one of the pillars of the economy and the people most often visits those countries who are rich in heritage and developed enough from a foreign prospective, like friendly environment.

Every city is unique in their own way and give something new. And now the information is so common regarding location of every place around the world on your fingertips which make it easier to explore. Therefore, tourists always eager to travel to different places on the basis of available information, and the comparison (the part of the information) between the two cities always assist to choose the specific places or according to their choice

DATA DESCRIPTION:

We will use Foursquare API to explore the data of two cities, in terms of their neighborhoods. The data also include the information about the places around each neighborhood like restaurants, hotels, coffee shops, parks, theaters, art galleries, museums and many more.
We selected one Borough from Toronto city to analyze its neighborhoods. and Los Angeles from California We will use machine learning technique, “Clustering” to segment the neighborhoods with similar objects on the basis of each neighborhood data. These objects will be given priority on the basis of foot traffic (activity) in their respective neighborhoods. This will help to locate the tourist’s areas and hubs, and then we can judge the similarity or dissimilarity between two cities on that basis

METHODOLOGY:

As a database, I used GitHub repository in my study. My master data which has the main components *Borough, Average House Price, Latitude* and *Longitude* informations of the city.

I will be using several data sources from the Web and CSV files and the consolidate them as a Pandas dataframe as following example:

Limiting the results to Toronto

	Borough	Neighborhood	Latitude	Longitude
0	Downtown Toronto	Rosedale	43.679563	-79.377529
1	Downtown Toronto	St. James Town / Cabbagetown	43.667967	-79.367675
2	Downtown Toronto	Church and Wellesley	43.665860	-79.383160
3	Downtown Toronto	Regent Park / Harbourfront	43.654260	-79.360636
4	Downtown Toronto	Garden District, Ryerson	43.657162	-79.378937

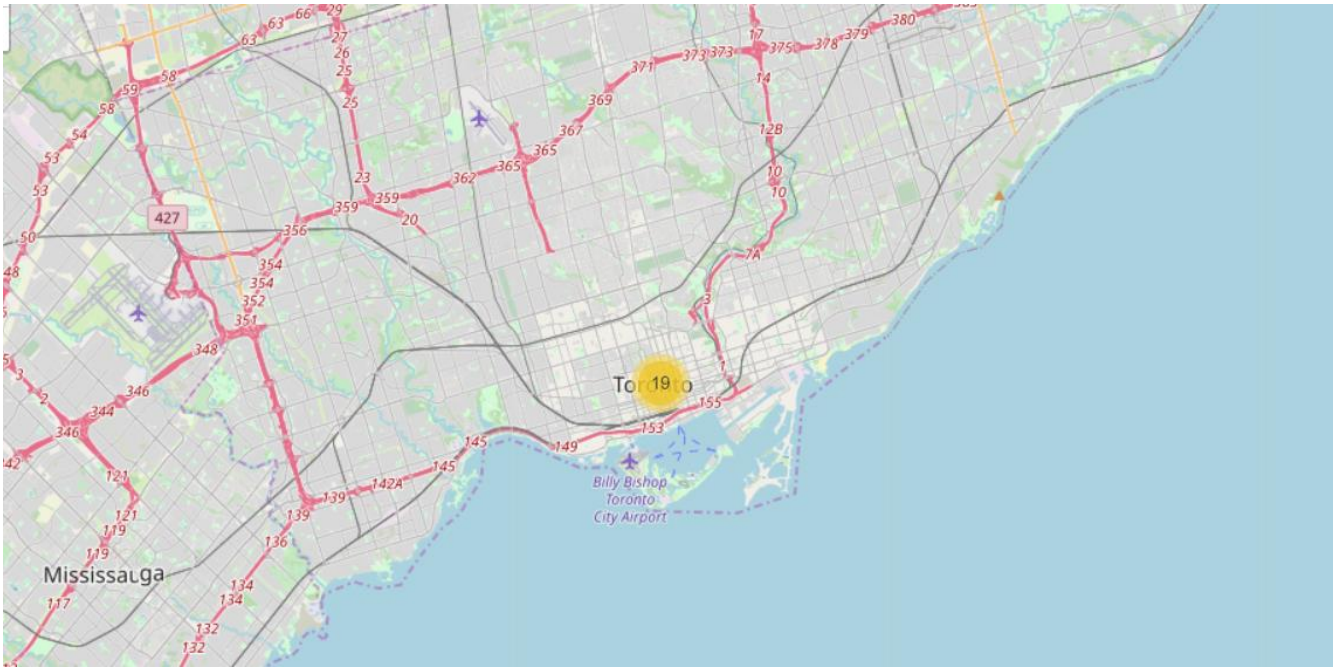
Limiting the results to Los Angeles

	NeighbourhoodName	latitude	longitude
0	Acton	34.497355	-118.169810
1	Adams-Normandie	34.031461	-118.300208
2	Agoura Hills	34.146736	-118.759884
3	Agua Dulce	34.504927	-118.317104
4	Alhambra	34.085539	-118.136512

Visualization of LA and Toronto:

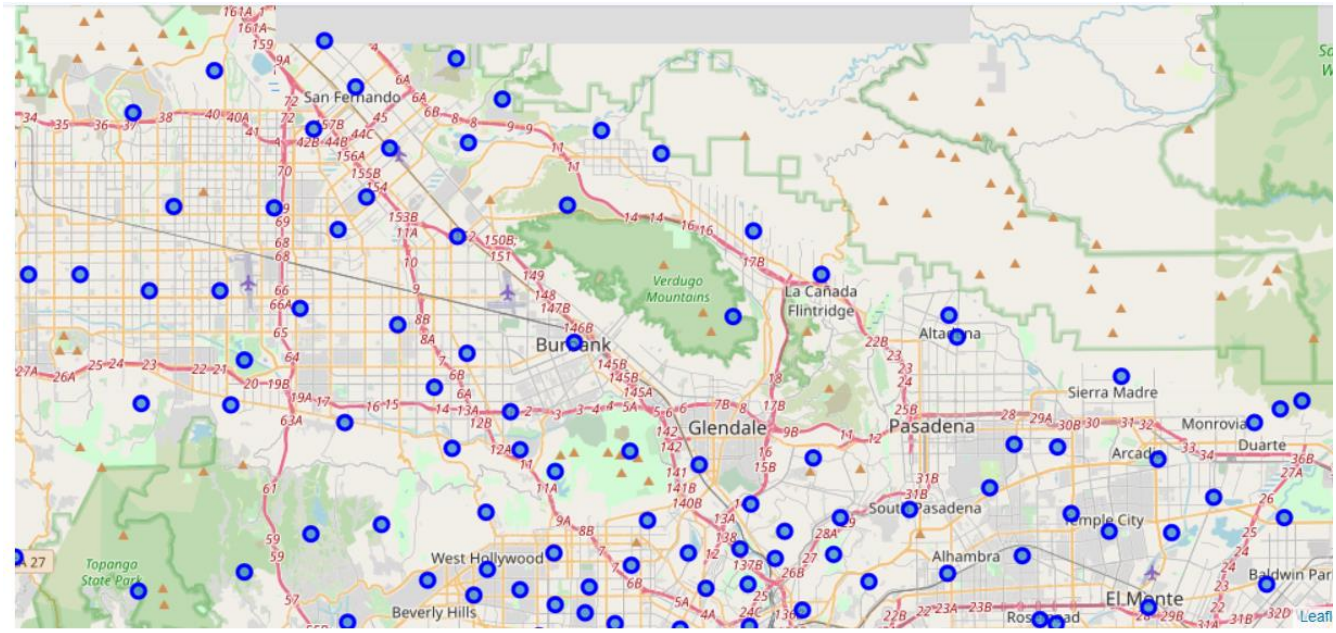
I used python folium library to visualize geographic details of Toronto and LA and its boroughs and I created a map of Toronto with boroughs superimposed on top. I used latitude and longitude values to get the visual as below:

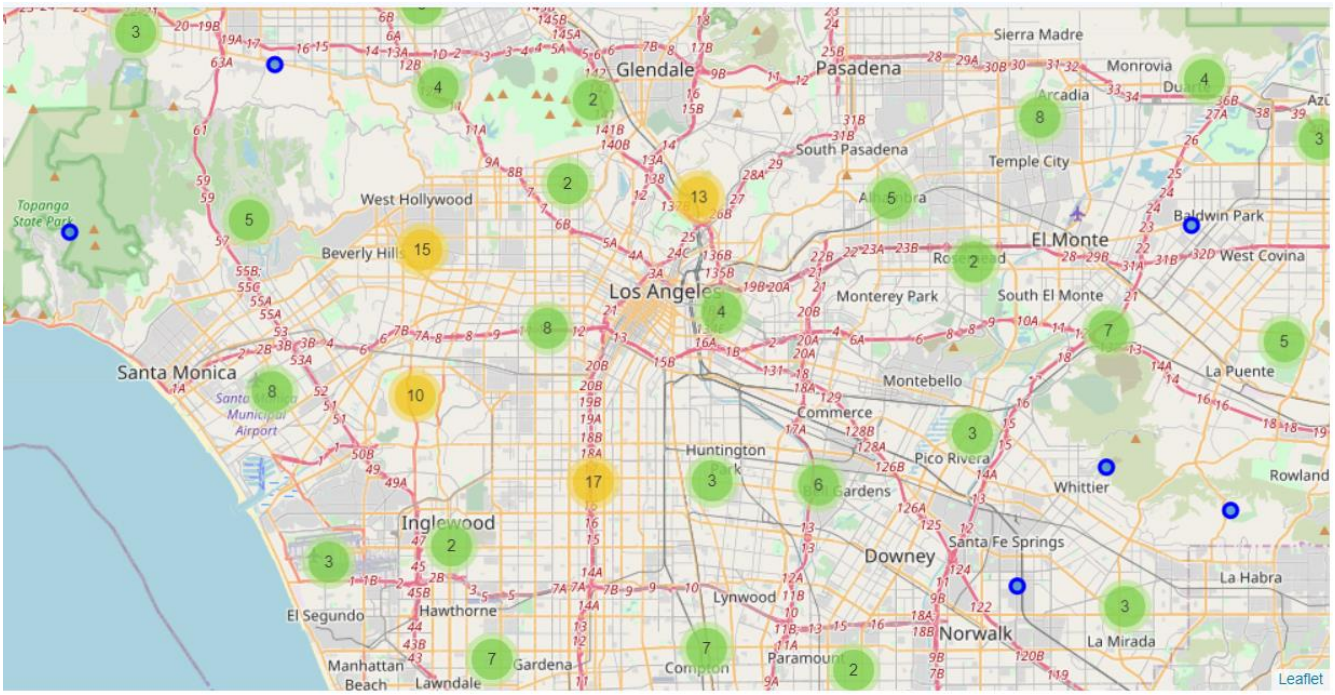
create map of Downtown Toronto using latitude and longitude values and instantiate a mark cluster object for the incidents in the dataframe.



Do the same for Los Angeles:

create map of Downtown Toronto using latitude and longitude values and instantiate a mark cluster object for the incidents in the dataframe.





Exploring Neighborhoods in Downtown Toronto

Utilizing the Foursquare APIs, we can explore locations and venues based on given geographical coordinates.

We can get nearby venues using explore API:

```
Regent Park / Harbourfront
Garden District, Ryerson
St. James Town
Berczy Park
Central Bay Street
Richmond / Adelaide / King
Harbourfront East / Union Station / Toronto Islands
Toronto Dominion Centre / Design Exchange
Commerce Court / Victoria Hotel
University of Toronto / Harbord
Kensington Market / Chinatown / Grange Park
CN Tower / King and Spadina / Railway Lands / Harbourfront Wes
Stn A PO Boxes
First Canadian Place / Underground city
Christie
Queen's Park / Ontario Provincial Government
```

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Rosedale	43.679563	-79.377529	Rosedale Park	43.682328	-79.378934	Playground
1	Rosedale	43.679563	-79.377529	Whitney Park	43.682036	-79.373788	Park
2	Rosedale	43.679563	-79.377529	Alex Murray Parkette	43.678300	-79.382773	Park
3	Rosedale	43.679563	-79.377529	Milkman's Lane	43.676352	-79.373842	Trail
4	St. James Town / Cabbagetown	43.667967	-79.367675	Cranberries	43.667843	-79.369407	Diner

	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Neighborhood						
Berczy Park	20	20	20	20	20	20
CN Tower / King and Spadina / Railway Lands / Harbourfront West / Bathurst Quay / South Niagara / Island airport	16	16	16	16	16	16
Central Bay Street	20	20	20	20	20	20
Christie	18	18	18	18	18	18
Church and Wellesley	20	20	20	20	20	20
Commerce Court / Victoria Hotel	20	20	20	20	20	20
First Canadian Place / Underground city	20	20	20	20	20	20
Garden District, Ryerson	20	20	20	20	20	20
Harbourfront East / Union Station / Toronto Islands	20	20	20	20	20	20
Kensington Market / Chinatown / Grange Park	20	20	20	20	20	20
Queen's Park / Ontario Provincial Government	20	20	20	20	20	20
Regent Park / Harbourfront	20	20	20	20	20	20

Analyzing neighbour and convert venues categories into columns using one hot encoding

	Neighborhood	Yoga Studio	Airport	Airport Food Court	Airport Gate	Airport Lounge	Airport Service	Airport Terminal	American Restaurant	Art Gallery	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	BBQ Joint	Baby Store	B
0	Berczy Park	0.0	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.0	0.0	0.0	0.0	0.000000	0.0	0.000000	0
1	CN Tower / King and Spadina / Railway Lands / ...	0.0	0.0625	0.0625	0.0625	0.125	0.125	0.0625	0.0	0.0	0.0	0.0	0.000000	0.0	0.000000	0
2	Central Bay Street	0.0	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.0	0.0	0.0	0.0	0.000000	0.0	0.000000	0
3	Christie	0.0	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.0	0.0	0.0	0.0	0.055556	0.0	0.055556	0
4	Church and Wellesley	0.0	0.0000	0.0000	0.0000	0.000	0.000	0.0000	0.0	0.0	0.0	0.0	0.000000	0.0	0.000000	0

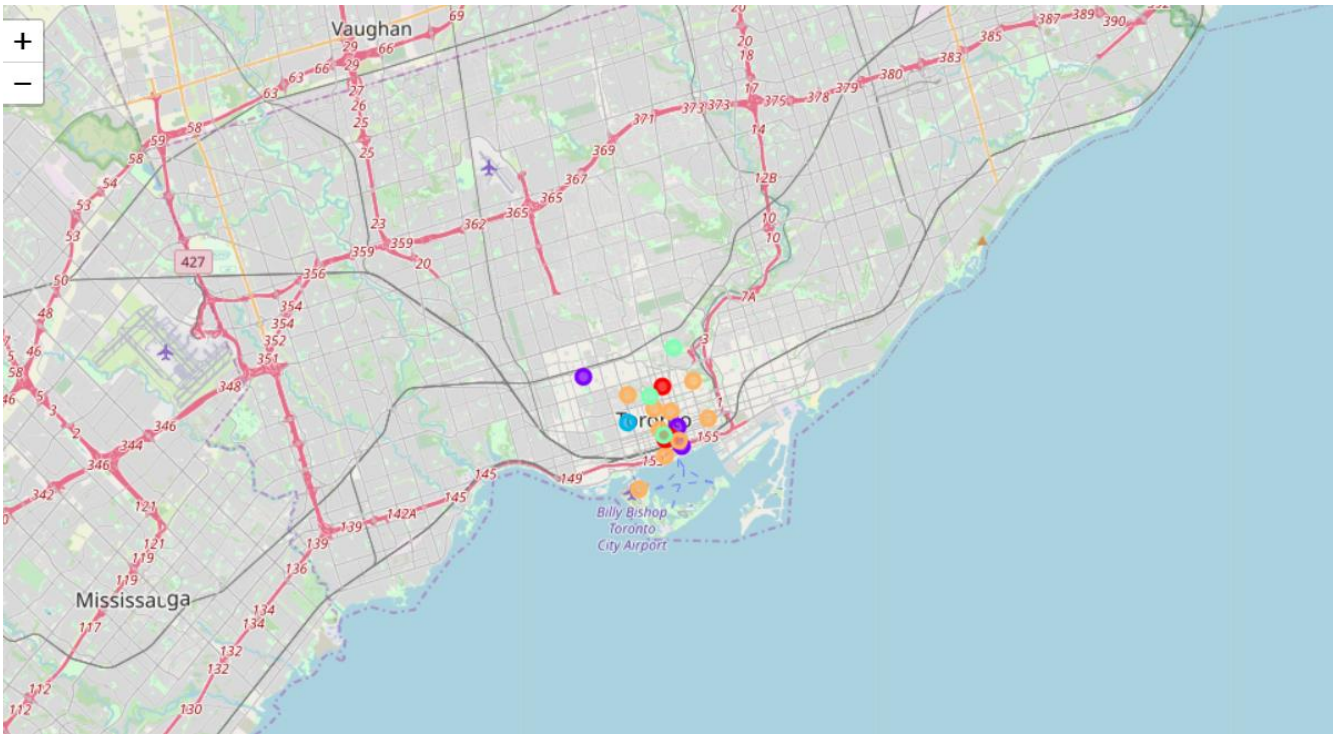
Calculating the frequency

```
----Berczy Park----
            venue  freq
0    Cocktail Bar  0.10
1  Farmers Market  0.10
2        Beer Bar  0.10
3          Bistro  0.05
4          Bakery  0.05


----CN Tower / King and Spadina / Railway
            venue  freq
0   Airport Lounge  0.12
1  Airport Service  0.12
2  Harbor / Marina  0.06
3         Airport  0.06
4     Coffee Shop  0.06


----Central Bay Street----
                       venue  freq
0                Coffee Shop  0.25
1          Italian Restaurant  0.10
2         Japanese Restaurant  0.10
3          Chinese Restaurant  0.05
4  Modern European Restaurant  0.05


----Christie----
```

Clustering, create a new dataframe that includes the cluster as well as the top 10 venues for each neighborhood.

	Borough	Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Con
0	Downtown Toronto	Rosedale	43.679563	-79.377529	3	Park	Trail	Playground	Coffee Shop	Cosmetics Shop	Concert Hall	Comic Shop	Comf Food Resta
1	Downtown Toronto	St. James Town / Cabbagetown	43.667967	-79.367675	4	Restaurant	Café	Deli / Bodega	Pub	Market	Jewelry Store	Japanese Restaurant	Italiar Resta
2	Downtown Toronto	Church and Wellesley	43.665860	-79.383160	0	Diner	Ramen Restaurant	Restaurant	Pub	Salon / Barbershop	Bookstore	Beer Bar	Breal Spot
3	Downtown Toronto	Regent Park / Harbourfront	43.654260	-79.360636	4	Coffee Shop	Bakery	Breakfast Spot	Park	Historic Site	Pub	Spa	Dess Shop
4	Downtown Toronto	Garden District, Ryerson	43.657162	-79.378937	4	Café	Coffee Shop	Burger Joint	Ramen Restaurant	Plaza	Sandwich Place	Movie Theater	Cloth Store

View Clusters:



Examine Clusters:

Cluster 1:

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
2	Church and Wellesley	Diner	Ramen Restaurant	Restaurant	Pub	Salon / Barbershop	Bookstore	Beer Bar	Breakfast Spot	Creperie	Dance Studio
10	Toronto Dominion Centre / Design Exchange	Coffee Shop	Deli / Bodega	Café	Restaurant	Japanese Restaurant	Beer Bar	Pub	Bar	Bakery	Hotel
11	Commerce Court / Victoria Hotel	Café	Coffee Shop	Gastropub	Restaurant	Museum	Pub	Gym	Gym / Fitness Center	Tea Room	American Restaurant

Cluster 2:

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
5	St. James Town	Gastropub	Restaurant	Coffee Shop	Japanese Restaurant	Church	Café	Food Truck	Italian Restaurant	Middle Eastern Restaurant	Hotel
6	Berczy Park	Cocktail Bar	Beer Bar	Farmers Market	Park	Bakery	Coffee Shop	Liquor Store	Concert Hall	Bistro	Restaurant
17	Christie	Grocery Store	Café	Park	Gas Station	Athletics & Sports	Candy Store	Coffee Shop	Restaurant	Diner	Baby Store

Cluster 3:

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
13	Kensington Market / Chinatown / Grange Park	Café	Vietnamese Restaurant	Mexican Restaurant	Caribbean Restaurant	Fish Market	Belgian Restaurant	Dessert Shop	Bar	Bakery	Farmers Market

Cluster 4:

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Rosedale	Park	Trail	Playground	Coffee Shop	Cosmetics Shop	Concert Hall	Comic Shop	Comfort Food Restaurant	College Gym	Wings Joint
16	First Canadian Place / Underground city	Café	Coffee Shop	Restaurant	Steakhouse	Gluten-free Restaurant	Gym	Gym / Fitness Center	Deli / Bodega	Pizza Place	Pub
18	Queen's Park / Ontario Provincial Government	Coffee Shop	Diner	Wings Joint	Park	Arts & Crafts Store	Beer Bar	Boutique	Burger Joint	Burrito Place	Creperie

Cluster 5:

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
1	St. James Town / Cabbagetown	Restaurant	Café	Deli / Bodega	Pub	Market	Jewelry Store	Japanese Restaurant	Italian Restaurant	Bakery	Indian Restaurant
3	Regent Park / Harbourfront	Coffee Shop	Bakery	Breakfast Spot	Park	Historic Site	Pub	Spa	Dessert Shop	Distribution Center	Restaurant
4	Garden District, Ryerson	Café	Coffee Shop	Burger Joint	Ramen Restaurant	Plaza	Sandwich Place	Movie Theater	Clothing Store	Diner	Steakhouse
											Middle

Repeat the same steps for LA

Results

After clustering the data of the respective neighborhoods, both cities (Boroughs) have venues which can be explored and attract the Tourists. The neighborhoods are much similar in features like Theaters, opera houses, food places, clubs, museums, parks etc. As far as concern to dissimilarity, it differs in terms of some unique places like historical places and monuments.

Observations & Recommendations:

As far as concern to recommendations, we recommend Los Angeles Neighborhoods will be considered first to visit. The tourists have an easily travelling access due to Airport facility, which not only saves time but also helps to save money. This saved money can be utilized to explore more, the attracting venues.

Conclusion:

The downtown Toronto and Los Angeles neighborhoods have more like similar venues. As we know that every place is unique in its own way, so that's argument is present in both neighborhoods. The dissimilarity exists in terms of some different venues and facilities but not on a larger extent