Capstone Proj: Brewery Neighborhoods

1. Introduction:

The current project is to help me plan a vacation with my friends. As a group of beer enthusiasts, we plan to do a beer tour over a 15-day vacation within the US. The choice has to be made between neighborhoods of San Francisco, CA on the west coast or Boston, MA on the east coast. The primary interst of the vacation is the beer tour among a variety of breweries in the neighborhood locations, while secondary interests can also be included to help make a better choice or decision. In this example, I have listed museums as my secondary choice of points of interest in the neighborhood.

Since the vacation time is 15-day with an aim to visit decent number of breweries and spend good time, along with some attention to other points of interest(museums), it is important to plan the itinerary appropriately. For this, we will divide each location/neighborhood into 3 clusters and list out the number of breweries and other details in respective cluster neighborhoods. Then we look for museums around the centroids of each of clusters. Dataframes will be created to guide us in evaluating these parameters and accordingly plan the trip to visit one or more cluster regions in the selected neighborhood - SFO or Boston!

This approach can be adapted for any vacation planning and change the parameters of interest and generate maps, tables summarizing the available options which can help design itineraries!!

2. Data

We mainly need the location data and query data from FourSquare. We list out breweries in hte neighborhood areas (radius = 1000 km) of SFO and BOS (Boston). K-Means clustering will be used to create 3 Clusters from each neighborhood (nearby breweries fall within each cluster). The number of breweries within each cluster and the corresponding centroids are presented in a dataframe. Based on latitude and longitude of the centroid, nearby museums are identified and the top 5 are added onto the dataframe.

In this way, a dataframe with information on brewery clusters in SFO and BOS locations, along with available museum options in respective clusters, will be presented as summary.

3. Methodology:

Firstly, using the credentials for FourSquare, the geographic locations of the cities of interest were taken.

Using search query, lists of breweries were identified for both regions and listed in dataframes with specific details such as name, id and location(latitude and longitude).

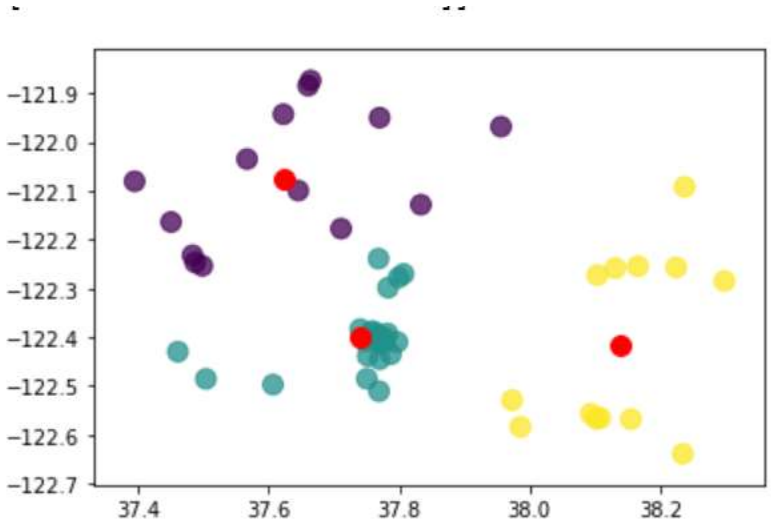
Since all the breweries cannot be covered within the vacation period, the overall list from each location will be divided into 3 clusters by KMeans clustering and analyzed.

Corresponding centroids are calculated and list of museums nearby those centroids are listed.

Dataframes with all these data are created by using a combination of for loops, defining functions, dataframe operations etc.

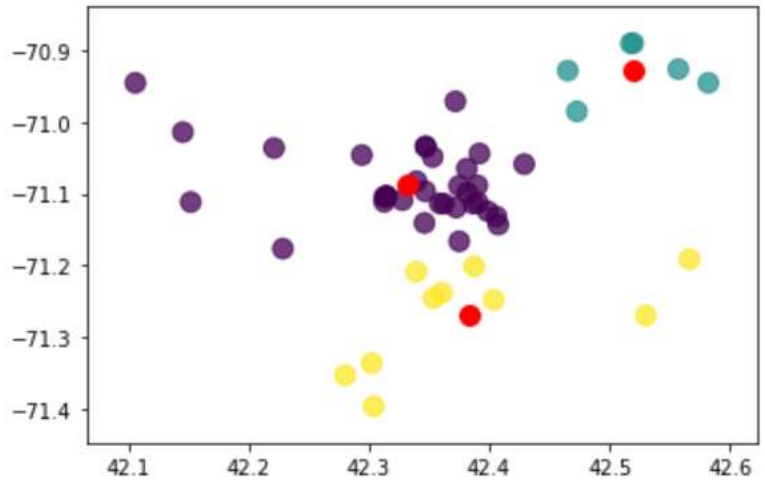
4. Results:

Brewery clusters in SFO and the dataframe with the number of breweries on each cluster and centroid locations:



	centroid#	no. of breweries	latitude	longitude
0	0	14	37.624762	-122.074220
1	1	23	37.739515	-122.400335
2	2	13	38.139788	-122.417722

Brewery clusters in Boston and the dataframe with the number of breweries on each cluster and centroid locations:



cluster#	no. of breweries	latitude	longitude
0	34	42.332334	-71.087180
1	6	42.519094	-70.928169
2	10	42.382710	-71.268657

Querying museum options in the neighborhood of each centroid locations and adding (only top 5) them into the dataframe:

For SFO:

	centroid#	no. of breweries	latitude	longitude	Museum1	Museum2	Museum3	Museum4	Museum5
0	0	14	37.624762	-122.074220	Niles Depot Museum	Museum on Main Street	Union City Historical Museum	Oakland Aviation Museum	Oakland Museum of California
1	1	23	37.739515	-122.400335	Museum of Craft and Design	de Young Museum	Children's Creativity Museum	Maritime Museum	Contemporary Jewish Museum
2	2	13	38.139788	-122.417722	Mare Island Historic Park Foundation Artifacts...	Petaluma Museum	Vallejo Naval and Historical Museum	Crockett Historical Society & Museum	Marin History Museum - Boyd Gate House

For Boston:

cluster#	no. of breweries	latitude	longitude	Museum1	Museum2	Museum3	Museum4	Museum5
0	34	42.332334	-71.087180	Museum of Fine Arts	Isabella Stewart Gardner Museum	MBTA Museum of Fine Arts Station	Museum of Science	Boston Tea Party Ships and Museum
1	6	42.519094	-70.928169	Museum Place Mall	Historic New England Phillips House Museum	Peabody Essex Museum (PEM)	Salem Witch Museum	Witch History Museum
2	10	42.382710	-71.268657	Charles River Museum of Industry & Innovation	DeCordova Museum and Sculpture Park	Museum of Science	Museum of Modern Renaissance	National Heritage Museum

5. Discussions:

As seen from the kMeans clusters, breweries are concentrated in a small radius in Boston region and scattered in SFO region. If visiting maximum number of breweries is important, we can choose a specific cluster from looking at the cluster map. Additional details can be found on the breweries by looking at the list generated in the dataframes. Each cluster in both neighborhoods has good options of museums. Looking at the list and type of museums one is interested in we can make further decisions on which cluster is important.

6. Conclusion:

The above approach gives a brief idea on how to plan the vacation depending on where to go. For my interests, Boston looks appealing since I get to cover large number of breweries in one cluster and the museum options are also attractive!