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Introduction.

San Francisco (SF) Mayor's office has provided comprehensive data for affordable housing projects in SF neighborhoods. In this report we will get affordable housing data from SF Mayors site.

The affordable housing data provides project name, location (latitude, longitude), neighborhood and other data elements related to the affordable housing data. In this project I will create clusters of different projects going in a neighborhood (Tenderloine, CA). I will get the list of venues from Foursquare near each of the projects in a neighborhood. Finally report will create relationship between each cluster, provide project names for the housing and activities that are carried near the cluster.

This report will provide recommendation about each cluster based on the activities near by that renters can use to rent based on their day to day activities.

San Francisco Affordable Housing - Data Gathering & Manipulation.

SF Government site provides affordable housing data for renting an apartment in a json format. In this project I will download data from SF Mayors site. Convert the json data into data frame outlining neighborhood, project name, location (latitude, longitude).

Data Wrangling. For some of the entries due to sensitivity of the information location data is not provided as part of the json data. I will clean up the data replace these data elements and eventually drop the data from final analysis.

:

	Neighborhood	Project_Name	Latitude	Longitude
0	Confidential	SafeHouse	None	None
1	Tenderloin	William Penn Hotel	37.78	-122.4102631
2	Noe Valley	60 28th Street	37.75	-122.4234398
3	Bayview Hunters Point	Geraldine Johnson Manor	37.73	-122.3931198
4	South of Market	1028 Howard	37.78	-122.4079208
...	...	...	...	...
371	Tenderloin	990 Polk	37.79	-122.4193802
372	Lone Mountain/USF	The Coronet	37.78	-122.4579163
373	Mission	3353 26th Street - Small Sites	37.75	-122.4171635
374	Mission	Mission Hotel	37.76	-122.4178848

I have removed any rows that don't have latitude and longitude provided.

After cleaning the data I got summary of the data.

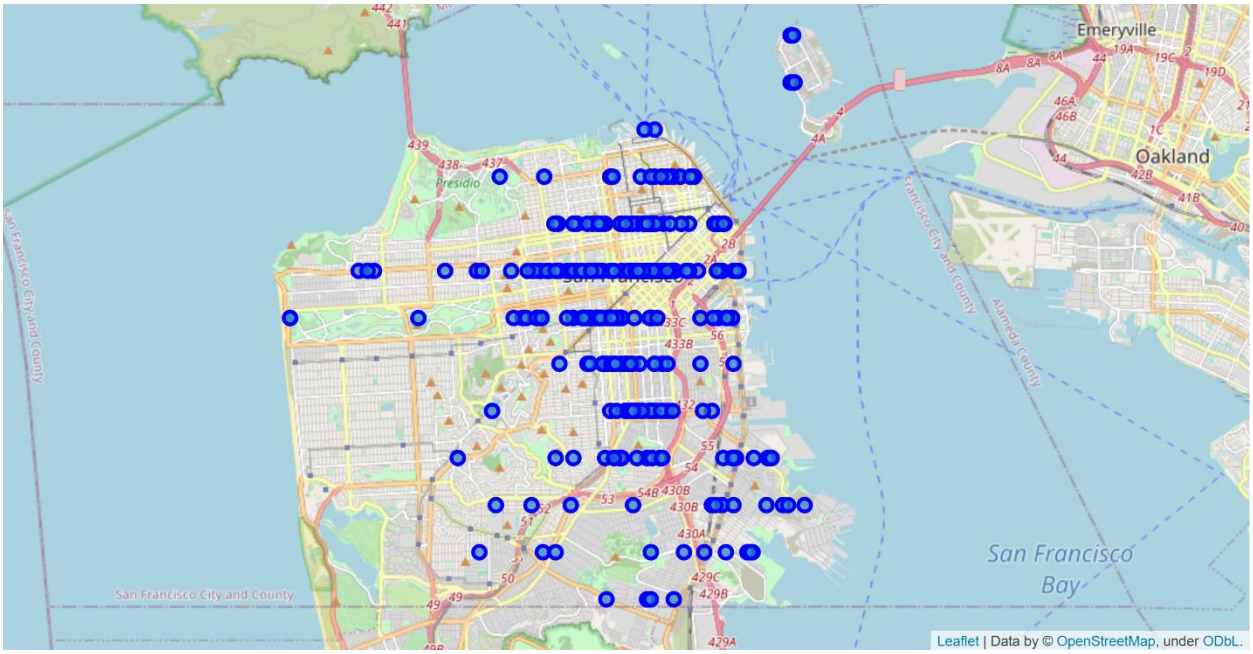
	Neighborhood	Project_Name	Latitude	Longitude
count	371	371	371	371
unique	36	371	13	356
top	Tenderloin	735 Ellis	37.78	-122.4127884
freq	70	1	147	2

For this report I will be using **Tenderloin** neighborhood for detailed analysis. I removed all the data and only considered data related to Tenderloin neighborhood.

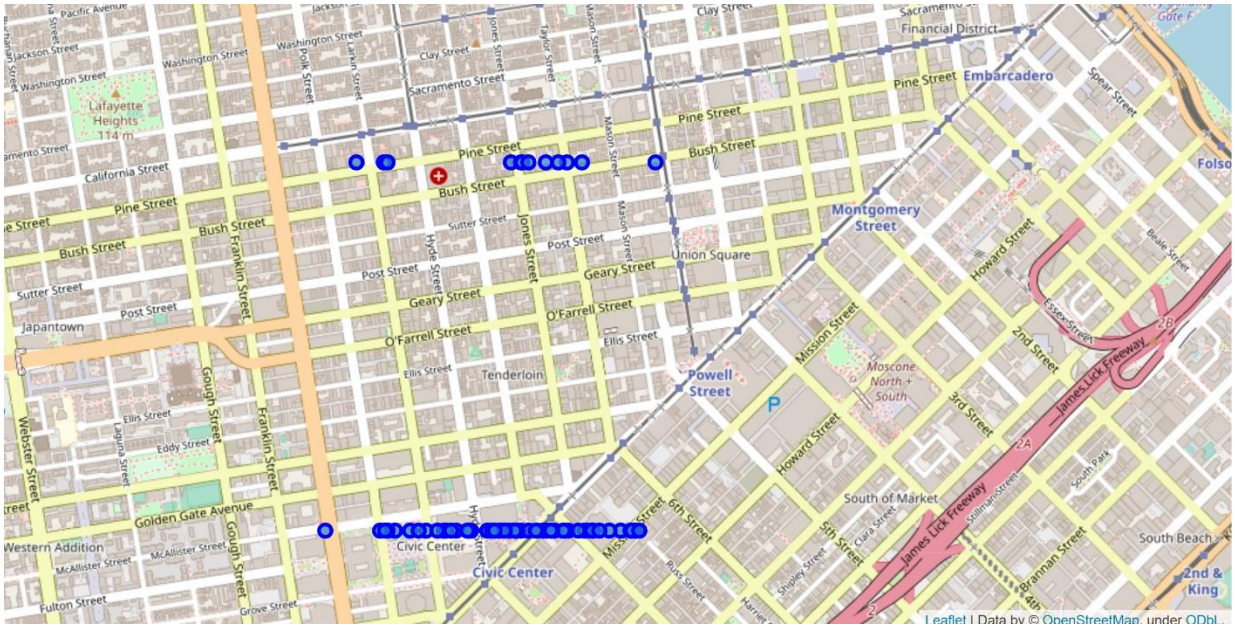
	Neighborhood	Project_Name	Latitude	Longitude
0	Tenderloin	William Penn Hotel	37.78	-122.4102631
1	Tenderloin	125 Mason Street	37.78	-122.4097443
2	Tenderloin	555 Ellis Street Family Apartments	37.78	-122.4154129
3	Tenderloin	Madonna Residence	37.78	-122.4163818
4	Tenderloin	The Nathan Building	37.78	-122.4134521
5	Tenderloin	Marathon Hotel	37.78	-122.41803
6	Tenderloin	Curran House	37.78	-122.4112244
7	Tenderloin	Yosemite Apartments	37.78	-122.4155045
8	Tenderloin	Maria Manor	37.79	-122.40905
9	Tenderloin	Presentation Senior Community	37.78	-122.411438
10	Tenderloin	Cadillac Hotel	37.78	-122.4139404
11	Tenderloin	Tenderloin Family Housing	37.78	-122.412941

San Francisco Affordable Housing – Geospatial Analysis using Foursquare API.

First using the above data set I created the map of affordable housing available for renting in San Francisco.



Using the Foursquare API I got the list of venues near each project under each neighborhood



San Francisco Affordable Neighborhood – Cluster Analysis

Using the Foursquare API I got the list of venues near each project in Tenderloin. After that for each project I tried to list out most activities that are done near each project area.

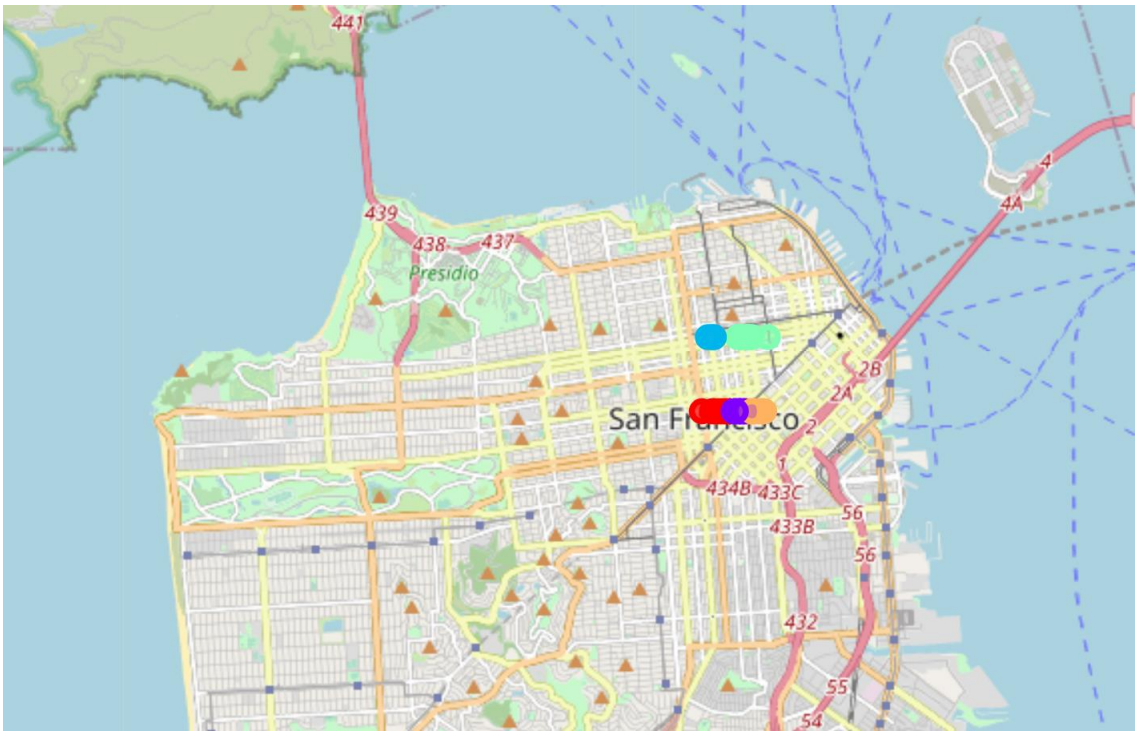
	Project_Name	Adult Boutique	American Restaurant	Art Gallery	Art Museum	Arts & Crafts Store	Asian Restaurant	Bagel Shop	Bakery	Bank	...	Theater	Tiki Bar	Toy / Game Store	Turkish Restaurant
0	111 Jones	0.000000	0.032258	0.021505	0.010753	0.010753	0.010753	0.0	0.032258	0.010753	...	0.032258	0.0	0.0	0.0
1	125 Mason Street	0.015152	0.030303	0.030303	0.000000	0.015152	0.000000	0.0	0.045455	0.015152	...	0.030303	0.0	0.0	0.0
2	149 Mason Street Apartments	0.015152	0.030303	0.030303	0.000000	0.015152	0.000000	0.0	0.045455	0.015152	...	0.030303	0.0	0.0	0.0

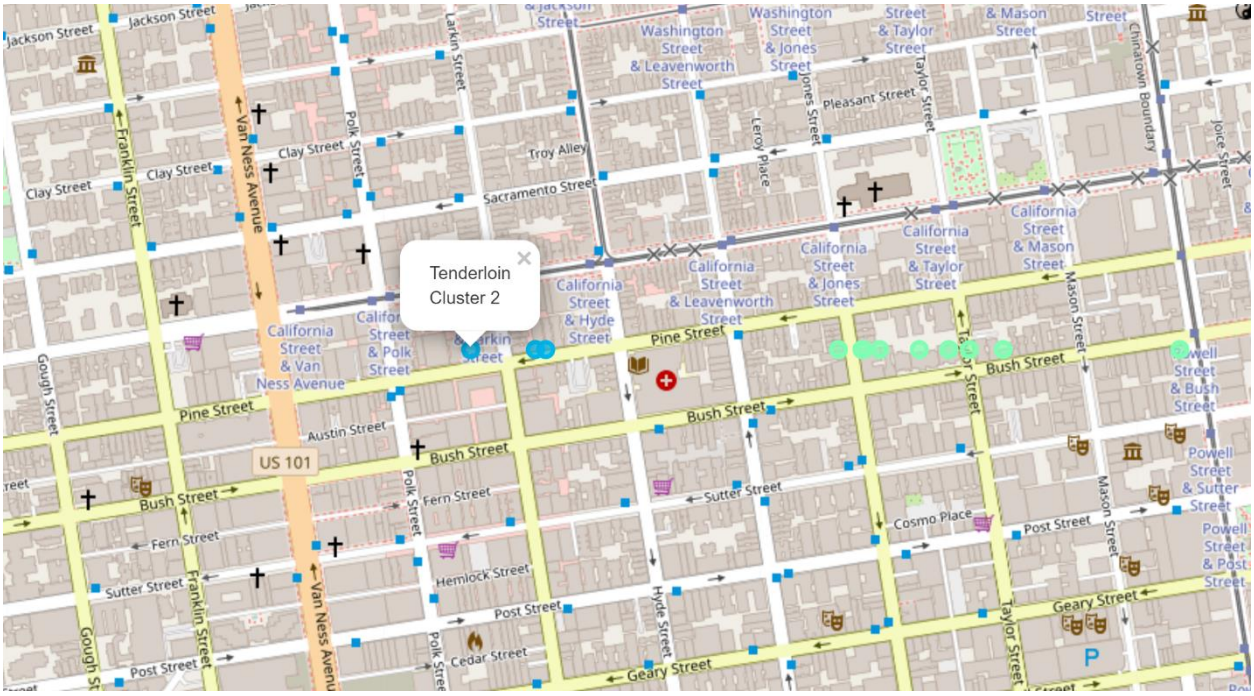
I tried to list top five avenues under each project name.

```
----111 Jones----
                 venue  freq
0          Coffee Shop  0.10
1  Marijuana Dispensary  0.04
2          Music Venue  0.03
3               Bakery  0.03
4                 Café  0.03


----125 Mason Street----
                  venue  freq
0           Coffee Shop  0.11
1  Vietnamese Restaurant  0.05
2               Bakery  0.05
3    Mexican Restaurant  0.03
4                   Bar  0.03
```

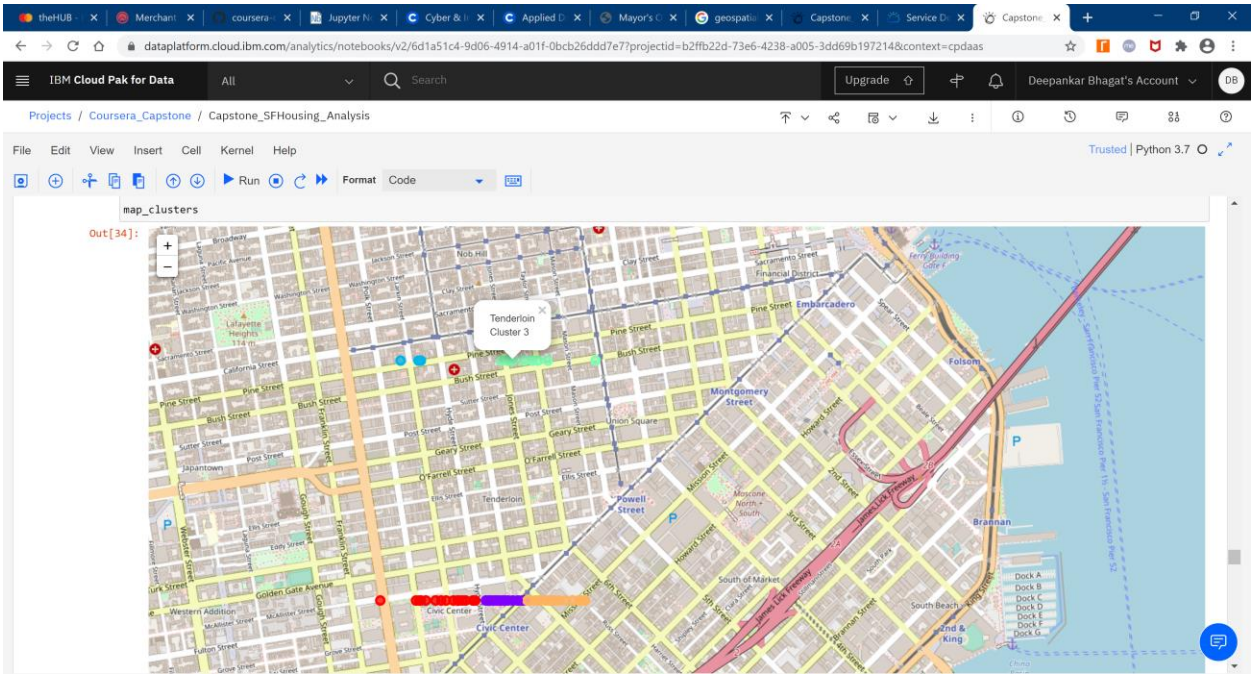
After that I created five clusters for the tenderloin neighborhood.





Cluster #	**Activity**
Cluster 0	Vietnamese Restaurant & Café
Cluster 1	Coffee Shops
Cluster 2	Bar & Café
Cluster 3	Grocery Stores
Cluster 4	Coffee Shops & Restaurants

San Francisco Affordable Neighborhood – Recommendations



	Project_Name	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	Con
8	Maria Manor	Boutique	Hotel	Clothing Store	Coffee Shop	Bubble Tea Shop	Sushi Restaurant	Cocktail Bar	Jewelry Store	Art Gallery	
9	St. Claire Residence	Hotel	Cocktail Bar	Italian Restaurant	Café	Theater	Grocery Store	Spa	Speakeasy	French Restaurant	Bi
3	Tower 737 (aka Post St Towers)	Hotel	Italian Restaurant	Café	Cocktail Bar	Bar	Theater	Grocery Store	Speakeasy	American Restaurant	
4	350 Ellis	Hotel	Bar	Café	Speakeasy	Cocktail Bar	Breakfast Spot	Italian Restaurant	French Restaurant	Pizza Place	Ki
6	O'Farrell Towers	Hotel	Bar	Café	Cocktail Bar	Speakeasy	French Restaurant	Italian Restaurant	Spa	Breakfast Spot	Elec
0	Cecil Williams Glide Community House	Hotel	Bar	Cocktail Bar	Speakeasy	Café	Breakfast Spot	French Restaurant	Italian Restaurant	Pizza Place	
1	450 Ellis St	Hotel	Italian Restaurant	Cocktail Bar	Café	Theater	Breakfast Spot	American Restaurant	Grocery Store	Beer Bar	
2	Geary Courtyard	Hotel	Italian Restaurant	Cocktail Bar	Café	Theater	Breakfast Spot	American Restaurant	Grocery Store	Beer Bar	
8	525 O'Farrell Street	Hotel	Italian Restaurant	Cocktail Bar	Café	Theater	Grocery Store	Beer Bar	Spa	Art Gallery	Bi

Although there are not a whole lot of grocery stores, but the 7th and 8th preferable place is groceries in cluster 3.

Anyone who wants to entertain guests should opt in for cluster 3 to rent an apartment over there.

References.

[Data Code in GIT Hub]