Battle of the Neighbourhoods

City :San Francisco

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Introduction

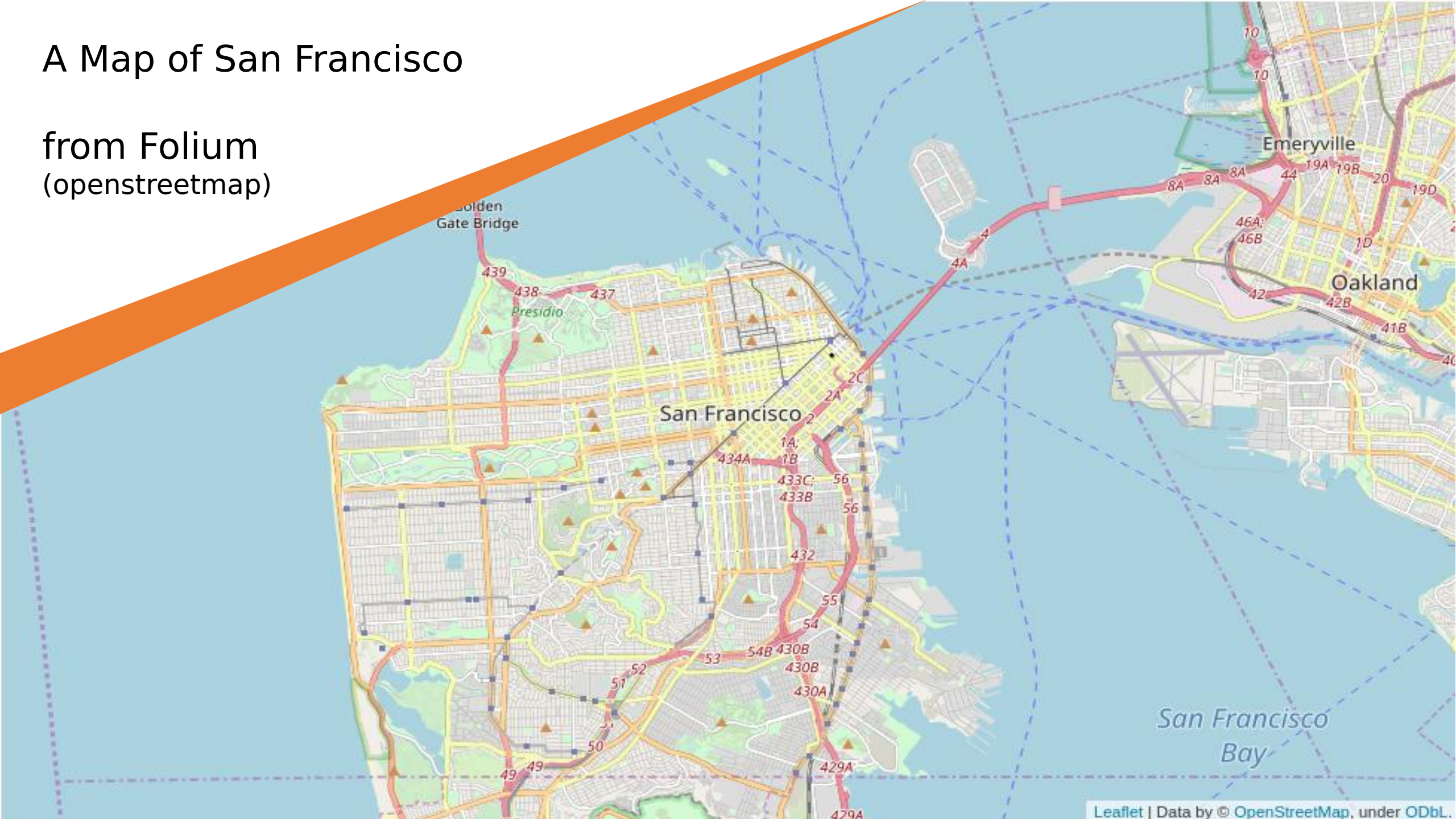
The Project aims to Help choose the best Location to begin an Apartments Project.

Below are some of the Problems we need to answer;

1. Where is the best spot to start an Apartments Project ?
2. What are the factors on which customers choose Apartments?
3. What are the proximities of the basic Necessities available?

A Map of San Francisco

from Folium
(openstreetmap)



Factors on Choosing an Apartment

Building Factors: (Ignoring, these are left to the builder)

- Well Built and Sturdy.
- Electricity and Plumbing.
- Parking Space.
- Rent

Location Factors: (We’ll be focusing on this Section)

- Nearest Hospital (distance)
- Nearest School/College(distance)
- Lifestyle / Gym Nearby
- Restaurants and Eateries

Data Source and Overview

We will be using Foursquare API as a reliable source of Location Data of the City, San Francisco.

We aim to make a suitable Scatter Plot of the Nearby Facilities and hence choose an appropriate location for Building the Apartment.

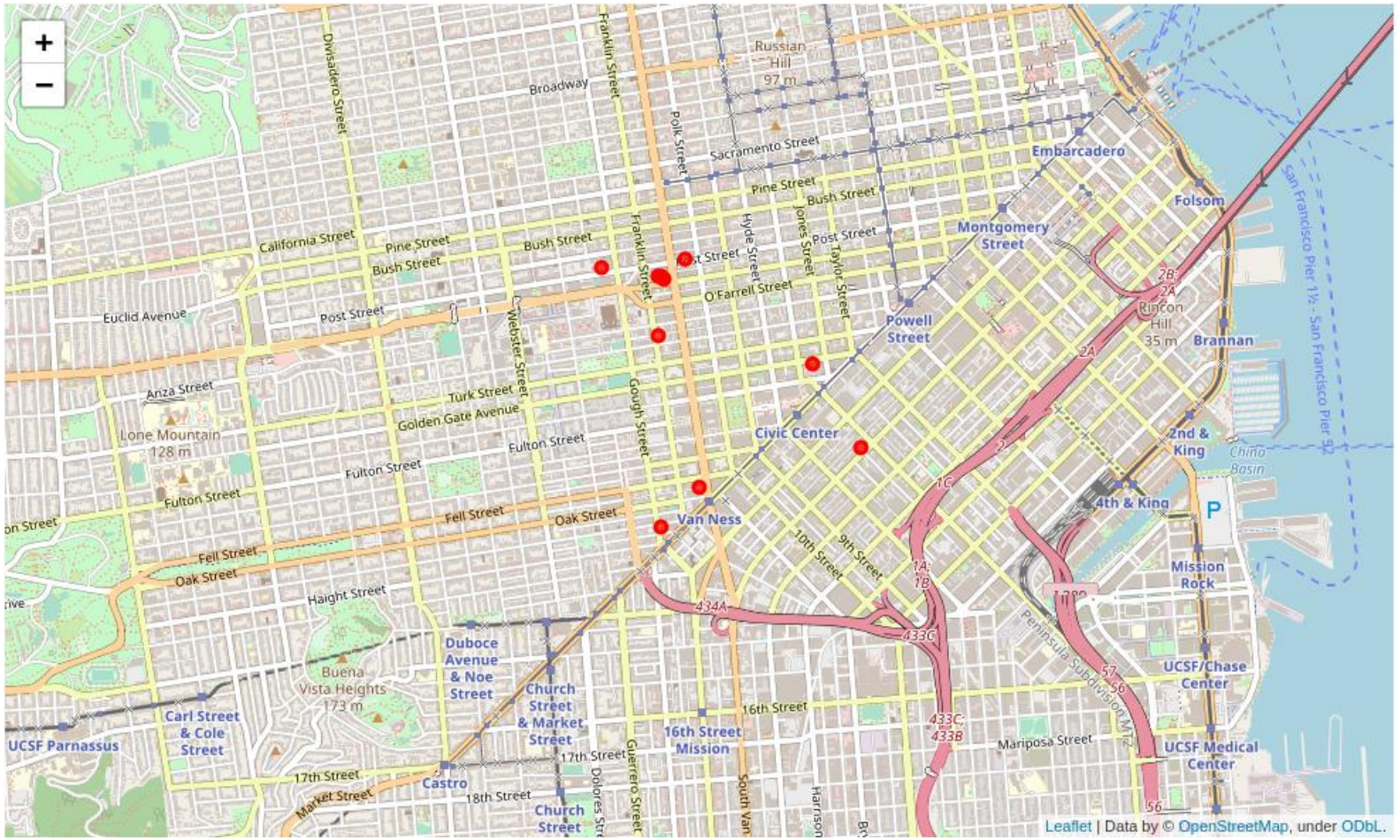
Data Introduction

We first plan to map the points of all the Hospitals, Restaurants, Gyms and Schools onto a map of San Francisco.

We will then convert those points to form a scatter plot (hopefully) marking each type of facility in a different colour.

We will then perform k-means algorithm on the Data and find Suitable Centroids that will hold as Locatons for building the apartment

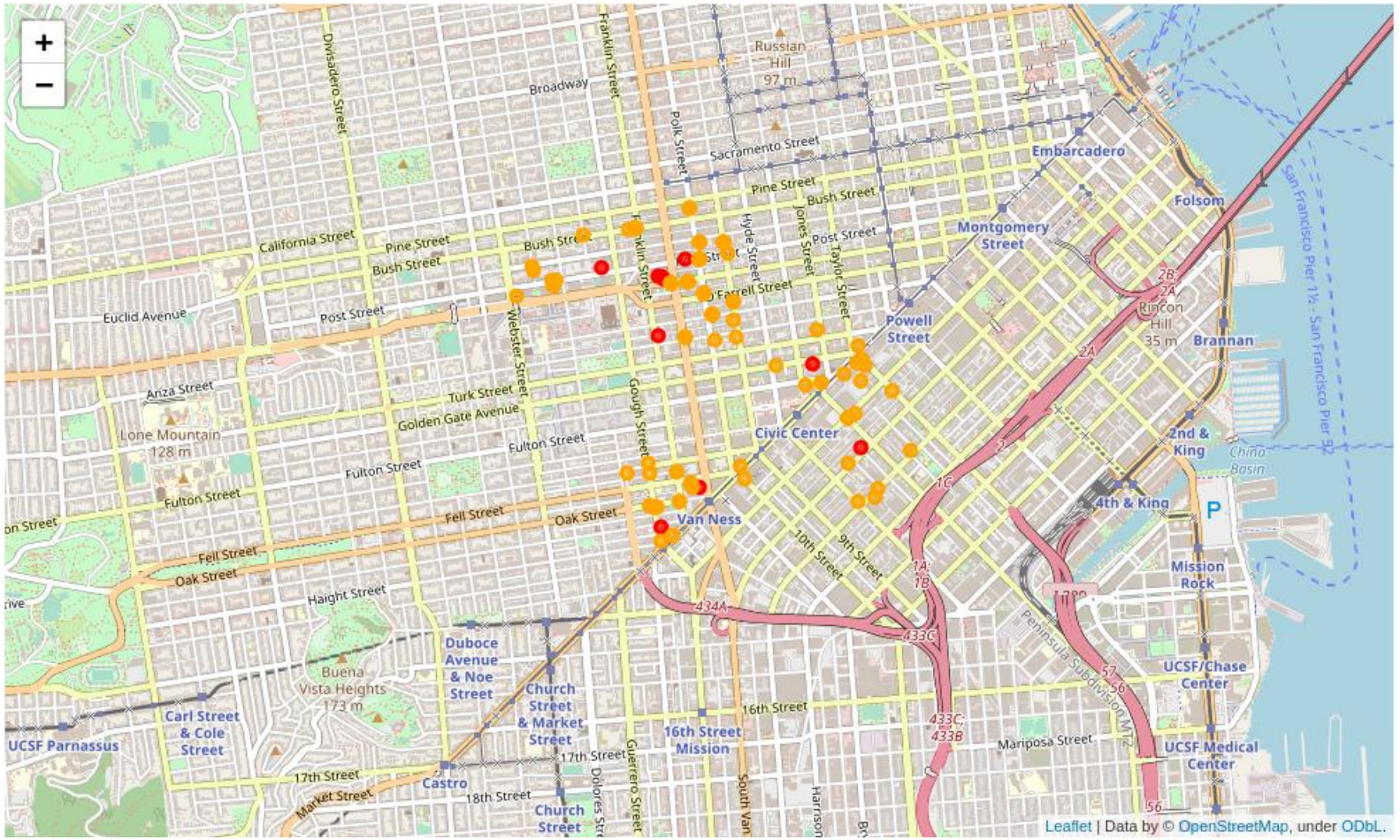
Initial Point Selection



Hospitals

Placing Hospitals as a mandatory necessity, we Began by marking the Hospitals on the Map

Mapping of Nearby Eateries

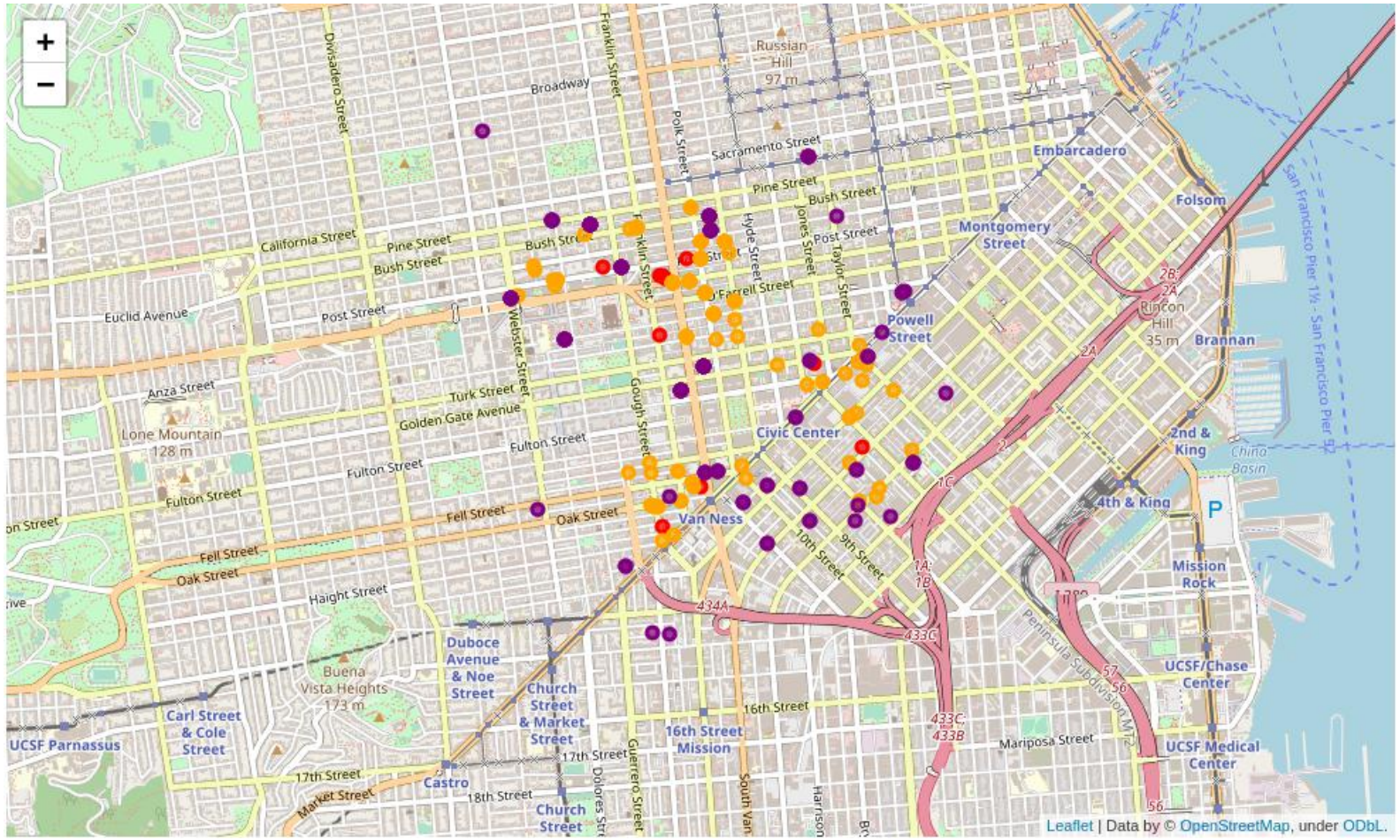


Hospitals

Eateries/Foods

We Find the nearby Eateries using Explore of Foursquare maps API

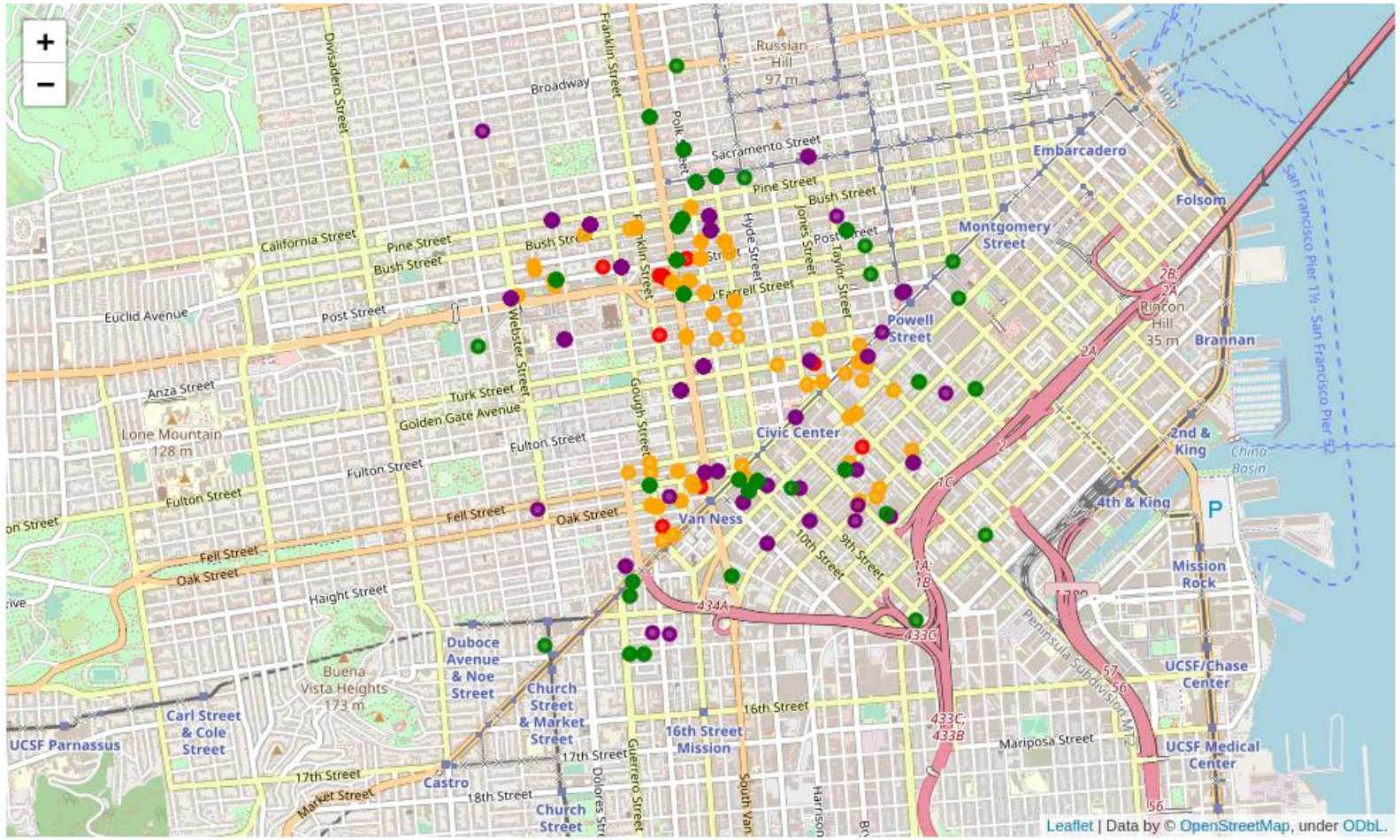
Mapping of Nearby Schools



- Hospitals
- Eateries/Foods
- Schools

Similarly,We Find the nearby Schools using Explore of Foursquare maps API

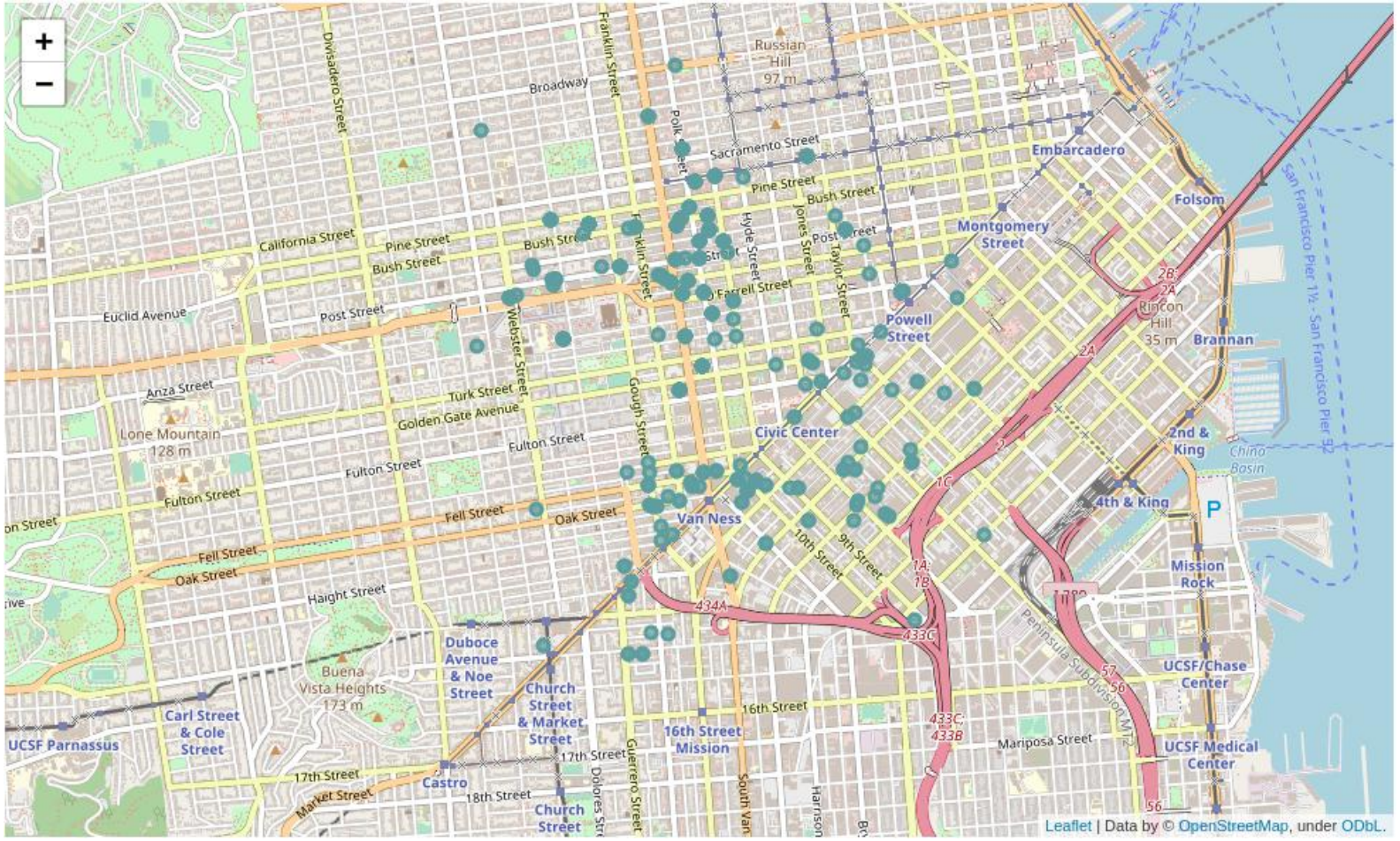
Mapping of Nearby Gyms



- Hospitals
- Eateries/Foods
- Schools
- Gyms

Lastly,We Find the nearby Gyms and Lifestyle Centers using Explore of Foursquare maps API

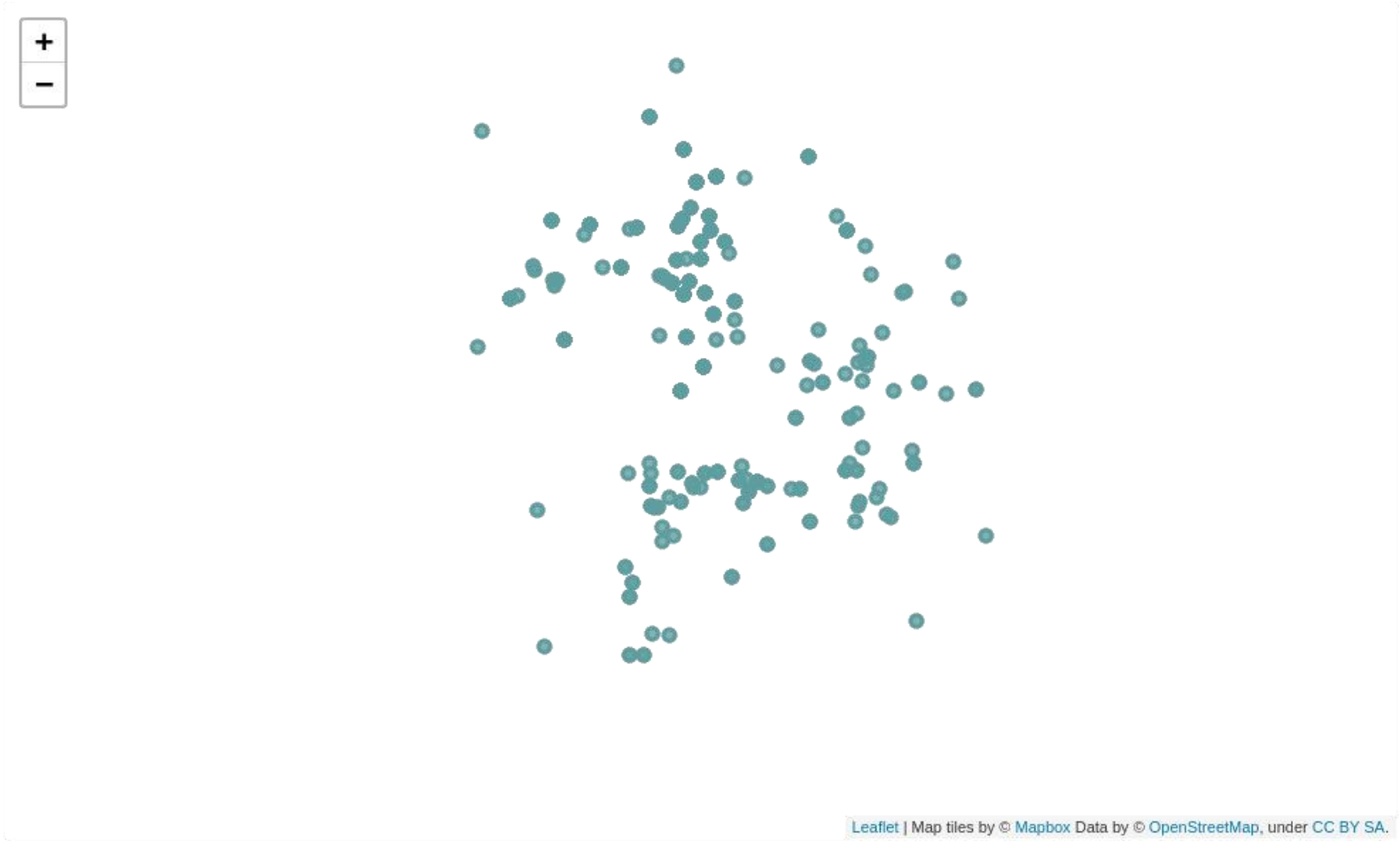
Complete Map of Neccessities



Necessities

We can sum up all these Necessities, that are needed for Choosing an Apartment Building Location

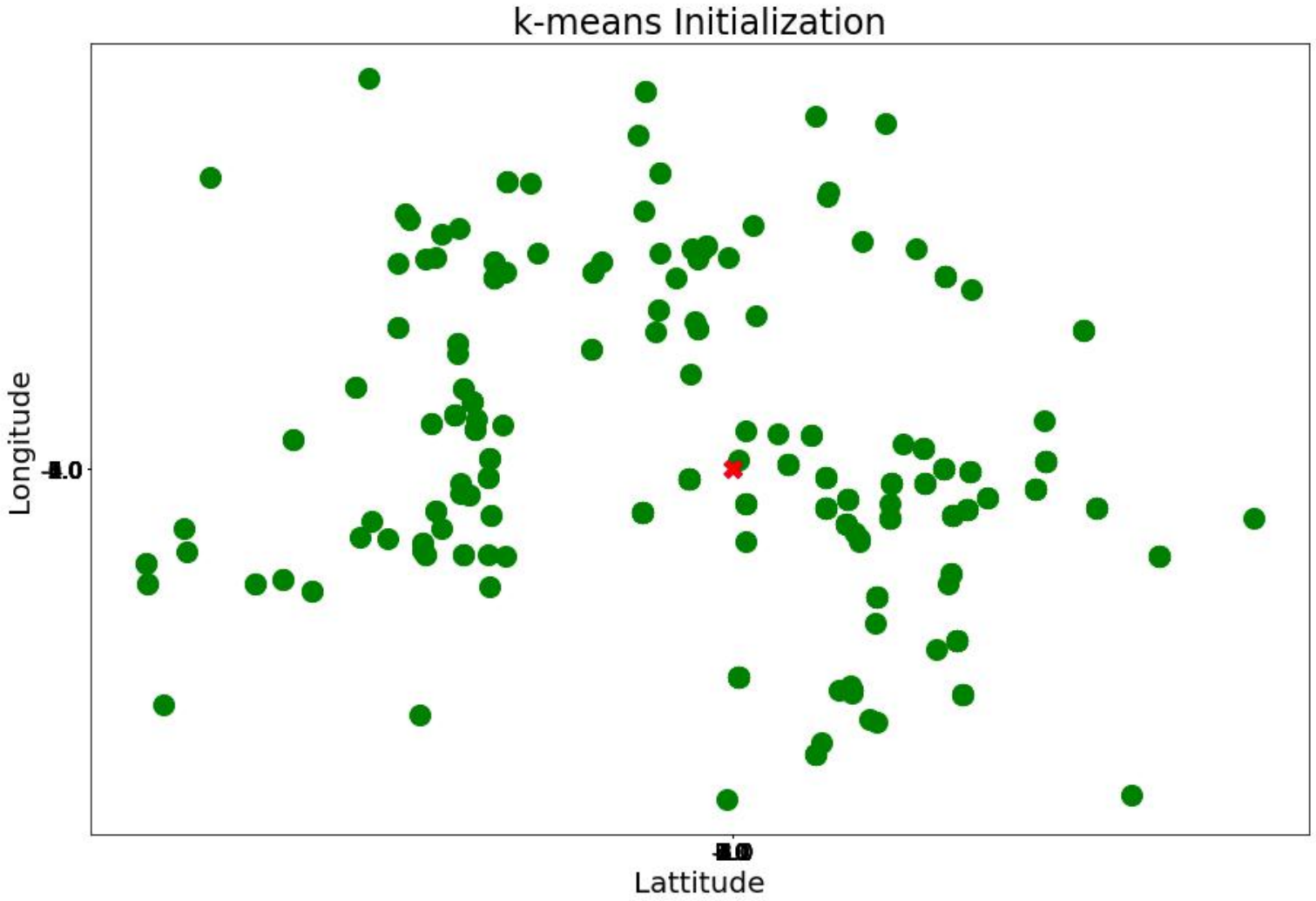
Clear view Map of the Points



Necessities

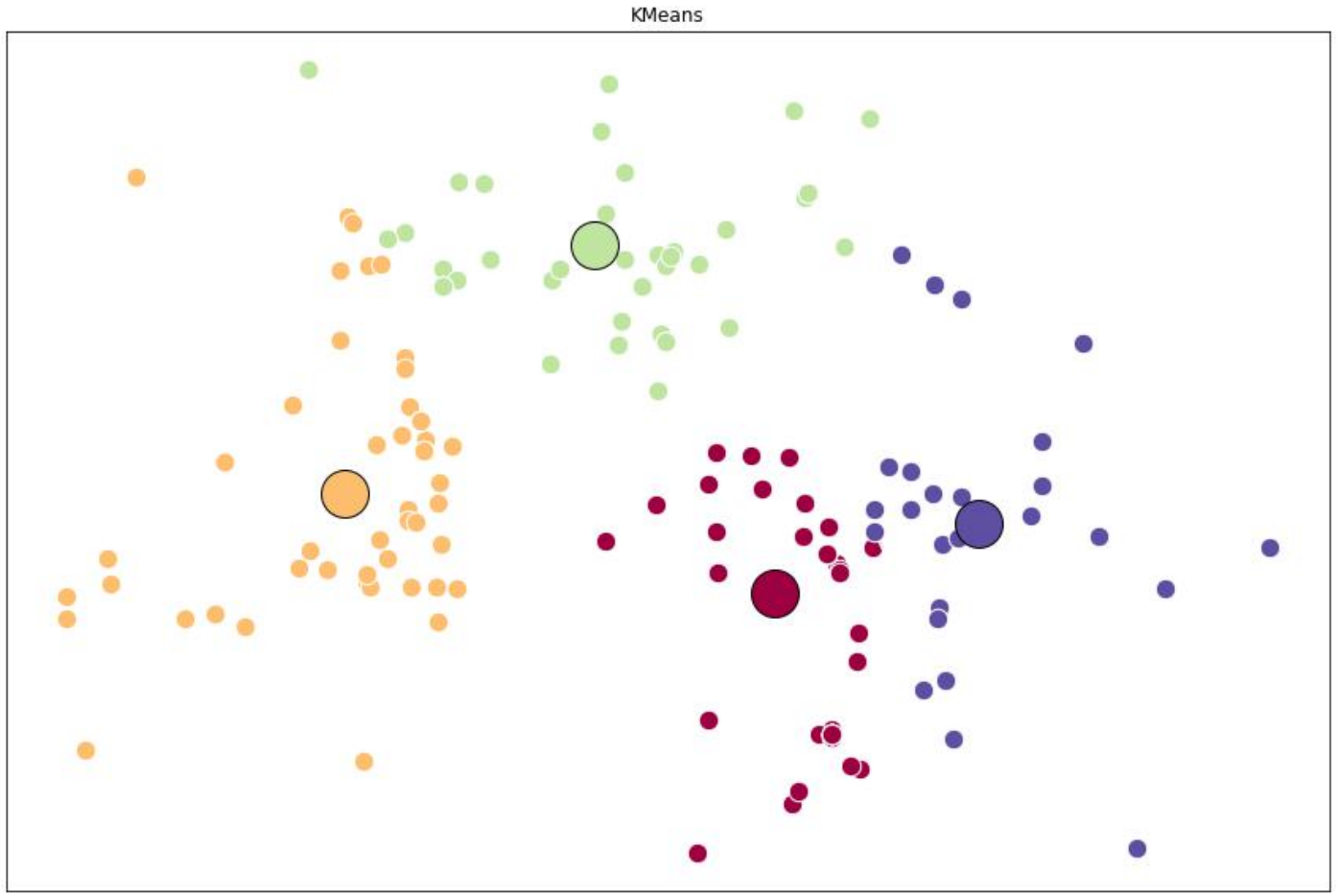
We can now run K-Mean Clustering on this Data

Trial Plot using ScatterPlot



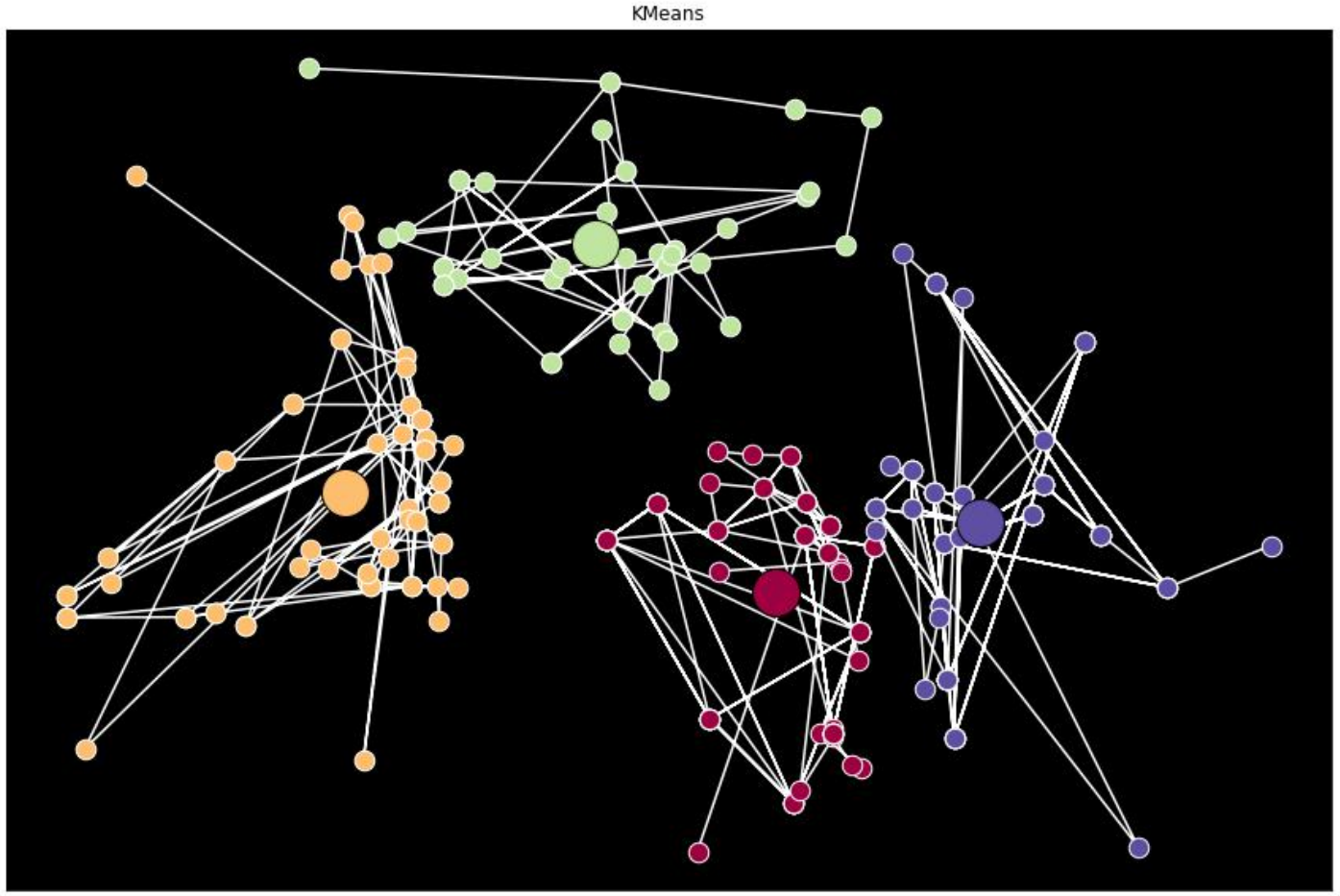
We Plot the points using Matplotlib

K-Means Algorithm



Here I Ran Kmeans
with 4 clusters
(since KMeans failed
when i chose 5)

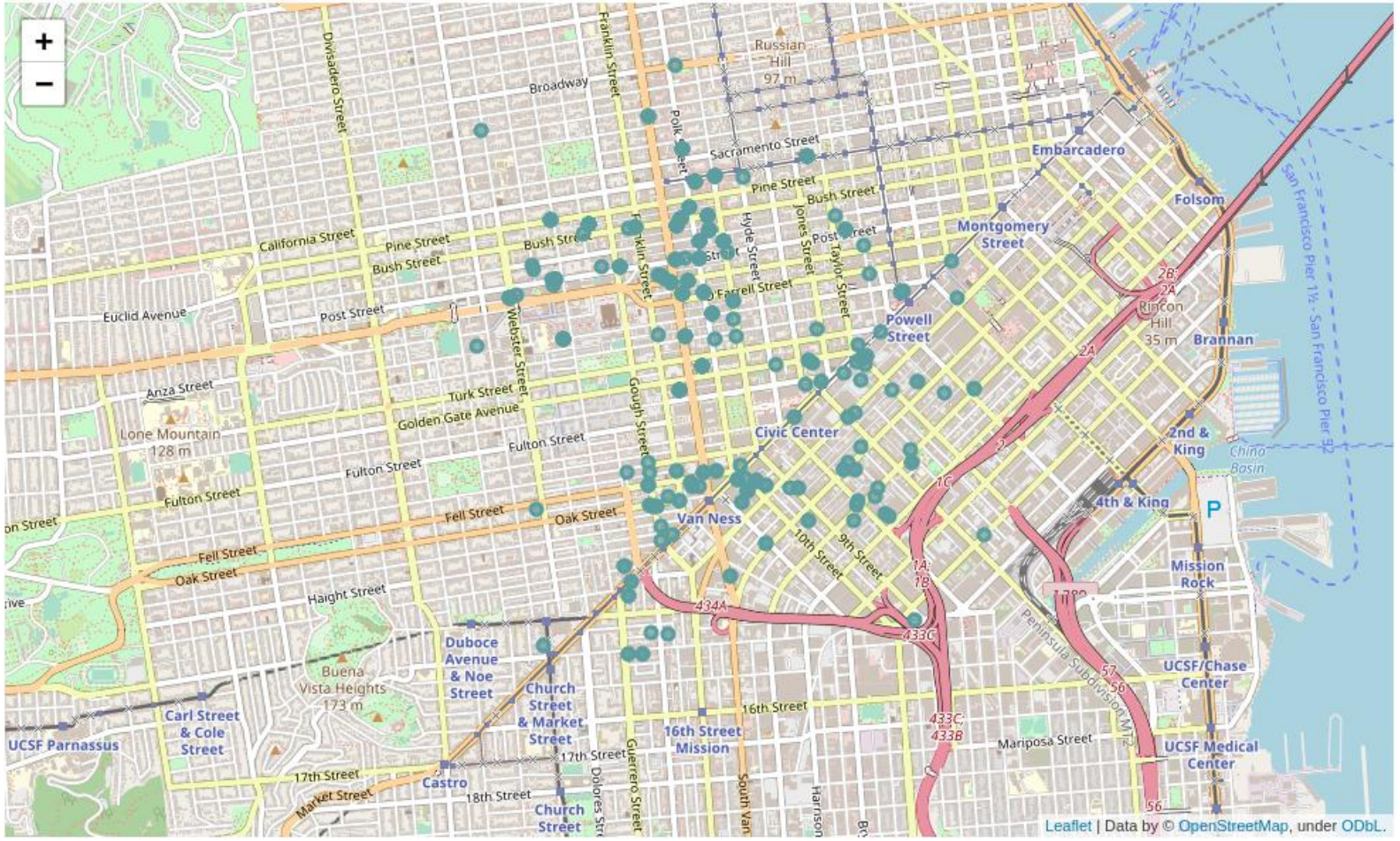
K-Means Algorithm (Grouped Result)



A little more clearer Cluster

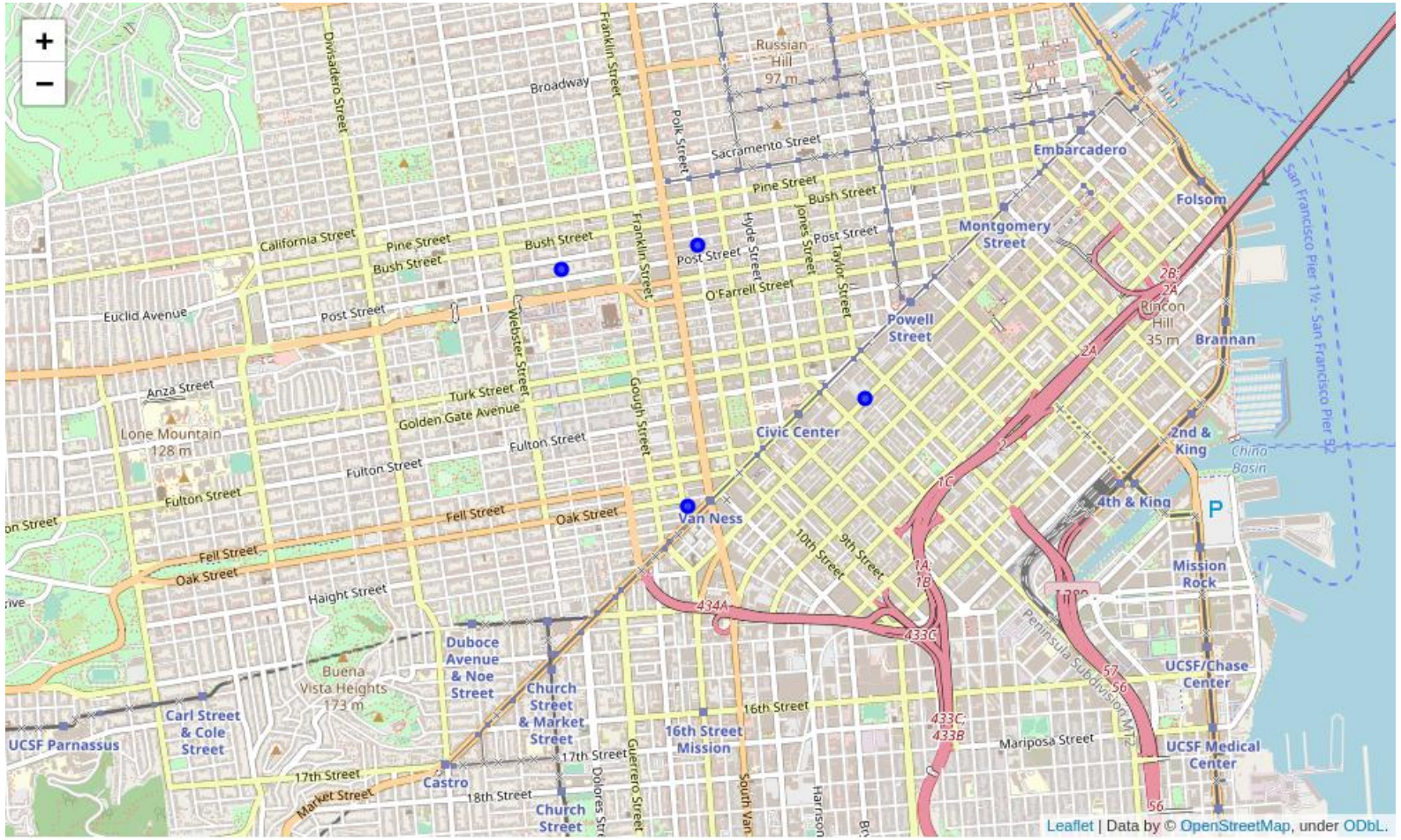
Now we have 4 possible points.

Our Data (what we had)



We now can see that, from these Location points we calculated and Formed Possible location points

Final Result (what we now have)



These poinst pose as Best Possible points that satisfies the previously said problems.

Final Result

Nearby Facilities and their Distances

	name	categories	lat	lng	distances_metres
0	California Skin Institute - San Francisco - No...	Hospital	37.789348	-122.417545	140.155565
1	Saint Francis Hospital Outpatient Registration	Hospital	37.789608	-122.416921	138.452522
2	SFMH Radiology	Hospital	37.789637	-122.416571	157.433378
0	Soko Gakuen Japanese Language School	Language School	37.788453	-122.426564	795.872803
1	Grace Cathedral	Church	37.791666	-122.413348	419.168993
2	Sips n Sews	School	37.788127	-122.419243	296.135904
0	Mymy Coffee Shop	Diner	37.790833	-122.419118	109.606637
1	Crostini And Java	Café	37.789111	-122.417099	177.781797
2	Swan Oyster Depot	Seafood Restaurant	37.790931	-122.420759	253.080523
0	Uforia Studios	Gym / Fitness Center	37.790441	-122.420148	196.878076
1	Core 40	Gym / Fitness Center	37.790700	-122.418967	93.578391
2	Krav Maga San Francisco	Gym / Fitness Center	37.788365	-122.421242	381.844228

AT Location 1
(Sample)

and so on . . .

Conclusion

I now conclude my Project, This project has shown how the Foursquare API is used to solve Problems based on Locations and Topology.

The Project presented 4 viable locations for building an Apartment Complex by satisfying the criteria previously set in the Introduction.

Below are the Websites that helped me along the way,

https://www.coursera.org/

https://stackoverflow.com/

https://pandas.pydata.org/

https://deparkes.co.uk/2016/06/10/folium-map-tiles/

https://labs.cognitiveclass.ai/