Restaurant Cuisine/Location Selector

INTRODUCTION

Venturing into the restaurant business is always risky. The risk is usually higher than other businesses. A crucial step in this business is to select the right location and to select the right cuisine.

Not every available space is right for a restaurant. A good restaurant location is harder to find than some people think. What may look like the perfect spot- say a busy pedestrian street in the heart of city- may turn out to be a dud. The location is an essential factor to consider while discussing how to start a restaurant business, as it can determine the success of your restaurant. While choosing your restaurant's location, it is a good idea to identify your competitor in that area and gauge their progress and understand their business model.

It is also very essential to select the right cuisine to ensure success in the business. A thorough examination of the competitors around a selected location should give a fair idea of the cuisine to select. Higher the competition, higher the risk.

AIM

The aim of this project is to help those venturing into this business to select the right location and cuisine for their restaurant in San Jose, the tech hub in California's Bay Area.

TARGET AUDIENCE

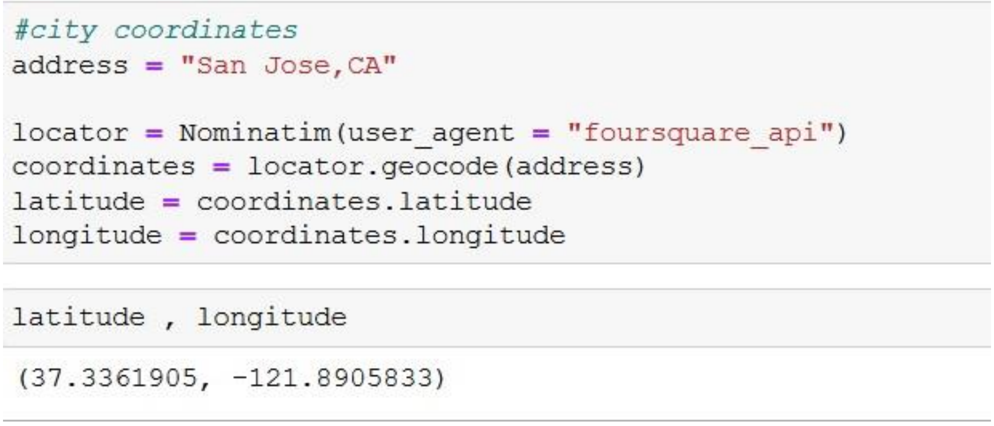
A important step in a restaurant business is choosing the location and cuisine. Anyone who is willing to step into the restaurant business but unclear about the location and cuisine to choose can use this project to come to a conclusion about the same.

DATA FOR RESTAURANT CUISINE/LOCATION SELECTOR

The sources data for the project are:

- FourSquareAPI for data on restaurants
- Geopy for translating address to coordinates

First, I used the Geopy to fetch the coordinates of the city (San Jose, CA)



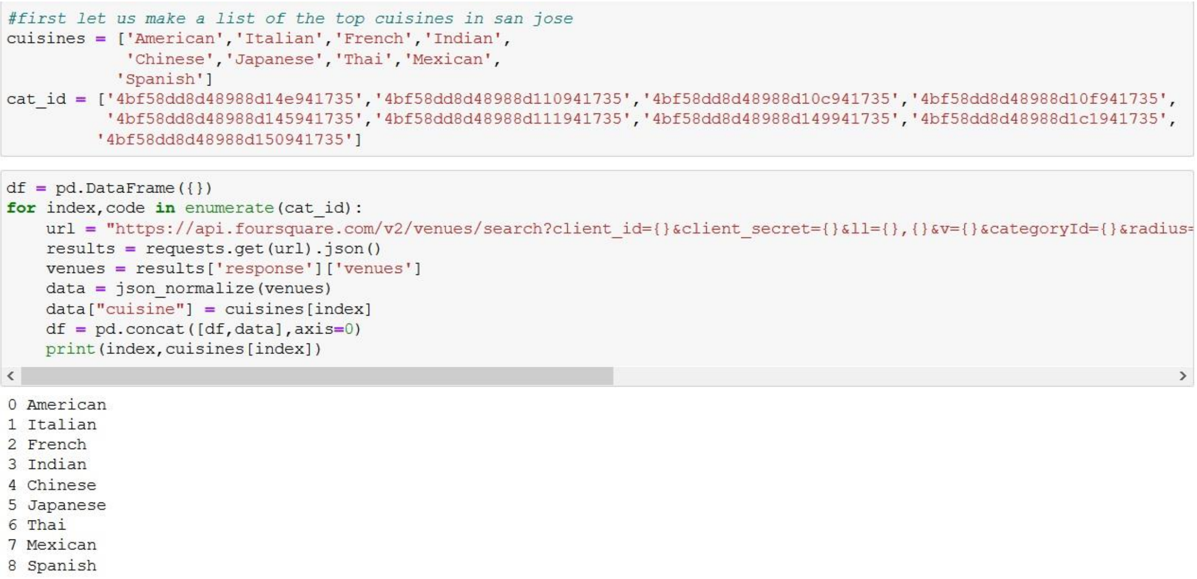
```
#city coordinates
address = "San Jose,CA"

locator = Nominatim(user_agent = "foursquare_api")
coordinates = locator.geocode(address)
latitude = coordinates.latitude
longitude = coordinates.longitude
```

```
latitude , longitude
```

```
(37.3361905, -121.8905833)
```

Then using the category code for each cuisine, I fetched the data for restaurants of each cuisine type.

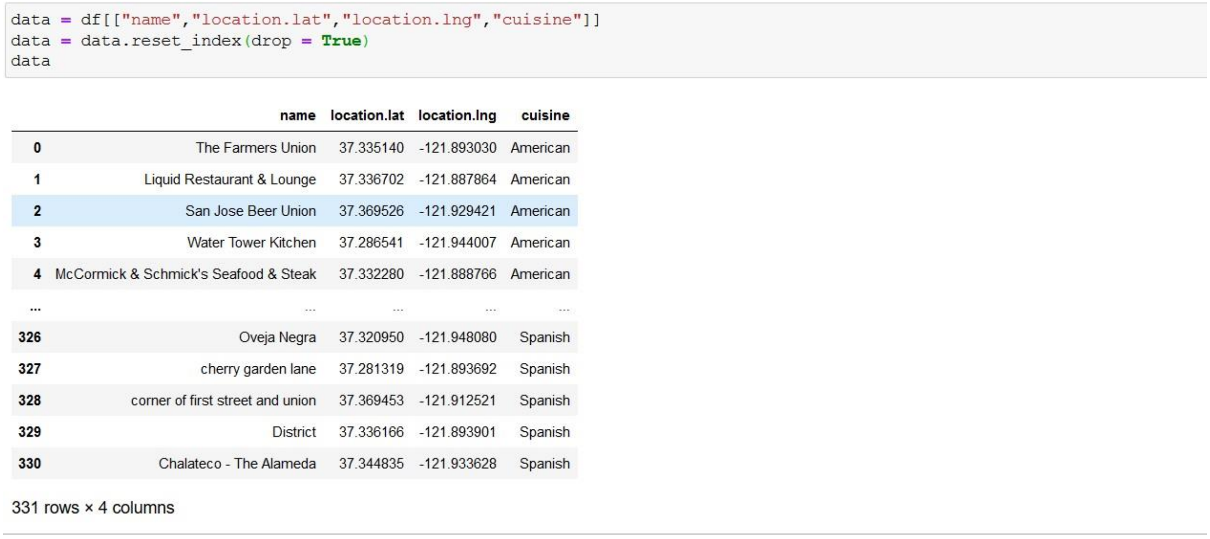


```
#first let us make a list of the top cuisines in san jose
cuisines = ['American','Italian','French','Indian',
            'Chinese','Japanese','Thai','Mexican',
           'Spanish']
cat_id = ['4bf58dd8d48988d14e941735','4bf58dd8d48988d110941735','4bf58dd8d48988d10c941735','4bf58dd8d48988d10f941735',
          '4bf58dd8d48988d145941735','4bf58dd8d48988d111941735','4bf58dd8d48988d149941735','4bf58dd8d48988d1c1941735',
         '4bf58dd8d48988d150941735']
```

```
df = pd.DataFrame({})
for index,code in enumerate(cat_id):
    url = "https://api.foursquare.com/v2/venues/search?client_id={}&client_secret={}&ll={},{}&v={}&categoryId={}&radius=
    results = requests.get(url).json()
    venues = results['response']['venues']
    data = json_normalize(venues)
    data["cuisine"] = cuisines[index]
    df = pd.concat([df,data],axis=0)
    print(index,cuisines[index])
```

```
0 American
1 Italian
2 French
3 Indian
4 Chinese
5 Japanese
6 Thai
7 Mexican
8 Spanish
```

Then I convert the json file to a DataFrame and filter out the required data from the data fetched.

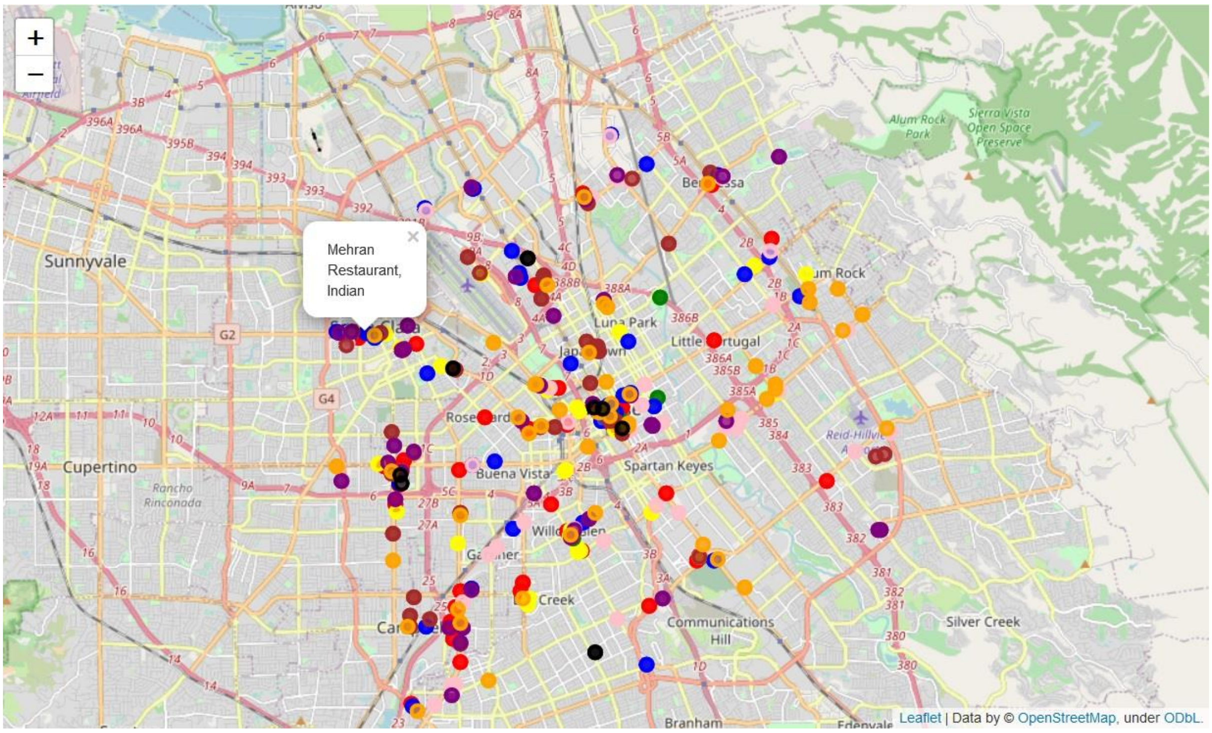


```
data = df[["name","location.lat","location.lng","cuisine"]]
data = data.reset_index(drop = True)
data
```

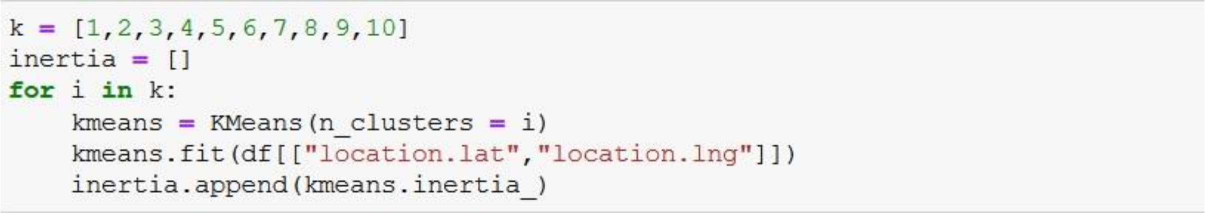
	name	location.lat	location.lng	cuisine
0	The Farmers Union	37.335140	-121.893030	American
1	Liquid Restaurant & Lounge	37.336702	-121.887864	American
2	San Jose Beer Union	37.369526	-121.929421	American
3	Water Tower Kitchen	37.286541	-121.944007	American
4	McCormick & Schmick's Seafood & Steak	37.332280	-121.888766	American
...	...	...	...	...
326	Oveja Negra	37.320950	-121.948080	Spanish
327	cherry garden lane	37.281319	-121.893692	Spanish
328	corner of first street and union	37.369453	-121.912521	Spanish
329	District	37.336166	-121.893901	Spanish
330	Chalateco - The Alameda	37.344835	-121.933628	Spanish

331 rows × 4 columns

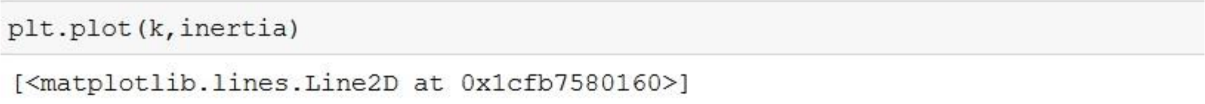
I then plot a map of the restaurants categorised based on the cuisines



Choose the right number of clusters using the elbow method

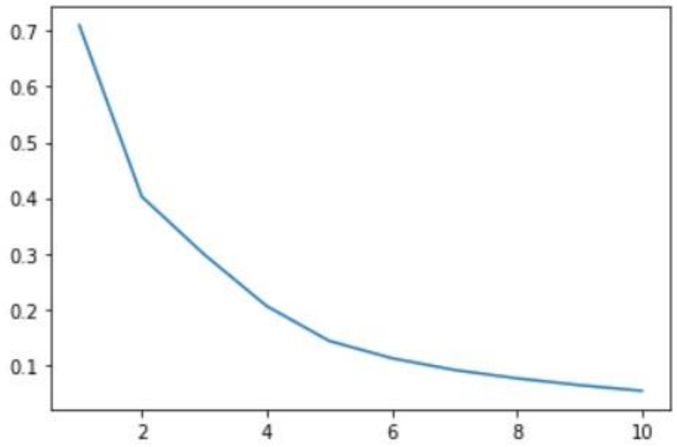


```
k = [1,2,3,4,5,6,7,8,9,10]
inertia = []
for i in k:
    kmeans = KMeans(n_clusters = i)
    kmeans.fit(df[["location.lat","location.lng"]])
    inertia.append(kmeans.inertia_)
```

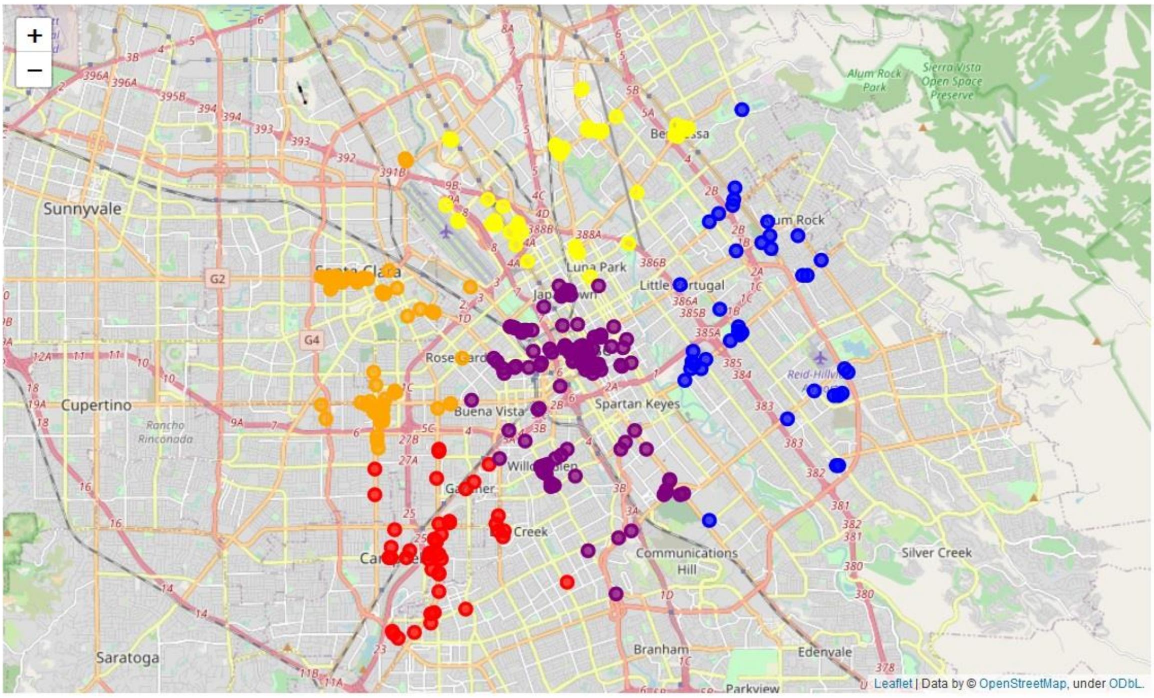


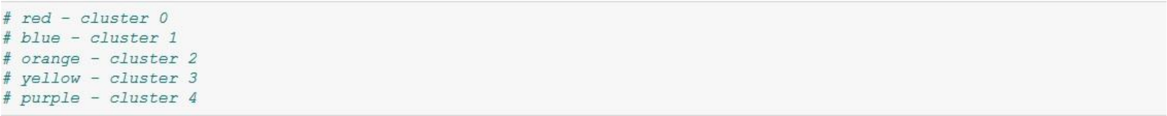
```
plt.plot(k,inertia)
```

```
[<matplotlib.lines.Line2D at 0x1cfb7580160>]
```



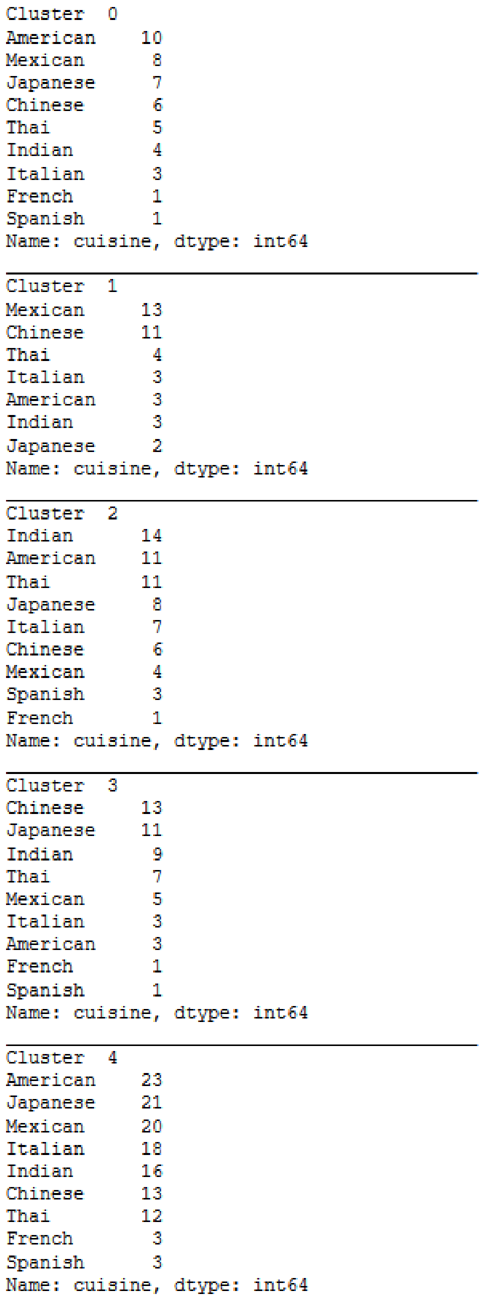
Choosing 5 clusters, plot a map of all the clusters





```
# red - cluster 0
# blue - cluster 1
# orange - cluster 2
# yellow - cluster 3
# purple - cluster 4
```

Information about cuisines per cluster



```
Cluster  0
American    10
Mexican      8
Japanese     7
Chinese      6
Thai         5
Indian       4
Italian      3
French       1
Spanish      1
Name: cuisine, dtype: int64

Cluster  1
Mexican     13
Chinese     11
Thai         4
Italian      3
American     3
Indian       3
Japanese     2
Name: cuisine, dtype: int64

Cluster  2
Indian      14
American    11
Thai        11
Japanese     8
Italian      7
Chinese      6
Mexican      4
Spanish      3
French       1
Name: cuisine, dtype: int64

Cluster  3
Chinese     13
Japanese    11
Indian       9
Thai         7
Mexican      5
Italian      3
American     3
French       1
Spanish      1
Name: cuisine, dtype: int64

Cluster  4
American    23
Japanese    21
Mexican     20
Italian     18
Indian      16
Chinese     13
Thai        12
French       3
Spanish      3
Name: cuisine, dtype: int64
```

We can select the least common cuisine and the cluster with lowest ratio of cuisine(x) restaurants : total restaurants.