Project Report

An Analysis of Restaurants in Paris, France
Based on their Types and Distance from the City Centre

By Ashish Dubey

1. **Introduction to the Identified Problem**. Paris – The Undisputed Culinary Capital of the World. It is certainly one of the best cities for food-culture in the entire Europe. There are abundant choices for various types of gourmet food in the city. There are also Michelin Star-chefs and Michelin star-restaurants. I have personally been to Paris on a number of occasions and have been amazed with the options available in the city. I always want to try out more. And I am sure, all tourists also would be hungry-for-more. One major problem that I have found is the distance of our places of residence in Paris to the locations of these fantastic restaurants. Therefore, I want to find out the correct distances, preferably from a central location, so as to make it easy for everyone and also so that I may be able to use it during my next visit and also share it with the community.

Figure 1 - Eiffel Tower along the River Seine

2. **Data**. I have used all knowledge that I have gained during the course on Coursera about how and where data for my project would be available. I have used the Foursquare API that I have learnt in one of the modules to extract the exact locations of all required destinations (i.e. restaurants) in Paris and I have then worked on it.

3. **Step-by-Step**. I will now take you step-by-step and also provide graphics where necessary to demonstrate how I arrived at my conclusion. I have undertaken following steps to solve the stated problem:-

(a) Firstly, I imported all required libraries (numpy, pandas, json, matplotlib, matplotlib colours, seaborne, folium etc) and installed them.

```
import numpy as np
import pandas as pd
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)
import json
from geopy.geocoders import Nominatim # convert an address into latitude and longitude values
import requests # library to handle requests
from pandas.io.json import json_normalize # tranform JSON file into a pandas dataframe
# Matplotlib and associated plotting modules
import matplotlib.cm as cm
import matplotlib.colors as colors
!pip install folium
import folium
!conda install -c conda-forge geopy --yes
print('All the necessary Libraries are imported.')
```

Figure 2 – Importing Required Libraries

(b) Then I obtained the geographical location of Paris (by calling the geolocator function).

(c) I then connected to the Foursquare API, using my credentials that I had established in an earlier module.

(d) I could then obtain a big list of restaurants in Paris, albeit arranged in a haphazard manner, as far as my requirement was concerned.

	categories	hasPerk	id	location.address	location.cc	location.city	location.country	location.crossStreet	location.distance	location.formattedAddress	locati
0	[{'id': '4bf58dd8d48988d10c941735', 'name': 'F...	False	50445ef7e4b0ba0a539ad83f	23 rue d'Arcole	FR	Paris	France	NaN	373	[23 rue d'Arcole, 75004 Paris, France]	[{'l 48
1	[{'id': '4bf58dd8d48988d10c941735', 'name': 'F...	False	4cbb05054352a1cd0d4396f5	1 rue de la Légion d'Honneur	FR	Paris	France	NaN	1950	[1 rue de la Légion d'Honneur, 75007 Paris, Fr...	[{'l 48
2	[{'id': '4bf58dd8d48988d10c941735', 'name': 'F...	False	4e2b2d0ad22d3f83c88c7029	12 passage Molière	FR	Paris	France	NaN	626	[12 passage Molière, 75003 Paris, France]	[{'l 48
3	[{'id': '4bf58dd8d48988d10c941735', 'name': 'F...	False	52cf091111d2d9bb920d6122	Hôtel Costes	FR	Paris	France	239 rue Saint-Honoré	2053	[Hôtel Costes (239 rue Saint-Honoré), Paris, F...	[{'l 48
4	[{'id': '4bf58dd8d48988d10c941735', 'name': 'F...	False	59ab059c86bc49021b313ca9	47 rue Berger	FR	Paris	France	NaN	895	[47 rue Berger, 75001 Paris, France]	[{'l 48

tput; double click to hide output

Figure 3 – Imported Raw Data

(e) I then filtered this raw data and got it in a format that would suit the data-frame of pandas.

	name	categories	address	cc	city	country	crossStreet	distance	formattedAddress	labeledLatLngs	lat	lng	neighborhood	postalCode	state	
0	Restaurant Aux Tours de Notre-Dame	French Restaurant	23 rue d'Arcole	FR	Paris	France	NaN	373	[23 rue d'Arcole, 75004 Paris, France]	[{'label': 'display', 'lat': 48.85362193008465...	48.853622	2.349421	NaN	75004	Île-de-France	50445ef7e4b0ba0a539ad
1	Le Restaurant du Musée d'Orsay	French Restaurant	1 rue de la Légion d'Honneur	FR	Paris	France	NaN	1950	[1 rue de la Légion d'Honneur, 75007 Paris, Fr...	[{'label': 'display', 'lat': 48.86029986248957...	48.860300	2.325392	NaN	75007	Île-de-France	4cbb05054352a1cd0d439
2	Le Restaurant des Poètes	French Restaurant	12 passage Molière	FR	Paris	France	NaN	626	[12 passage Molière, 75003 Paris, France]	[{'label': 'display', 'lat': 48.86232131013030...	48.862321	2.351590	NaN	75003	Île-de-France	4e2b2d0ad22d3f83c88c70
3	Restaurant Costes Saint-Honoré	French Restaurant	Hôtel Costes	FR	Paris	France	239 rue Saint-Honoré	2053	[Hôtel Costes (239 rue Saint-Honoré), Paris, F...	[{'label': 'display', 'lat': 48.86669789450374...	48.866698	2.327894	NaN	NaN	Île-de-France	52cf091111d2d9bb920d61
4	Restaurant Le Mona Lisa	French Restaurant	47 rue Berger	FR	Paris	France	NaN	895	[47 rue Berger, 75001 Paris, France]	[{'label': 'display', 'lat': 48.86219809159731...	48.862198	2.342542	NaN	75001	Île-de-France	59ab059c86bc49021b313c
5	Restaurant de l'Institut du Monde Arabe.	Middle Eastern Restaurant	1 rue des Fossés Saint-Bernard	FR	Paris	France	Institut du Monde Arabe	963	[1 rue des Fossés Saint-Bernard (Institut du M...	[{'label': 'display', 'lat': 48.84881796195433...	48.848818	2.356911	NaN	75005	Île-de-France	4bd1e55c9854d13a2c79fa
6	Restaurant Au 35	French Restaurant	91 rue La Boétie	FR	Paris	France	NaN	1343	[91 rue La Boétie, 75008 Paris, France]	[{'label': 'display', 'lat': 48.85568519411101...	48.855685	2.333184	NaN	75008	Île-de-France	4d4960ae9544a09370bb27
7	Restaurant 58 Tour Eiffel	French Restaurant	5 avenue Anatole France	FR	Paris	France	Tour Eiffel, 1er étage	4194	[5 avenue Anatole France (Tour Eiffel, 1er éta...	[{'label': 'display', 'lat': 48.85836582402155...	48.858366	2.294249	NaN	75007	Île-de-France	4e078807e4cdefcff6dce
8	Restaurant Le Meurice Alain Ducasse	French Restaurant	228 rue de Rivoli	FR	Paris	France	Hôtel Le Meurice	1963	[228 rue de Rivoli (Hôtel Le Meurice), 75001 P...	[{'label': 'display', 'lat': 48.86529145109384...	48.865291	2.328056	NaN	75001	Île-de-France	4adcda13f964a520e53621
9	Restaurant	Restaurant	Hotel	FR	Paris	France	4 rue	1201	[Hotel Little Palace	[{'label': 'display', 'lat':	48.867286	2.353741	NaN	75009	Île-de-	

Figure 4 – Filtered Data

(f) Using folium (that I had already imported and installed in step 1), I could generate a map of Paris.

Figure 5 – Map of Paris

(g) Then I moved on to highlighting all restaurants in Paris, using Red color.

Figure 6 – Map of Paris depicting Restaurants

(h) I could then obtain the types of restaurants in Paris, along with their specific types.

	categories	Frequency
0	French Restaurant	21
1	Restaurant	4
2	College Cafeteria	3
3	Middle Eastern Restaurant	2
4	Turkish Restaurant	2
5	Vietnamese Restaurant	2
6	Szechuan Restaurant	2
7	Japanese Restaurant	2
8	Italian Restaurant	1
9	Chinese Restaurant	1

Figure 7 – Restaurants in Paris

(i) I then used appropriate codes to obtain distances of these restaurants from the centre, as was required for my solution.

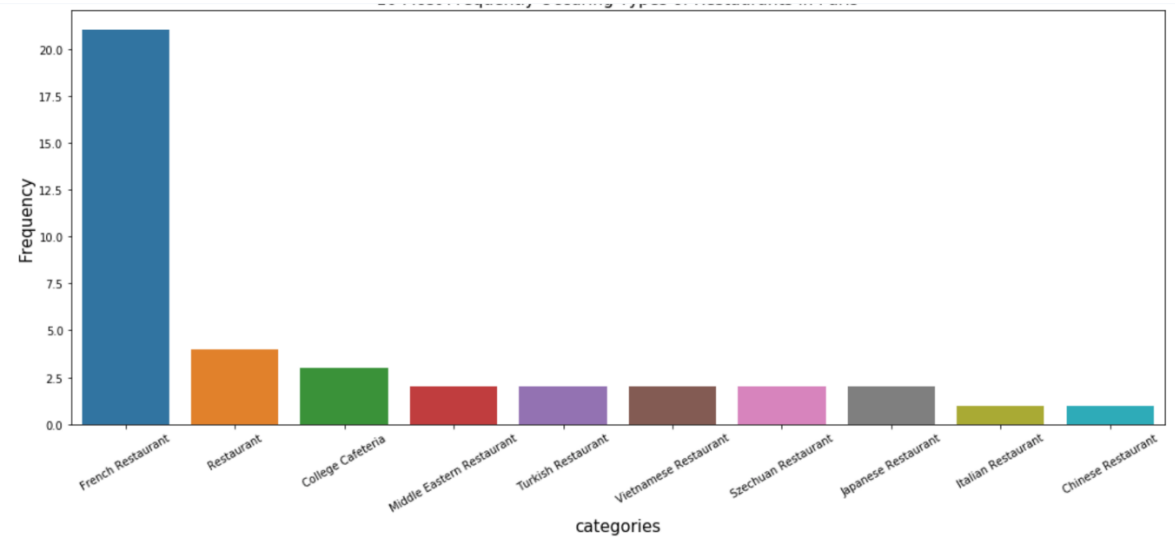

Figure 8 – Distances from Centre

(j) Now, instead of giving out this generic information, I wanted to provide a tangible output for the project. Therefore, I went ahead and selected only the top 10 restaurants and their distance.

	index	name	categories	distance
32	32	Hôtel de Ville de Paris (Hôtel de ville de Paris)	City Hall	71
17	17	Restaurant Viet	Vietnamese Restaurant	131
36	36	Restaurant Shiso	Japanese Restaurant	330
		and output; double click to hide output x Tours de Notre-Dame	French Restaurant	373
33	33	Restaurant Istamboul	Sandwich Place	396
49	49	Jaja Restaurant 3 Rue Sainte-Croix	Restaurant	443
18	18	Restaurant Jardin Notre-Dame	French Restaurant	573
42	42	Restaurant Les Degrés de Notre Dame	French Restaurant	603
2	2	Le Restaurant des Poètes	French Restaurant	626
40	40	Restaurant AT	Japanese Restaurant	820

Figure 9 – Top 10 Restaurants by Name and Distance

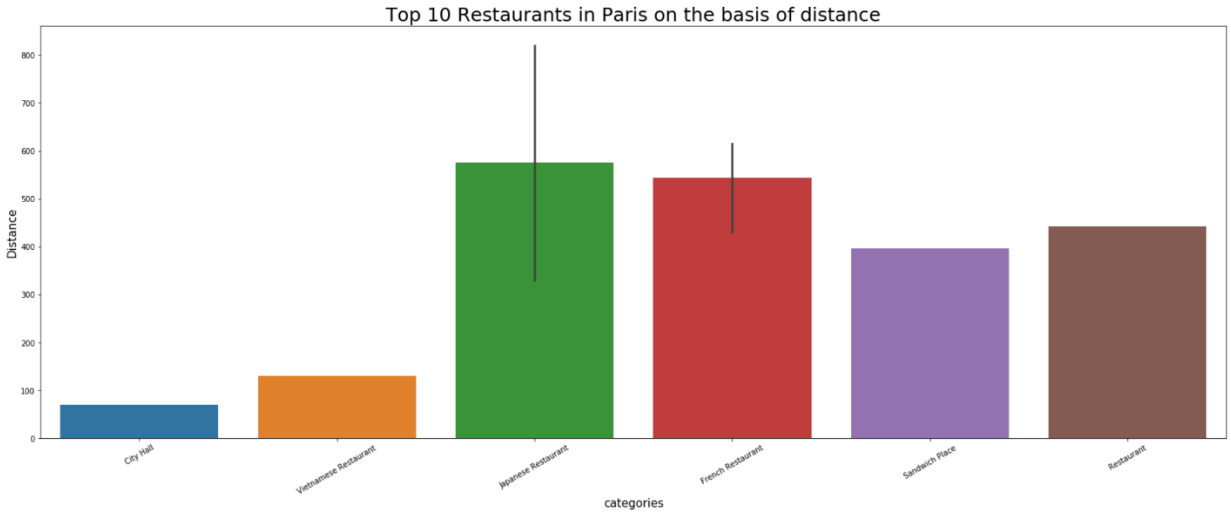

Figure 10 – Types of Restaurants by Distance

4. **Conclusion**. Whenever I visit any new country, where to stay and where to eat are always issues in front of me. I am sure, it is the same for maximum tourists. Here, I have focussed on the where to eat part of the issue. I am certain that every tourist would like to have such information at hand so as to use his time and, more importantly, his money in an optimal manner. Comparing the two bar-graphs, this looks more user friendly. It can be ascertained that Vietnamese, Japanese, French and Sandwich Place are the most suitable restaurants, based on distance from the centre, in Paris.