Capstone Project: Battle of the Neighborhoods (Week 2)¶

Applied Data Science Capstone by IBM/Coursera¶ Table of contents¶

Introduction: Business Problem ¶

In this project we will try to find an **optimal location for an art gallery**. Specifically, this report will be targeted to stakeholders interested in opening an **art gallery in Paris, France**.

Since there are lots of art galleries in Paris we will try to detect locations that are not already crowded with art galleries. We are also particularly interested in areas with no sculpture galleries in vicinity. We would also prefer locations as close to the city centre.

We will use our data science powers to generate a few most promising neighborhoods based on this criteria. Advantages of each area will then be clearly expressed so that best possible final location can be chosen by stakeholders.

Data ¶

Based on definition of our problem, factors that will influence our decision are:

- number of existing art galleries in the neighborhood
- distance of neighborhood from city center

We decided to use regularly spaced grid of locations, centered around city center, to define our neighborhoods.

Following data sources will be needed to extract/generate the required information:

- mapping and consolidation of location data features will be done using **Folium**
- number of art galleries and their type and location in every neighborhood will be obtained using **Foursquare API**

Methodology ¶

In this project we will direct our efforts on detecting areas of Paris that have low restaurant density, particularly those with low number of Italian restaurants. We will limit our analysis to area ~5km around city center. In first step we have collected the required data: location of every art gallery within 5km from Paris center. We identify the Paris center to be the area around the Louvre museum(also called the 1st Arrondissement). We believe that this is the optimal centerpoint because it is where the majority of tourists spend most of their time. This is of particular interest for the stakeholders since it increases their chances of maximizing their revenue.

Second step in our analysis will be calculation and exploration of 'art gallery density' across different areas of Paris - we will use heatmaps to identify a few promising areas close to center with low number of art galleries in general and focus our attention on those areas.

In third and final step we will focus on most promising areas and within those create clusters of locations that meet some basic requirements established in discussion with stakeholders: we will take into consideration locations with no more than three restaurants in radius of 300 meters. We will present map of all such locations but also create clusters (using k-means clustering) of those locations to identify general zones / neighborhoods / addresses which should be a starting point for final 'street level' exploration and search for optimal venue location by stakeholders.

Due to an error with javascript in watson studio, the map generated with folium cannot be shown in the notebook. This is a similar map from Google for reference:
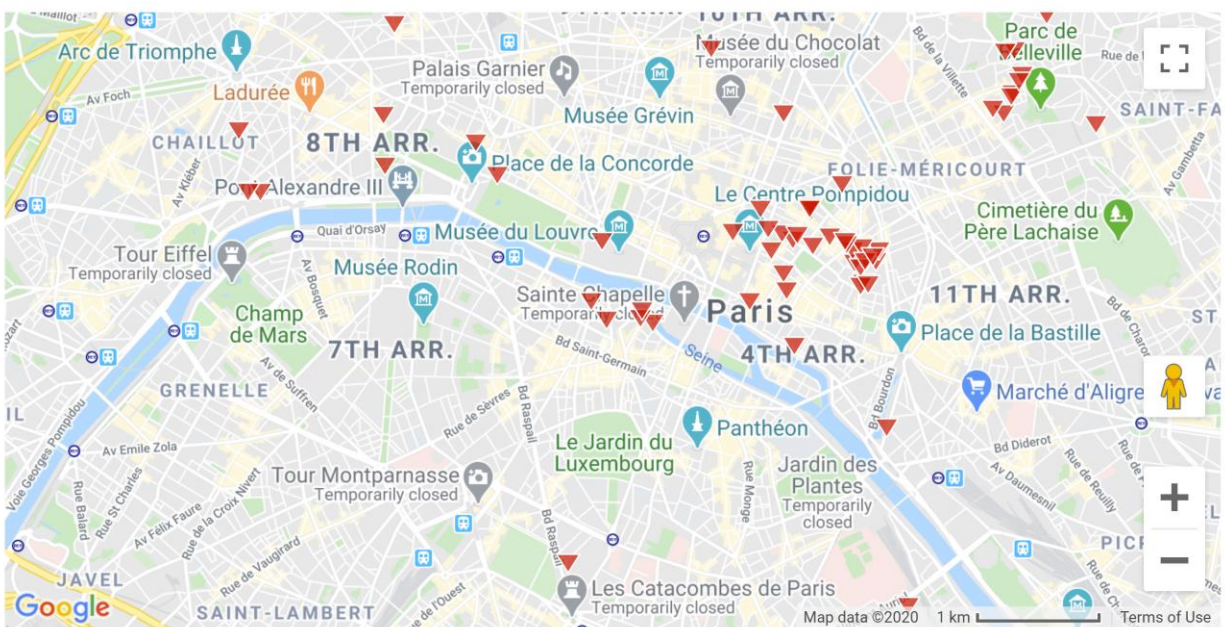
Analysis ¶

Let's perform some basic explanatory data analysis and derive some additional info from our raw data.
First let's count the number of art galleries in the key area:

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Average number of art galleries in every area with radius=300m: 17.0
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Out[69]:

	name	categories	address	cc	city	country	distance	formattedAddress	labeledLatLngs	lat	lng	postalCode	state	id
0	Galerie d'Art Primitif Africain Art Gal...	Art Gallery	41 rue de Verneuil	FR	Paris	France	993	[41 rue de Verneuil, 75007 Paris, France]	[{'label': 'display', 'lat': 48.857997, 'lng':...	48.857997	2.328082	75007	Île-de-France	4cab440436fa6dcb2f6cd778
1	Art Concorde	Art Gallery	36 rue de Penthièvre	FR	Paris	France	991	[36 rue de Penthièvre, 75008 Paris, France]	[{'label': 'display', 'lat': 48.87225903355606...	48.872259	2.313298	75008	Île-de-France	4c9b951680958cfa47fe4cd4
2	Bolotina Art Gallery	Art Gallery	21 rue	FR	Paris	France	778	[21 rue, Paris, France]	[{'label': 'display', 'lat': 48.86632587291662...	48.866326	2.334102	NaN	Île-de-France	5236fcf2498e2893fd02b918
3	BJ Art Gallery	Art Gallery	45 rue de Penthièvre	FR	Paris	France	986	[45 rue de Penthièvre, 75008 Paris, France]	[{'label': 'display', 'lat': 48.87227, 'lng':...	48.872270	2.313395	75008	Île-de-France	50ae6a6be4b0bcea5ca90981
4	Prince & Princess Art Gallery	Art Gallery	96 rue de Grenelle	FR	Paris	France	1157	[96 rue de Grenelle, 75007 Paris, France]	[{'label': 'display', 'lat': 48.85599899291992...	48.855999	2.322671	75007	Île-de-France	533720c9498e8f2e48cc9e5f
5	Alwane Art Gallery	Art Gallery	8 rue Milton	FR	Paris	France	1758	[8 rue Milton, 75009 Paris, France]	[{'label': 'display', 'lat': 48.87732378451565...	48.877324	2.340793	75009	Île-de-France	4c194296838020a13a72e561
6	A2Z Art Gallery	Art Gallery	24 rue de l'Échaudé	FR	Paris	France	1680	[24 rue de l'Échaudé, 75006 Paris, France]	[{'label': 'display', 'lat': 48.853578, 'lng':...	48.853578	2.335615	75006	Île-de-France	57e15202498eee71d3f97f8a
7	Paris Art Gallery	Art Gallery	67 avenue de Breteuil	FR	Paris	France	2216	[67 avenue de Breteuil, 75007 Paris, France]	[{'label': 'display', 'lat': 48.847894, 'lng':...	48.847894	2.312242	75007	Île-de-France	57b6ea0c498e3f2ad319159c
8	In)(between Art Gallery	Art Gallery	39 rue Chapon	FR	Paris	France	2192	[39 rue Chapon, 75003 Paris, France]	[{'label': 'display', 'lat': 48.8657, 'lng': 2...	48.865700	2.353400	75003	Île-de-France	55e88e33498e4f14ce62c7d7
9	International Art Gallery	None	78 avenue de Suffren	FR	Paris	France	2378	[78 avenue de Suffren, 75015 Paris, France]	[{'label': 'display', 'lat': 48.8519123, 'lng'...	48.851912	2.299590	75015	Île-de-France	55e2650b498e2abd1bc307bb
10	Democratik-art Gallery	Art Gallery	17 rue François Miron	FR	Paris	France	2742	[17 rue François Miron, 75004 Paris, France]	[{'label': 'display', 'lat': 48.85564530114246...	48.855645	2.357170	75004	Île-de-France	4c629f9f4b5176b033d20517
11	French Paper Art Gallery	Art Gallery	51 rue Volta	FR	Paris	France	2553	[51 rue Volta, 75003 Paris, France]	[{'label': 'display', 'lat': 48.867194, 'lng':...	48.867194	2.358324	75003	Île-de-France	55b122dd498e7e70c616cf67
12	No Man's Art Gallery	Art Gallery	NaN	FR	NaN	France	3047	[France]	[{'label': 'display', 'lat': 48.86184285488514...	48.861843	2.364511	NaN	NaN	4f6927eee4b07dcd55ac70a4
13	In)(between Art Gallery	Art Gallery	3 Rue Saint Anastase	FR	Paris	France	3079	[3 Rue Saint Anastase, Paris, France]	[{'label': 'display', 'lat': 48.85952815161378...	48.859528	2.364214	NaN	Île-de-France	519cf821498e2470b94d61b2
14	Lowave - art gallery	Art Gallery	8, rue Alphonse Baudin	FR	Paris	France	3541	[8, rue Alphonse Baudin, 75011 Paris, France]	[{'label': 'display', 'lat': 48.86047281483945...	48.860473	2.370987	75011	Île-de-France	50125b15c84c561e8cb6eb54
15	printmodel art gallery	Art Gallery	NaN	FR	NaN	France	4666	[France]	[{'label': 'display', 'lat': 48.84551, 'lng':...	48.845510	2.378723	NaN	NaN	55118363498e75ba7458679d
16	Joel Knafo Art Gallery	Art Gallery	146, boulevard Vincent Auriol	FR	Paris	France	4605	[146, boulevard Vincent Auriol, 75013 Paris, F...	[{'label': 'display', 'lat': 48.83269515561537...	48.832695	2.359962	75013	Île-de-France	53270325498eb8b519cd77f

Results and Discussion ¶

We can see that, according to Foursquare data, the small number of art galleries found in the key area
(5km within the Louvre) means that our stakeholders will not be faced with overwhelming competition.
This is true no matter where they may choose to open their art gallery, since only 17 such galleries exist
in the area that concerns them.

Conclusion ¶

In conclusion, the project has found valuable information for the stakeholders. They had expected a very
high number of art galleries to be found in the area most tourists visit when they go to Paris, but instead
they found a very low number of competitors.

This means they are likely to be successful in their business.