

Value of the research

Opening a restaurant in Paris could be a good business in case a proper niche and location are found

Paris has a lot of different food spots but it seems there is a lack of venues to have a proper American-style breakfast with eggs

Analysis of existing breakfasting spots and in particular egg-serving breakfasting spots can:

- give an idea whether opening another one is a good investment
- help to find best candidate locations for it

Data acquisition, transformation and cleaning

Venue titles, addresses, categories, coordinates, tip texts and ratings as well as nearby venues scraped from Foursquare API [<https://developer.foursquare.com/docs/api-reference/>].

Some additional information particularly on egg-serving breakfasting places is taken from Foursquare's "The 15 Best Places for Eggs in Paris" list [<https://foursquare.com/top-places/paris/best-places-eggs>].

The total number of food spots is taken from World Cities Culture Forum [<http://www.worldcitiescultureforum.com/data/number-of-restaurants>] and total number of breakfasting spots from Foursquare App.

Paris Open Data [<https://opendata.paris.fr/explore/dataset/arrondissements/table/>] provided Paris and its neighborhoods coordinates.

17 egg-serving breakfasting spots have been found, their neighborhoods have been described by 411 venues of 112 categories. Number of nearby venues categories taken as feature for neighborhood profiling have been reduced to 25 by replacing less frequent of them by their immediate or top level parents

There is a niche for yet another egg-serving breakfasting place

	total number	% in breakfast spots	% in restaurants
Restaurants	44896	NaN	100.000000
Breakfast spots	120	100.000000	0.267284
Egg serving Breakfast spots	17	14.166667	0.037865

Mean venue rating have been taken to evaluate popularity of existing egg-places, since no other options could be used due to the limitation of Foursquare API free version

- Only 0.27 % of total number of food points in Paris are mentioned as serving breakfasts
- Around 14% of them serve eggs (0.04% from total food point number)
- Those spots are popular: mean rating is ~8.5

It could make sense to open yet another egg-serving breakfasting place

Egg-spot neighborhoods are grouped in 3 clusters based on nearby venues categories' occurrences

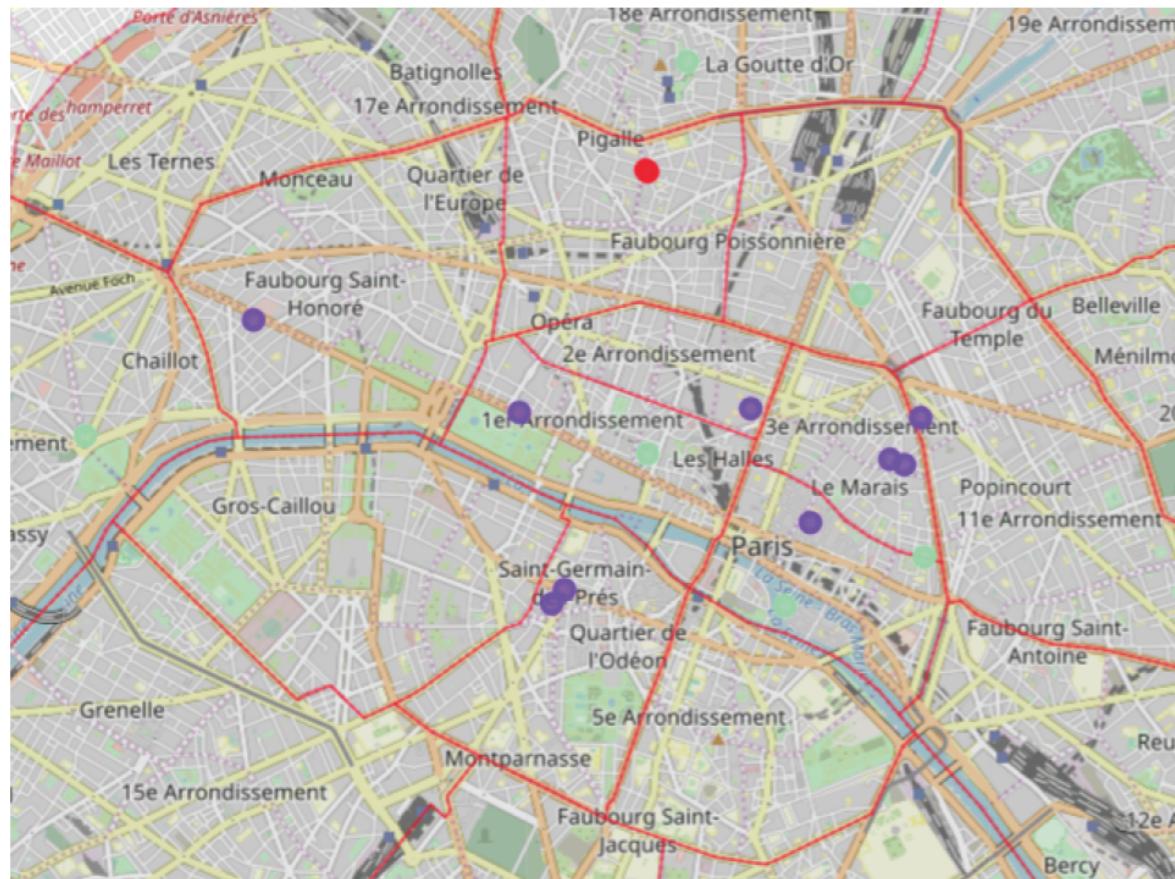


Figure 2: Map of existing egg-serving breakfasting points in Paris clustered according their neighborhood profiles

egg place venue id	egg place venue name	categories	cluster label
5293ae7d11d2fba382d9f652	Benedict	French Restaurant	1
4b1411c6f964a520c09c23e3	Le Saint-Régis	Bistro	2
53f32591498e1cd3c3ec2555	Holybelly 19	Breakfast Spot	2
4adcda14f964a5203a3721e3	Carette	Tea Room	2
5116b70ce4b0d096ad258d22	Le Mary Céleste	Cocktail Bar	1
4adcda04f964a520323221e3	Café de Flore	Café	1
4adcda12f964a520543621e3	Angelina	Tea Room	1
4bc5e23151b376b0ce8e1a6f	Ladurée	Pastry Shop	1
4b8a4680f964a520a76632e3	Les Bonnes Sœurs	French Restaurant	2
583025d07ff1e43c19cd8599	Biglove Caffè	Italian Restaurant	1
4cc9f623b878a093404b799a	Eggs & Co	French Restaurant	1
53037fbb498e6f8b7ada68a3	Café Marlette	Breakfast Spot	0
4de77728e4cdfedb8a9dad41	Claus - La table du petit-d	Breakfast Spot	2
524fef8411d29554626d9a1a	Le Pain Quotidien	Breakfast Spot	0
5710c77a498e3021c0641aa9	Hardware Société	Breakfast Spot	2
4b8a5057f964a520146832e3	Twinkie Breakfasts	Breakfast Spot	1
531499ec11d2a01b87e9e3a3	Paperboy	Breakfast Spot	1

Table 8: Egg-serving breakfasting spots clusters

cluster label	number of datapoints	descriptive characteristics
0	2	relatively fast eating spots
1	9	clothing stores, bars, shops
2	6	french restaurants, other food points

Table 10: Egg-serving breakfasting places neighborhood clusters descriptions

2.177 Paris grid points have been profiled based on nearby venues categories' occurrences

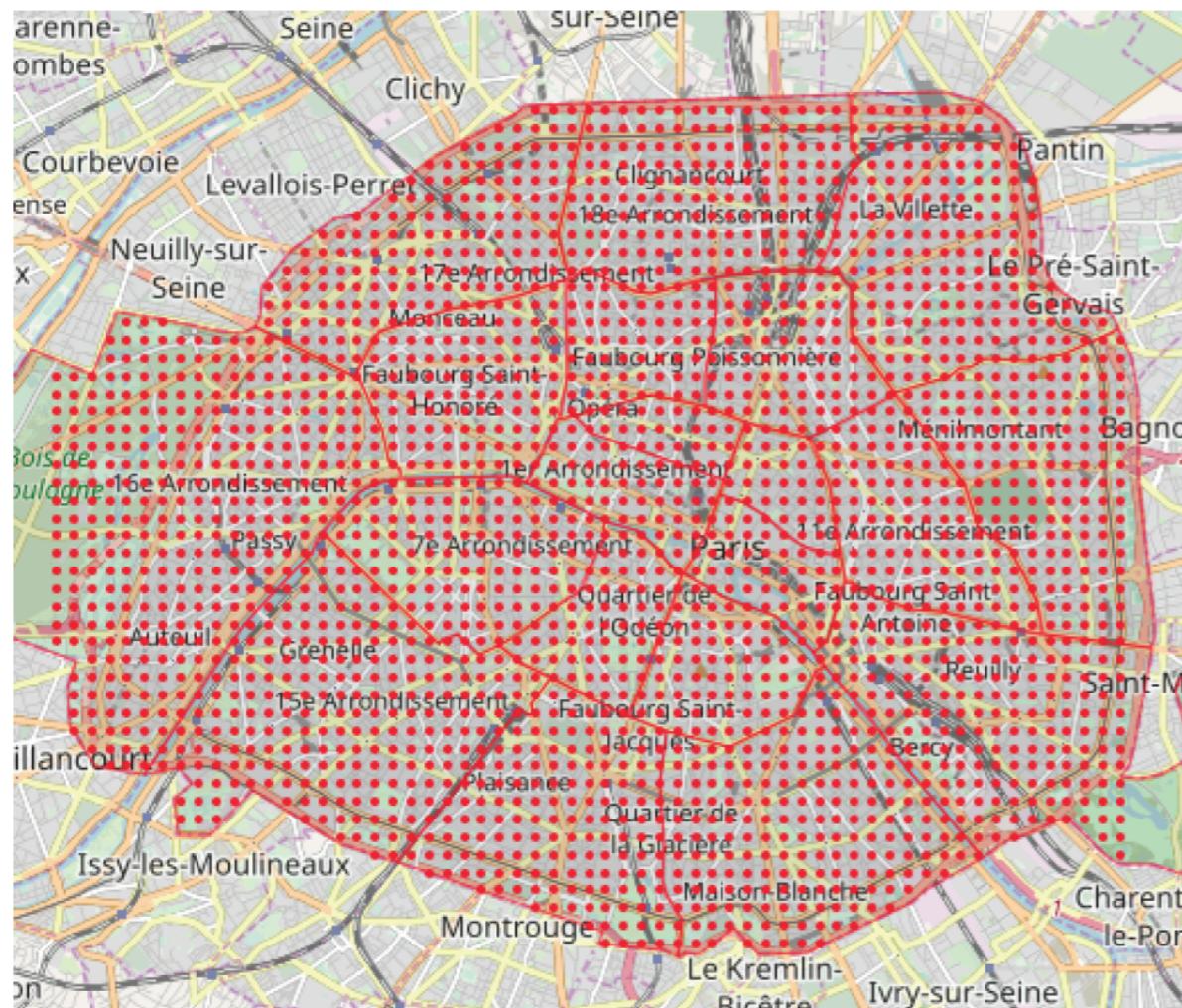


Figure 3: 300 m coordinate grid of 2.345 points displayed on Paris map

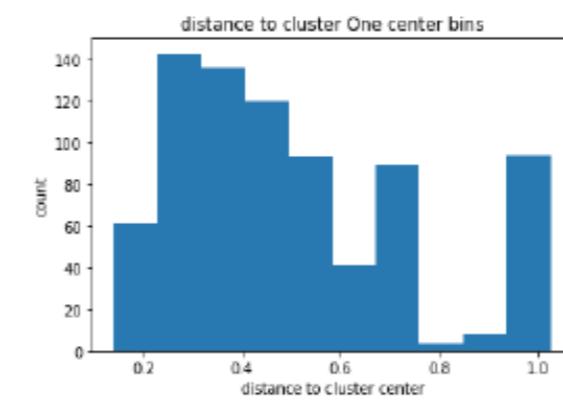
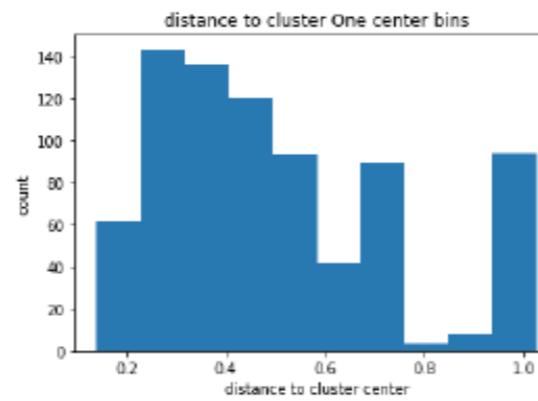
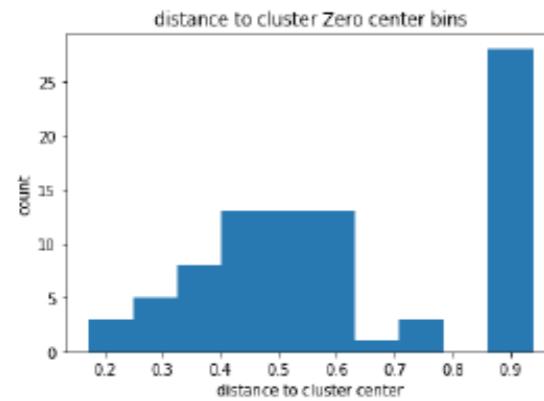
point index	closest cluster index	distance to cluster center
0	2	0.357567
1	1	0.991687
9	2	0.816250
10	2	0.816250
12	2	0.998388

Table 11: Examples of candidate grid points to be attributed to one of 3 clusters

cluster label	number of candidate grid points
0	87
1	788
2	1302

Table 12: The breakdown of candidate grid points by clusters

14 of Paris grid points have been selected as falling into one of 3 clusters



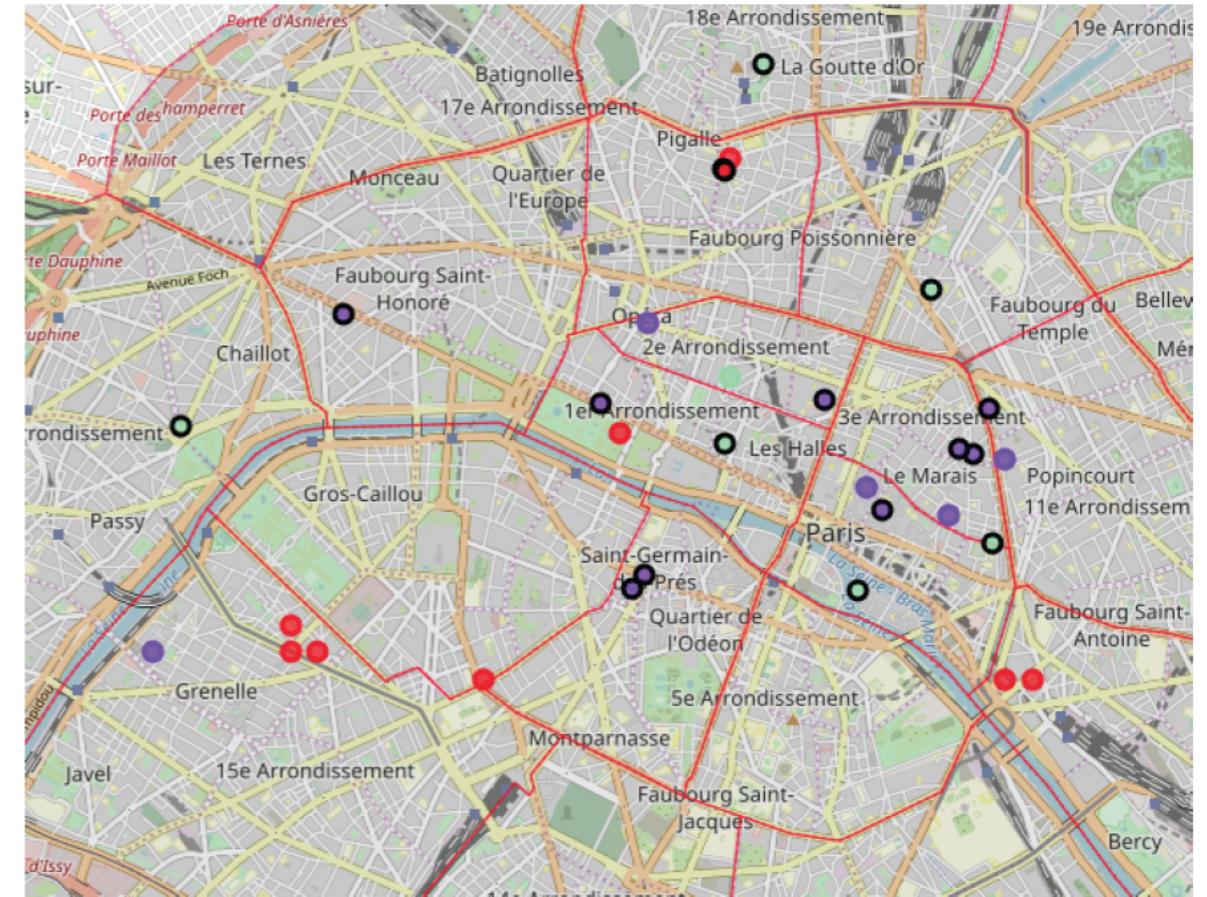
cluster label	distance to cluster center
0	0.324383
1	0.164253
2	0.147337

Table 13: Maximum distances to cluster centers to fall into corresponding cluster

Figures 4 (a, b, c): Distribution of distances to closest cluster center for candidate grid points

point index	closest cluster index	distance to cluster center	lon	lat
508	0	0.315592	2.297973	48.848990
509	0	0.214822	2.297973	48.850763
545	0	0.243628	2.300668	48.848990
790	0	0.320684	2.316838	48.847216
1027	0	0.318689	2.330312	48.863175
1229	0	0.173273	2.341092	48.880901
1688	0	0.318689	2.368042	48.847216
1735	0	0.313880	2.370737	48.847216
336	1	0.161974	2.284498	48.848990
1079	1	0.150637	2.333007	48.870266
1456	1	0.145813	2.354567	48.859629
1599	1	0.144165	2.362652	48.857856
1696	1	0.140671	2.368042	48.861402
1221	2	0.128865	2.341092	48.866721

Table 14: List of 14 candidategrid points falling into one of 3 clusters

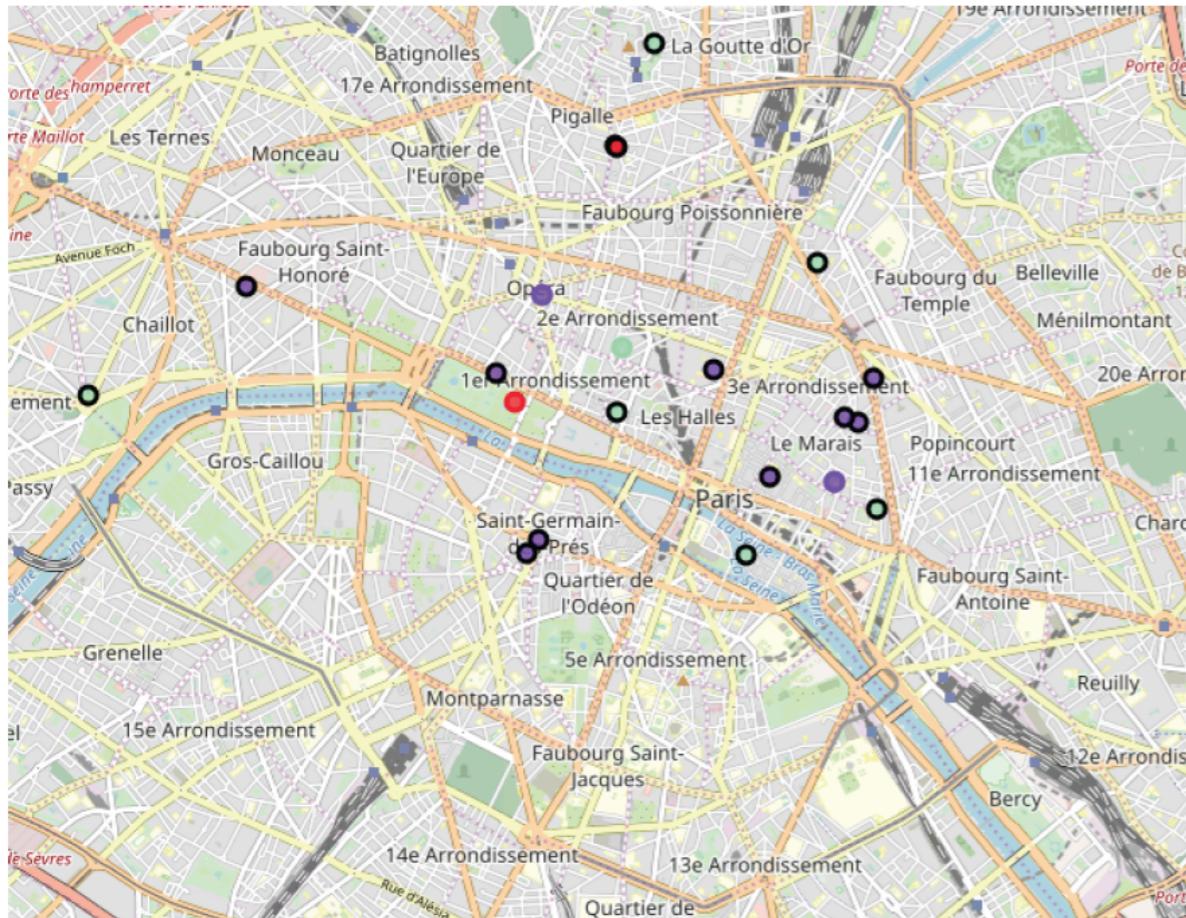


Figures 5: Distribution of 14 candidate grid points on Paris map (existing egg-spots have black border)

4 final candidate points have been found based on the distance from city center and already existing egg-serving spots

point index	closest cluster index	lon	lat	distance from louvre (m)	distance from nearest existing egg place (m)
1027	0	2.330312	48.863175	875.0	385.0
1079	1	2.333007	48.870266	1596.0	1013.0
1599	1	2.362652	48.857856	2843.0	571.0
1221	2	2.341092	48.866721	986.0	723.0

Table 15: Final list of candidate points to examine their neighborhoods for opening a new egg-serving breakfasting spot



< 3000 m from Louvre
> 300 m from existing egg-serving spot

Figures 6: Distribution of final 4 candidate grid points on Paris map (existing egg-spots have black border)

Conclusion and future directions

It makes sense to open yet another egg-serving breakfasting place in Paris since they are popular and not wide spread

4 candidate points have been found, characterized by:

- similar neighborhoods as existing egg-breakfasting points (in terms of mean occurrences of nearby venues categories)
- proximity to city center (less than 3000 m from Louvre)
- farness from already existing egg-breakfasting points (more than 300 m away)

Accuracy of models has room for improvement:

- More features to evaluate popularity
- Reduction of number of features for clustering by finding correlations between independent variables
- Absence of particular nearby venues' categories can be also used as clustering feature