Where to open a restaurant in Prague

by

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INTRODUCTION

Prague is widely recognized as one of the most beautiful city in Europe. It is also a highly appreciated tourisitc destination. As a result, many restaurants have appear in the last years. However, the city is continuously growing and the customers are hungry for more quality food.

Along this growth of the potential customer base, comes the growth in readiness to spend the money. Between 2008 and 2018, the Household consumption expenditure on restaurants and hotels in the Czech Republic has increased by 60%!

Therefore, investors and business owners could be interested in opening a new restaurant in the capital. The question of location is obviously one of the main aspect of this decision.

In this project, I will attempt to bring help with this decision by analyzing the neighborhoods of Prague.

DATA

To help define the best neighborhood to open a new restaurant, I will first list Prague's neighborhood from the following Wikipedia page (https://cs.wikipedia.org/wiki/Seznam_katastr%C3%A1ln%C3%ADch_%C3%BAzem%C3%AD_v_Praze). The page, in Czech language, provides a table with all the neighborhoods, the respective populations in 2001, 2011 and 2014, the surface covered by the neighborhood and its density of population.

Then retrieve the venues from the FourSquare API to check the restaurants already in place. I retrieved a total of 82 entries.

Further, I will compare the density of population provided in the first Wikipedia page as well.

And finally, I will look at the location of the main touristic attractions, focusing on the cultural monuments listed in another Wikipedia page. This page, in Czech language as well, provides a table listing the national monuments for the whole country as well as its official number in the register of national monument, its location (for Prague, the neighborhood), its name, the "county" where it can be found, the date of discovery, a photo and a link to its Wikipedia page.

## METHODOLOGY

Prague's Neighborhoods

First I retrieve a list of Prague's neighborhood from the Wikipedia page, for now I only keep the name of the neighborhoods and drop the other columns. I standardize the names using Unidecode to remove the accents that would not be displayed appropriately in the maps. I also retrieve the latitude and longitude of each neighborhood using a geocoder named OpenCage.

Here the resulting dataframe:

	Neighborhood	latitude	longitude
0	Stodulky	50.048307	14.312404
1	Zizkov	50.081054	14.454917
2	Chodov	50.032843	14.501643
3	Vinohrady	50.075359	14.436394
4	Vrsovice	50.071885	14.472665
...	...	...	...
107	Lahovice	49.988587	14.397336
108	Nedvezi u Rican	50.016467	14.653807
109	Lipany	49.999546	14.617539
110	Mala Chuchle	50.026136	14.393634
111	Zadni Kopanina	50.006452	14.312206

112 rows × 3 columns

And here the map of Prague using Folium:
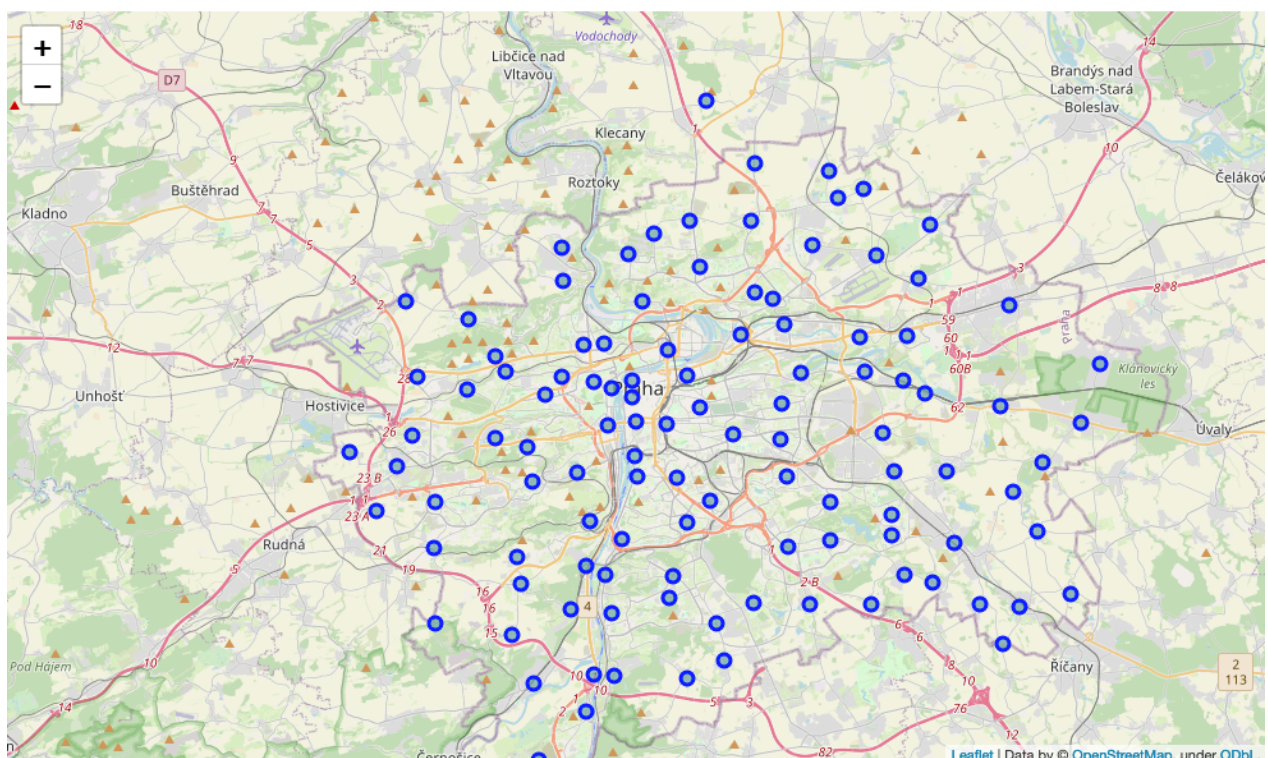
While there are certainly excellent opportunities in the outer parts of the city, I will focus here on the larger center by setting a maximum distance of 5km from the center.

For this I start by calculating the distance from each neighborhood to the center. For this purpose the Haversine distance calculation seems to be the prefered method and an excellent library exists for this purpose.

Once filtered I have the following list of 21 Neighborhoods:

	Neighborhood	latitude	longitude	Distance[km]
0	Zizkov	50.081054	14.454917	2.505453
1	Vinohrady	50.075359	14.436394	1.726055
2	Vrsovice	50.071885	14.472665	4.057035
3	Holesovice	50.100616	14.437384	1.860683
4	Smichov	50.074946	14.404844	1.819018
5	Liben	50.106103	14.476626	4.460459
6	Nusle	50.056530	14.442035	3.745966
7	Nove Mesto	50.075938	14.419946	1.285223
8	Brevnov	50.085209	14.371788	3.538113
9	Dejvice	50.102556	14.391797	2.688993
10	Bubenec	50.102981	14.402831	2.168770
11	Kosire	50.067083	14.362062	4.793530
12	Troja	50.117454	14.423442	3.338190
13	Podoli	50.057318	14.420786	3.352442
14	Karlin	50.092087	14.447667	1.953207
15	Stare Mesto	50.084285	14.417839	0.429475
16	Stresovice	50.091560	14.380505	2.942488
17	Mala Strana	50.087403	14.406917	1.022851
18	Vysehrad	50.064215	14.419447	2.588587
19	Hradcany	50.089673	14.397803	1.690924
20	Radlice	50.058391	14.388612	3.984818
21	Josefov	50.090019	14.418023	0.365689

I can now display these on the map as previously:
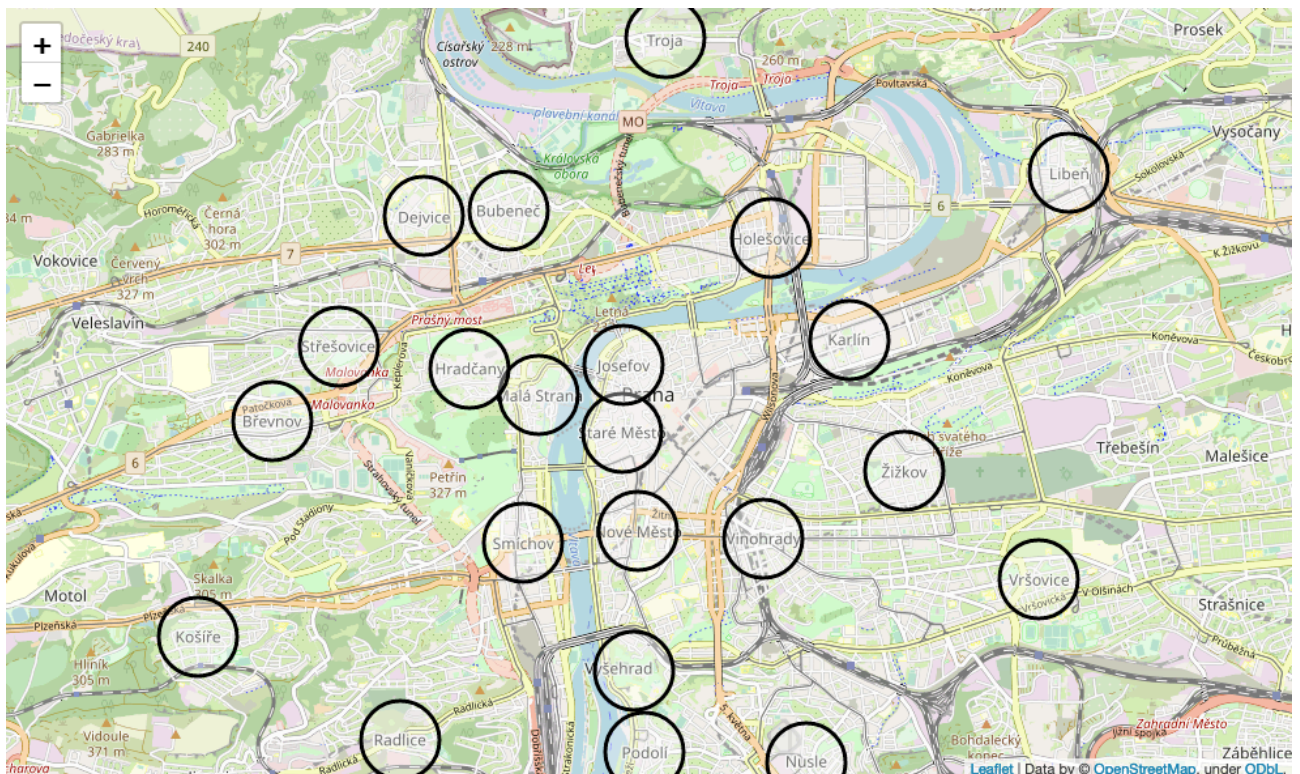
Prague's Venues

Now that I found, located and mapped the Neighborhoods, I decided to look for venues using the FourSquare API. I was able to retrieve a dataframe with 84 venues, the Neighborhoods, Neighborhood's latitude and longitude, the venue, its latitude and longitude and finally the venue category.

Here the first rows:

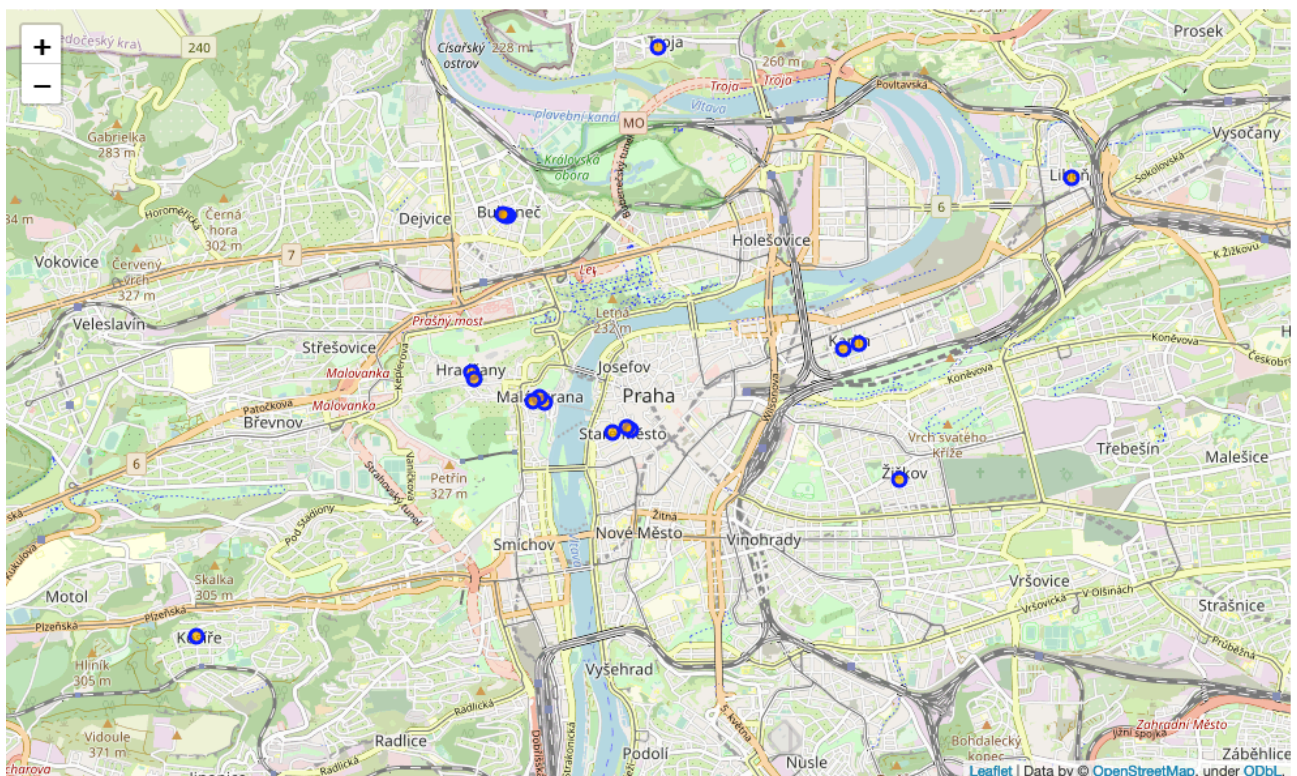|	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Zizkov	50.081054	14.454917	Chilli & Lime	50.080432	14.454244	Asian Restaurant
1	Vinohrady	50.075359	14.436394	Náměstí Míru	50.075136	14.436554	Plaza
2	Vinohrady	50.075359	14.436394	Párek v rohlíku – Ladislav Červený	50.075042	14.437258	Hot Dog Joint
3	Vinohrady	50.075359	14.436394	The Craft: Food & Beers	50.076067	14.435890	Burger Joint
4	Vinohrady	50.075359	14.436394	Vanille	50.074865	14.436825	Ice Cream Shop

For the next step, I made 2 assumptions. I assumed that any stakeholder:
- would want to open a restaurant, not a fast-food or other type of food shop,
- not have any idea about the type of food served yet (i.e Italian, Asian…)

Based on these, I decided to combine all venue categories containing the word "restaurant" into 1 category called "Restaurant".

It could be interesting to review this step, once a stakeholder chooses which kind of restaurant he is looking into opening.

And here is the map:

The map displays 17 venues. While this provided some information about where the resataurants are located it is not nearly enough to give a clear picture about a good location for a new restaurant.

We will however notice that the Neighborhoods of Mala Strana and Stare Mesto display several venues.

There are generally too main type of customers for a restaurant: the "locals", that is people living in close by, and the tourists, of course.

Prague's Habitants

Local customer are absolutely essential for any good restaurant. They have certain expectation in terms of quality and pricing, but if met they will return regularly and form the customer base.

For this analysis, I will look at the population density for each neighborhood to give us an indication of the potential customer population. *In future analysis it would be reasonable to consider neighborhoods close by as potential customer population as well since the distances are not very large.*

The first table I worked on at the begining already included the population density for all neighborhoods, I just had to reformat it, removing the spaces to format them as integers.

The resulting dataframe:

	Neighborhood	latitude	longitude	Distance[km]	density
0	Zizkov	50.081054	14.454917	2.505453	6351
1	Vinohrady	50.075359	14.436394	1.726055	10443
2	Vrsovice	50.071885	14.472665	4.057035	7237
3	Holesovice	50.100616	14.437384	1.860683	13401
4	Smichov	50.074946	14.404844	1.819018	12243
5	Liben	50.106103	14.476626	4.460459	7655
6	Nusle	50.056530	14.442035	3.745966	5657
7	Nove Mesto	50.075938	14.419946	1.285223	6080
8	Brevnov	50.085209	14.371788	3.538113	4759
9	Dejvice	50.102556	14.391797	2.688993	4493
10	Bubenec	50.102981	14.402831	2.168770	4125
11	Kosire	50.067083	14.362062	4.793530	10999
12	Troja	50.117454	14.423442	3.338190	5655
13	Podoli	50.057318	14.420786	3.352442	8505
14	Karlin	50.092087	14.447667	1.953207	7742
15	Stare Mesto	50.084285	14.417839	0.429475	7624
16	Stresovice	50.091560	14.380505	2.942488	11708
17	Mala Strana	50.087403	14.406917	1.022851	4569
18	Vysehrad	50.064215	14.419447	2.588587	9846
19	Hradcany	50.089673	14.397803	1.690924	3138
20	Radlice	50.058391	14.388612	3.984818	3663
21	Josefov	50.090019	14.418023	0.365689	4749

My first intention here was to use a choropleth map to display the population density, unfortunately I was not able to find a usable map with the neighborhoods.

So, I decided to use the standard Folium visualization and use the colors of the markers to display the population density. The map below displays the density of population in 5 groups separated by the following thresholds: 4.000, 6.000, 8.000 and 10.000 hab/km2.
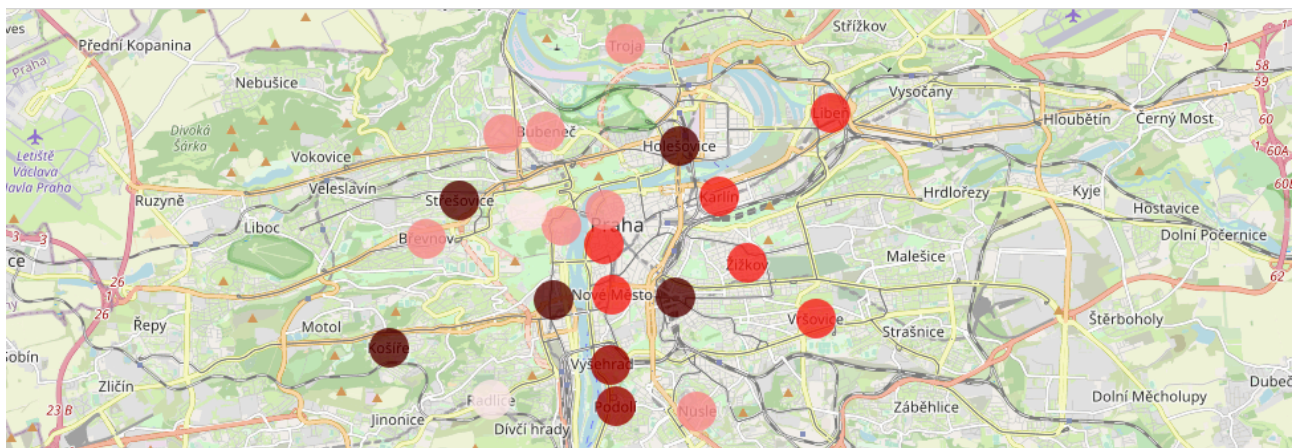
On the map we can see that the population is quite dense in the city center, but also in several neighborhoods outside. The neighborhoods Vinohrady, Smichov, Holesovice, Kosire and Stresovice all have a density over 10.000 habitants per square km.

Prague's Tourists
Touristic flows through the streets of a city like Prague is very important. According to the statisitcs of Prague City Toursim (www.praguecitytourism.cz), in 2019 about 8 Million tourists visited the city.

The vast majority of tourist come to Prague for its impressive cultural heritage. These are aslo the customers most likely to go to a restaurant as opposed to other, cheaper type of food shops. This Wikipedia page (https://cs.wikipedia.org/wiki/Seznam_n%C3%A1rodn%C3%ADch_kulturn%C3%ADch_pam%C3%A1tek_%C4%8Cesk%C3%A9_republiky) provides a list of the main cultural monuments in the Czech Republic.

Here a snapshot of the table:

Rejstříkové číslo	Pam. katalog	Sídlo	Památka	Okres	Vyhlášeno	Obrázek	Commons
101	101	Praha 1 - Hradčany	Pražský hrad	Praha	1962		
102	102	Praha 1 - Hradčany	české korunovační klenoty	Praha	1962		
103	103	Praha 1 - Staré Město	kostel Panny Marie před Týnem	Praha	1962		
104	104	Praha 1 - Staré Město	palác Kinských	Praha	1962		
105	105	Praha 1 - Staré Město	Staroměstská radnice	Praha	1962		
106	106	Praha 1 - Staré Město	Betlémská kaple	Praha	1962		

After filtering the monuments in Prague only and standardizing the writting, I could use the name of the monument to retrieve its latitude and longitude.

Here they are on the map:
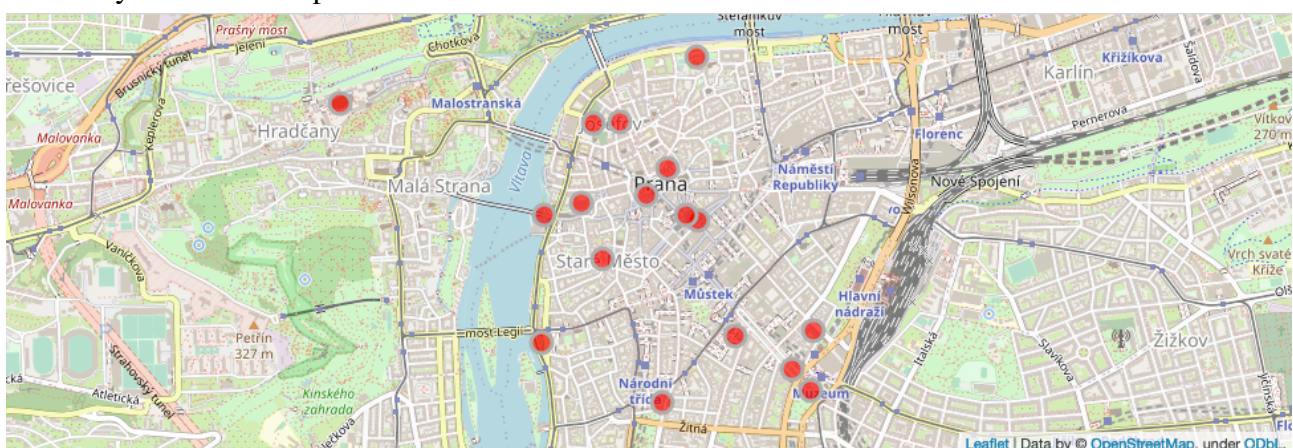
The cultural monuments are unsurprisingly concentrated in the center of the city, more specifically in the neighborhoods: "Stare Mesto", "Josefov", "Vinohrady" and "Hradcany". So these are the neighborhood where most tourist will be located and will look for a place to eat.

RESULTS AND DISCUSSION

Using the data from FourSquare provided some entries, but by far not enough to help define a good location. It however showed that the Neighborhoods Stare mesto and Mala Strana did display several restaurants. The reason for the lack of results could have several causes, but one reason is a certainly the lack of popularity of the FourSquare app in Europe in general, and in the Czech Republic in particular.

Turning to the population density and touristic attractions with the somewhat rough assomption that the more people close by, the more potential customers, I could find some interesting insights.
The results show that while the density of population is, of course, high in the very center namely Stare Mesto (7.624 hab/km2) and Nove Mesto (6.080 hab/km2), it is actually much higher in neighborhoods just outside, in particular Vinohrady (10.443 hab/km2) and Smichov (12.243 hab/km2).

When considering the touristic attractions, most of the cultural monuments are located in Stare Mesto and Josefov. But here again, looking a bit outside, we notice a small concentration of monuments in the **neighborhood of Vinhrady**.

According to this analysis, the Vinohrady neighborhood could actually be a better place for a new restaurant as it combines the proximity with some major touristic attractions with a very high density of population.

Alternatively, one could decide to rather concentrate on the tourists, in which case Stare Mesto, Josefov or Hracany would be the best places. On the other side, avoiding the touristic places to focus on the local customers might offer more stable incomes with probably much lower rent cost. In this case, Holesovice, Stresovice and Kosire would be the prefered solutions.

CONCLUSION

The purpose of the analysis was to help finding an appropriate location for a new restaurant in Prague.

After defining the neighborhoods and retrieving there location, I could add them on a map of Prague as a reference. The second step was to look at the existing venues. This, unfortunately did not provide enough data points to help much.

I then looked at 2 particular categories of customer for a restaurant: people leaving close by and thus potential recurrent clients, and the tourists visiting the city. For the first category, I mapped the density of population in each neighborhood, for the second, I used a listing of the major cultural monuments and located them on the map.

The results will provide some interesting input into the location of a future restaurant.

This analysis could be expanded in many directions. For example, the rental costs could be an interesting information to add to the decision making process. Also the connections to the public transportation grid might be an important parameter, just to name a few.