

Finding the best district to open a Cofé shop in the city of Regensburg

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1. Introduction:

The city of Regensburg is a small, academic, medieval, and historic city, due to this not only the tourism around it but the flow of students, in times without the pandemic, are constant. The city is structured into seven districts, some more oriented for academic purposes and some for tourism. The problem to address in this work is which district has the best Cofé shop and which one is the best to open a Cofé shop, this taking into account the distribution of the current Cofé shops around the city and the number of clients using the tips.

2. Data sources:

The data has been taken from different places according its type:

1. For the Postal code and the districts of the city of Regensburg:
the Deutsche Post website: <https://www.postdirekt.de/plzserver/PlzSearchServlet>.

There one can obtain the Postal code for the six districts and for all the streets on the city. For example:

Postal Code	City	District
93051	Regensburg	Großprüfening-Dechbetten-Königswiesen

Table 1: Main dataframe format.

2. For the latitude and longitude we used the location data platforms :

- Foursquare: <https://foursquare.com/>
- Strassenkatalog: <https://www.strassenkatalog.de>

Description:

Column name	Type	Description
PostalCode	int64	District's postal code
City	object	City's name
District	object	District's name
Latitude	float64	District's latitude
Longitude	float64	District's longitude

Table 2: Data types for the dataframe.

3. Methodology:

The methodology to solve the problem will be:

- Determine the six districts in a City map using its Postal Code, latitude, and longitude.

- Determine the flow of people for each district, this finding the number of Cofé shops on each district and its number of tips using the Foursquare API.
- Find the distribution of the Cofé shops around the districts on a City map.
- Determine the best district for the new Cofé shop using the distribution of the Cofé shop and its number of tips.

4. Data Cleaning:

The main dataframe was created using the postal code, the district, and city data from the Deutsche post website; the latitude and the longitude for some districts using the Foursquare API; the latitude and the longitude for the rest districts using the Strassenkatalog Web site.

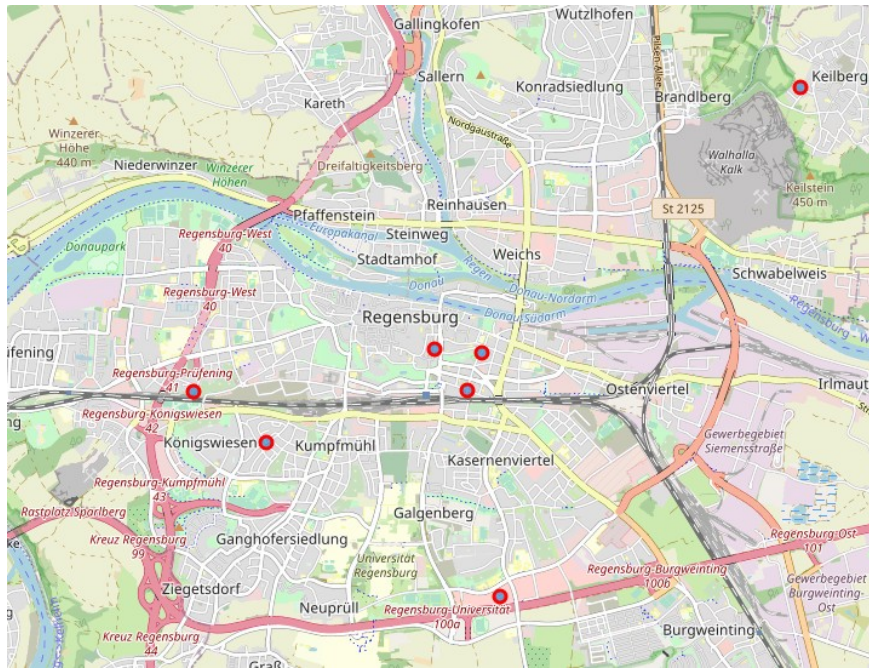
After the main dataframe was created, we found all the Cofé shops on each district fixing a radius of 500 m, from the its center. This gave us the notion of how the al the establishments were distributed around the city.

Fortunately, all information for the dataframe was able using the sources and there was no need to use NaN values or to drop certain columns.

After the final data frame was created, we determined the distributions of the Cofé shops on each district using the respectively latitude and longitude. We found the number of Cofé shops and the name of the venues. Also, we found that there are three districts where there are no Cofé shops and three containing this type of establishments, such that:

District	Latitude	Longitude	No. Cofé Shops
Großprüfening-Dechbetten-Königswiesen	49.007839	12.077042	0
Innenstadt	49.016491	12.100904	30
Kasernenviertel	49.012688	12.105520	9
Ostenviertel	49.016174	12.107655	9
Westenviertel	49.012512	12.066780	0
Brandlberg-Keilberg	49.040813	12.152743	0
Galgenberg	48.993454	12.110230	0

Table 3: Number of Cofé shops per districts in the city of Regensburg.



5. Data Analysis:

5.2 Getting the number of Cofé shops per district:

Using the information for the number of districts, the number of Cofé shops and the geographical data we were able to find the distribution of the venues around the city. The result of this procedures are showed in Fig. 1, here the red dots are the Cofé shops per district with 500 m of radius from the center.



Now, considering that the size of the city of Regensburg is small, we performed a search for duplicates on the venues. This because there was an overlap in the the venues at the edge of each district. We filtered the venues arranged them by its distance from the center of the district. The we removed the duplicates with the highest distance, this gave at the end:

District	No. Cofé Shops
Innenstadt	22
Kasernenviertel	5
Ostenviertel	5

Table 4: Number of Cofé shops per district after removing the duplicates.

5.2 Getting the number of tips for each Cofé shop:

In this work we used the number of tips as a measure for the flow of people per district. In order to obtain this number we divided the dataframe per districts. Then we found the number of tips and the rating for each Cofé shop using the Foursquare API. Finally, we used the number of tips as indicator of the number of people consuming Café on each street. Obtaining the following table:

Venue	Tips	Rating	District
Café Lola	11	7.3	Innenstadt
ANNA	9	8.9	Kasernenviertel
Café Rinaldi	8	7.0	Innenstadt
Café Scholz	7	6.9	Innenstadt
190 GRAD CAFÉ BAR RÖSTEREI Rehorik	7	8.5	Innenstadt
Paul's Boutique Cafebar	5	7.6	Innenstadt
Café Picasso	4	5.7	Innenstadt
Stehcafé im Milchschwammerl	4	7.0	Kasernenviertel
Café Felix	2	7.0	Innenstadt
Museums-Café	2	7.5	Innenstadt

Table 5: Tips per venue for different districts.

Now in the next table we show the number of tips and the mean rating for each district in order to obtain the best score per district.

District	No. Cofé shops with tips	Mean rating
Innenstadt	8	7.1875
Kasernenviertel	2	7.95
Ostenviertel	0	0.0

Table 6: Mean rating per district for Cofé shops in Regensburg.

6. Results:

Here we present the result for the data analysis for the Cofé shops in the city of Regensburg.

6.1. In the first part, we found that the distribution of the Cofé shop over the city is of the form:

District	No. Cofé Shops
Innenstadt	22
Kasernenviertel	5
Ostenviertel	5
Großprüfening-Dechbetten-Königswiesen	0
Westenviertel	0
Brandlberg-Keilberg	0
Galgenberg	0

Table 7: Number of Cofé shops per district in the city of Regensburg.

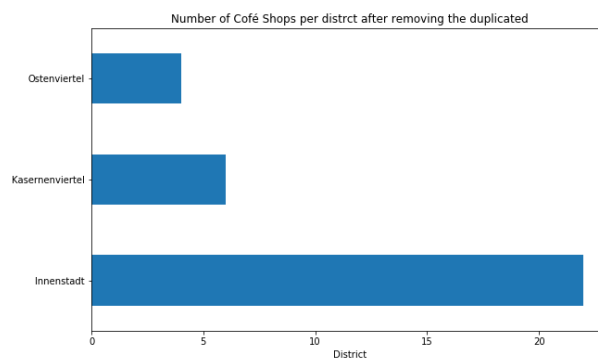


Figure 3: No. of Cofé shops in Regensburg

This clearly show which that the worst places to open a Cofé shop are:

- Großprüfening-Dechbetten-Königswiesen
- Westenviertel
- Brandlberg-Keilberg

- Galgenberg

And the potential districts to open the Cofé shops clearly are:

- Innenstadt
- Kasernenviertel
- Ostenviertel

Is important to note that these three districts are the ones near of the city center and the University of Regensburg.

6.2. In the second part of the analysis we found that there are 8 Cofé shops with ratings and tips in the Innerstadt district in contrast to only 2 found in the Kasernenviertel district and 0 for the Ostenviertel district. The result for the number of Cofé shops per district including the mean rating per district are presented in the following table.

District	No. Cofé shops with tips	Mean rating
Innenstadt	8	7.1875
Kasernenviertel	2	7.95
Ostenviertel	0	0.0
Großprüfening-Dechbetten-Königswiesen	0	0
Westenviertel	0	0
Brandlberg-Keilberg	0	0
Galgenberg	0	0

Table 8: Mean rating per district for Cofé shops in Regensburg.

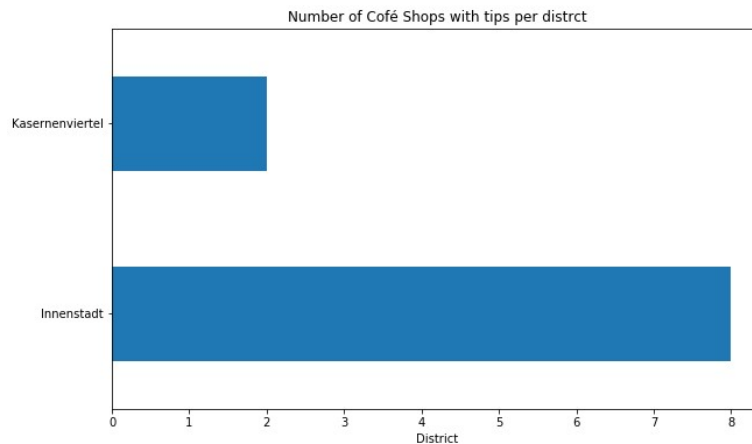


Figure 4: No. of tips per district

7. Discussion:

As we mention before, Regensburg is a small tourist and academic city. For this reason the number of venues is mostly reduced to restaurants and Cofé shops. For this reason is important to know where is the district with more clients. Due to this is important to know that the characteristics of each district are very different. As we saw in the analysis some of the do not contain any establishments of this kind. Also we can notice from the second part of the analysis that even the Kasernenviertel and Innerstadt districts have almost the same mean for the rating, Innerstadt has a higher number of Cofé shops and number of tips. This means that the number of persons in this district is higher than in the Kasernenviertel district. As conclusion the Innerstadt district is the best option to open a Cofé shop. As final result is that the Innerstadt district is the the best option the Cofé shop.

8. Conclusions:

In this project we analyzed which district in the city of Regensburg is the best to open a Cofé shop. First we analyzed the distribution of all the Cofé shops across the city using the Foursquare API. Here we found that there are mainly three important districts to these kind of establishments, the Innenstadt district, the Kasernenviertel district, and the Ostenviertel district. Secondly, with the previous information and adding the tips and ratings as a measure of the flow of people for each Cofé shop we were able to determine which was the best candidate zone for the new Cofé shop.