

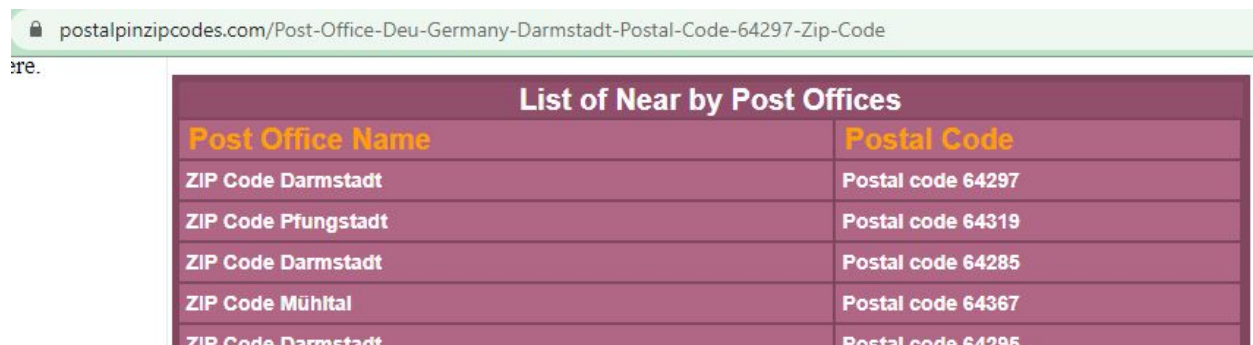
1. INTRODUCTION

Döner is one of the most popular fast-food in Germany. As in any retail and fast food industry, location selection is one of the most important decisions. So, as an entrepreneur, I would like to open up a döner restaurant in Darmstadt, Hessen and choose the best possible location.

2. DATA

In order to address the business problem, I will scrape the Postal Code and Location data from the link

<https://www.postalpinzipcodes.com/Post-Office-Deu-Germany-Darmstadt-Postal-Code-64297-Zip-Code> Data looks like the following table. After, extracting the name and the zip code from the website. I will look up the latitude and longitude data using *pgeocode* package of Python. Using *Neighbourhood*, *Postal_Code*, *Latitude* and *Longitude* features in the final dataset, then, I will explore the vicinity of the locations using foursquare API and try to have some insights about the best location for Döner Restaurant.

A screenshot of a web browser displaying a table titled "List of Near by Post Offices". The browser's address bar shows the URL "postalpinzipcodes.com/Post-Office-Deu-Germany-Darmstadt-Postal-Code-64297-Zip-Code". The table has two columns: "Post Office Name" and "Postal Code". It lists five entries, all for Darmstadt, with postal codes 64297, 64319, 64285, 64367, and 64295.

List of Near by Post Offices	
Post Office Name	Postal Code
ZIP Code Darmstadt	Postal code 64297
ZIP Code Pfungstadt	Postal code 64319
ZIP Code Darmstadt	Postal code 64285
ZIP Code Mühlthal	Postal code 64367
ZIP Code Darmstadt	Postal code 64295

3. METHODOLOGY

Data Cleansing

After the data is scraped and merged with the location data obtained via *pgeocode* package, we have the following table (as dataframe). *Neighbourhood* column has multiple entries for Darmstadt. So let's rename it as Darmstadt-1, Darmstadt-2 and so on to differentiate them.

Clustering

After getting revenues from foursquare I filtered non relevant categories and only kept those including the word 'restaurant' in the category field. After clustering, I added one more *magic* cluster. This magic cluster includes the neighbourhoods they have no restaurants at all. This cluster might be significant since they might be an opportunity for a new restaurant.

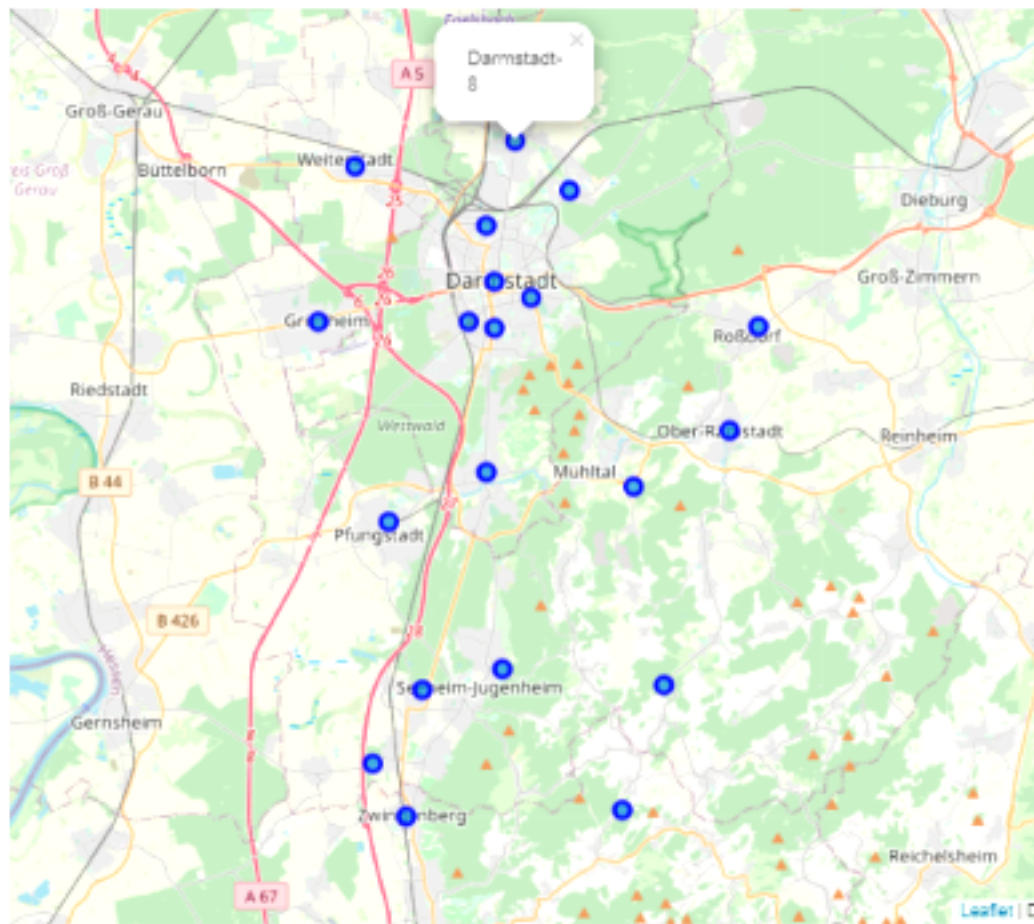
Interpretation

Since there might be a lot of factors for the location choice besides the lack or the types of current restaurants. A domain expert, in this case me, is required to interpret the raw results. For example the menu of the other restaurants and the effects of being close to a particular type of restaurants might be non intuitive.

	Neighbourhood	Postal_Code	Latitude	Longitude
0	Darmstadt	64297	49.8192	8.6449
1	Pfungstadt	64319	49.8056	8.6031
2	Darmstadt	64285	49.8591	8.6486
3	Mühlital	64367	49.8156	8.7081
4	Darmstadt	64295	49.8611	8.6373
5	Darmstadt	64287	49.8676	8.6644
6	Darmstadt	64283	49.8719	8.6484
7	Seeheim-Jugenheim	64342	49.7650	8.6519
8	Darmstadt	64293	49.8875	8.6446
9	Ober-Ramstadt	64372	49.8308	8.7489
10	Griesheim	64347	49.8609	8.5725
11	Modautal	64397	49.7606	8.7208
12	Bickenbach	64404	49.7592	8.6175
13	Roßdorf	64380	49.8597	8.7617
14	Darmstadt	64289	49.8972	8.6809
15	Alsbach-Hähnlein	64665	49.7386	8.5958
16	Weiterstadt	64331	49.9039	8.5887
17	Darmstadt	64291	49.9111	8.6573
18	Zwingenberg	64673	49.7239	8.6108
19	Lautertal	64686	49.7258	8.7033

	Neighbourhood	Postal_Code	Latitude	Longitude
0	Darmstadt-1	64297	49.8192	8.6449
1	Pfungstadt	64319	49.8056	8.6031
2	Darmstadt-2	64285	49.8591	8.6486
3	Mühlital	64367	49.8156	8.7081
4	Darmstadt-3	64295	49.8611	8.6373
5	Darmstadt-4	64287	49.8676	8.6644
6	Darmstadt-5	64283	49.8719	8.6484
7	Seeheim-Jugenheim	64342	49.7650	8.6519
8	Darmstadt-6	64293	49.8875	8.6446
9	Ober-Ramstadt	64372	49.8308	8.7489
10	Griesheim	64347	49.8609	8.5725
11	Modautal	64397	49.7606	8.7208
12	Bickenbach	64404	49.7592	8.6175
13	Roßdorf	64380	49.8597	8.7617
14	Darmstadt-7	64289	49.8972	8.6809
15	Alsbach-Hähnlein	64665	49.7386	8.5958
16	Weiterstadt	64331	49.9039	8.5887
17	Darmstadt-8	64291	49.9111	8.6573
18	Zwingenberg	64673	49.7239	8.6108
19	Lautertal	64686	49.7258	8.7033

Figure: Assigning Unique names for Darmstadt neighborhoods.



Map: Neighbourhoods in Darmstadt

4. RESULTS

After the initial analyses we ended up with 22 restaurant categories for all the neighbourhoods.

Venue Category	
German Restaurant	6
Italian Restaurant	4
Sushi Restaurant	4
Asian Restaurant	3
Turkish Restaurant	3
Falafel Restaurant	2
French Restaurant	2
Greek Restaurant	2
Vegetarian / Vegan Restaurant	2
Middle Eastern Restaurant	2
Indian Restaurant	1
Mediterranean Restaurant	1
Mexican Restaurant	1
Fast Food Restaurant	1
Restaurant	1
Eastern European Restaurant	1
Doner Restaurant	1
Cuban Restaurant	1
Comfort Food Restaurant	1
Australian Restaurant	1
Tapas Restaurant	1
American Restaurant	1

Most common venues for the neighbourhoods are as follows. As expected, the city center has more restaurants than the peripheral areas. Darmstadt-1, Darmstadt-4, Darmstadt-8, Seeheim-Jugenheim, Weiterstadt look like good candidates, for they look like not having Turkish restaurants.

	Neighbourhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Darmstadt-1	Vegetarian / Vegan Restaurant	Italian Restaurant	French Restaurant	Asian Restaurant	Australian Restaurant
1	Darmstadt-2	German Restaurant	Cuban Restaurant	French Restaurant	Turkish Restaurant	Asian Restaurant
2	Darmstadt-3	Asian Restaurant	Vegetarian / Vegan Restaurant	Turkish Restaurant	Australian Restaurant	Comfort Food Restaurant
3	Darmstadt-4	Tapas Restaurant	Sushi Restaurant	Comfort Food Restaurant	Indian Restaurant	Vegetarian / Vegan Restaurant
4	Darmstadt-5	Sushi Restaurant	Turkish Restaurant	Asian Restaurant	Middle Eastern Restaurant	Italian Restaurant
5	Darmstadt-6	Eastern European Restaurant	Vegetarian / Vegan Restaurant	Turkish Restaurant	Asian Restaurant	Australian Restaurant
6	Darmstadt-8	Doner Restaurant	Italian Restaurant	Vegetarian / Vegan Restaurant	French Restaurant	Asian Restaurant
7	Griesheim	Falafel Restaurant	Vegetarian / Vegan Restaurant	Turkish Restaurant	Asian Restaurant	Australian Restaurant
8	Ober-Ramstadt	German Restaurant	Turkish Restaurant	Asian Restaurant	Australian Restaurant	Comfort Food Restaurant
9	Pfungstadt	Fast Food Restaurant	Vegetarian / Vegan Restaurant	Turkish Restaurant	Asian Restaurant	Australian Restaurant
10	Seeheim-Jugenheim	German Restaurant	Restaurant	French Restaurant	Asian Restaurant	Australian Restaurant
11	Weiterstadt	German Restaurant	Mediterranean Restaurant	Greek Restaurant	French Restaurant	Asian Restaurant

I clustered the neighbourhoods that has the same type of restaurants.

Neighbourhood	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
Darmstadt-1	0	Vegetarian / Vegan Restaurant	Italian Restaurant	French Restaurant	Asian Restaurant	Australian Restaurant
Darmstadt-8	0	Doner Restaurant	Italian Restaurant	Vegetarian / Vegan Restaurant	French Restaurant	Asian Restaurant
Weierstadt	0	German Restaurant	Mediterranean Restaurant	Greek Restaurant	French Restaurant	Asian Restaurant
Darmstadt-3	0	Asian Restaurant	Vegetarian / Vegan Restaurant	Turkish Restaurant	Australian Restaurant	Comfort Food Restaurant
Darmstadt-4	0	Tapas Restaurant	Sushi Restaurant	Comfort Food Restaurant	Indian Restaurant	Vegetarian / Vegan Restaurant
Darmstadt-5	0	Sushi Restaurant	Turkish Restaurant	Asian Restaurant	Middle Eastern Restaurant	Italian Restaurant
Seeheim-Jugenheim	1	German Restaurant	Restaurant	French Restaurant	Asian Restaurant	Australian Restaurant
Ober-Ramstadt	1	German Restaurant	Turkish Restaurant	Asian Restaurant	Australian Restaurant	Comfort Food Restaurant
Darmstadt-2	1	German Restaurant	Cuban Restaurant	French Restaurant	Turkish Restaurant	Asian Restaurant
Griesheim	2	Falafel Restaurant	Vegetarian / Vegan Restaurant	Turkish Restaurant	Asian Restaurant	Australian Restaurant
Pfungstadt	3	Fast Food Restaurant	Vegetarian / Vegan Restaurant	Turkish Restaurant	Asian Restaurant	Australian Restaurant
Darmstadt-6	4	Eastern European Restaurant	Vegetarian / Vegan Restaurant	Turkish Restaurant	Asian Restaurant	Australian Restaurant
Zwingenberg	5	NaN	NaN	NaN	NaN	NaN
Modautal	5	NaN	NaN	NaN	NaN	NaN
Bickenbach	5	NaN	NaN	NaN	NaN	NaN
Roßdorf	5	NaN	NaN	NaN	NaN	NaN
Darmstadt-7	5	NaN	NaN	NaN	NaN	NaN
Alsbach-Hähnlein	5	NaN	NaN	NaN	NaN	NaN
Mühlital	5	NaN	NaN	NaN	NaN	NaN
Lautertal	5	NaN	NaN	NaN	NaN	NaN

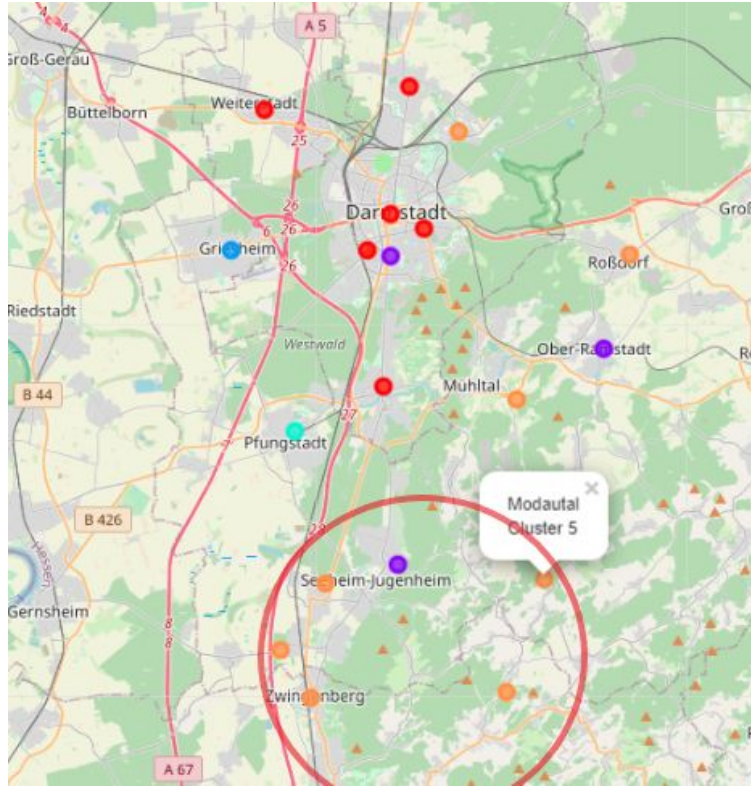


Figure: Clusters

5. DISCUSSION

No single type of restaurant category stands out. This can be interpreted as that the choice of customers vary and they want to try diverse recipes. There are not so many Turkish (which are most likely to sell döner) restaurants.. Eight neighborhoods don't have any type of restaurants at all. This is partly because of the low population. However, it might be a good business opportunity to start up a restaurant shown in red circle in the Figure Clusters.

Results indicate that Darmstadt-1, Darmstadt-4, Darmstadt-8, Seeheim-Jugenheim, Weiterstadt are good candidates, for they look like not having Turkish restaurants. But, as I live in Weiterstadt, there are some Turkish restaurants that are not listed in the data. So foursquare data is not complete. This might also be the case for some of the other neighbourhoods. Checking this is out of scope of this analysis.

6. CONCLUSION

In this report, I have searched for the best candidate location for my new döner restaurant. Even though I can not come up with a single location, I gained good insights about the candidates and from now on I can focus a subset of the neighborhoods and take into consideration other factors not analysed in this report.