



Coursera Capstone Project

Battle of the Neighborhoods

– Differences between Hamburg Districts

Introduction/Business Problem

Hamburg consists of 7 districts, of which the districts of Altona, Wandsbek and Harburg, among others, came to Hamburg by the Greater Hamburg Act in 1937.

All three were independent cities before they were incorporated.

My aim is it to analyse if the centre of activity can still be found in these formerly independent city centres or whether it has moved somewhere else. I aim to do this by examine what are the most and least urban neighbourhoods based on the population density and analysing if they can still be counted as centres of activity by analysing what kind of venues can be found there.

As a second approach I'd like to give a recommendation which neighbourhood in which district would be the best location for opening up an Italian Restaurant because one of the most liked type of restaurant in Germany are Italian Restaurants

Data / Foursquare data

I am going to use Foursquare data to find all the popular venues of the city. This dataset will give me the name, category, latitude and longitude of each venue within a given radius around the neighborhoods and districts of interest.

	Neighbourhood	Neighbourhood Latitude	Neighbourhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Hamburg-Altstadt	53.54992	9.99893	GOOT - Finest Cuts	53.548509	10.000675	Comfort Food Restaurant
1	Hamburg-Altstadt	53.54992	9.99893	O-ren Ishii	53.548291	9.997890	Vietnamese Restaurant
2	Hamburg-Altstadt	53.54992	9.99893	Picasso	53.549934	9.995627	Spanish Restaurant
3	Hamburg-Altstadt	53.54992	9.99893	Thalia Theater	53.551897	9.998384	Theater
4	Hamburg-Altstadt	53.54992	9.99893	Mi Chii	53.548320	9.998530	Vietnamese Restaurant

Data of Hamburg Districts

The names and geolocation data for the neighborhoods of Hamburg can be obtained from the German Wikipedia page of the districts and neighborhoods of Hamburg:

https://de.wikipedia.org/wiki/Liste_der_Bezirke_und_Stadtteile_Hamburgs

It is the second table on this page.

This information can only be gathered from the german page , because it is not included in the English equivalent at

https://en.wikipedia.org/wiki/Boroughs_and_quarters_of_Hamburg

Most and least urban neighborhoods in Hamburg

The data provided at the German Wikipedia page is particularly useful, as it provides the density of population of each neighborhood („Bevölkerungsdichte (Einwohner/km²)“) which I take as indicators if a neighborhood has a more or less urban character.

Stadtteil	Ortsteile	Bezirk	Fläche (km ²)	Einwohner	Bevölkerungsdichte (Einwohner/km ²)	Koordinaten	Karte
Hamburg-Altstadt	101–102	Hamburg-Mitte	2,4	2272	947	53° 33' 0" N, 10° 0' 0" O	
HafenCity	103–104	Hamburg-Mitte	2,2	4592	2087	53° 32' 28" N, 10° 0' 1" O	
Neustadt	105–108	Hamburg-Mitte	2,3	12.920	5617	53° 33' 7" N, 9° 59' 8" O	
St. Pauli	109–112	Hamburg-Mitte	2,5	22.436	8974	53° 33' 25" N, 9° 57' 50" O	
St. Georg	113–114	Hamburg-Mitte	2,4	11.384	4743	53° 33' 18" N, 10° 0' 44" O	
Hammerbrook	115–118	Hamburg-Mitte	3,0	4323	1441	53° 32' 43" N, 10° 1' 50" O	
Borgfelde	119–120	Hamburg-Mitte	0,8	7696	9620	53° 33' 17" N, 10° 2' 4" O	
Hamm	121–127	Hamburg-Mitte	4,0	38.773	9693	53° 33' 39" N, 10° 3' 28" O	
Horn	128–129	Hamburg-Mitte	5,9	38.799	6576	53° 33' 14" N, 10° 5' 24" O	
							

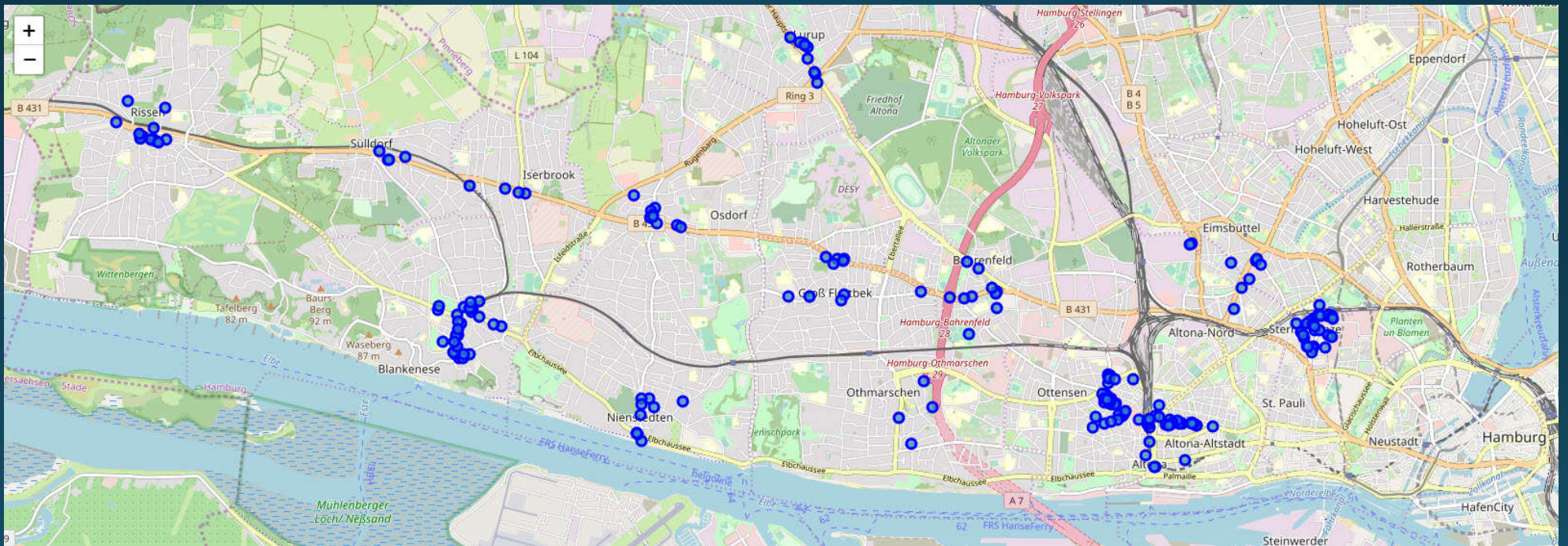
Geo location Data

However, the geo location data is provided in Degree, Minute, Second format, so that the decimal coordinates are added via geocoder for the sake of simplicity.

	Neighborhood	District	Population	Density	Latitude	Longitude
0	Hamburg-Altstadt	Hamburg-Mitte	2272.000	947	53.54992	9.99893
1	HafenCity	Hamburg-Mitte	4592.000	2087	53.54444	9.99762
2	Neustadt	Hamburg-Mitte	12.920	5617	53.55479	9.98999
3	St. Pauli	Hamburg-Mitte	22.436	8974	53.55700	9.96400
4	St. Georg	Hamburg-Mitte	11.384	4743	53.55513	10.01231
5	Hammerbrook	Hamburg-Mitte	4323.000	1441	53.54623	10.02416
6	Borgfelde	Hamburg-Mitte	7696.000	9620	53.55226	10.03473
7	Hamm	Hamburg-Mitte	38.773	9693	53.56067	10.05519
8	Horn	Hamburg-Mitte	38.799	6576	53.55489	10.08739

Methodology / Results for Altona

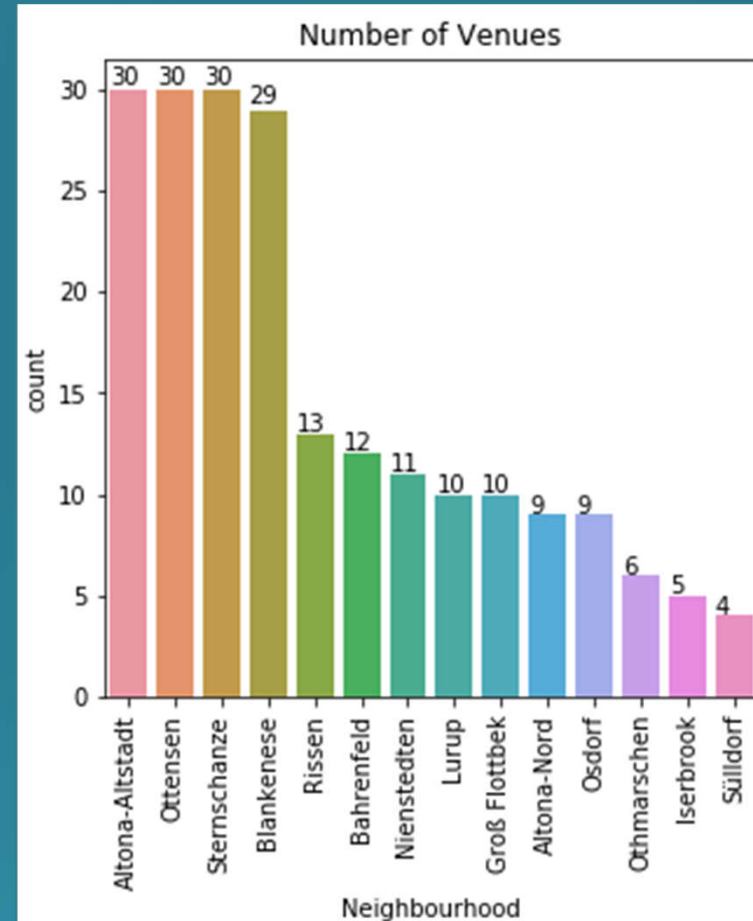
The map of Altona shows a clustering of venues around certain hot spots with a few bigger clusters and several smaller ones.



Venues in Altona

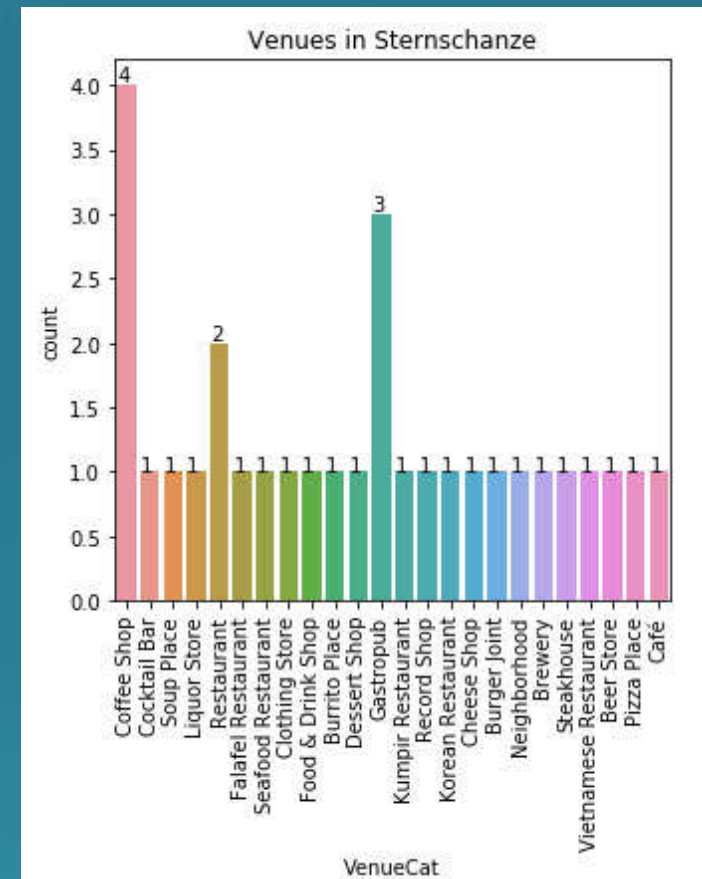
The distribution graph shows four neighbourhoods having considerably more venues than the others.

The word cloud for Altona shows a wide variety of venue categories with the biggest categories of Restaurant and Supermarket.



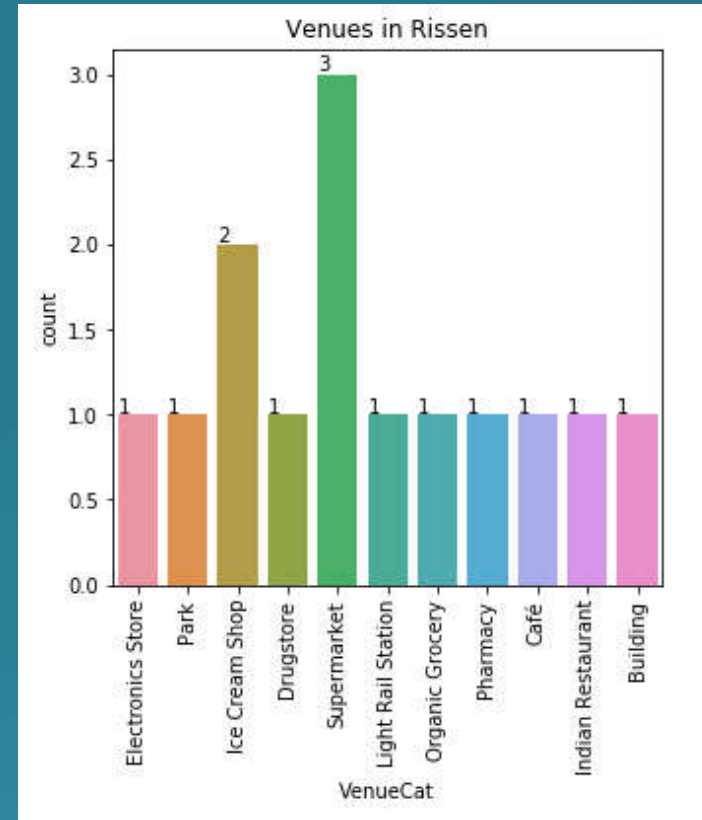
Most urban Neighbourhood: Sternschanze

- A lot of venues for small area
- Big amount of venues with just one occurrence
- Most frequent are Coffee Shop and Restaurant



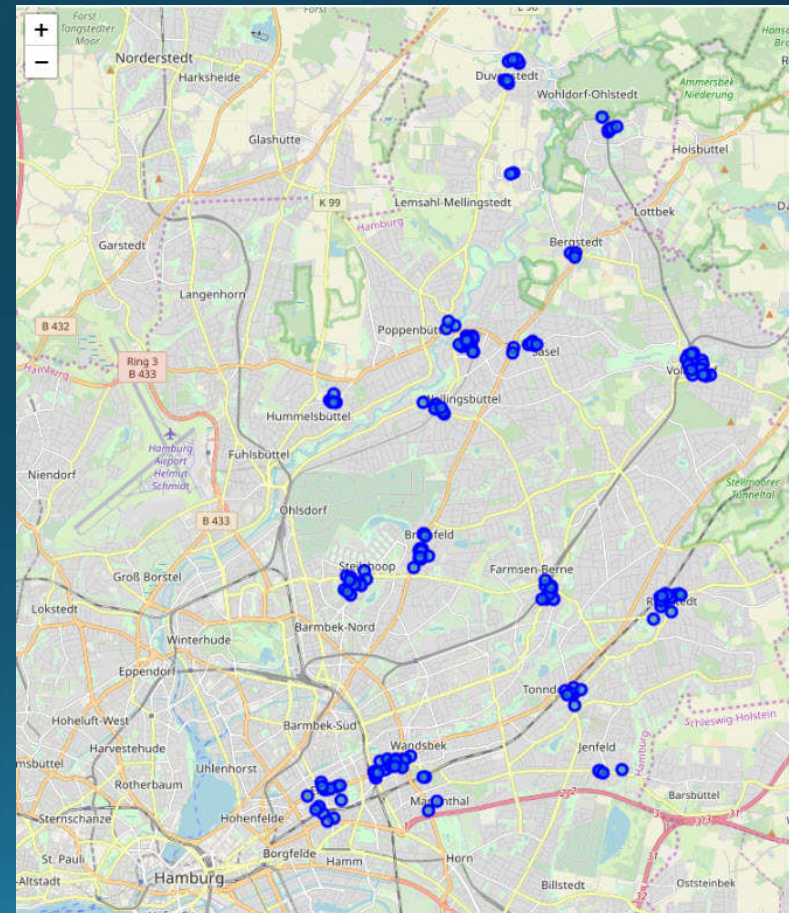
Most rural Neighbourhood: Rissen

- Considerable less venues
- Big amount of venues with just one occurrence
- Most frequent are Coffee Shop and Restaurant



Methodology / Results for Wandsbek

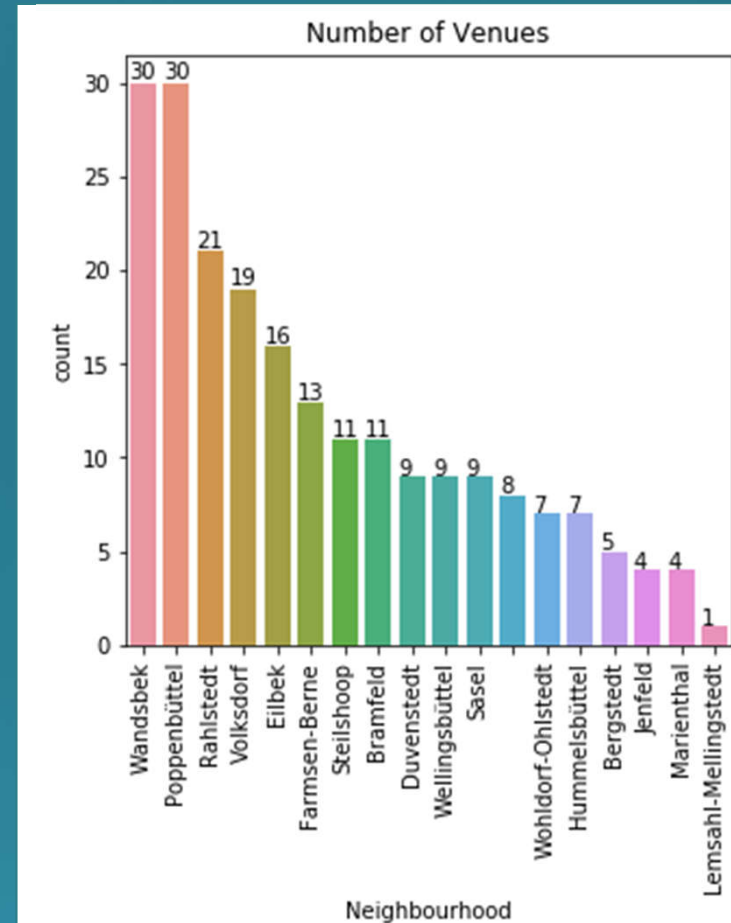
The map of Wandsbek shows the same clustering of venues like the map of Altona, if not even stronger.



Venues in Wandsbek

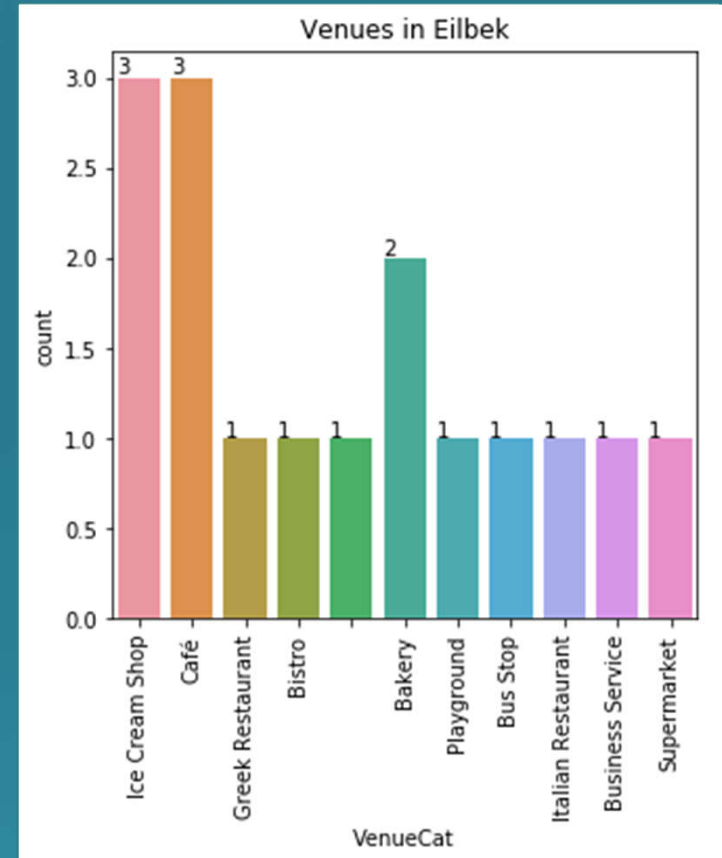
The distribution graph of the venues shows a more mixed distribution. There are certainly neighbourhoods with a lot more venues than the most of the others, but in between there are neighbourhoods with a medium range of venues.

The word cloud for Wandsbek also indicates restaurants as the most frequent venue, followed by supermarket and cafe on a par.



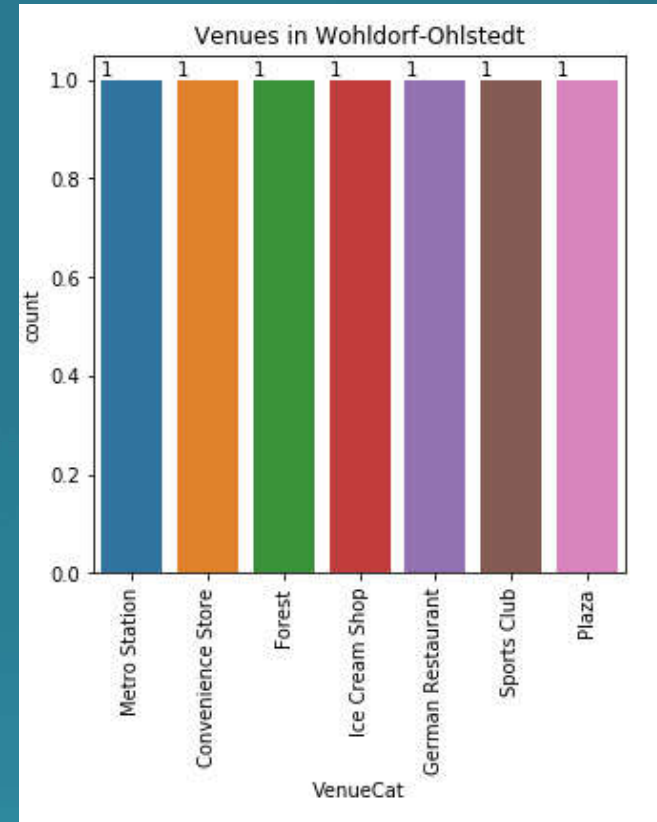
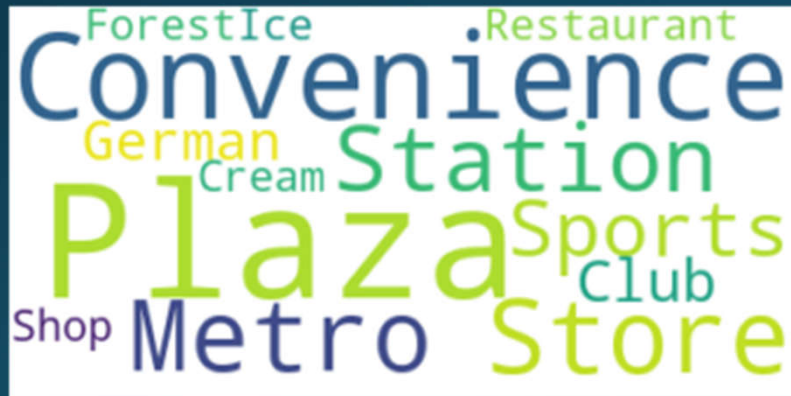
Most urban Neighbourhood: Eilbek

- Big amount of venues with just one occurrence
- Most frequent are Ice Cream Shop, Café and Bakery



Most rural Neighbourhood: Wohldorf-Ohlstedt

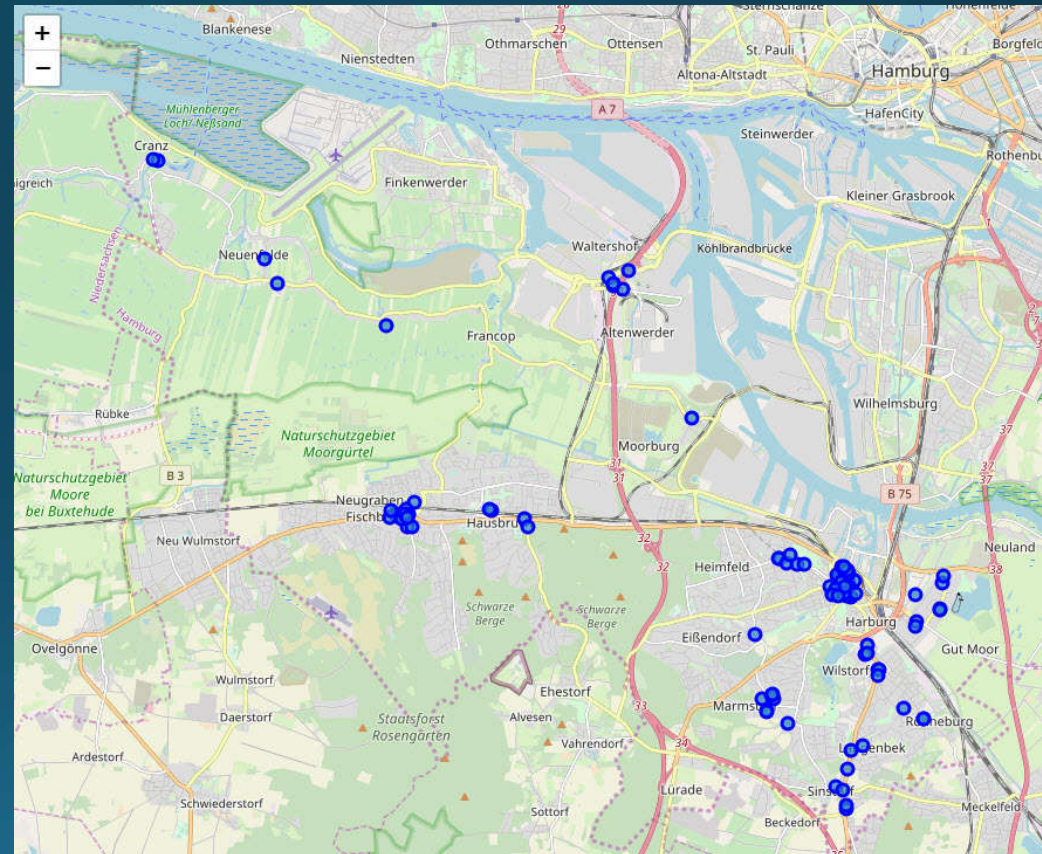
- Equally one occurrence for each of seven venues
- Lack of venues and the characteristic of those present underline the rural character



Methodology / Results for Harburg

The map with its large green areas shows that Harburg is likely to have the biggest discrepancy between urban and rural neighbourhoods.

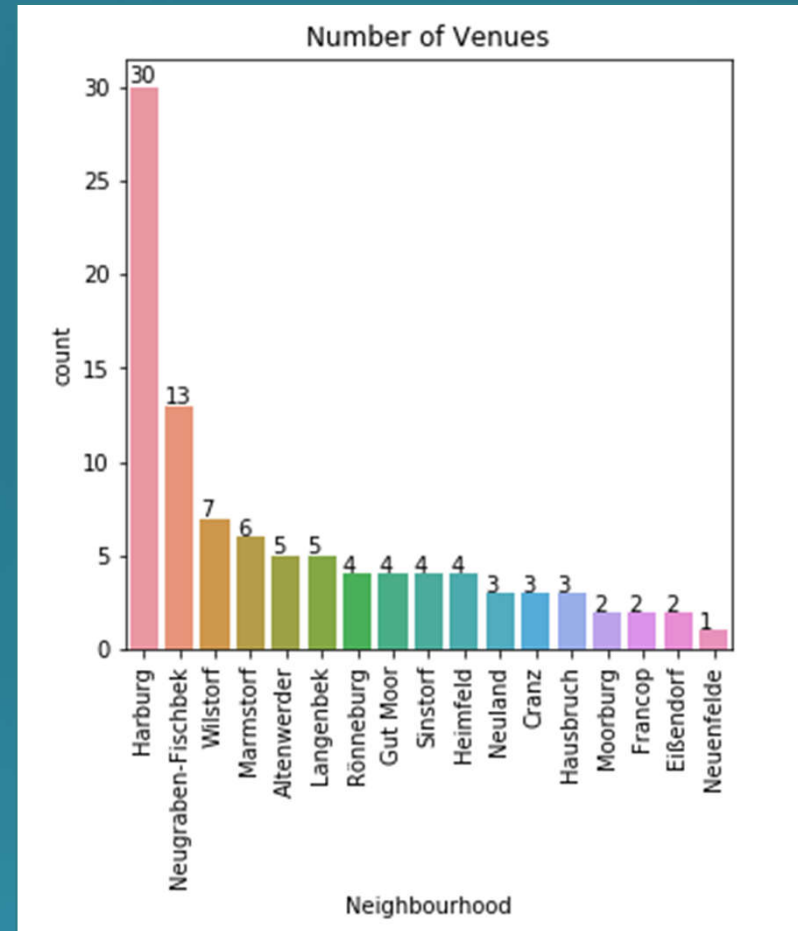
Apart from that also this map shows the familiar clustering of venues around a few hot spots



Venues in Harburg

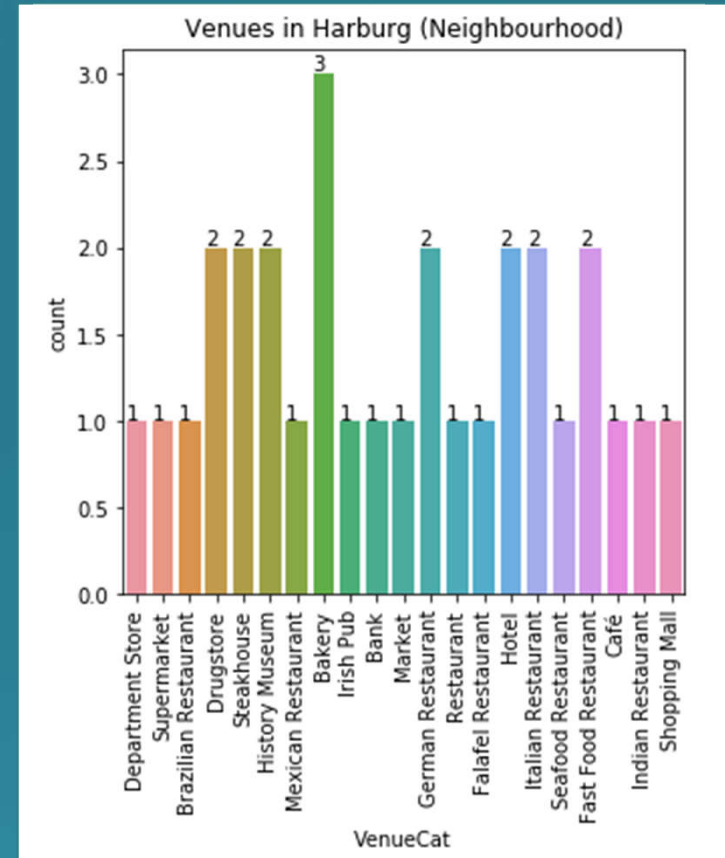
The distribution of venues on the frequency graph is similar to the distribution of venues in Altona, one Neighbourhood with a lot of venues and most of the rest in the single-digit range of venues.

The word cloud for Harburg confirms the mixed characteristics we concluded from the map as it shows restaurants, as indicator for urban neighbourhoods, and supermarket, as indicator for rural neighbourhoods, both in prominent positions.



Most urban Neighbourhood: Harburg

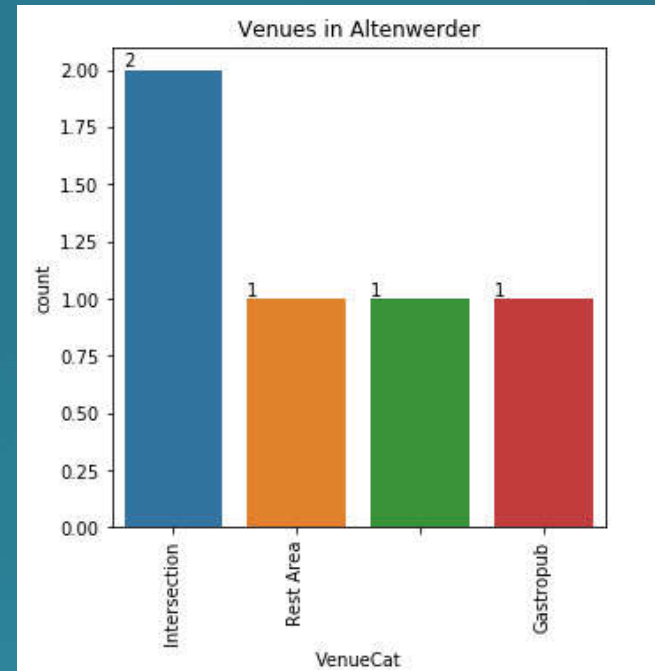
- Again a big amount of venues with just one occurrence
- Diverse word cloud with restaurant and bakery in prominent places.



Most rural Neighbourhood: Altenwerder

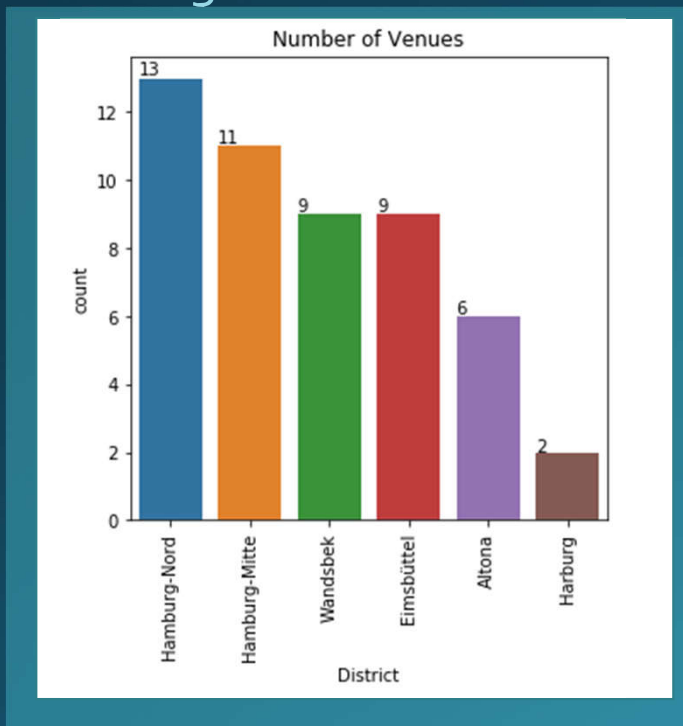
- Lack of venues and the characteristic of those present underline the rural character

Intersection
Gastropub
Rest
Station
Area
Train

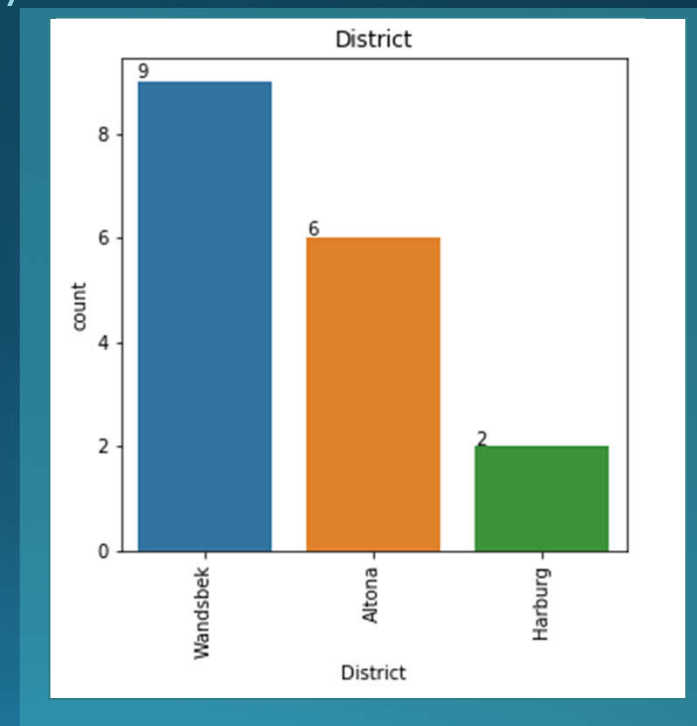


Methodology / Results for Recommendation

Number of Italian Restaurants in Hamburg



Number of Italian Restaurants in the analysed Districts

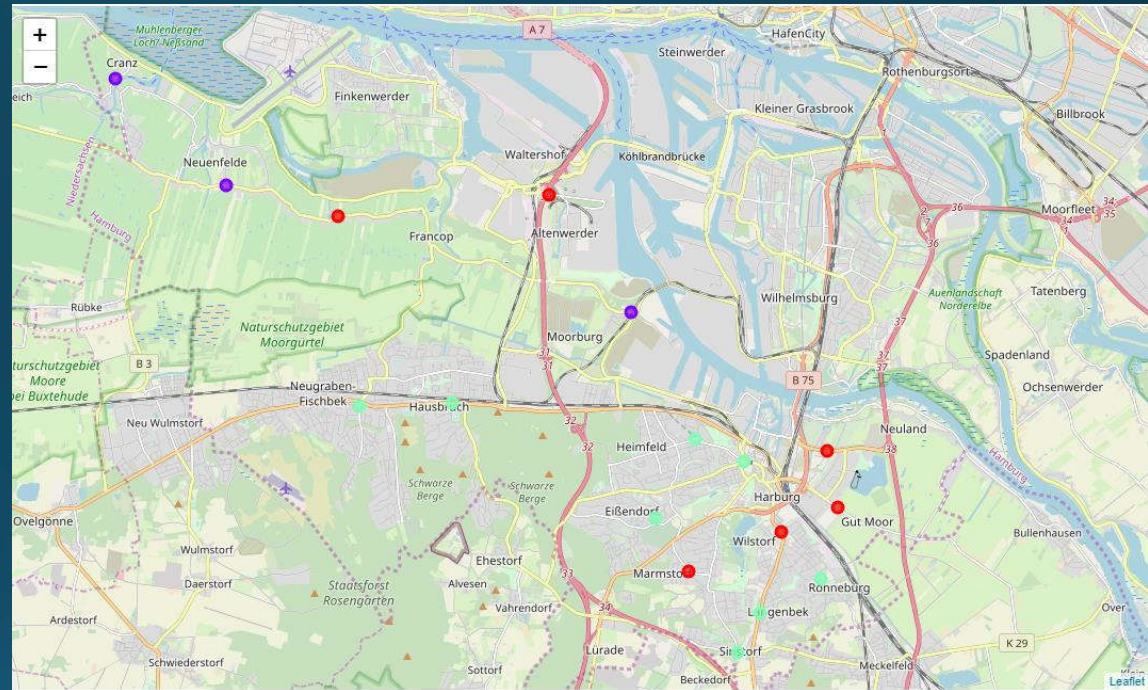


Clustering

Cluster 0 (red dots): The market is not saturated

Cluster 1 (purple dots): The markets are saturated

Cluster 2 (sage dots): The markets are not yet saturated.

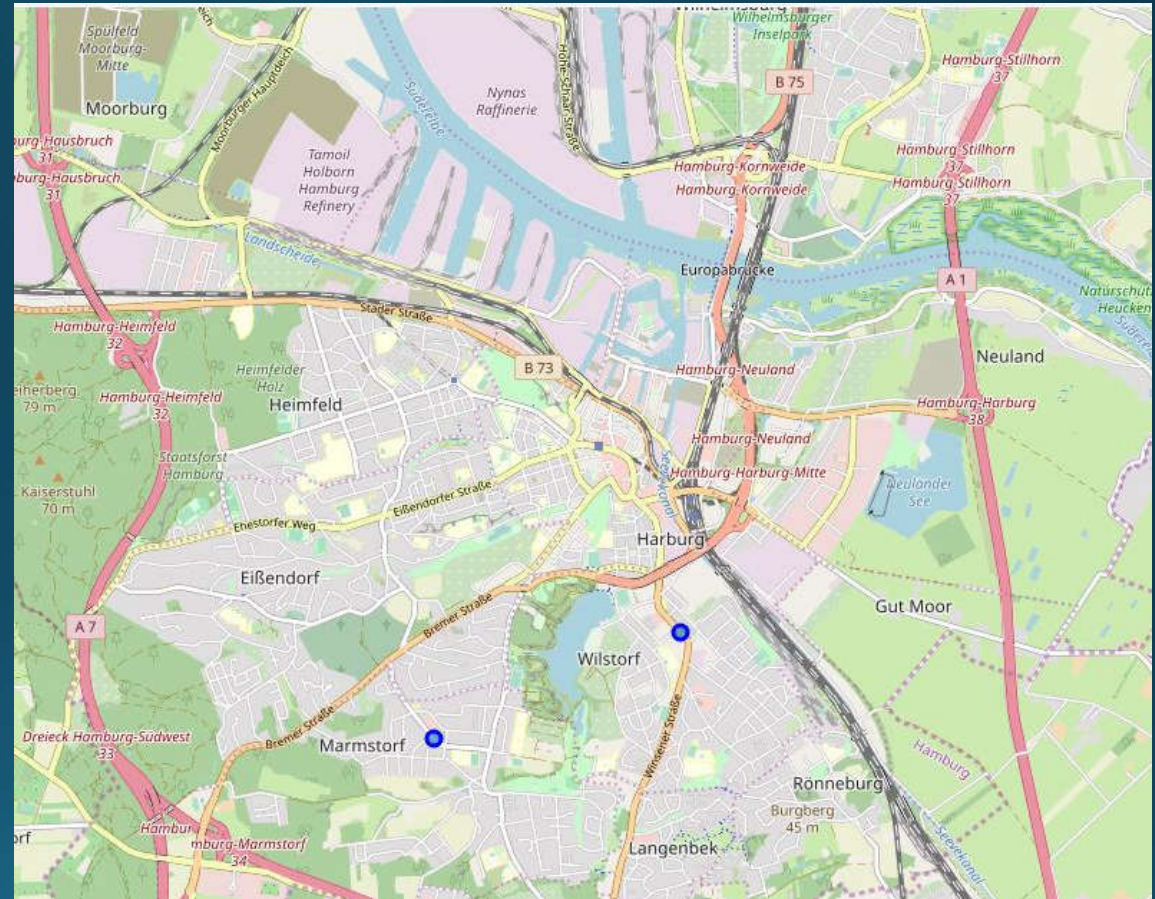


	Eastern European Restaurant	Falafel Restaurant	Fast Food Restaurant	German Restaurant	Greek Restaurant	Indian Restaurant	Italian Restaurant	Mexican Restaurant	Restaurant	Seafood Restaurant	Szechuan Restaurant	Turkish Restaurant	Total	Total Sum
cluster0	0.000	0.000000	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
cluster1	0.000	0.000000	0.000000	0.888889	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.888889	1.777778
cluster2	0.025	0.004167	0.070833	0.059615	0.09375	0.004167	0.008333	0.004167	0.004167	0.004167	0.009615	0.009615	0.297596	0.595192

Recommendation

- neighbourhoods with the highest population density
- neighbourhoods with the largest population for my recommendation.

	Neighbourhood	District	Population	Density	Latitude	Longitude	Total	Cluster_Labels
7	Marmstorf	Harburg	8929.000	1539	53.43991	9.96058	0.0	0
3	Wilstorf	Harburg	17.506	5149	53.44746	9.99021	0.0	0



DISCUSSION

- Quite thin data basis - foursquare is not as popular in Germany, as it is in the US and Canada.
- Cross check with more complete data set, like Google Maps
- Further analysis like comparing the identified most urban and most rural neighbourhoods with the characteristics of the neighbourhoods that were the assumed centres of the independent cities before 1937, might bring further insights

CONCLUSION

- The centres of Altona and Wandsbek moved away from the assumed centres before the incorporation into Hamburg
- Not the case for Harburg:
 - separation of Harburg from the centre of Hamburg by the river Elbe
 - Hamburg Port located between Harburg and Hamburg centre
- Marmstorf and Wilstorf in the Harburg District are the most promising locations for a new Italian restaurant