Coursera - Capstone Project

Segmenting, Clustering Neighbourhoods in Zurich + Analysing Restaurants in the region of Fluntern

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Business Problem and Background

My friend lives in Zurich, Switzerland and wants to open a restaurant in the premium segment. It is known that some areas more crowed with restaurants than other. For instance, a famous area for nightlife and restaurants is around the "Langstrasse".

His main question is if he should open his restaurant in an area, where there already many restaurants and competition is fierce or if he should open the restaurant in an area where less restaurants exists. One example of an are with a low density of Restuarants miht be the region of Kirche Fluntern.

Tasks:

1. Give an overiew about the the different bouroughs/neighboorhoods (Kreise) in Zurich and what are the top venues for this Kreise.
2. Visualize and analyze the Restauarants around the 12 Kreise of Zurich
3. Visualize and analyze the Restauarants in the are of "Kirche Fluntern"

Data used

- List of the "Kreise" (=boroughs) of Zurich from Wikipedia https://de.wikipedia.org/wiki/Stadtteile_der_Stadt_Z%C3%BCrich: This data is needed to get information about the borughs
- Geopy client: In addition to boroughs of Zurich, we will need the Geopy clien for the geolocation
- Foursquare API: o get venues and especially restaurants around a specific location
- Google Search to clear outliners/wrong entries

	Borough	Neighboorhood	Area_km2	Residents	Density_capita_per_km2	Latitude	Longitude
0	Kreis 1	Altstadt	1.80	5'750	3194	47.3722	8.54233
1	Kreis 2	Kreis 2	11.07	34'877	3151	47.3453	8.53363
2	Kreis 3	Wiedikon	8.65	50'569	5846	47.3663	8.51071
3	Kreis 4	Aussersihl	2.90	28'729	9907	47.4917	8.70673
4	Kreis 5	Industriequartier	1.99	15'579	7829	47.3875	8.52063
5	Kreis 6	Kreis 6	5.10	34'321	6730	47.3934	8.55036
6	Kreis 7	Kreis 7	15.02	38'191	2543	47.3712	8.57669
7	Kreis 8	Riesbach	4.81	16'788	3490	47.3575	8.55986
8	Kreis 9	Kreis 9	12.07	55'765	4620	47.381	8.47991
9	Kreis 10	Kreis 10	9.09	40'341	4438	47.4047	8.504
10	Kreis 11	Kreis 11	13.42	75'344	5614	47.4169	8.52986
11	Kreis 12	Schwamendingen	5.97	32'483	5441	47.405	8.57241

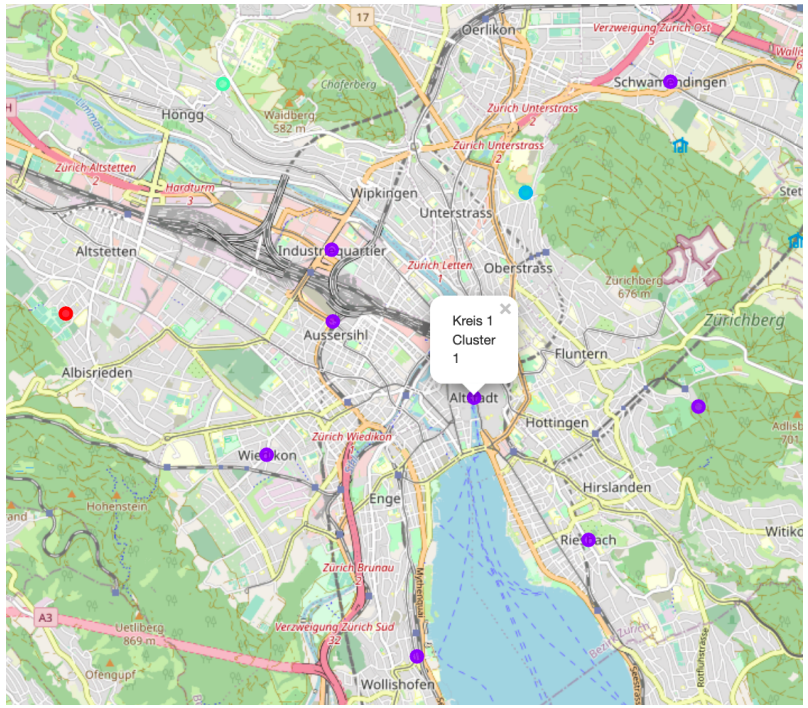
Methodology

- **Data scrapping:**
  - Wikipedia page
  - Geopy client to get the geolocation.
  - Foursquare API: venue information in these neighbourhoods,
- **Data wrangling**
- **Data Visualization**
  - Folium library.
- **Machine Learning**
  - K-Means: Segment and cluster neighbourhoods

Summary of the Results (1/2)

Task 1

If you look at the map, you see many neighbourhoods belong to cluster 2 (purple). In this cluster are mainly restaurants (see list below). Examining the other cluster the data seem to be inconsistent. It can be a can be assumed that not enough venue entries are accessible.




```
zh_merged.loc[zh_merged['Cluster Label'] == 1, zh_merged.columns[[1] + list(range(5, zh_merged.shape[1]))]]
```

]:

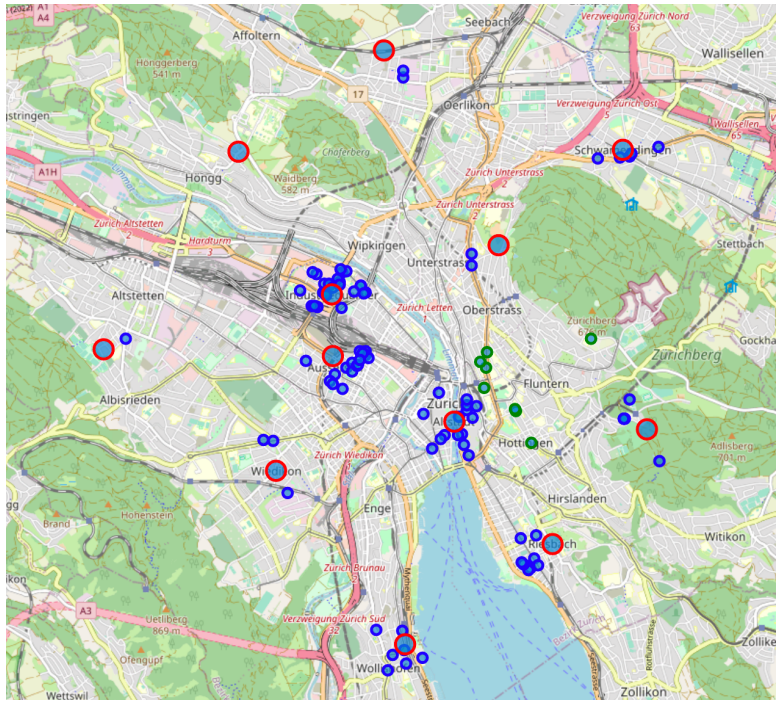
	Neighboorhood	Latitude	Longitude	Cluster Label	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Altstadt	47.3722	8.54233	1	Café	Swiss Restaurant	Bar	Cocktail Bar	Department Store	Lounge	Plaza	Pedestrian Plaza	Boutique	French Restaurant
1	Kreis 2	47.3453	8.53363	1	Restaurant	Bus Station	Supermarket	Community Center	Mediterranean Restaurant	Pier	Fast Food Restaurant	Cheese Shop	Music Venue	Building
2	Wiedikon	47.3663	8.51071	1	Tram Station	Italian Restaurant	Supermarket	Restaurant	Video Store	Plaza	Asian Restaurant	Lounge	Hotel	Coffee Shop
3	Aussersihl	47.3801	8.5207	1	Bar	Restaurant	Italian Restaurant	Swiss Restaurant	Park	Café	Wine Bar	Outdoors & Recreation	Hotel	Food Court
4	Industriequartier	47.3875	8.52063	1	Nightclub	Bar	Bakery	Restaurant	Café	Pizza Place	Italian Restaurant	Hotel	Falafel Restaurant	Mexican Restaurant
6	Kreis 7	47.3712	8.57669	1	Swiss Restaurant	Spa	Molecular Gastronomy Restaurant	Restaurant	Hotel	South American Restaurant	Music Venue	Scenic Lookout	Golf Course	Cable Car
7	Riesbach	47.3575	8.55986	1	Supermarket	Italian Restaurant	Restaurant	Bakery	Taverna	Swiss Restaurant	Wine Bar	Mexican Restaurant	Farm	Plaza
11	Schwamendingen	47.405	8.57241	1	Italian Restaurant	Thai Restaurant	Fast Food Restaurant	Shopping Mall	Café	Bus Station	Supermarket	Swiss Restaurant	Plaza	Asian Restaurant

```
zh_merged.loc[zh_merged['Cluster Label'] == 2, zh_merged.columns[[1] + list(range(5, zh_merged.shape[1]))]]
```

Summary of the Results (2/2)

Task 2

As already indicated in the result of Task 1 not all neighbourhoods have a lot of restaurants. Out of the 12 boroughs the main restaurants areas are: **Kreis 1 (Old City), Kreis 4, Kreis 5** (blue points)**.** If he wants to open a Restaurant where there are already a lot of other Restaurants I recommend to open it in one of these areas



Task 3

The region of Kirche Fluntern (green points), might be a valid option for opening a restaurant in the premium segment. Although it is not known for it's restaurant district, there are living many people (Kreis 6: 34'321 & Kreis 7: 38'191) with high income* and therefore a chance entering an new market.

Conclusion

My friend has to decide if he wants to open the restaurant

a) In a region with a high density of restaurants, which means more competition, more demand

b) In a region with a low density of restaurants, which means less competition, less demand

If he chooses **option a**) I recommend the following areas: **Kreis 1 (Old City), Kreis 4, Kreis 5.** If he chooses **option b)** the area of **Kirche Fluntern** seems to be a possible choice.

The analysis does not show which option is the better one. For this further analysis needs to done. For instance:

- Where is an appropriate space available?
- What are the costs?
- What cuisine should be offered (depending on the needs)?
- etc.

In the end the success of the restaurants relies on the whole concept and mot only on the location.