

Exploring a good district for opening a new Japanese restaurant in Zurich

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1. Introduction

Zurich is one of the largest cities in Switzerland. These days, Japanese food such as Sushi can be easily found in the supermarkets of Zurich even though this city is located in the middle part of Europe. This fact implies that the potential interest of people in Japanese cuisine has been increasing. Considering this fact, opening a new Japanese restaurant in Zurich would be a good idea. However, there are already some Japanese restaurants in Zurich. Therefore, it is important, especially for people who are interested in opening a new Japanese restaurant in Zurich, to know which district is less crowded with Japanese restaurants. In addition, they should also know in which district there are many train stations because a lot of people who are potential customers come to stations every day. In this capstone project, I will show which district of Zurich is the best for opening a new Japanese restaurant in terms of the numbers of Japanese restaurants and train stations.

2. Data

- Based on the coordinates, a district, which is called "Kreis," is assigned to each restaurant. In order to do the assignment of restaurants, the geojson data of districts are obtained from the web page of Open Data Katalog provided by Stadt Zurich (<https://data.stadt-zuerich.ch/dataset?sort=score+desc%2C+date+last+modified+desc&tags=geodaten&q=+Postleitzahl+zurich>). The boundaries of the Kreis are shown in Fig. 1.
- The names and coordinates of Japanese restaurants are imported using Foursquare. As a reference, Japanese restaurants in Kreis 1 is shown in Fig. 2.
- The list of train stations of Zurich including their coordinates is taken from Wikipedia

([https://en.wikipedia.org/wiki/Category:Railway_stations_in Zürich](https://en.wikipedia.org/wiki/Category:Railway_stations_in_Zürich)). The screen shot of the obtained list is shown in Fig. 3.

- The numbers of restaurants and stations are determined for each district and shown in Fig. 4. This data can be used for revealing which area is more competitive and good for transportation.

Out[26]:

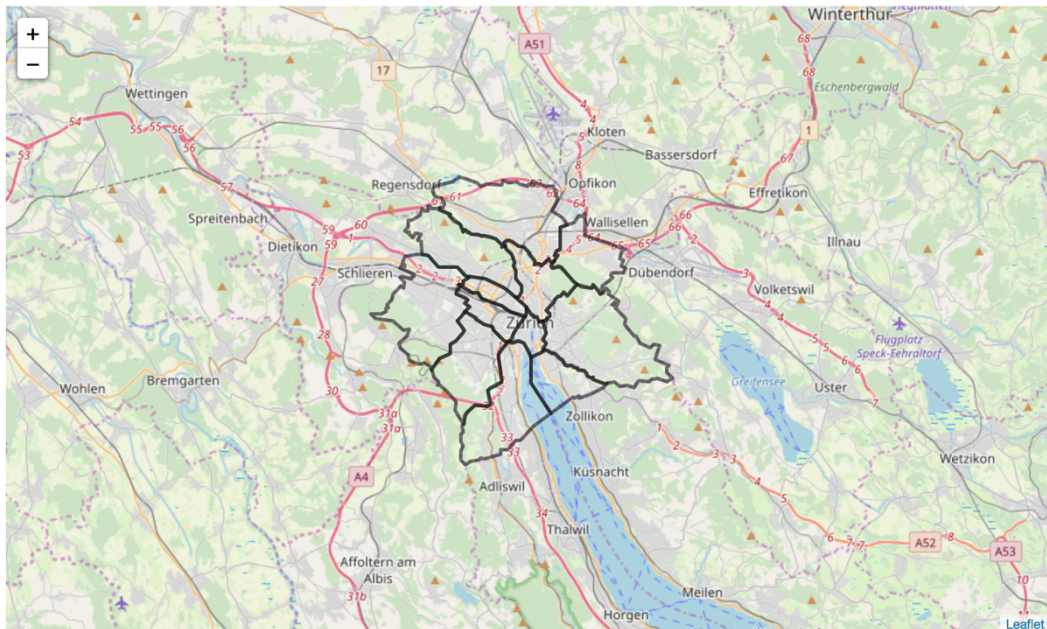


Fig. 1 The boundaries of the districts (Kreis)

| | name | categories | Kreis | lat | lng |
|----|--------------------|---------------------|-------|-----------|----------|
| 0 | O'Tabe | Japanese Restaurant | 1 | 47.368881 | 8.538315 |
| 1 | Negishi Sushi Bar | Sushi Restaurant | 1 | 47.371517 | 8.535471 |
| 2 | Sushishop | Sushi Restaurant | 1 | 47.372857 | 8.535131 |
| 3 | Takano City | Japanese Restaurant | 1 | 47.374636 | 8.535804 |
| 4 | Negishi Sushi Bar | Japanese Restaurant | 1 | 47.370853 | 8.543192 |
| 5 | Isakaya | Japanese Restaurant | 1 | 47.376640 | 8.540564 |
| 6 | Yooji's sushi deli | Sushi Restaurant | 1 | 47.378033 | 8.538804 |
| 7 | Sora Sushi | Sushi Restaurant | 1 | 47.377623 | 8.539133 |
| 8 | Barfüsser | Sushi Restaurant | 1 | 47.373601 | 8.544591 |
| 9 | Yooji's | Sushi Restaurant | 1 | 47.367173 | 8.546464 |
| 10 | Re Place Iko Miki | Ramen Restaurant | 1 | 47.370627 | 8.549584 |
| 11 | Yooji's | Japanese Restaurant | 1 | 47.376387 | 8.539659 |
| 12 | Nippon Sushi Bar | Japanese Restaurant | 1 | 47.374152 | 8.536871 |

Fig.2 The screen shot of the list of Japanese restaurants in Kreis 1.

| | station | Kreis | latitude | longitude |
|----|---------------------------------------|-------|-----------|-----------|
| 0 | Zürich Stadelhofen railway station | 1 | 47.366667 | 8.548611 |
| 1 | Zürich Hauptbahnhof | 1 | 47.377778 | 8.540278 |
| 2 | Zürich Manegg railway station | 2 | 47.338216 | 8.519881 |
| 3 | Zürich Leimbach railway station | 2 | 47.333600 | 8.519100 |
| 4 | Zürich Enge railway station | 2 | 47.365278 | 8.531944 |
| 5 | Zürich Wollishofen railway station | 2 | 47.347800 | 8.533800 |
| 6 | Zürich Brunau railway station | 2 | 47.351952 | 8.526496 |
| 7 | Zürich Friesenberg railway station | 3 | 47.364700 | 8.508000 |
| 8 | Zürich Wiedikon railway station | 3 | 47.371400 | 8.523600 |
| 9 | Zürich Triemli railway station | 3 | 47.365000 | 8.495200 |
| 10 | Zürich Schweighof railway station | 3 | 47.365000 | 8.503300 |
| 11 | Zürich Saalsporthalle railway station | 3 | 47.357900 | 8.521800 |
| 12 | Zürich Binz railway station | 3 | 47.362846 | 8.517945 |
| 13 | Zürich Giesshübel railway station | 3 | 47.362152 | 8.521340 |

Fig.3 The screen shot of the list of train stations in Zurich. Only stations in Kreis 1, 2, and 3 are shown in the figure.

| Kreis | Number of restaurants | Number of stations |
|-------|-----------------------|--------------------|
| 1 | 13 | 2 |
| 2 | 3 | 5 |
| 3 | 3 | 7 |
| 4 | 7 | 2 |
| 5 | 6 | 0 |
| 6 | 1 | 0 |
| 7 | 0 | 0 |
| 8 | 4 | 2 |
| 9 | 2 | 1 |
| 10 | 1 | 2 |
| 11 | 3 | 3 |
| 12 | 0 | 1 |

Fig. 4 The screen shot of the numbers of Japanese restaurants and stations.

3. Methodology

- The district (Kreis) where the number of Japanese restaurants is large is emphasized by a choropleth map in order to understand a crowded district visually.
- More qualitative evaluation will be done by comparing bar charts of the number of Japanese resutaurants and that of stations.
- By taking the ratio of the number of Japanese restaurants and that of stations, the most ideal district is determined.

4. Results and discussion

The obtained data is shown as a choropleth map in Fig. 5. In the map, the position of the Japanese restaurants and stations in Zurich are also shown by blue and black circles, respectively. As you can see in Fig. 5, the central part (Kreis 1) is a very competitive area. This district is the one where the Zurich main station exist.

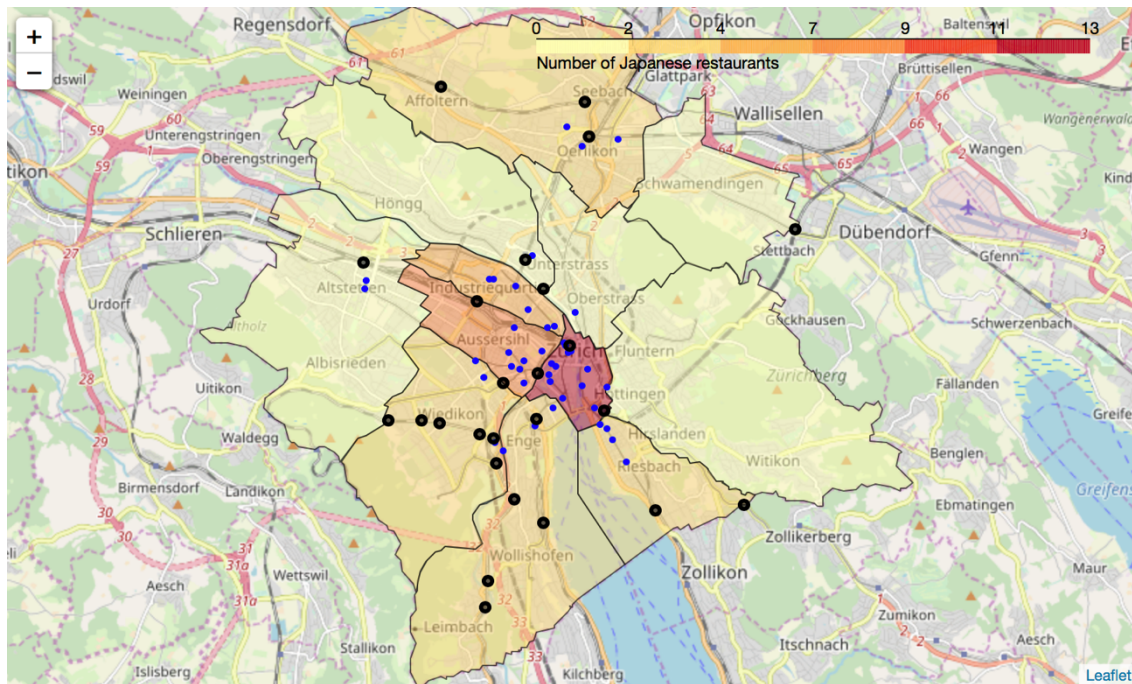


Fig.5 The choropleth map for showing the number of Japanese restaurants. The black and blue circles indicate the positions of stations and Japanese restaurants, respectively.

Figure 6 shows bar charts of the number of stations and Japanese restaurants. There are some notable features:

- The number of Japanese restaurants in Kreis 1 is large even though there are only 2 stations. However, it should be noted that there is the Zurich main station in this district.
- In Kreis 7, there are relatively many train stations. Compared to the number of stations, that of the Japanese restaurants is relatively small.
- There are no train stations in Kreis 5, 6, and 7.
- There are no Japanese restaurants in Kreis 7 and 12.

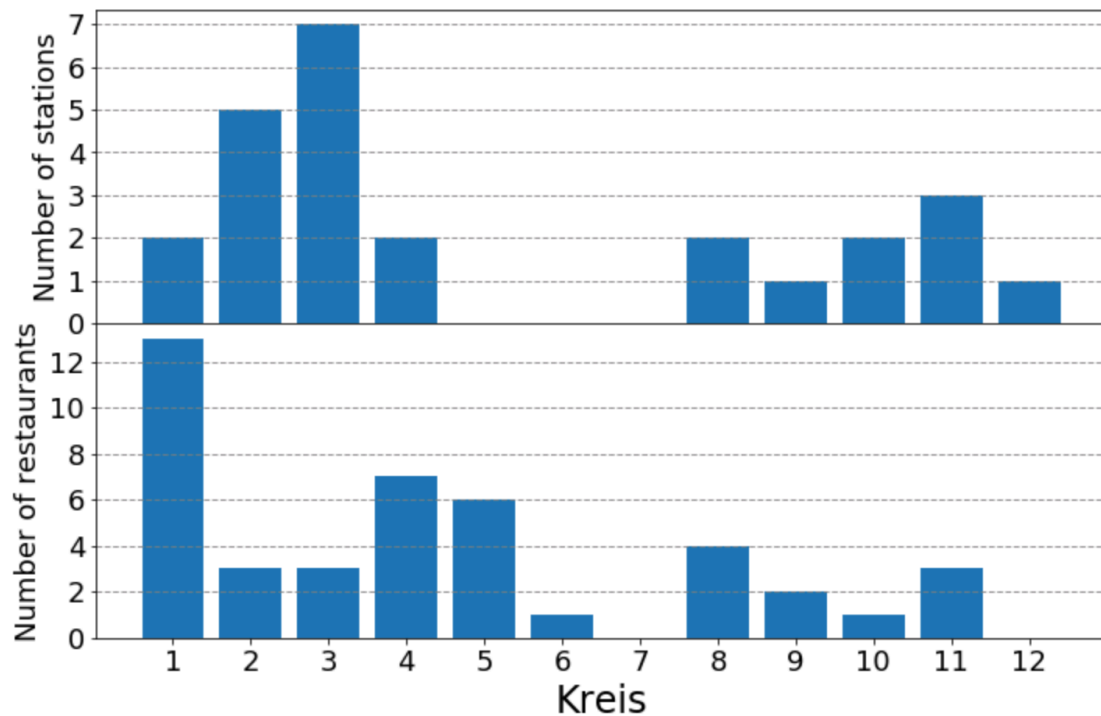


Fig. 6 The numbers of Japanese restaurants and stations

Now, we would like to find the district where the number of the restaurants is small and that of the stations is large. In order to consider both factors, the ratio R is defined by

$$R = N_{\text{sta}} / N_{\text{res}},$$

where N_{sta} is the number of stations and N_{res} is the number of restaurants. The parameter R always satisfies $0 \leq R$. If the ratio R is large, there are not so many Japanese restaurants, but relatively many stations in the corresponding district has not many. Hence, the district with a large R is an ideal area for opening a new Japanese restaurant in terms of good transportation and number of other Japanese restaurants.

In the case that N_{sta} is not equal to 0 and N_{res} equals 0, R becomes infinite. In this case, for the sake of simplicity, R is replaced by -0.5 so that you can easily distinguish such data. The calculated parameter R is shown in Fig. 7.

From the Fig.7, you can learn:

- Kreis 12 is less competitive. There are no Japanese restaurants, but there is at least one station.
- Kreis 3 and Kreis 10 are also relatively good. The high R parameters show that there are many stations compared to the number of Japanese restaurants.

- Kreis 5, 6, and 7 are worst in terms of transportation because the R parameters have the value of 0.

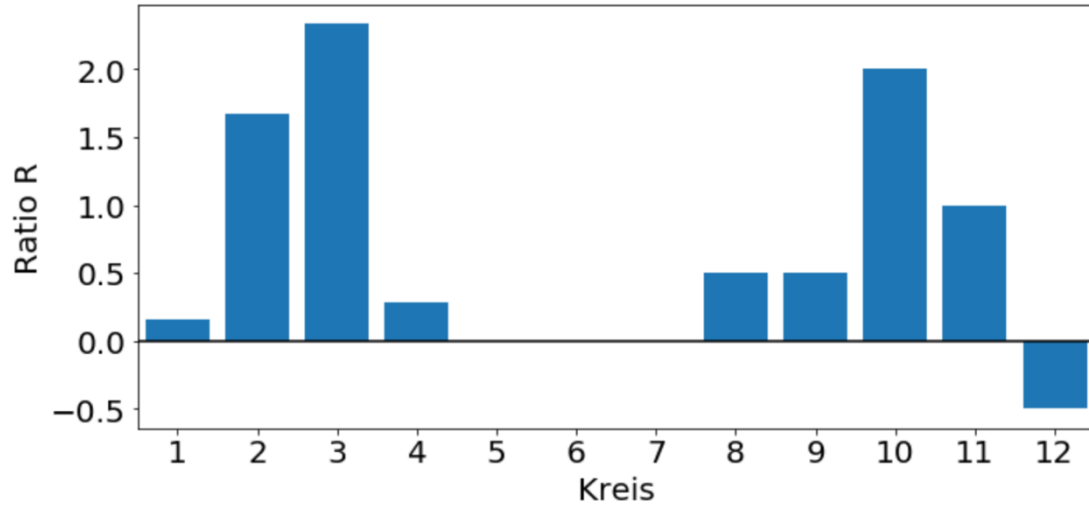


Fig. 7 The ratio of the number of stations N_{sta} and that of Japanese restaurants N_{res} . If N_{sta} is not equal to 0 and N_{res} equals 0, the ratio takes the value of -0.5 for the sake of simplicity.

5. Conclusion

Possible districts for opening a new Japanese restaurant are Kreis 3, 10, and 12. From the analysis, the following conclusions are derived.

- Kreis 12 is less competitive. There are no Japanese restaurants, but there is one station.
- Kreis 3 and Kreis 10 are also relatively good because the number of stations is relatively large compared to that of Japanese restaurants.
- Kreis 5, 6, and 7 are worst in terms of transportation. In fact, there are no train stations.

