Concert halls in Switzerland : a territorial study

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Introduction

Culture is a major factor when measuring a city's attractivity, whether it is for attracting tourists, skilled people, or simply to increase the well being of the inhabitants and their quality of living.

There are regular discussions about cultural fundings, and here in Switzerland, the language situation (with 4 different official languages, but we will probably not have 'Romanche' speaking cities, given it is a rural population, and represents less than one % to the total population), and the federal regime, with highly independant states (called canton), makes this issue even more closely followed.

One of the component of cultural activity, is the music scene, and one way to measure how lively is the musical scene in a city, is through the concert halls.

The following study, aims to compare the major cities in Swizerland in terms of concert halls per capita, to provide an insight to the federal authorities, music professionals or simply to people interested in the cultural state of things from a numbers perspective, on the current distribution of the venues between the cities, opening the door for more focused studies on the budget side of things, to see how the discrepancies, if any, between the different territories could be explained, solved.

By grouping the cities into distinct clusers, based on the number of venues per capita, but also the number of inhabitants, we should be able to provide the insight needed to explore further the issue. Through a chloropeth map, we will also be able to see how the territory part, affects the distribution.

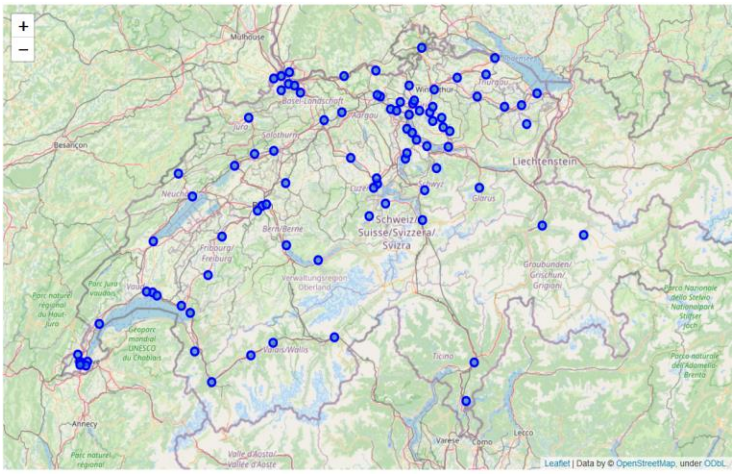
Data sources

I. Data on Cities

Data on cities will include:

- Geospatial coordinates
- The state in which the city is located
- The population
- The name of the city

All this data will be scrapped from the website https://simplemaps.com/data/ch-cities as a downloadable csv.



II. Data on concert halls

Based on foursquare, we will be able to retrieve the venues, located in the different cities. Here is an example of concert hall as described in foursquare. https://foursquare.com/v/lusine/4adcdab5f964a5209a5021e3 A concert hall, is considered a 'Category' and this data should be easy to extract using the API.

We will be only focusing on the number of venues, we will need to defines the radius used to include a venue in the city or not.

Methodology

Data processing

I. Cleaning the data

As stated in the data part, we have gathered the information on the venues through Foursquare API, under some constraints :
- Limited number of calls to the API allowed per day
- Limits in the data reliability

After trying to recommendations endpoint, we have decived to go with the ‘Search endpoint’.
In order to make the most of what we had, we have filtered the tables through several manual steps, the details are available in the notebook.


```
{'meta': {'code': 200, 'requestId': '601040ec804dc92cb8ff8da3'},
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', 'suffix': '.png'}, 'primary': True}], 'referralId': 'v-1611677932',
'hasPerk': False}

II. Merging the data from the different sources.

Once the quality of the data on the venues was considered 'acceptable' both sources were merged in order to create the input for our study.

At this stage we have several dataframes, that will allow us to start the statistical exploration

	city	lat	lng	country	iso2	admin_name	capital	population	population_proper
0	Zürich	47.3786	8.5400	Switzerland	CH	Zürich	admin	434008.0	434008.0
1	Geneva	46.2000	6.1500	Switzerland	CH	Genève	admin	201818.0	201818.0
2	Basel	47.5606	7.5906	Switzerland	CH	Basel-Stadt	admin	177595.0	177595.0
3	Lausanne	46.5333	6.6333	Switzerland	CH	Vaud	admin	138905.0	138905.0
4	Bern	46.9480	7.4474	Switzerland	CH	Bern	primary	133798.0	133798.0

Data visualisation and exploratory analysis

I. Statistics to produce

A repartition of the concert venues by 'Canton', will provide a first outlook on how balanced is the distribution of the music venues in Switzerland.
A table providing the concert venue per capita for each city will allow us to have a first statistical answer to the main question, related to the potential discrepancies between cities.

II. Visual Analysis

Using the maplotlib library, and folium we will be able to have figures, helping us reading the data:
- A horizontal bar chart, describing the table A.
- Various maps, will add visibility to the geographical part of the study.

III. Clustering

Finally, using, scikit library, we will try to cluster the swiss cities, to 4 different groups, based on the criteria ‘number of venues per capita’.
As this part is only a complement to the statistical exploration, we will stay really basic in our method, we will only use the default values of the kmeans clustering methodology, to try to define those four groups.

Results

	Cluster Labels	city	lat_x	lng_x	admin_name	population_proper	Venue	bypop
44	1	Interlaken	46.6881	7.8646	Bern	5592.0	24	0.004292
45	0	Bad Zurzach	47.5872	8.2944	Aargau	4242.0	5	0.001179
17	0	Sion	46.2304	7.3661	Valais	34708.0	36	0.001037
39	0	Davos	46.8091	9.8398	Graubünden	10937.0	11	0.001006
37	0	Glarus	47.0331	9.0664	Glarus	12515.0	12	0.000959
29	0	Martigny	46.1000	7.0728	Valais	17998.0	15	0.000833
34	2	Sierre	46.2918	7.5320	Valais	16860.0	12	0.000712
43	2	Appenzell	47.3333	9.4167	Appenzell Innerrhoden	5649.0	4	0.000708
16	2	Chur	46.8521	9.5297	Graubünden	35038.0	23	0.000656
42	2	Altdorf	46.8806	8.6394	Uri	9401.0	6	0.000638
36	2	Brig-Glis	46.3159	7.9876	Valais	13109.0	8	0.000610
24	2	Kreuzlingen	47.6458	9.1783	Thurgau	21801.0	13	0.000596
46	2	Laufenburg	47.5608	8.0594	Aargau	3626.0	2	0.000552
33	2	Olten	47.3531	7.9078	Solothurn	17133.0	9	0.000525
8	2	Lugano	46.0103	8.9625	Ticino	63185.0	33	0.000522
7	2	Sankt Gallen	47.4233	9.3772	Sankt Gallen	75833.0	37	0.000488
23	2	Frauenfeld	47.5558	8.8964	Thurgau	25442.0	12	0.000472
11	2	Bellinzona	46.1956	9.0238	Ticino	43220.0	20	0.000463
13	2	La Chaux-de-Fonds	47.0996	6.8296	Neuchâtel	38965.0	18	0.000462
10	2	Thun	46.7590	7.6300	Bern	43743.0	18	0.000411
20	2	Kriens	47.0344	8.2800	Luzern	26997.0	10	0.000370
31	2	Monthey	46.2500	6.9500	Valais	17563.0	6	0.000342
6	3	Lucerne	47.0523	8.3059	Luzern	81691.0	24	0.000294

Figure 1 Number of venues per capita

The top five ranks, are attributed to small cities, this highlights a bias, in our indicator (venue per capita) which will make some cities stand out, because of the population, ‘Bad Zurzach’ is an example, if we vary, the number of venues from 5 to 4, then its ranking will hugely decrease.

However, this still provides some usefull insights, as in absolute numbers Lausanne, which is 40% less populous than geneva, has more less the same number of concert venues, and therefore a lot high per capita index.

- Valais which is not a populous state, is among the top five, when it comes to the number of venues.

- Same thing, can be said about Ticino.

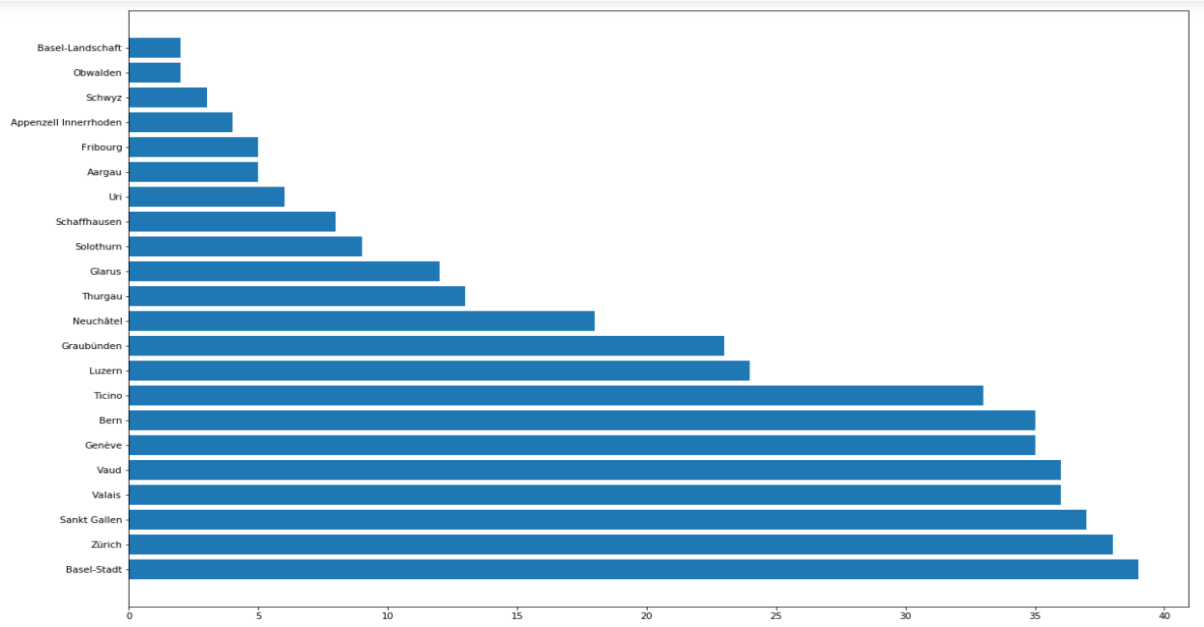


Figure 2 Number of venues per state (canton)

Warning : This is just, an experimental attempt, to see how we could use now that the data is properly sorted, machine learning, and in this case, clustering to try to classify the cities.

By using our indicator, we have 4 distinct groups:

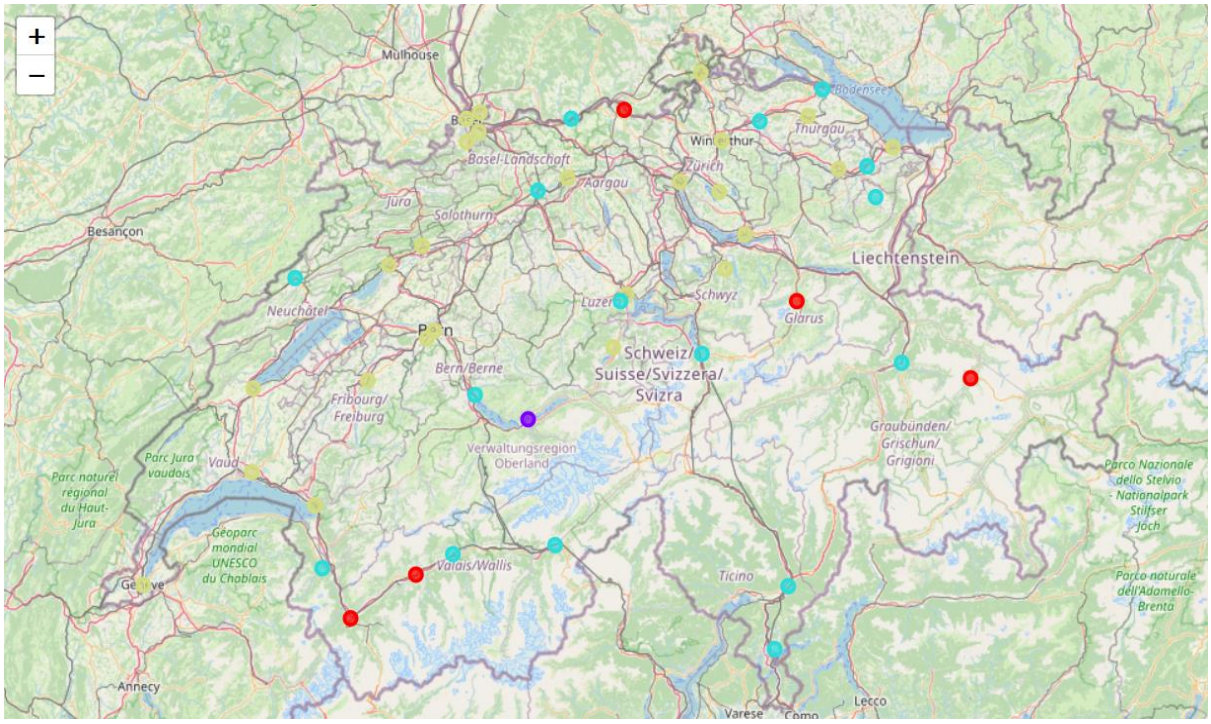
A group for cities with a very high venue per capita, which is constituted by a unique city : Interlaken, this might explained by the fact that the city is famous for holding different festivals all over the year, and being a touristic destination.

Second group, is also made of mainly small cities, and located all over the territory, they correspond to places known for a lively musical scene, or again, places that are touristic destinations all over the year.

Our third group, is basically, cities with an average indicator,

And finally, and this might be, the most interesting indication, the last group is the one where we find the biggest cities, this seems logical, as we've seen before that this indicator, has a bias and favours the small cities, but in this group, we also find smaller cities, that might be good targets for further analysis on how to make them more attractive.

Fribourg canton, is a good example, of a canton, with only cities with poor per capita venue indicators.



Discussion

Foursquare limits, are real in this particular use case, not only the reliability of the data is questionable (category classification) but also the limitations due to the kind of account that was used (free developer account) which limits the number of results, might have altered the quality of the data.

For more interesting statistics, other data like budget for the cultural department in each city, the number of yearly tourists, would also provide interesting insights.

Conclusion : going further

To conclude, thanks for your attention, and hopefully this gives a first glimpse at how numbers and data can improve our knowledge of the cultural scene in a given country.
Lots of ideas, will come, with more data.
It would be interesting to create a more detailed study, focusing on a smaller subset of towns, having the same kind of characteristics, and then try to build a better indicator, going probably further than only Switzerland, to have enough data, so data the results can be put into comparison with what is the situation in different countries (especially those cited as examples, Dublin, or Amsterdam).