Similarities between Swiss Ski Resorts

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1. Introduction

Switzerland has numerous ski areas, all of which have their own advantages. However, not all ski areas offer the same venues. In particular, if you want to spend your holiday in a nearby village, you need to consider which venues you would like to benefit from. Some resorts offer wellness facilities, others focus more on culture, and still others offer a wide range of bars and pubs.

This document provides the details of my submission for the IBM Data Science Professional Certificate program on Coursera.

1.1 Business Problem

For tourists who want to visit more than just one ski area, it is difficult to find out which places suit their needs. Data analysis can help to solve this problem. If a tourist likes what is on offer in the Laax ski area for example, what other areas are quite similar or belong to the same category? The focus of this analysis is based not only on the possibility to ski but also on venues in nearby villages i.e. resorts.

Furthermore, the analysis enables tourist regions to determine their own position and to orientate their marketing activities accordingly.

1.2 Interest

The conclusion of this report is primarily interesting for tourists who want to find ski resorts with similar size or off-piste offers. Therefore, the target audience highly likely stays overnight.

On the other hand, the same evaluation might be helpful for tourist regions to compare themselves with their competitors.

2. Data acquisition and cleaning

2.1 Data sources

2.1.1 List of Swiss Ski Areas and Resorts

The list of Swiss ski areas will be obtained from Wikipedia:
https://en.wikipedia.org/wiki/List_of_ski_areas_and_resorts_in_Switzerland

It not only contains most resorts but also information about their size i.e. the number of lifts and ski pistes.

- Name of Ski area, e.g. Matterhorn ski paradise
- Resorts (nearby villages), e.g. St. Moritz
- Number of lifts, e.g. 114/78/12 (skilift/chair-lift/cable car)
- Number of pistes km, e.g. 239

The assignment of latitude and longitude by using GeoPy will be based on the column "Resort" since this content resprents villages nearby ski areas.

2.1.2. List of nearby venues

The Foursquare location data is used to explore nearby venues. Foursquare provides the following data:

- Venue Name, e.g. Fort D'artillerie
- Coordinates, e. g. 46.026147 / 7.122204
- Category Name, e.g. Museum

Information about the ski area as well as their nearby venues are then used to categorize each resort.

2.2 Data cleaning Swiss Ski Resort

I have to obtain latitude & longitude coordinates for centroids of my candidate resorts. I first obtain data from my sourcepage on Wikipedia. Afterwards, GeoPy will help to find the coordinates of my resort centers.

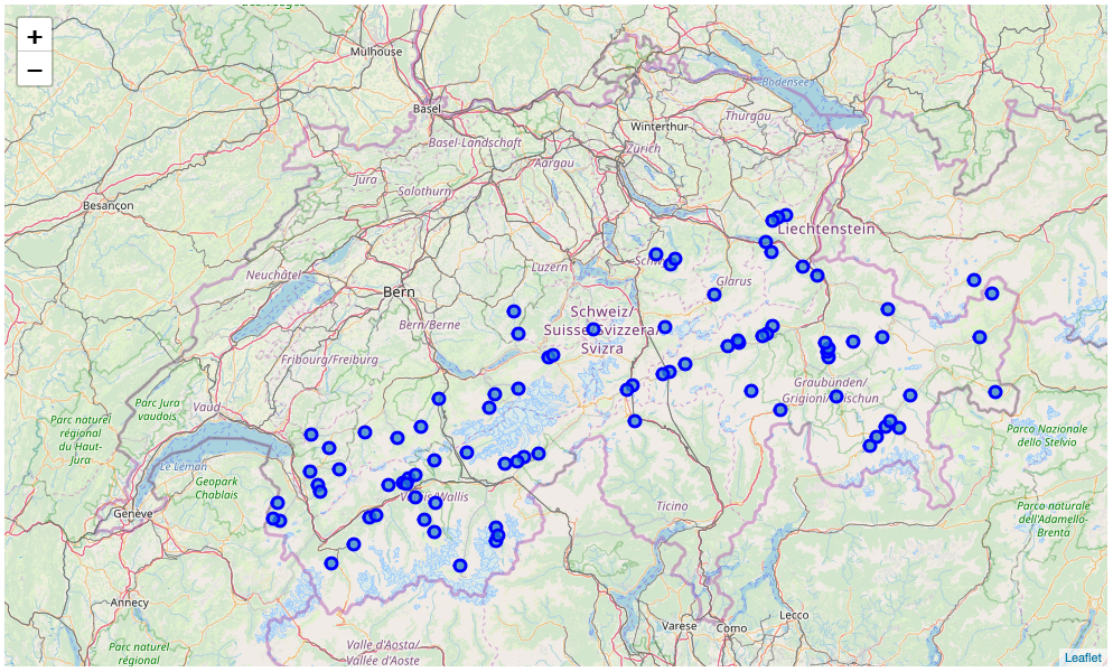
Since one ski area can be composed of several resorts, I will find centroids for all of its resorts. This is chosen because tourists usually stay in the village overnight and not in a ski area itself. Therefore, venues close to a village/resort is more important.

The imported list from Wikipedia comes with information I will not need for this analysis. Therefore, I drop information about Website and altitudes. Furthermore, I split all resorts onto a separate row. Information about the ski areas they belong to is copied onto the new row.

In order to have a better understanding of the size of a ski area, I calculate the total of all lifts (ski lift/chairlift/cable car). As a next step, I normalize the total for lifts and pistes km.

Last but not least, I enhance my data by adding latitude and longitude by using GeoPy. Some resorts names are not only situated in Switzerland but also in another country. For example, there is a Sörenberg in Germany as well. Therefore, I have to add the country code "CH" for every resort. I do this only for obtaining data and not for adding it to the dataframe. There are places, that even occur multiple times in Switzerland. For these, I add the code of canton they belong to such as "VD".

The final dataset for Swiss Ski Resorts has 88 entries.



2.3 Data cleaning for nearby Venues

Now that I have my resort candidates, I use Foursquare API to get info on venues in each resort. We're interested in venues of just a few categories. Despite Foursquare delivers several subcategories such as "Italian restaurant", I am interested in less granular categories as I need info on a wide range of offers within an area.

Considering what tourists would like to do most likely off-piste, I only gather venues of the following categories:

- Culture & Entertainment
- Events
- Nightlife
- Nature & Leisure
- Business & Services
- Railway station
- Bicycle rental
- Motorhome parking
- Car rental

Restaurants deliberately do not belong to these categories. In every resort, they are present in an extremely large number, which would have a negative effect on the analysis results. The same is true for hotels and supermarkets.

First, I need to obtain all kind of nearby venues. Since I am looking for venues within an entire village, I set a radius of 1.5 kilometers. Most resorts are located in remote places. Therefore, this range will cover an appropriate area. The search will go for a maximum of 100 venues within the given radius. Found venues, its coordinates and categories are returned in a dataset. I drop all rows with a venue Ski Area, Cable Car, Chairlift, Mountain and Ski Trail since I only list places next to a ski area. Therefore, these subcategories are irrelevant and moreover, not consistent across all resorts. I will ignore supermarkets as well. I then group some slight naming differences within a subcategory to one larger group, e.g. Ski Bar and Après Ski. I do the same for Cafés, Spa, Gym and Towns.

The final dataset for Venues has 1189 entries and 158 unique categories.

So now I have all Ski Areas in Switzerland and its resorts. I also know nearby venues in an area within 1.5 kilometers from each resort, and I know which ones are from what category.
This concludes the data gathering phase - we're now ready to use this data for analysis to produce the report on the similarity of Swiss Ski Resorts!

3. Methodology

In this project I will direct my efforts on detecting Swiss Ski resorts that have high similarities regarding its size and nearby venues or in other words with a view on offers that can also be obtained off-piste. I will limit my analysis to area 1.5km around resort centers.

In first step I have collected the required data: ski areas and venues. I have identified every resort of which a ski area is composed of. After, I obtained location and categories of venues within 1.5km from each resort center. For each resort I limited the number of categories to the given nine and the number of venues to 100.

Second step in my analysis will be exploring the venue categories across different resorts. I will figure out in what categories a specific resort is very strong and in what categories it has slighter density of offers. Then, I combine these results with the size of each ski area a resort belongs to. In order to find categories, all this information is used to create clusters (using k-means clustering). With the python folium library, I will present a map of all ski resorts to visualize their cluster. A description of the clusters completes the work.

3.1 Top ranking of nearby venues

In order to see trends regarding venue categories, I use one-hot encoding to calculate the frequency of occurrence of a venue category for each resort. The frequency over all resorts shows the mean occurrences of categories. It would show outliners, such as restaurants and hotels would be. Within the top five you can see Bars, Après Ski and Sporting Good Shops which, as expected, are typical for ski resorts. Offers for spa, culture or other adventures follow later on.

Bar	0.124446
Train Station	0.061660
Sporting Goods Shop	0.057576
Trail	0.056654
Après Ski	0.052064

Top five overall venues

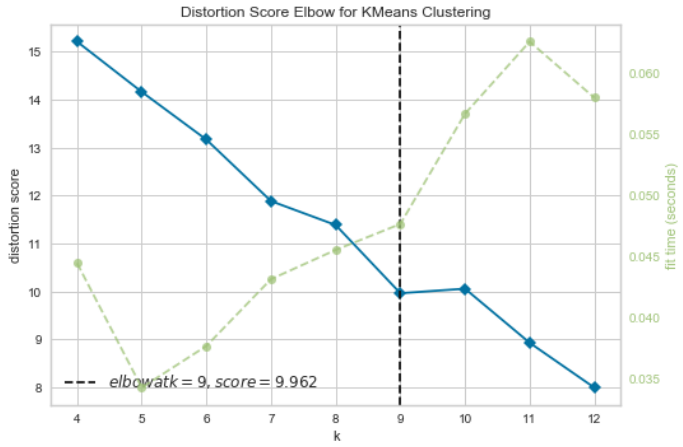
This is just an overall information how an average resort might look like. But what are the most common venues for each resort? I examine the top 10.

	Resort	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	Alt St. Johann	Trail	Bar	Zoo Exhibit	Garden Center	Garden	Furniture / Home Store	Forest	Food & Drink Shop	Flower Shop	Festival
1	Aminona	Museum	Gift Shop	Garden Center	Garden	Furniture / Home Store	Forest	Food & Drink Shop	Flower Shop	Festival	Farmers Market
2	Andiast	Stables	Zoo Exhibit	Gastropub	Garden	Furniture / Home Store	Forest	Food & Drink Shop	Flower Shop	Festival	Farmers Market
3	Barzettes	Bar	Photography Studio	Rental Car Location	Train Station	Bike Rental / Bike Share	Sports Bar	Gym	Museum	Trail	Cheese Shop
4	Bettmeralp	Bar	Après Ski	Sporting Goods Shop	Mini Golf	Sports Bar	Food & Drink Shop	Home Service	Bathing Area	Zoo Exhibit	Garden

Extract of the top 10 of each resort

3.2 Clustering Ski Resorts

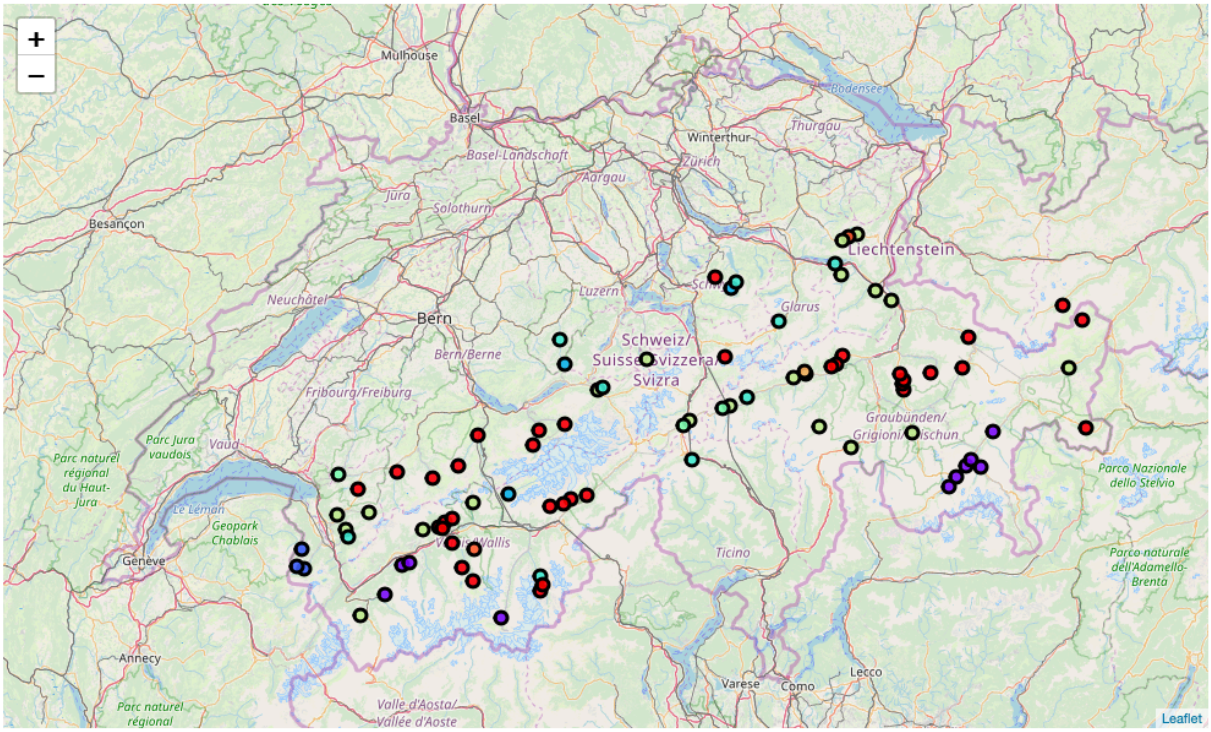
I first merge the normalized information of lifts and pistes km with the one-hot encoded data of all venues. This is my base for creating clusters. Then I define 'k' i.e. the number of clusters. To find the best k I use the Elbow method. To do so, I calculate the Within-Cluster-Sum of Squared Errors (WSS) for different values of k and choose the k for which WSS first starts to diminish. The calculation can be done with a python library called Yellowbrick. If I set the parameter to find the best k between 4 and 13, I find an elbow at k=9 as the following figure shows:



So, I will set this as number of clusters for my k-means algorithm.

4. Results

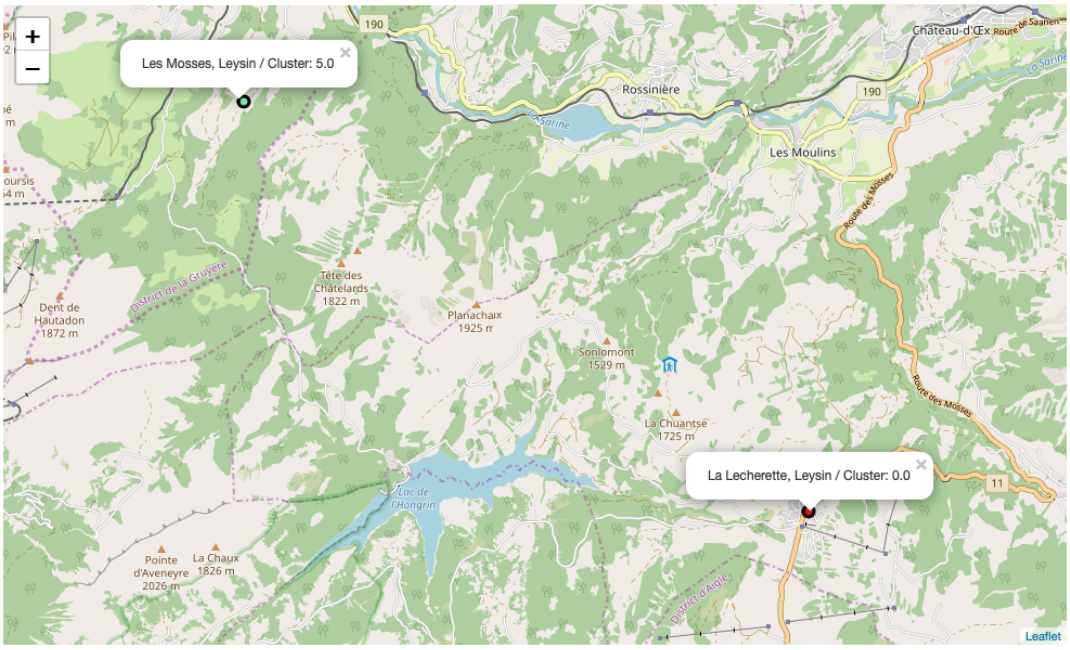
Mapping the output of k-means, Swiss Ski Resorts can be divided into clusters as follows:



Let's sort my results by cluster 0.0 as an example and analyze it. What do I see? Well, the opening question of this report was the following: If a tourist likes what is on offer in the Laax ski area for example, what other areas are quite similar or belong to the same category?

Having a look on Laax I can first see that there is no big difference between its resorts. If I were staying in Laax itself, I can also go to Flims or Falera. Both resorts belong to same category which means that they most likely offer similar venues accessible within 1.5km.

Second, I could choose another resort, 'Leysin' for example. There are two resorts belonging to this ski area: La Lecherette and Les Mosses. If I want to stay in a resort of the same category as Laax, I should prefer La Lecherette, because Les Mosses belongs to another cluster.



Analyzing each cluster itself, I can describe them as follows:

Cluster 0.0 (red):	This is the biggest cluster. It contains resort without a clear trend of similar top venues but a wide variety. There are also resorts, where no venue could be found by Foursquare.
Cluster 1.0 (purple):	Resorts in this cluster not only belong to large ski areas but also have Bars, Sporting Goods Shops and Clothing Stores on their list of most common venues.
Cluster 2.0 (dark blue):	This evaluation classifies Les Portes du Soleil as unique. It's the largest ski area and offers lots of venues to party.
Cluster 3.0 (turquoise):	These resorts are strong at venues for Après Ski, followed by Museums or Exhibits.
Cluster 4.0 (light blue):	In this cluster are resorts with remarkably few bars or pubs but lots of them offer a scenic lookout.
Cluster 5.0 (blue green):	These resorts seem to not offer a wide variety of venues for leisure.
Cluster 6.0 (light green):	Bars, Pubs and a wide variety on shops – these resorts might come close to the ones in cluster 1.0
Cluster 7.0 (orange):	Based on this analysis, cluster 7.0 only contains ‘Andiast’. Looking on venues, this resort seems to be inhabited mainly by locals.
Cluster 8.0 (dark orange):	Both listed resorts lead with trails.
Cluster 9.0 (-):	Is empty

This concludes my analysis. I have created 9 categories representing similar resorts based on the size of a ski area as well as venues for leisure activities within 1.5km. Most of the resorts belong to either cluster 0.0 or 6.0.

5. Discussion

For this study, 88 Swiss Ski Resort were used. These are all resorts listed on Wikipedia’s page whose link is mentioned in the beginning of this report. The number of 88 resorts, however, is not the actual number of resorts in Switzerland. For this study, all data from the Wikipedia page in English are used. The German page would list some more resorts. Some smaller resorts such as Axalp, Stoos or Melchsee-Frutt are therefore not part of this analysis.

When I tested the Elbow method to evaluate the cluster parameter for kmeans, I set the optimum k value to 9. However, only 8 clusters were used. I experimented with different parameters to find an optimum k. I expanded the radius for nearby venues, set different widths for k and experimented with diverse samples of venue categories. As I mentioned before, I dropped restaurants, hotels and supermarkets. This happened after experimenting clusters considering these categories as well. However, there was clear evidence, that these categories cloud the results due to their huge volume. Overall, it was very difficult to find an optimal k at all. For a lot of possibilities there was no Elbow found. This leads me to believe, that either lots of resorts are very similar or the data used was not from enough quality. Based on my knowledge about Swiss Ski Resorts I found out that looking on Switzerland, there is a weak degree of completeness for venues in the Foursquare database. To achieve a result of higher quality it might be necessary, to gather more data from another source.

On the other hand, the quality could also be enhanced by adding a price tier for resorts. For example, St. Moritz is geared towards high-end clients, while others focus more on families. This not only has an impact on the range of venues on offer, but also on pricing. However, regarding Cluster 1.0 this might already have happened without considering a price tier.

I ended my study by visualizing the clusters based on size and venues. For future studies it could be an option to category resorts only by venues and use visualization tools to show their size e.g. as a larger bubble.

6. Conclusion

As a result, we can see that not all resorts belonging to the same ski area are similar to each other. This insight is a chance for tourists as well as for the ski areas itself. If the resorts of one area don't belong to one single category, the offer of a ski resort meets the needs of a wider range of holidaymakers.

Furthermore, there are similar resorts all over the country which offers tourists a wide choice or even alternative possibilities.

7. References

The list of Swiss ski areas:
https://en.wikipedia.org/wiki/List_of_ski_areas_and_resorts_in_Switzerland

Foursquare API: https://developer.foursquare.com/docs

Jupyter Notebook with Code: https://github.com/WannaBeesGit/datascience-capstone-project/blob/master/The%20Battle%20of%20Swiss%20Ski%20Resorts.ipynb

8. Appendix

Cluster 0.0

	Ski_Area	Resort	Lifts Normalized	Pistes Normalized	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
8	Skiregion Aletsch	Belalp	0.225	0.347619	46.371436	7.972471	0.0	Sporting Goods Shop	Gastropub	Ski Lodge	Garden	Furniture / Home Store
9	Skiregion Aletsch	Bettmeralp	0.225	0.347619	46.390600	8.062883	0.0	Bar	Après Ski	Sporting Goods Shop	Mini Golf	Sports Bar
10	Skiregion Aletsch	Fiesch	0.225	0.347619	46.402946	8.134150	0.0	Nightclub	Nightlife Spot	Train Station	Night Market	Beach Bar
11	Skiregion Aletsch	Riederalp	0.225	0.347619	46.378171	8.033135	0.0	Sporting Goods Shop	Bar	Trail	Music Venue	Train Station
12	Crans Montana	Crans	0.215	0.285714	46.306917	7.469015	0.0	Golf Course	Bar	Boutique	Movie Theater	Electronics Store
13	Crans Montana	Barzettes	0.215	0.285714	46.320596	7.498611	0.0	Bar	Photography Studio	Rental Car Location	Train Station	Bike Rental / Bike Share
14	Crans Montana	Montana	0.215	0.285714	46.299956	7.485769	0.0	Golf Course	Sporting Goods Shop	Photography Studio	Electronics Store	Mini Golf
15	Crans Montana	Aminona	0.215	0.285714	46.331426	7.532270	0.0	Museum	Gift Shop	Garden Center	Garden	Furniture / Home Store
16	Sierre-Anniviers	Grimentz	0.200	0.333333	46.180295	7.573834	0.0	Bar	Sporting Goods Shop	Après Ski	Gift Shop	Smoothie Shop
17	Sierre-Anniviers	Zinal	0.200	0.333333	46.136612	7.626600	0.0	Comedy Club	Bar	Après Ski	Pub	Sporting Goods Shop
18	Sierre-Anniviers	Vercorin	0.200	0.333333	46.257165	7.530704	0.0	Après Ski	Farm	Sporting Goods Shop	Scenic Lookout	Recreation Center
20	Saas Fee	Saas Fee	0.260	0.198413	46.107342	7.924705	0.0	Ski Shop	Sporting Goods Shop	Bar	Après Ski	Nightclub
22	Saas Fee	Saas Grund	0.260	0.198413	46.127844	7.937005	0.0	Bar	Bike Rental / Bike Share	Playground	Stables	Campground
25	Leysin	La Lecherette	0.125	0.126984	46.421353	7.108044	0.0	0	0	0	0	0
32	Gstaad Mountain Rides	Gstaad	0.325	0.365079	46.474043	7.285794	0.0	Boutique	Clothing Store	Scenic Lookout	Art Gallery	Bar
33	Jungfrauregion	Mürren	0.175	0.306349	46.559458	7.892932	0.0	Trail	Souvenir Shop	Arts & Crafts Store	Ski Shop	Café
34	Jungfrauregion	Wengen	0.175	0.306349	46.605441	7.921724	0.0	Après Ski	Bar	Train Station	Sporting Goods Shop	Hotel Bar
35	Jungfrauregion	Grindelwald	0.175	0.306349	46.624273	8.036746	0.0	Sporting Goods Shop	Train Station	Bar	Train	Athletics & Sports
36	Adelboden-Lenk	Adelboden	0.235	0.293651	46.492721	7.558762	0.0	Scenic Lookout	Home Service	Indie Movie Theater	Lounge	Movie Theater
37	Adelboden-Lenk	Lenk	0.235	0.293651	46.455888	7.441698	0.0	Bar	Farm	Ski Lodge	Music Venue	Hot Spring
38	Adelboden-Lenk	Frutigen	0.235	0.293651	46.587421	7.644437	0.0	Bar	Business Service	Platform	Home Service	Photography Studio

41	Brunni-Alpthal	Brunni	0.010	0.000000	46.828843	8.758396	0.0	0	0	0	0	0
42	Brunni-Alpthal	Alpthal	0.010	0.000000	47.073494	8.713891	0.0	0	0	0	0	0
51	Davos-Klosters	Davos	0.105	0.476190	46.796174	9.823727	0.0	Bar	Piano Bar	Platform	Clothing Store	Nightclub
52	Davos-Klosters	Klosters	0.105	0.476190	46.890554	9.851794	0.0	Business Service	Cheese Shop	Zoo Exhibit	Festival	Garden Center
53	Arosa Lenzerheide	Arosa	0.185	0.325397	46.779725	9.678136	0.0	Bar	Mini Golf	Zoo Exhibit	Lake	Scenic Lookout
54	Arosa Lenzerheide	Lenzerheide	0.185	0.325397	46.727896	9.556834	0.0	Bar	Lake	Cocktail Bar	Sporting Goods Shop	Trail
55	Arosa Lenzerheide	Valbella	0.185	0.325397	46.745765	9.554180	0.0	Lake	Bar	Bakery	Spa	Sporting Goods Shop
56	Arosa Lenzerheide	Parpan	0.185	0.325397	46.759631	9.559821	0.0	Sports Bar	Bar	Bakery	Zoo Exhibit	Gift Shop
57	Arosa Lenzerheide	Churwalden	0.185	0.325397	46.778453	9.542967	0.0	Campground	Furniture / Home Store	Auto Garage	Zoo Exhibit	Gift Shop
64	LAAX	Flims	0.130	0.317460	46.833244	9.283456	0.0	Bar	Movie Theater	Museum	Flower Shop	Skate Park
65	LAAX	Laax	0.130	0.317460	46.806412	9.258127	0.0	Music Venue	Nightclub	Lake	Bar	Flower Shop
66	LAAX	Falera	0.130	0.317460	46.800798	9.232137	0.0	Beer Garden	Sculpture Garden	Farmers Market	Garden Center	Garden
67	Silvretta Arena	Samnaun	0.190	0.285714	46.944242	10.360084	0.0	Jewelry Store	Shopping Mall	Bar	Nightclub	Trail
68	Silvretta Arena	Ischgl (A)	0.190	0.285714	46.986282	10.274518	0.0	0	0	0	0	0
79	Minschuns	Val Müstair	0.000	0.007937	46.610633	10.374508	0.0	0	0	0	0	0

Cluster 1.0

	Ski_Area	Resort	Lifts Normalized	Pistes Normalized	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
1	Matterhorn ski paradise	Zermatt	0.495	0.465079	46.022227	7.749400	1.0	Sporting Goods Shop	Bar	Après Ski	Clothing Store	Athletics & Sports
5	Verbier - Les quatre vallées	Verbier	0.480	0.619048	46.096795	7.228548	1.0	Bar	Après Ski	Nightclub	Sporting Goods Shop	Clothing Store
6	Verbier - Les quatre vallées	Nendaz	0.480	0.619048	46.186708	7.305101	1.0	Bar	Nightclub	Print Shop	Salsa Club	Clothing Store
7	Verbier - Les quatre vallées	Veysonnaz	0.480	0.619048	46.195508	7.336327	1.0	Bar	Convenience Store	Memorial Site	Sporting Goods Shop	Beer Bar
58	Engadin-St. Moritz	St. Moritz	0.485	0.523810	46.496059	9.838658	1.0	Boutique	Bar	Athletics & Sports	Clothing Store	Electronics Store
59	Engadin-St. Moritz	Silvaplana	0.485	0.523810	46.459933	9.795917	1.0	Bar	Lounge	Campground	Lake	Sporting Goods Shop
60	Engadin-St. Moritz	Sils Maria	0.485	0.523810	46.429156	9.763788	1.0	Sporting Goods Shop	Trail	Lounge	Art Museum	Bar
61	Engadin-St. Moritz	Pontresina	0.485	0.523810	46.489993	9.904296	1.0	Train Station	Trail	Bar	Spa	IT Services
62	Engadin-St. Moritz	Celerina	0.485	0.523810	46.513230	9.858625	1.0	Platform	Bike Rental / Bike Share	Garden	Bar	Train Station
63	Engadin-St. Moritz	Zuoz	0.485	0.523810	46.601289	9.960804	1.0	Lounge	Hotel Bar	Food & Drink Shop	Skating Rink	Golf Course

Cluster 2.0

	Ski_Area	Resort	Lifts Normalized	Pistes Normalized	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
2	Les Portes du Soleil	Morgins	1.0	1.0	46.237659	6.858102	2.0	Bar	Après Ski	Board Shop	Pub	Sporting Goods Shop
3	Les Portes du Soleil	Champéry	1.0	1.0	46.175679	6.868767	2.0	Bar	Hotel Bar	Athletics & Sports	Lounge	Arts & Entertainment
4	Les Portes du Soleil	Les Crosets	1.0	1.0	46.185115	6.835676	2.0	Bar	Lounge	Country Dance Club	Ski Lodge	Movie Theater

Cluster 3.0

	Ski_Area	Resort	Lifts Normalized	Pistes Normalized	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
28	Lötschental	Wiler (Lötschen)	0.005	0.020635	46.408307	7.784841	3.0	Après Ski	Trail	Ski Lodge	Bar	History Museum
47	Sörenberg	Sörenberg	0.090	0.047619	46.807715	8.037136	3.0	Après Ski	Mini Golf	History Museum	Bar	Zoo Exhibit
49	Hoch-Ybrig	Oberiberg	0.035	0.047619	47.039177	8.783416	3.0	Après Ski	Zoo Exhibit	Farmers Market	Garden Center	Garden

Cluster 4.0

	Ski_Area	Resort	Lifts Normalized	Pistes Normalized	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
21	Saas Fee	Saas Balen	0.260	0.198413	46.154021	7.928192	4.0	Campground	Scenic Lookout	Food & Drink Shop	Zoo Exhibit	Farmers Market
31	Villars-Gryon	Gryon	0.035	0.087302	46.274663	7.063671	4.0	Garden	Campground	Plaza	Food & Drink Shop	Platform
40	Alpenregion Meiringen-Hasliberg	Hasliberg	0.060	0.063492	46.737906	8.205257	4.0	Beer Garden	Cocktail Bar	Speakeasy	Zoo Exhibit	Festival
46	Airolo-Pesciüm	Airolo-Pesciüm	0.020	0.015873	46.514385	8.608116	4.0	Scenic Lookout	Bike Rental / Bike Share	Bar	Train Station	Train
48	Sörenberg	Flühli	0.090	0.047619	46.884007	8.015640	4.0	Scenic Lookout	Playground	Zoo Exhibit	Farm	Garden
50	Hoch-Ybrig	Unteriberg	0.035	0.047619	47.059802	8.803527	4.0	Locksmith	Paper / Office Supplies Store	Food & Drink Shop	Sporting Goods Shop	Recreation Center
69	Gotthard Oberalp Arena	Disentis	0.090	0.142857	46.704175	8.854978	4.0	Train Station	Convenience Store	Gym	Sports Bar	Stables
75	Brigels	Waltensburg	0.025	0.087302	46.776679	9.116054	4.0	Scenic Lookout	Soccer Field	Stables	Train Station	Zoo Exhibit
81	Flumserberg	Unterterzen	0.065	0.071429	47.113954	9.252290	4.0	Scenic Lookout	Spa	Pub	Sporting Goods Shop	Flower Shop
87	Braunwald	Braunwald	0.025	0.019048	46.939005	8.998280	4.0	Playground	Train Station	Soccer Field	Tennis Court	Gastropub

Cluster 5.0

	Ski_Area	Resort	Lifts Normalized	Pistes Normalized	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
24	Leysin	Les Mosses	0.125	0.126984	46.466297	7.017835	5.0	Train Station	Zoo Exhibit	Farm	Garden	Furniture / Home Store
45	Gotthard Oberalp Arena	Hospental	0.095	0.055556	46.618945	8.568599	5.0	Trail	Train Station	Zoo Exhibit	Garden	Furniture / Home Store
71	Gotthard Oberalp Arena	Dieni	0.090	0.142857	46.670839	8.743998	5.0	Train Station	Playground	Campground	Zoo Exhibit	Farmers Market

Cluster 6.0

	Ski_Area	Resort	Lifts Normalized	Pistes Normalized	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Champex-Lac	Champex-Lac	0.000	0.000000	46.030578	7.116816	6.0	Trail	Pub	Botanical Garden	Campground	Athletics & Sports
23	Leysin	Leysin	0.125	0.126984	46.343870	7.014840	6.0	Bar	Train Station	Concert Hall	Sporting Goods Shop	Go Kart Track
26	Les Diablerets	Les Diablerets	0.205	0.095238	46.351102	7.156644	6.0	Bar	Ski Shop	Nightclub	Indie Movie Theater	Scenic Lookout
27	Leukerbad	Leukerbad	0.045	0.063492	46.379517	7.626476	6.0	Sporting Goods Shop	Train	Bar	Spa	Music Venue
29	Anzère	Anzère	0.035	0.031746	46.296935	7.397920	6.0	Bar	Lounge	Board Shop	Wine Bar	Country Dance Club
30	Villars-Gryon	Villars	0.035	0.087302	46.297764	7.055331	6.0	Bar	Train Station	Tennis Court	Athletics & Sports	Food & Drink Shop
39	Alpenregion Meiringen-Hasliberg	Meiringen	0.060	0.063492	46.728552	8.187093	6.0	Bar	Train	Print Shop	Train Station	Pub
43	Engelberg Titlis	Engelberg	0.190	0.098413	46.822350	8.404400	6.0	Bar	Sporting Goods Shop	Movie Theater	Lawyer	Train
44	Gotthard Oberalp Arena	Andermatt	0.095	0.055556	46.634050	8.594815	6.0	Bar	Train	Train Station	Sporting Goods Shop	Hotel Bar
70	Gotthard Oberalp Arena	Sedrun	0.090	0.142857	46.680959	8.776220	6.0	Train Station	Bar	Board Shop	Summer Camp	Playground
72	Savognin	Savognin	0.090	0.095238	46.596957	9.598149	6.0	Bar	Sporting Goods Shop	Lounge	Dance Studio	Lake
73	Engadin-Scuol	Scuol	0.030	0.095238	46.796281	10.297630	6.0	Spa	Après Ski	Bar	Train	Convenience Store
74	Brigels	Brigels	0.025	0.087302	46.767406	9.062233	6.0	Convenience Store	Après Ski	Gastropub	Plaza	Golf Course
77	Splügen	Splügen	0.020	0.015873	46.553084	9.323676	6.0	Après Ski	ATM	Trail	Public Bathroom	Sporting Goods Shop
78	Vals3000	Vals	0.005	0.007937	46.616685	9.180495	6.0	Music Venue	Women's Store	Convenience Store	Memorial Site	Sporting Goods Shop
80	Flumserberg	Flumserberg	0.065	0.071429	47.082850	9.276590	6.0	ATM	Bar	Après Ski	Market	Sporting Goods Shop
82	Toggenburg	Wildhaus	0.080	0.063492	47.203318	9.350702	6.0	Museum	Convenience Store	Après Ski	Sporting Goods Shop	Skating Rink
84	Toggenburg	Alt St. Johann	0.080	0.063492	47.186802	9.282226	6.0	Trail	Bar	Zoo Exhibit	Garden Center	Garden
85	Pizol	Bad Ragaz	0.040	0.031746	47.002528	9.501644	6.0	Art Gallery	Pub	Golf Course	Bar	ATM
86	Pizol	Wangs	0.040	0.031746	47.032617	9.432531	6.0	Electronics Store	Photography Studio	Bar	Furniture / Home Store	Rental Car Location

Cluster 7.0

	Ski_Area	Resort	Lifts Normalized	Pistes Normalized	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
76	Brigels	Andiast	0.025	0.087302	46.784958	9.114178	7.0	Stables	Zoo Exhibit	Gastropub	Garden	Furniture / Home Store

Cluster 8.0

	Ski_Area	Resort	Lifts Normalized	Pistes Normalized	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
19	Sierre-Anniviers	St-Luc und Chandolin	0.20	0.333333	46.236536	7.627631	8.0	Trail	Zoo Exhibit	Gastropub	Garden	Furniture / Home Store
83	Toggenburg	Unterwasser	0.08	0.063492	47.197779	9.308989	8.0	Trail	Music Venue	Zoo Exhibit	Garden Center	Garden

Cluster 9.0

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