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Trending Business Ventures in Zurich, Switzerland

Introduction

- The aim of this capstone project is to demonstrate how Foursquare API can be used to explore and compare cities in Canton Zurich, Switzerland.
- This project will help people in exploring better facilities around their neighbourhood in Zurich.
- It will help people making smart and efficient decision on selecting great neighbourhood out of numbers of other neighborhoods in Zurich, Switzerland.
- Visualising Trending Venues near to each given Province (in German, Bezirk)

Data

- **Data Source:** https://raw.githubusercontent.com/zauberware/postal-codes-json-xml-csv/master/data/CH/zipcodes.ch.csv

```
swiss_data = pd.read_csv('zipcodes.ch.csv')
#swiss_data.head()
print(swiss_data.shape)
swiss_data.sample(n=10)
```

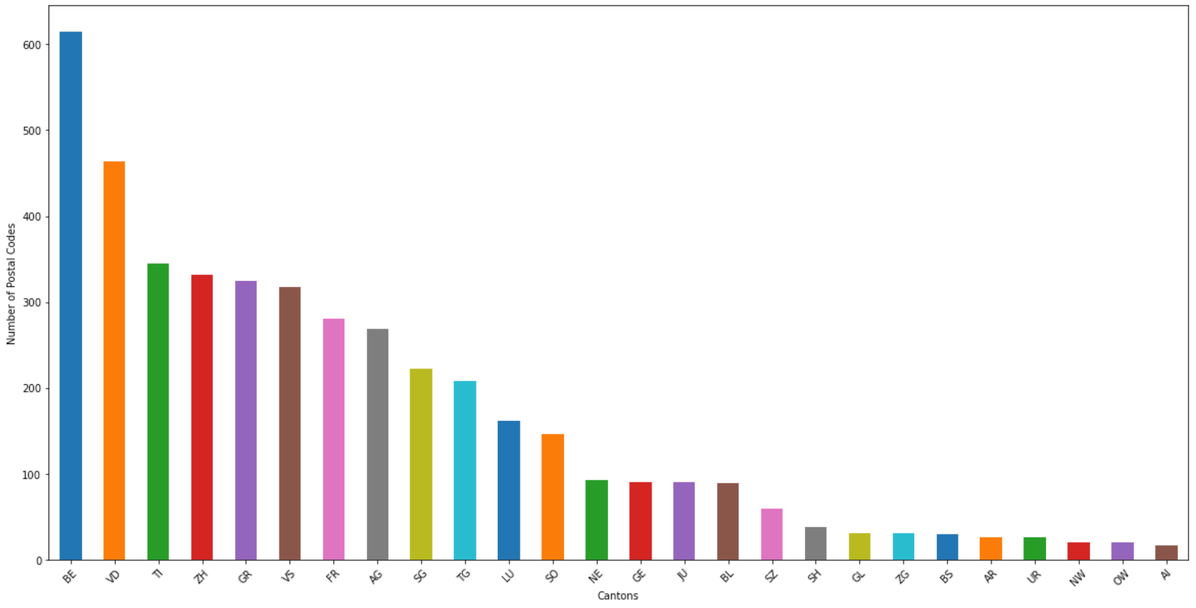
(4356, 11)

	country_code	zipcode	place	state	state_code	province	province_code	community	community_code	latitude	longitude
1614	CH	7075	Churwalden	Kanton Graubünden	GR	Region Plessur	1848	Churwalden	3911	46.7814	9.5438
1829	CH	2884	Montenol	Jura	JU	Porrentruy District	2603	Clos du Doubs	6808	47.3518	7.1487
1963	CH	6232	Geuensee	Kanton Luzern	LU	Sursee District	314	Geuensee	1085	47.1997	8.1069
818	CH	3654	Gunten	Canton de Berne	BE	Thun District	247	Sigriswil	938	46.7119	7.7024
1950	CH	6207	Nottwil	Kanton Luzern	LU	Sursee District	314	Nottwil	1094	47.1357	8.1371
3794	CH	1973	Nax	Canton du Valais	VS	Hérens District	2305	Mont-Noble	6090	46.2282	7.4310
3006	CH	6900	Massagno	Ticino	TI	Lugano District	2105	Massagno	5196	46.0126	8.9435
3703	CH	1976	Daillon	Canton du Valais	VS	Conthey District	2302	Conthey	6023	46.2574	7.3067
1447	CH	8865	Bilten	Kanton Glarus	GL	Glarus	800	Glarus Nord	1630	47.1500	9.0255
292	CH	9105	Schönengrund	Kanton Appenzell Ausserrhoden	AR	Bezirk Hinterland	1501	Schönengrund	3003	47.3259	9.2269

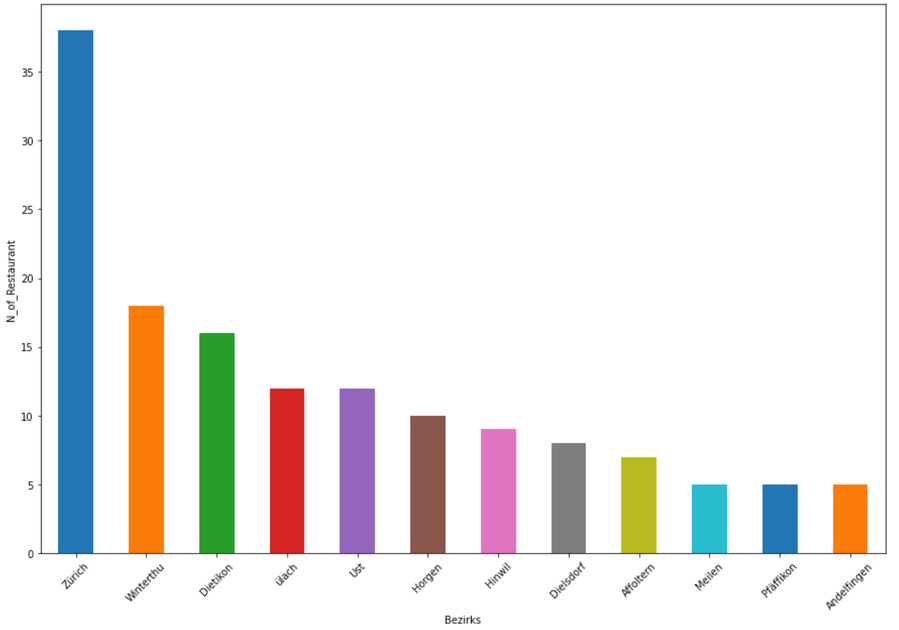
- **country_code:** CH Switzerland
- **zipcode:** the Postal Code
- **place:** main city name
- **state:** State or Canton names
- **state_code** : Corresponding state code
- **province:** District name
- **province_code :** Corresponding District code
- **community:** Local Community
- **community_code:** Corresponding Local Community Code
- **latitude:** Latitude coordinates Information
- **longitude :** Longitude coordinates Information

Methodology

- Exploratory Data Analysis (EDA)
- Modelling using K-Means Algorithm



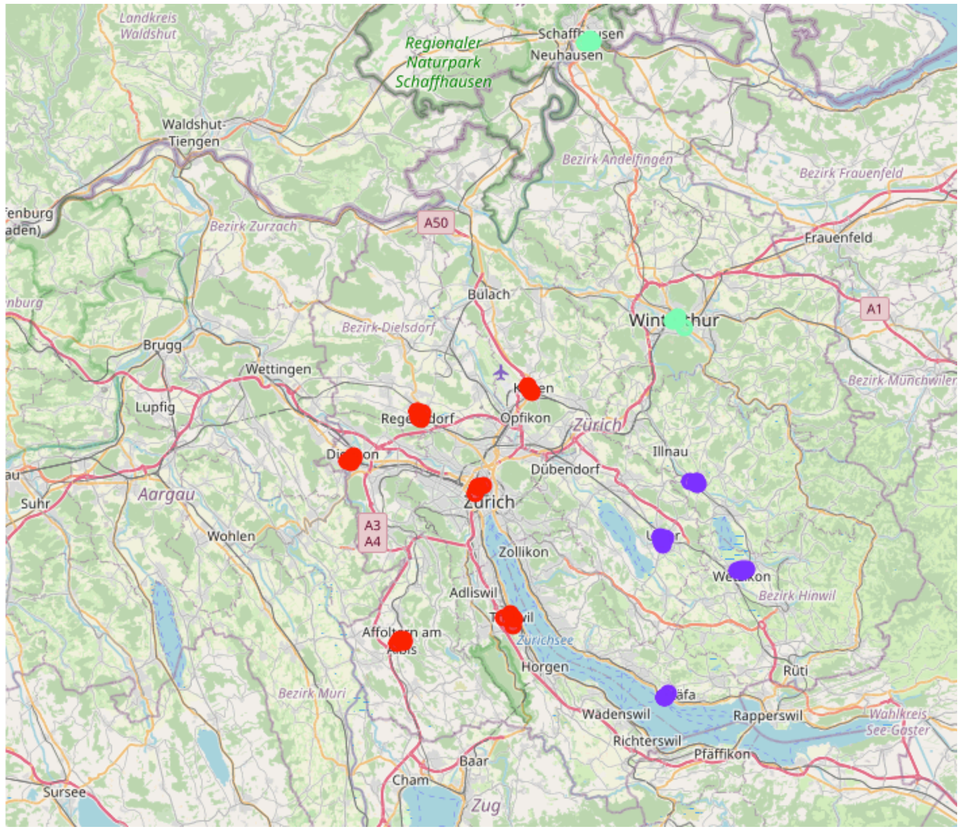
Distribution of Postal codes among each Canton



Distribution of Restaurants in Zurich within each Province (Bezirk) around 500m radius

Modelling

- K-means Algorithm
- K-Means is an unsupervised machine learning algorithm, which has been used to group similar data points together and discover underlying patterns.
- Since the number of data points were small a random value of k as 3 is selected.



Results

- Canton Zurich is divided into 3 clusters.
- Among 12 Provinces Cluster 0 contains 9 provinces where the most common venues are mainly Hotels.
- Cluster 1, which contains only one Province which is Pfäffikon. The suggested most common venue is the Restaurant.
- Cluster 2 contains 2 provinces such as Meilen and Dietikon. Interestingly the 1st most common venue for both is Supermarket. Also, these two provinces are geographically far apart. The reason for this cluster allocation is need to be studied further.
- In addition to the clustering part we plotted the WordCloud which visually represent the most common venues, where the font size represent the frequency of occurrence of the corresponding venue.

Results

[105]:
```
#Cluster 0
bezirk_merged.loc[bezirk_merged['Cluster Labels'] == 0, bezirk_merged.columns[[1] + list(range(2, bezirk_merged.shape[1]))]]
```

[105]:

	Latitude	Longitude	Bezirk	N_Restaurants	Cluster Labels	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	47.3828	8.5307	Zürich	38	0	Bar	Asian Restaurant	Café	Indian Restaurant	Italian Restaurant	Vietnamese Restaurant	Thai Restaurant	Museum	Moroccan Restaurant	Modern European Restaurant
1	47.4967	8.7342	Winterthu	18	0	Café	Hotel Bar	Bar	Nightclub	Restaurant	Hotel	Burger Joint	Plaza	Swiss Restaurant	Italian Restaurant
3	47.4515	8.5849	ülach	12	0	Hotel	Restaurant	Supermarket	Steakhouse	Pizza Place	Pub	Department Store	Bus Station	Discount Store	Bakery
4	47.3471	8.7209	Ust	12	0	Snack Place	Argentinian Restaurant	Italian Restaurant	Japanese Restaurant	Grocery Store	Fast Food Restaurant	Chinese Restaurant	Ice Cream Shop	Theater	Asian Restaurant
5	47.2918	8.5635	Horgen	10	0	Hotel	Swiss Restaurant	Falafel Restaurant	Sporting Goods Shop	Bakery	Mexican Restaurant	Asian Restaurant	Grocery Store	Train Station	Gourmet Shop
6	47.3264	8.7978	Hinwil	9	0	Irish Pub	Grocery Store	Shopping Mall	Movie Theater	Supermarket	Gourmet Shop	Food & Drink Shop	Fast Food Restaurant	Falafel Restaurant	Coffee Shop
7	47.4341	8.4687	Dielsdorf	8	0	Restaurant	Gym / Fitness Center	Supermarket	Hotel	Shopping Mall	Bookstore	Pizza Place	Sporting Goods Shop	Asian Restaurant	Train Station
8	47.2774	8.4513	Affoltern	7	0	Plaza	Train Station	Grocery Store	Tapas Restaurant	Supermarket	Restaurant	Eastern European Restaurant	Vietnamese Restaurant	Discount Store	Construction & Landscaping
11	47.6905	8.6436	Andelfingen	5	0	Train Station	Shopping Mall	Cosmetics Shop	River	Vietnamese Restaurant	Drugstore	Construction & Landscaping	Cultural Center	Department Store	Discount Store

Results

[106]:
```
#Cluster 1
bezirk_merged.loc[bezirk_merged['Cluster Labels'] == 1, bezirk_merged.columns[[1] + list(range(2, bezirk_merged.shape[1]))]]
```

[106]:

	Latitude	Longitude	Bezirk	N_Restaurants	Cluster Labels	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
10	47.3878	8.7515	Pfäffikon	5	1	Restaurant	Food & Drink Shop	Soccer Field	Bakery	Construction & Landscaping	Drugstore	Cosmetics Shop	Cultural Center	Department Store	Discount Store

[107]:
```
#Cluster 2
bezirk_merged.loc[bezirk_merged['Cluster Labels'] == 2, bezirk_merged.columns[[1] + list(range(2, bezirk_merged.shape[1]))]]
```

[107]:

	Latitude	Longitude	Bezirk	N_Restaurants	Cluster Labels	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
2	47.4017	8.4001	Dietikon	16	2	Supermarket	Italian Restaurant	Hotel	Bus Stop	Sushi Restaurant	Drugstore	Falafel Restaurant	Cultural Center	Department Store	Discount Store
9	47.2425	8.7234	Meilen	5	2	Supermarket	Restaurant	Train Station	Bus Station	Eastern European Restaurant	Cosmetics Shop	Cultural Center	Department Store	Discount Store	Drugstore

Results

Results shows that Restaurant (Swiss, Italian, Indian/Asian), Supermarket businesses are popular within the 500 m city radius in Canton Zurich.

Discussion and Conclusion

- Identified a business problem, specified the data required, extracted and prepared the data, performed data analysis, provided recommendations to stakeholders.
- The model using K-Means clustering algorithm by combining Foursquare location data and the dataset describing the location details of Switzerland provided 3 different clusters.
- Visualised using WordCloud.
- The wordcloud showed the trending venues around different cities within 500 meters.
- As a Future work, the datasets can be extended by adding different features from each province such as; Air Quality Index, Population Density, Area and migration data.