Map Luxembourg communes by venue types

Capstone project for IBM Data Science certification
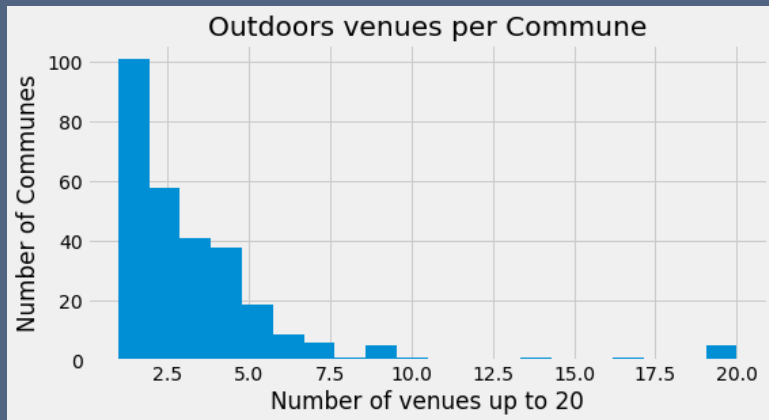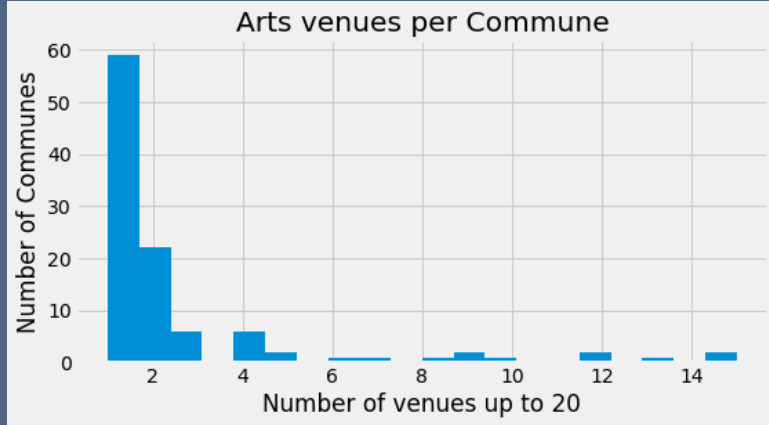
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Problem statement

- Cluster analysis of Luxembourg communes by types of Venues, basically Outdoors and Arts.

- Luxembourg is a small country in the western Europe, landlocked between Belgium, France and Germany. Its population amounts to 590 000 as of 1- Jan-2017, attracting lot of foreigners, such as tourists, expats and cross-border workers

- Will use public data about Luxembourg, available in internet

- Foursquare API is used to explore venues

- Obtained information could provide a view to quickly understand what area of the country or even a commune would represent an interest for a visit/trip/stay/live.

Data used and the approach applied

- Download data publicly available on Luxembourg data portal.

- Geocoder API in order to obtain geolocations of the Ville de Luxembourg districts.

- Foursquare API for the determination of venues of the Outdoors and Arts sections available in the locations and nearby in radius 1km

- Conduct cluster analysis of the communes and get different clusters of Luxembourg communes mapped in on a chart in different colors.

- Analyze most used venues in the clusters and will try to provide description of distinctions among the clusters.
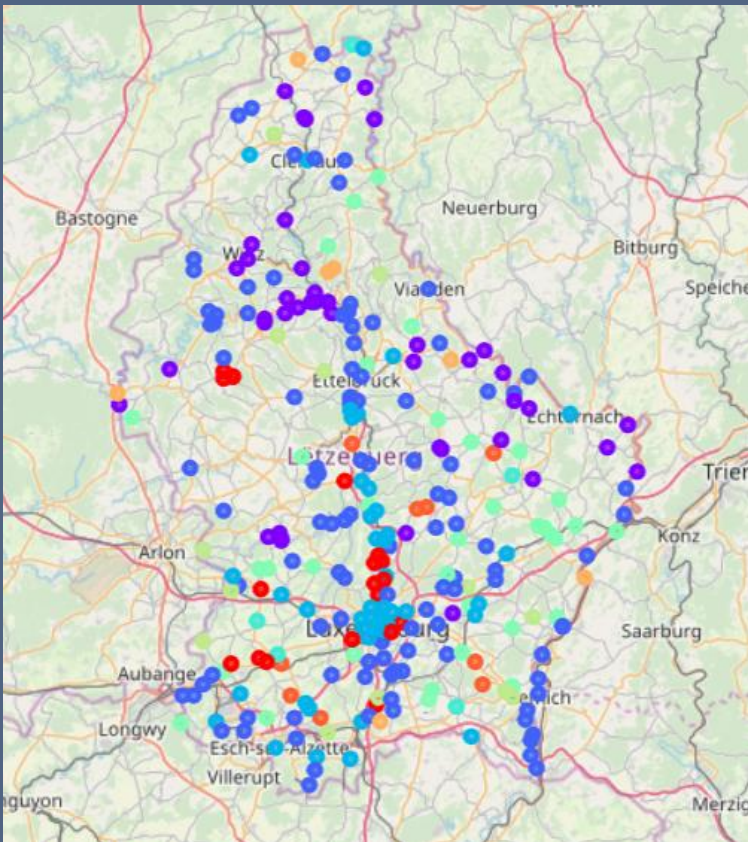
Analysis is done in IBM Watson studio using Python libraries

Key facts

- Number of Luxembourg communes incl. districts of Ville de Luxembourg – 586
- Outdoor venues in Luxembourg – 877
- Arts venues in Luxembourg - 271
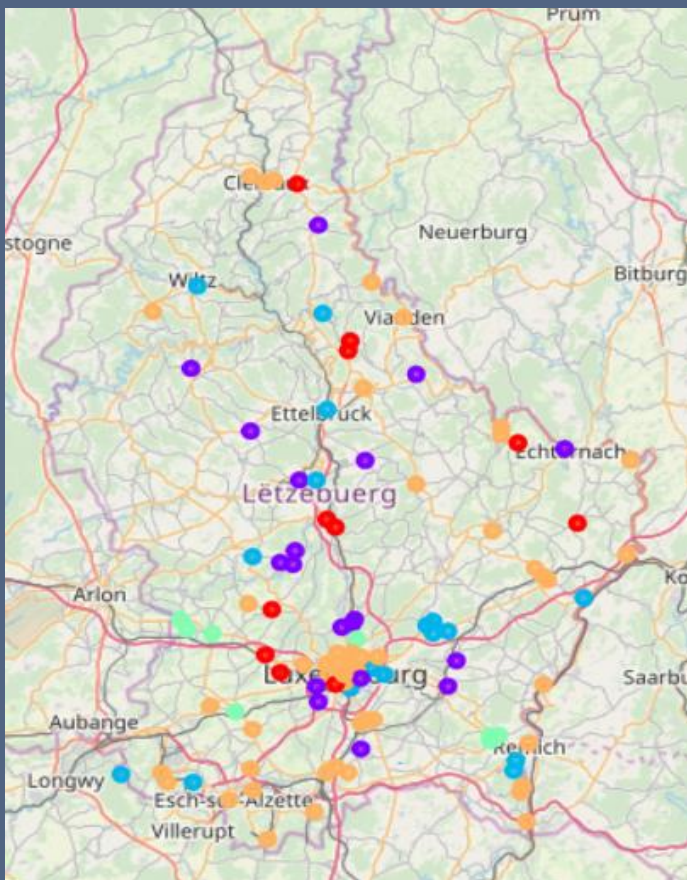
Clustering of communes by Outdoors venues

Matrix of top 10 Outdoors venue types per cluster

	Cluster 0	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7	Cluster 8
Venue 1	Gym	Campground	Plaza	Park	Farm	Soccer Field	Playground	Trail	Stables
Venue 2	Soccer Field	Scenic Lookout	Athletics & Sports	Plaza	Basketball Court	Bowling Green	Trail	Vineyard	Scenic Lookout
Venue 3	Gym / Fitness Center	Playground	Gym / Fitness Center	Gym / Fitness Center		Forest	Park	Forest	
Venue 4	Gym Pool	Castle	Soccer Field	Skate Park		Athletics & Sports	Gym / Fitness Center		
Venue 5	Outdoors & Recreation	Pool	Campground	Soccer Field		Skate Park	Golf Course		
Venue 6	Athletics & Sports	Athletics & Sports	Lake	Athletics & Sports		Scenic Lookout			
Venue 7		Soccer Field	Trail	Gym		Tennis Court			
Venue 8		River	Gym	Pool		Golf Course			
Venue 9		Trail	Pool	Trail		Bathing Area			
Venue 10		Indoor Play Area	Tennis Court	Campground		Bay			

- Only 286 communes out of total 586 communes in Luxembourg have Outdoors venues.

- Clusters can be called by the most popular venue type: **Gym, Campground, Plaza, Park, Farm, Soccer Field, Playground, Trail, Stables**.

Clustering of communes by Arts venues

Matrix of top 10 Arts venue types per cluster

	Cluster 0	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Venue 1	Concert Hall	Music Venue	Performing Arts Venue	Art Gallery	History Museum
Venue 2	Theater	Indie Movie Theater	History Museum		Museum
Venue 3	Performing Arts Venue	Racecourse	Music Venue		Theater
Venue 4	Multiplex	Performing Arts Venue	Science Museum		Art Gallery
Venue 5	Mini Golf	Museum	Public Art		Performing Arts Venue
Venue 6	Art Museum	Mini Golf	Country Dance Club		Music Venue
Venue 7			Concert Hall		Movie Theater
Venue 8					Science Museum
Venue 9					Public Art
Venue 10					Outdoor Sculpture

- 5 commune clusters, such as Concert Hall, Music Venue, Performing Arts Venue, Art Gallery, History Museum. Only

- 106 communes have Arts of venues in Luxembourg (according to Foursquare service)