

It's a (Tourist) Trap:

A Data Science based approach in
finding the best accommodation for
tourists

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IBM Data Science Capstone Project

Problem Statement

You are a student planning on visiting Stuttgart for the first time. You are mainly interested in the **nightlife** of the city and you are on a **cash strapped budget**.

Main problems:

- You have don't know anything about the neighbourhoods in the city,
- You don't know where the nightlife venues are,
- You don't want to waste money on transport driving to these venues.

This project aims to use data science techniques to find the best neighbourhoods and cheap accommodation for tourists in Stuttgart.

Data Sources

Moving to Germany Website:

- **Idea:** scrape the website to obtain the name of all of the suburbs
- **How?** Using the BeautifulSoup API

BeautifulSoup

Foursquare API:

- **Idea:** use the API to query for all the venues in a given neighbourhood
- We will look for **nightlife** related venues
- We will also look for **cheap hotels**



Methodology

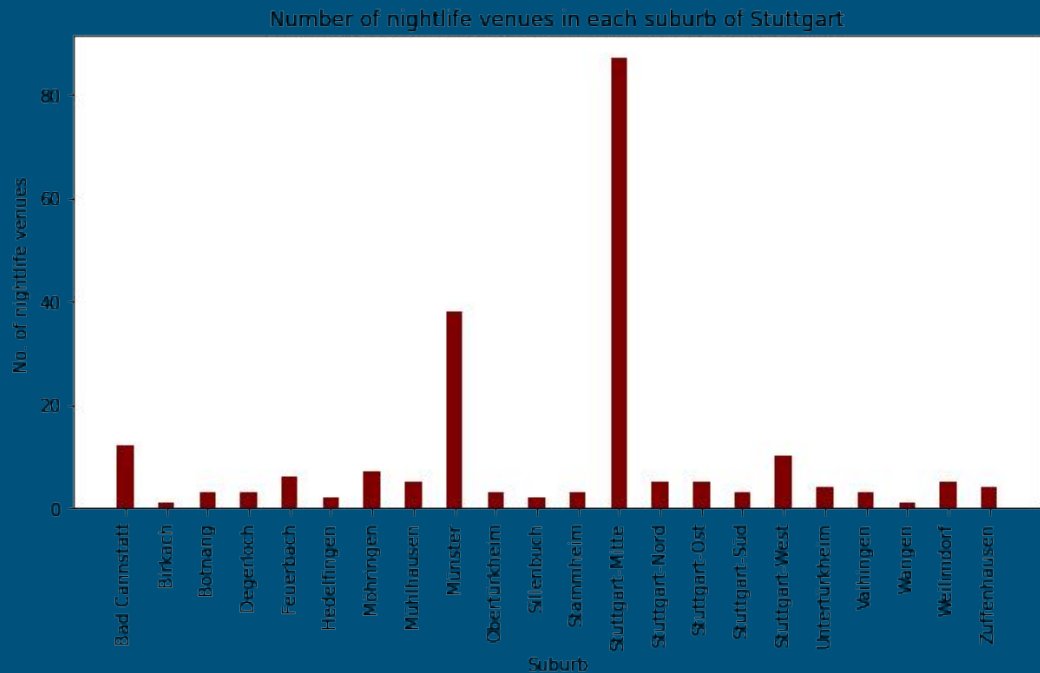
Exploratory data analysis:

The first step in this methodology requires data analysis to investigate the data types for our features; we draw tables and construct bar charts for this purpose.

Machine Learning:

Next, we use unsupervised learning to cluster the neighbourhoods based on similarity regarding the types of nightlife venues. Using these clustered neighbourhoods we can see where might be the best location for a tourist to visit based on their interests.

Results: Data Exploration



Bar	50
Nightclub	20
Pub	19
Gastropub	16
Lounge	14
Cocktail Bar	10
Beer Garden	9
German Restaurant	8
Café	8
Hookah Bar	7
Sports Bar	6
Burger Joint	4
Restaurant	3
Hotel	3
Hotel Bar	3
Brewery	3
Wine Bar	3
Gay Bar	2
Jazz Club	2
Wine Shop	2
Beach Bar	2
Spanish Restaurant	1
Speakeasy	1
Sushi Restaurant	1
Mexican Restaurant	1
Asian Restaurant	1
Whisky Bar	1
Bowling Alley	1
Pizza Place	1
Bakery	1
Deli / Bodega	1
Event Space	1
Modern European Restaurant	1
Music Venue	1
Boat or Ferry	1
Breakfast Spot	1
Bistro	1
Piano Bar	1
Rock Club	1

Name: Venue Category, dtype: int64

Results: Feature Selection



	Suburb	Suburb Latitude	Suburb Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Stuttgart-Mitte	48.7759	9.1798	Bix Jazzclub	48.773178	9.179495	Jazz Club
1	Stuttgart-Mitte	48.7759	9.1798	Eduard's	48.775537	9.179935	Cocktail Bar
2	Stuttgart-Mitte	48.7759	9.1798	TATTI	48.774353	9.177209	Café
3	Stuttgart-Mitte	48.7759	9.1798	Mata Hari	48.773798	9.177704	Bar
4	Stuttgart-Mitte	48.7759	9.1798	Brenner Drinks, Food etc.	48.774059	9.182335	Bar

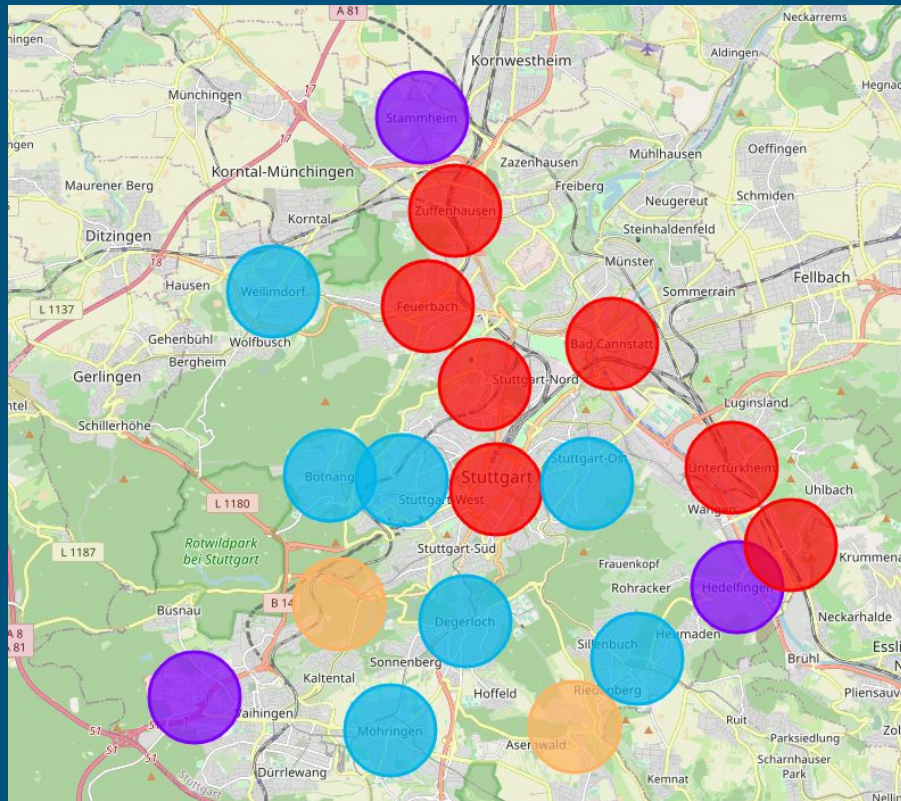
Results: Clustering

→ Use k -means clustering

→ Set $k=5$

→ Legend:

- ◆ Cluster 1
- ◆ Cluster 2
- ◆ Cluster 3
- ◆ Cluster 4
- ◆ Cluster 5



Results: Clustering

→ Cluster 1

	Suburb	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	Stuttgart-Mitte	Nightclub	Cocktail Bar	Lounge	German Restaurant	Café	Wine Bar	Jazz Club	Burger Joint	Sports Bar
1	Stuttgart-Nord	Burger Joint	Hotel Bar	Beer Garden	Nightclub	Gastropub	Event Space	Deli / Bodega	Cocktail Bar	Café
5	Bad Cannstatt	Café	Beer Garden	Gastropub	Sports Bar	Hotel Bar	Boat or Ferry	Lounge	Wine Shop	Event Space
10	Untertürkheim	Bar	Gastropub	Hookah Bar	Burger Joint	Gay Bar	Event Space	Deli / Bodega	Cocktail Bar	Café
12	Zuffenhausen	Hookah Bar	Gastropub	Nightclub	Gay Bar	Event Space	Deli / Bodega	Cocktail Bar	Café	Burger Joint
13	Feuerbach	Bar	Gastropub	Restaurant	Pub	German Restaurant	Burger Joint	Gay Bar	Event Space	Deli / Bodega
17	Mühlhausen	Bar	Sports Bar	Beer Garden	Cocktail Bar	Burger Joint	Gay Bar	Gastropub	Event Space	Deli / Bodega
19	Obertürkheim	Lounge	Pub	Brewery	Gay Bar	Gastropub	Event Space	Deli / Bodega	Cocktail Bar	Café

→ Cluster 2

	Suburb	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
9	Stammheim	Hookah Bar	Wine Shop	Burger Joint	Gay Bar	Gastropub	Event Space	Deli / Bodega	Cocktail Bar	Café
11	Vaihingen	Deli / Bodega	Wine Shop	Brewery	Gay Bar	Gastropub	Event Space	Cocktail Bar	Café	Burger Joint
16	Hedelfingen	Lounge	Wine Shop	Burger Joint	Gay Bar	Gastropub	Event Space	Deli / Bodega	Cocktail Bar	Café

Results: Clustering

→ Cluster 3

	Suburb	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	Stuttgart-Ost	Beer Garden	Lounge	Pub	Wine Shop	Burger Joint	Gastropub	Event Space	Deli / Bodega	Cocktail Bar
4	Stuttgart-West	Pub	Gastropub	Sports Bar	German Restaurant	Wine Shop	Brewery	Event Space	Deli / Bodega	Cocktail Bar
6	Degerloch	Bar	Wine Shop	Brewery	Gay Bar	Gastropub	Event Space	Deli / Bodega	Cocktail Bar	Café
7	Möhringen	Gastropub	Beach Bar	Pub	Wine Shop	Burger Joint	Gay Bar	Event Space	Deli / Bodega	Cocktail Bar
15	Botnang	Gastropub	Pub	Wine Shop	Brewery	Gay Bar	Event Space	Deli / Bodega	Cocktail Bar	Café
18	Münster	Pub	Nightclub	Café	Gastropub	Lounge	Sports Bar	Spanish Restaurant	German Restaurant	Whisky Bar
20	Sillenbuch	Pub	Wine Shop	Brewery	Gay Bar	Gastropub	Event Space	Deli / Bodega	Cocktail Bar	Café
22	Weilmündorf	Bar	Beer Garden	Brewery	Wine Shop	Burger Joint	Gay Bar	Gastropub	Event Space	Deli / Bodega

→ Cluster 4

	Suburb	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
21	Wangen	Wine Shop	Hookah Bar	Gay Bar	Gastropub	Event Space	Deli / Bodega	Cocktail Bar	Café	Burger Joint

→ Cluster 5

	Suburb	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
3	Stuttgart-Süd	Lounge	Wine Shop	Hookah Bar	Gay Bar	Event Space	Deli / Bodega	Cocktail Bar	Café	Burger Joint
14	Birkach	Wine Shop	Brewery	Gay Bar	Event Space	Deli / Bodega	Cocktail Bar	Café	Burger Joint	Breakfast Spot

Discussion

Important findings:

- Majority of all nightlife venues are in **Stuttgart-Mitte**.
- **Cluster 1** has the most type of nightlife venues of interest.
- **Stuttgart-Mitte** falls in **Cluster 1**, and is central to all other neighbourhoods.
- The suburbs to the **north** of Stuttgart-Mitte contain **similar** nightlife venues.
- **Cheap accommodation** in Stuttgart also found in Stuttgart-Mitte.
- Recommend Motel-One as accommodation to a tourist.

Conclusion

Our **data science** techniques yield that the most suitable neighbourhood for a tourist interested in **nightlife** in Stuttgart is **Stuttgart-Mitte**. This neighbourhood has in total the **most nightlife venues** when compared to the other neighbourhoods, and is central to the city.

North of Stuttgart-Mitte lies the neighbourhoods which are **most similar**, and thus accommodation near this area will be the best option. Therefore, the best accommodation would be the **Motel-One** in Stuttgart-Mitte

