THE BATTLE OF NEIGHBORHOODS

APPLIED DATA SCIENCE CAPSTONE PROJECT

by Handi Rizkinugraha

INTRODUCTION

Aachen is one of the top 10 city in Germany with the most number of college students.

The purpose of this case study is to help making some guidance for basic data about renting in Aachen, before they survey further for details.

The conclusion will summarize about three things:

- How much is the usual cost rent in Aachen
- What number of rooms will be more efficient cost-wise
- What are the cost rate for each district around Aachen and what are the facilities around those districts

DATA

- Data on apartments is collected by web scrapping a local website with apartment listings (immonet.de)
  - In total 344 apartment datas with their address, size, number of rooms, and coldprice (price with deposit and water & electricity cost excluded)
- List coordinates of each postal code found
- Foursquare data to collect top 10 venues for each district

ANALYSIS (CONT'D)

- First topic: How much is the average rent cost in Aachen?

	Coldprice	Area	Rooms	Coldprice/m2	Coldprice/room
count	344.000000	344.000000	344.000000	344.000000	344.000000
mean	674.991831	65.393547	2.292151	11.077674	319.257529
std	318.449874	29.563325	0.974737	3.568296	140.339787
min	199.000000	13.000000	1.000000	4.760000	100.000000
25%	449.000000	45.000000	2.000000	8.515000	224.442500
50%	600.000000	64.000000	2.000000	10.070000	291.775000
75%	816.285000	83.250000	3.000000	12.420000	374.140000
max	2250.000000	200.000000	5.000000	26.940000	1399.000000

- From here, we can see that the mean price for the properties around Aachen (per July 2021):
  - Coldprice: 674.99 €
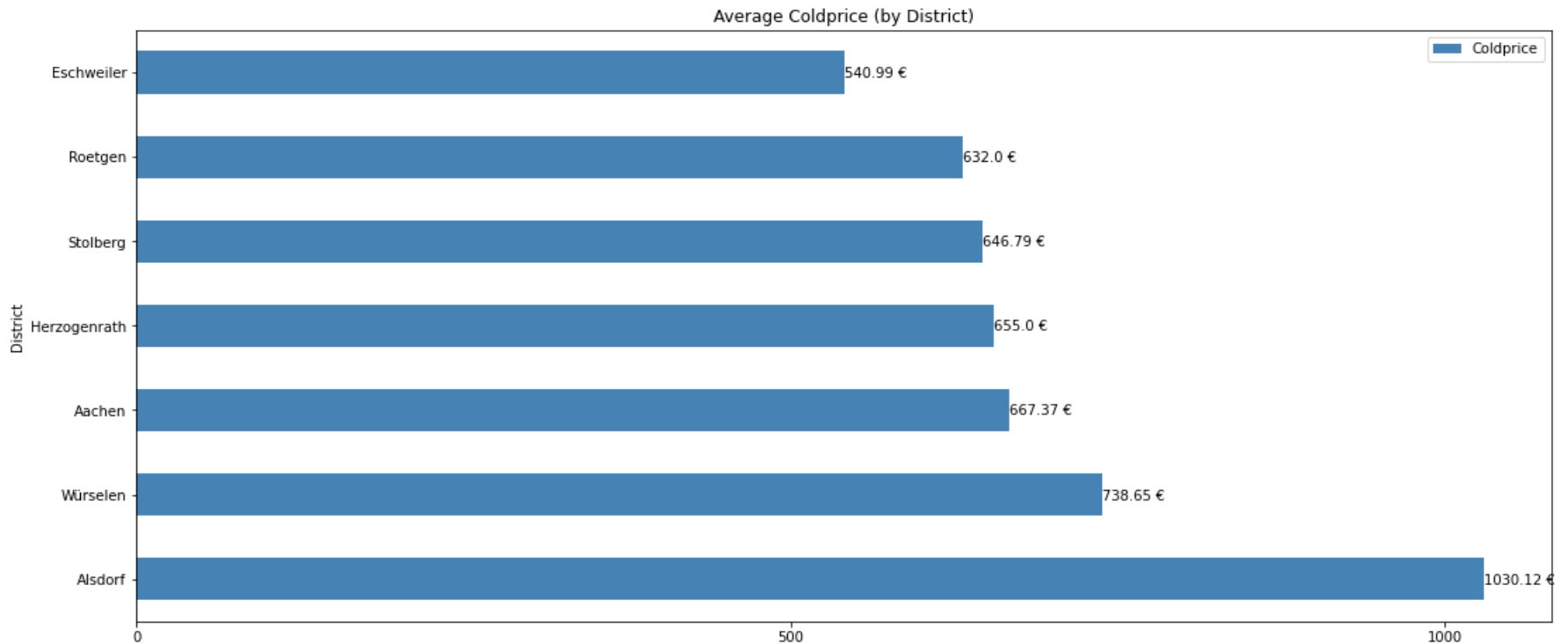 - Coldprice/m²: 11.07 €
  - Coldprice/room: 319.25 €

ANALYSIS (CONT'D)

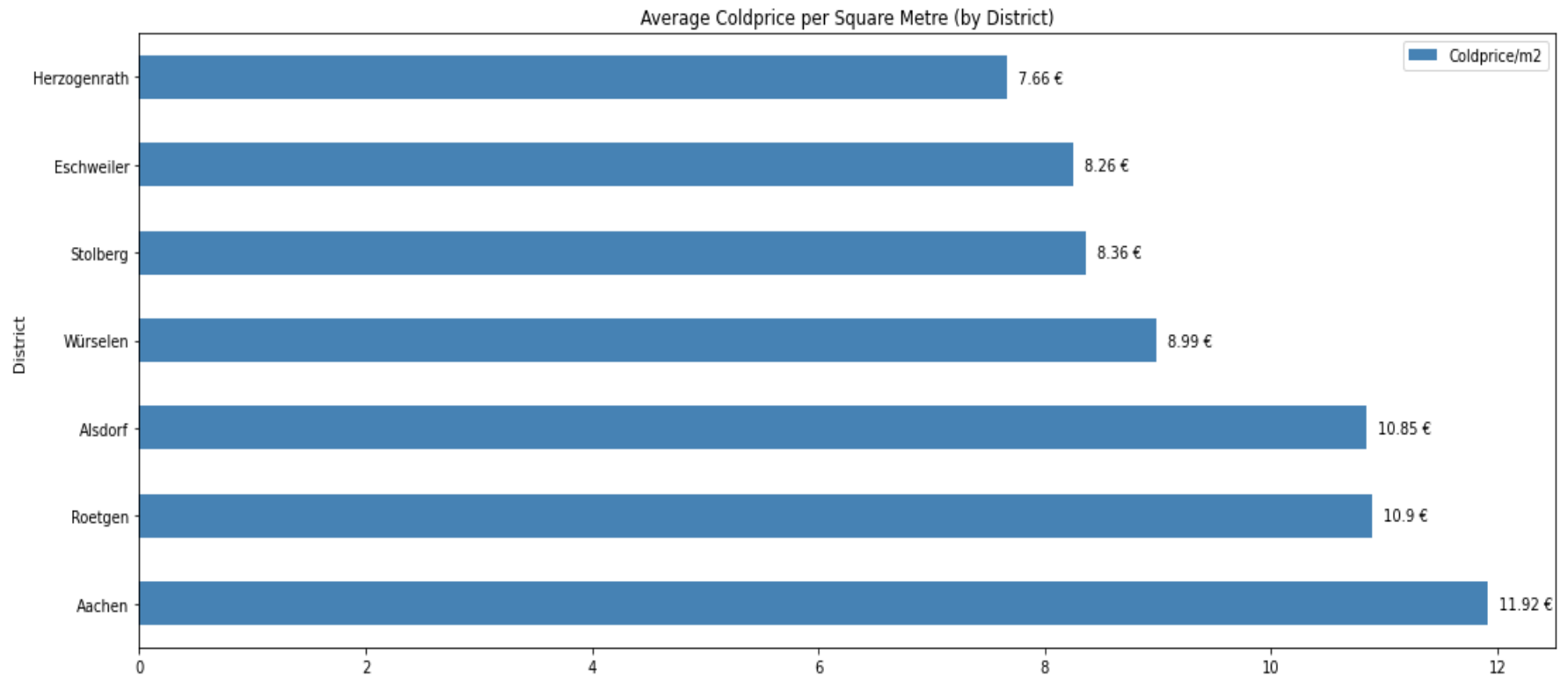- Next topic: **Which district** is **the cheapest average rent cost** around Aachen?

	District	Coldprice	Area	Rooms	Coldprice/m2	Coldprice/room	DataEachDistrict
0	Aachen	667.373880	60.944520	2.114000	11.916040	343.406120	250
1	Alsdorf	1030.115625	92.080625	3.656250	10.848750	276.605625	16
2	Eschweiler	540.993000	66.295333	2.416667	8.259000	233.679667	30
3	Herzogenrath	655.000000	82.633333	2.916667	7.663333	225.750000	6
4	Roetgen	632.000000	58.000000	2.000000	10.900000	316.000000	1
5	Stolberg	646.791667	78.146250	2.604167	8.360417	260.473750	24
6	Würselen	738.651765	80.458235	2.764706	8.990000	271.477059	17

ANALYSIS (CONT'D)

Average Coldprice (by District)

ANALYSIS (CONT'D)

Average Coldprice per Square Metre (by District)

ANALYSIS (CONT'D)

Average Coldprice per Room (by District)
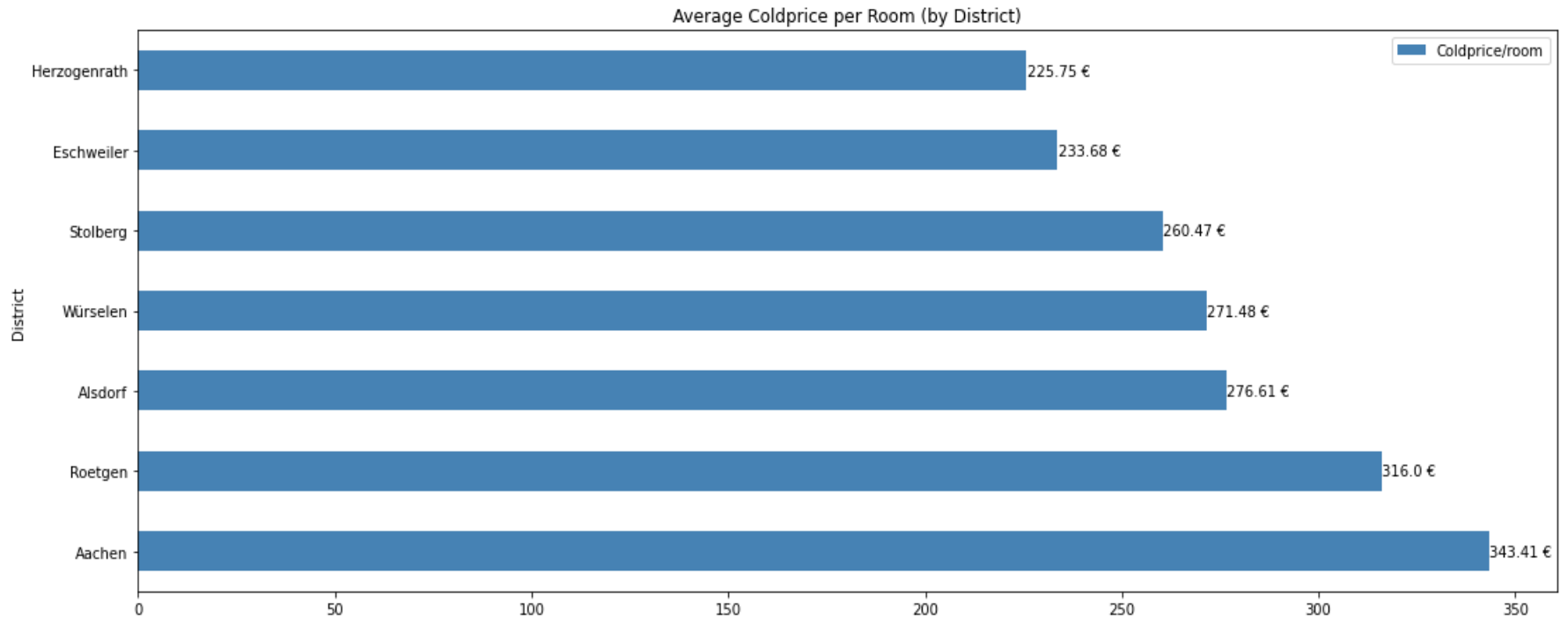
ANALYSIS (CONT'D)

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From the table and the graphics above, we can see that from cold price, cold price per square metre, and cold price per amount of room aspects, **Eschweiler** comes first as the overall cheapest district. Followed by **Stolberg** in second. The data also have quite good amount of samples for representation (around 10% from the total sample).
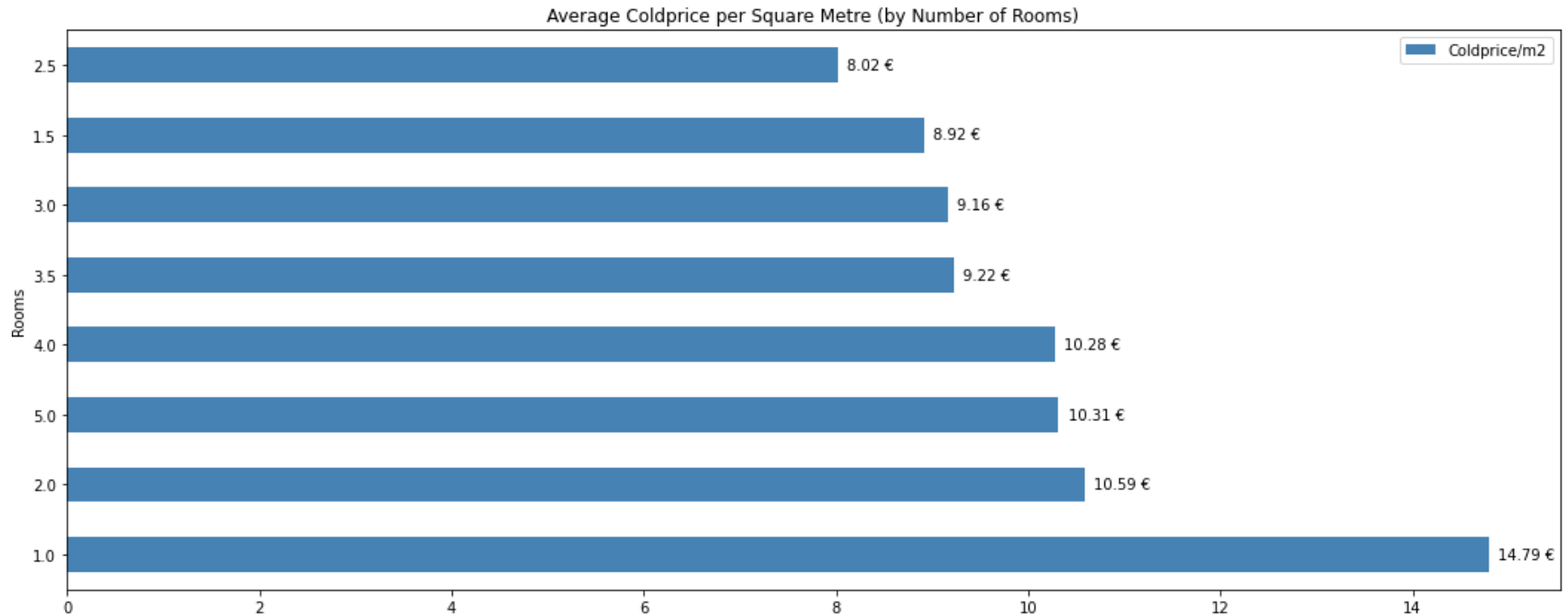
ANALYSIS (CONT'D)

- Next topic: **Which type number of rooms** is **the cheapest average rent cost** around Aachen?
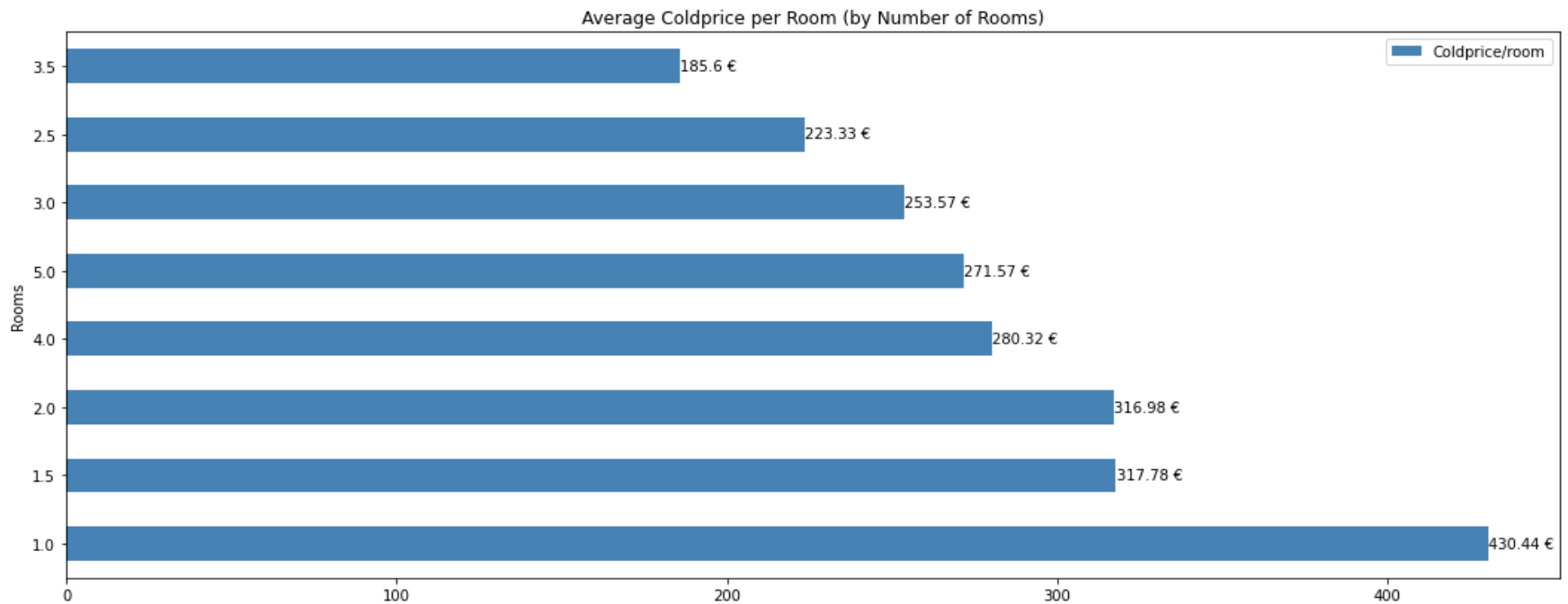
	Rooms	Coldprice	Area	Coldprice/m2	Coldprice/room	Samples
0	1.0	430.442195	32.038049	14.791707	430.442195	82
1	1.5	476.666667	54.666667	8.916667	317.776667	3
2	2.0	633.961316	59.932982	10.586754	316.980702	114
3	2.5	558.317500	66.387500	8.015000	223.327500	4
4	3.0	760.723786	82.783592	9.160971	253.574563	103
5	3.5	649.595000	71.375000	9.225000	185.600000	2
6	4.0	1121.280312	106.802500	10.275625	280.320000	32
7	5.0	1357.840000	129.802500	10.312500	271.567500	4

ANALYSIS (CONT'D)

Average Coldprice per Square Metre (by Number of Rooms)

ANALYSIS (CONT'D)

Average Coldprice per Room (by Number of Rooms)

Rooms	Coldprice/room
3.5	185.6 €
2.5	223.33 €
3.0	253.57 €
5.0	271.57 €
4.0	280.32 €
2.0	316.98 €
1.5	317.78 €
1.0	430.44 €

ANALYSIS (CONT'D)

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As we can see from those graphics above, the **3 room apartment** comes as the cheapest and also with a representative number of samples (around 30% of the total samples)
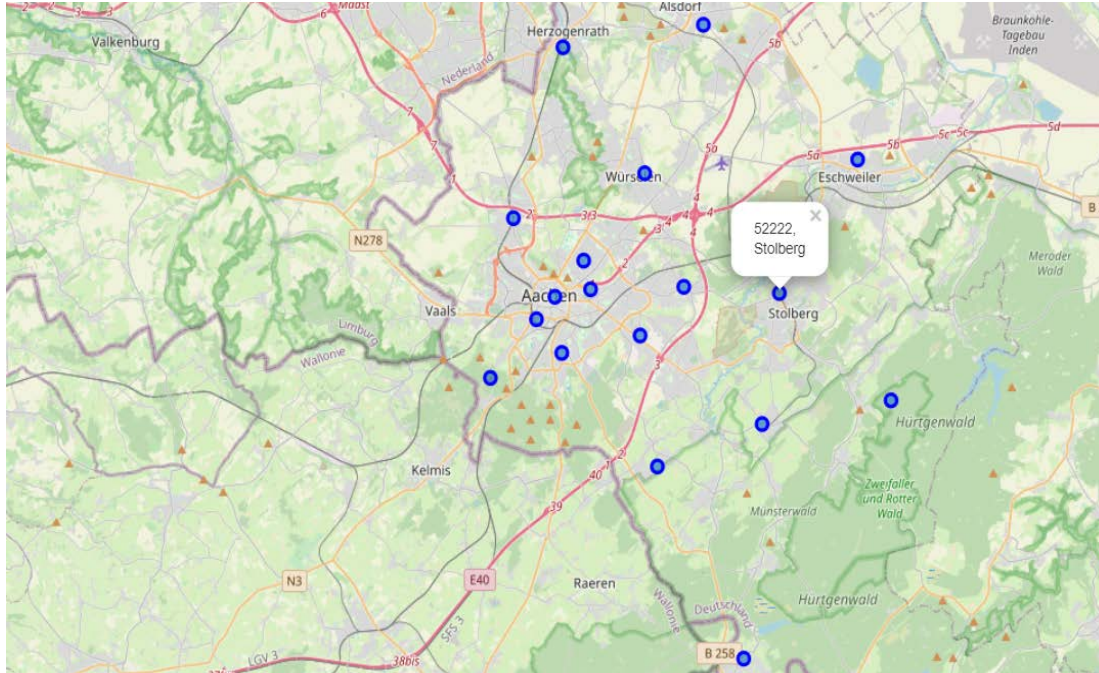
ANALYSIS (CONT'D)

- Next topic: How far is each district from the centre of Aachen
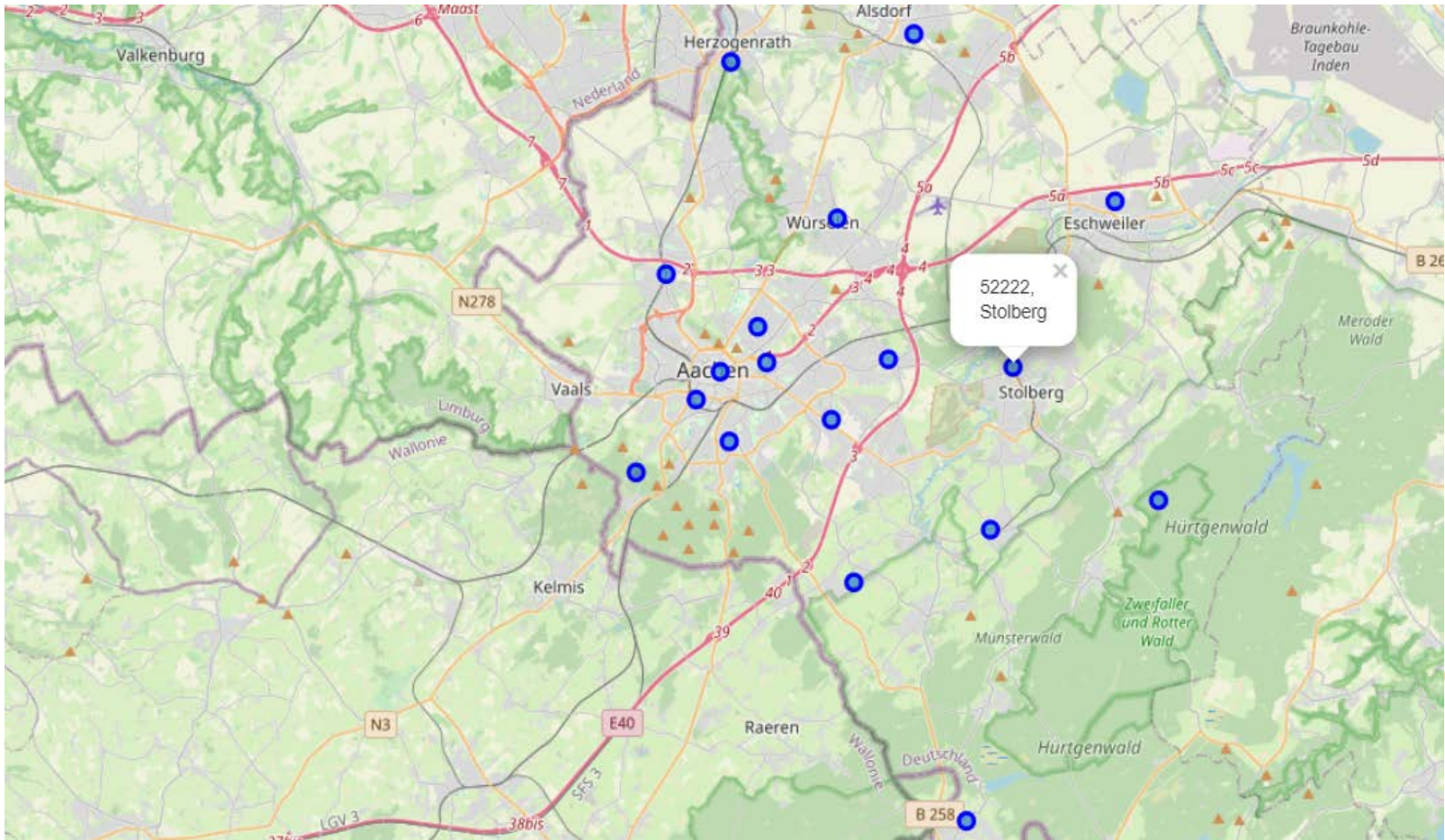
ANALYSIS (CONT'D)

- As we have mentioned before, **Eschweiler** and **Stolberg** are the two cheapest district
- **HOWEVER**, from **Eschweiler** district to the centre of Aachen takes **around 1 hour** using public transport
- **Stolberg** takes **even more, around 1 ½ hour** using public transport

ANALYSIS (CONT'D)

- Next topic: What are the most common facilities in each district
- We also will categorize the districts based on two clusters

ANALYSIS (CONT'D)

`cluster1`

|	District	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
12	Roetgen	Supermarket	Spa	Gas Station	Italian Restaurant	Fast Food Restaurant
13	Stolberg	Supermarket	Drugstore	Train Station	Big Box Store	Museum
15	Stolberg	Supermarket	Restaurant	Bank	Zoo	Fried Chicken Joint
17	Alsdorf	Supermarket	Gas Station	Drugstore	Zoo	Bus Station

ANALYSIS (CONT'D)

`cluster2`

	District	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Aachen	Bar	German Restaurant	Bakery	Plaza	Supermarket
1	Aachen	Bar	German Restaurant	Park	Bakery	Café
2	Aachen	Bar	Café	German Restaurant	Bakery	Turkish Restaurant
3	Aachen	Bar	Bakery	Park	Plaza	Italian Restaurant
4	Aachen	Bar	Bakery	Plaza	Supermarket	Italian Restaurant
5	Aachen	Supermarket	Hotel	Liquor Store	Outlet Store	Gym
6	Aachen	Supermarket	Café	Restaurant	Pool	Scenic Lookout
7	Aachen	Supermarket	German Restaurant	Hotel	Bakery	Trail
8	Aachen	Supermarket	Bus Stop	Hotel	Turkish Restaurant	Bar
9	Aachen	Supermarket	Fast Food Restaurant	Bakery	Hotel	Bus Station
10	Herzogenrath	Supermarket	Snack Place	Train Station	Drugstore	Hotel
11	Würselen	Supermarket	Drugstore	Furniture / Home Store	Big Box Store	Hotel
14	Stolberg	German Restaurant	Restaurant	Pizza Place	Gastropub	Supermarket
16	Eschweiler	Supermarket	Drugstore	Electronics Store	Hotel	Thai Restaurant

ANALYSIS (CONT'D)

- By analyzing the clusters we can see that cluster 1 is more residential since it contains mostly supermarket and drugstore, while cluster 2 is more commercial / touristic and contains many hotels, bars, and restaurants. We can visualize this cluster in a map.

RESULT
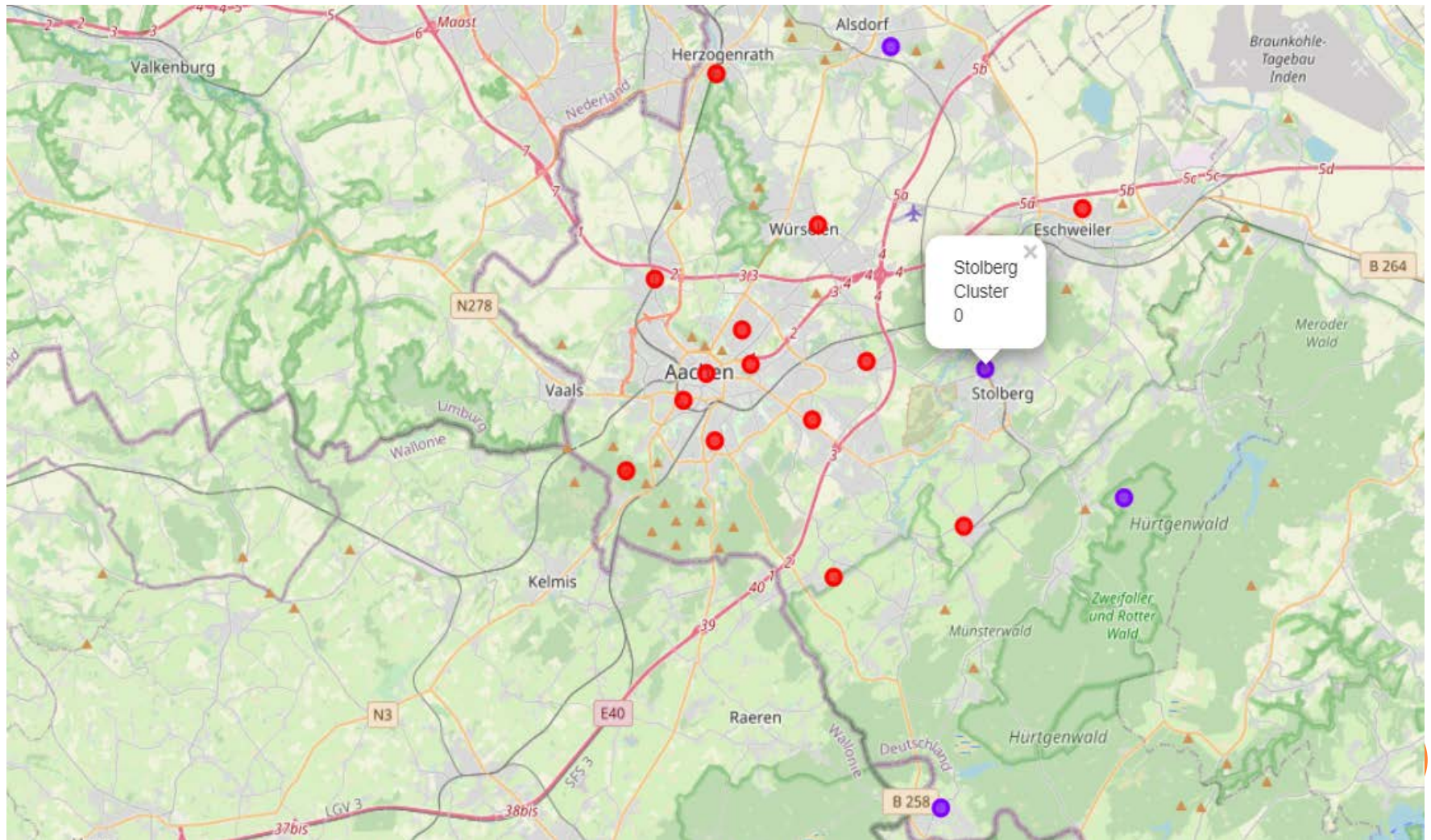
CONCLUSION & DISCUSSION

- From this analysis, we can determine the average cold price for the properties around Aachen based on immonet.de as follows (per July 2021):

  - Coldprice: 674.99 €
  - Coldprice/m²: 11.07 €
  - Coldprice/room: 319.25 €

- Also by the number of room categories, we find that **3 room apartments** is the cheapest option.

CONCLUSION & DISCUSSION (CONT'D)

- In this analysis, we find that **Eschweiler** and **Stolberg** are the two cheapest district

- <u>**HOWEVER**</u>, from **Eschweiler** district to the centre of Aachen takes **around 1 hour** using public transport

- **Stolberg** takes **even more, around 1 ½ hour** using public transport