

# Comparing Bavarian Neighborhoods and Cities

## Introduction

I want to buy a house or an apartment in the greater Munich area. Munich is quite expensive; therefore, I want to know, which neighborhoods and cities are similar to each other

## Data acquisition and cleaning

Of course, I need geodata for everything. For the Munich neighborhoods I collect them from Wikipedia. The other surrounding cities I downloaded geojson data from this website:

<http://opendatalab.de/projects/geojson-utilities/>

There is some clean up to do: the geojson files from the opendatalab has the German format with commas instead of dots. Therefore, I have to convert them to dots.

Afterwards, everything with NaN must go away. Now I can use the data to get the information from Foursquare.

## Methodology

Because time is of the essence, I am orienting around the last coursera project: New York city neighborhoods. K-Means clustering is quite easy and quick. Therefore I have to get data from foursquare for the neighborhoods and cities, cluster them and present them on folium.

## Results

I can get all the venues from the neighborhoods and cities:

----Adelshofen----

	venue	freq
0	Greek Restaurant	1.0
1	Arts & Crafts Store	0.0
2	Mongolian Restaurant	0.0
3	Movie Theater	0.0
4	Museum	0.0

----Adelzhausen----

	venue	freq
0	Hotel	0.5
1	Photography Studio	0.5
2	Arts & Crafts Store	0.0
3	Paper / Office Supplies Store	0.0
4	Movie Theater	0.0

----Affing----

	venue	freq
0	Electronics Store	0.25
1	Bookstore	0.25
2	Supermarket	0.25
3	Lottery Retailer	0.25
4	Arts & Crafts Store	0.00

----Aichach----

	venue	freq
0	Café	0.33
1	Steakhouse	0.17
2	Ice Cream Shop	0.17
3	Hotel	0.17
4	Food & Drink Shop	0.17

----Aindling----

	venue	freq
0	Turkish Restaurant	0.33
1	Supermarket	0.33
2	Nail Salon	0.33
3	Arts & Crafts Store	0.00
4	Palace	0.00

----Alling----

	venue	freq
0	Arts & Crafts Store	0.14
1	BBQ Joint	0.14
2	Furniture / Home Store	0.14
3	Playground	0.14
4	Stables	0.14

----Altheimberg----

	venue	freq
0	Lottery Retailer	0.33
1	Supermarket	0.33
2	Train Station	0.33
3	Paper / Office Supplies Store	0.00
4	Movie Theater	0.00

----Altomünster----

	venue	freq
0	Supermarket	0.25
1	Train Station	0.25
2	Hotel	0.25
3	German Restaurant	0.25
4	Arts & Crafts Store	0.00

----Andechs----

	venue	freq
0	Cheese Shop	0.2
1	Supermarket	0.2
2	Boarding House	0.2
3	Hotel	0.2
4	Board Shop	0.2

----Aschheim----

	venue	freq
0	Hotel	0.4
1	Italian Restaurant	0.1
2	Asian Restaurant	0.1
3	Food & Drink Shop	0.1
4	Ice Cream Shop	0.1

----Aubing-Lochhausen-Langwied----

	venue	freq
0	Post Office	0.17
1	Bus Stop	0.17
2	Supermarket	0.17
3	German Restaurant	0.17
4	Hotel	0.17

----Augsburg----

	venue	freq
0	Plaza	0.08
1	Bar	0.06
2	Steakhouse	0.06
3	Light Rail Station	0.06
4	Café	0.06

----Aying----

	venue	freq
0	Farmers Market	0.33
1	Brewery	0.17
2	German Restaurant	0.17
3	Hotel	0.17
4	Motorcycle Shop	0.17

----Baar (Schwaben)----

	venue	freq
0	Supermarket	0.5
1	Brewery	0.5
2	Arts & Crafts Store	0.0
3	Palace	0.0
4	Motorcycle Shop	0.0

----Baierbrunn----

	venue	freq
0	Bakery	0.50
1	German Restaurant	0.25
2	Hotel	0.25
3	Arts & Crafts Store	0.00
4	Paper / Office Supplies Store	0.00

----Berg----

	venue	freq
0	Dentist's Office	0.25
1	Supermarket	0.25
2	German Restaurant	0.25
3	Café	0.25
4	Arts & Crafts Store	0.00

----Bergkirchen----

	venue	freq
0	German Restaurant	0.33
1	Pharmacy	0.33
2	Bank	0.33
3	Arts & Crafts Store	0.00
4	Palace	0.00

----Brunnthal----

	venue	freq
0	Pizza Place	0.5
1	Soccer Field	0.5
2	Arts & Crafts Store	0.0
3	Palace	0.0
4	Movie Theater	0.0

----Dachau----

	venue	freq
0	Park	0.29
1	Restaurant	0.14
2	German Restaurant	0.14
3	Lottery Retailer	0.14
4	Bar	0.14

----Dasing----

	venue	freq
0	Supermarket	0.33
1	Train Station	0.33
2	Bank	0.33
3	Arts & Crafts Store	0.00
4	Palace	0.00

----Egenhofen----

	venue	freq
0	Clothing Store	1.0
1	Arts & Crafts Store	0.0
2	Paper / Office Supplies Store	0.0
3	Movie Theater	0.0
4	Museum	0.0

----Eichenau----

	venue	freq
0	Bakery	0.29
1	Italian Restaurant	0.14
2	Ice Cream Shop	0.14
3	Modern European Restaurant	0.14
4	Café	0.14

----Emmering----

	venue	freq
0	Construction & Landscaping	0.25
1	Community Center	0.25
2	Pizza Place	0.25
3	Gastropub	0.25
4	Arts & Crafts Store	0.00

----Erdweg----

	venue	freq
0	Athletics & Sports	0.2
1	German Restaurant	0.2
2	Supermarket	0.2
3	Train Station	0.2
4	IT Services	0.2

----Eurasburg----

	venue	freq
0	Electronics Store	0.67
1	Eastern European Restaurant	0.33
2	Arts & Crafts Store	0.00
3	Insurance Office	0.00
4	Museum	0.00

----Feldafing----

	venue	freq
0	Hotel	0.50
1	German Restaurant	0.25
2	Dog Run	0.25
3	Arts & Crafts Store	0.00
4	Palace	0.00

----Feldkirchen----

	venue	freq
0	Hotel	0.25
1	Italian Restaurant	0.12
2	German Restaurant	0.12
3	Greek Restaurant	0.12
4	Gym / Fitness Center	0.12

----Friedberg----

	venue	freq
0	Café	0.22
1	Pizza Place	0.11
2	Turkish Restaurant	0.11
3	Train Station	0.11
4	Ice Cream Shop	0.11

----Fürstenfeldbruck----

	venue	freq
0	Breakfast Spot	0.2
1	Supermarket	0.2
2	German Restaurant	0.2
3	Business Service	0.2
4	Bar	0.2

----Garching b. München----

	venue	freq
0	Plaza	0.1
1	Italian Restaurant	0.1
2	Greek Restaurant	0.1
3	Ice Cream Shop	0.1
4	German Restaurant	0.1

----Gauting----

	venue	freq
0	Pizza Place	0.18
1	Tea Room	0.06
2	Drugstore	0.06
3	Pastry Shop	0.06
4	Farmers Market	0.06

----Germering----

	venue	freq
0	Post Office	0.09
1	Café	0.09
2	Pizza Place	0.09
3	Sports Bar	0.09
4	Plaza	0.09

----Gilching----

	venue	freq
0	Italian Restaurant	0.25
1	Gastropub	0.25
2	Café	0.25
3	Gym	0.25
4	Palace	0.00

----Grafrath----

	venue	freq
0	Garden	1.0
1	Mongolian Restaurant	0.0
2	Motorcycle Shop	0.0
3	Movie Theater	0.0
4	Museum	0.0

----Grasbrunn----

	venue	freq
0	Boarding House	0.25
1	German Restaurant	0.25
2	Gift Shop	0.25
3	Gourmet Shop	0.25
4	Arts & Crafts Store	0.00

----Gräfelting----

	venue	freq
0	Italian Restaurant	0.12
1	Dessert Shop	0.12
2	Mobile Phone Shop	0.12
3	Train Station	0.12
4	Supermarket	0.12

----Gröbenzell----

	venue	freq
0	Pizza Place	0.08
1	Greek Restaurant	0.08
2	Post Office	0.08
3	Gas Station	0.08
4	Ice Cream Shop	0.08

----Grünwald----

	venue	freq
0	Hotel	0.09
1	German Restaurant	0.09
2	Coffee Shop	0.09
3	Bakery	0.09
4	Indian Restaurant	0.09

----Haar----

	venue	freq
0	Bakery	0.18
1	Italian Restaurant	0.09
2	Gas Station	0.09
3	Gastropub	0.09
4	Deli / Bodega	0.09

----Hadern----

	venue	freq
0	Bus Stop	0.50
1	Salon / Barbershop	0.25
2	Cafeteria	0.25
3	Arts & Crafts Store	0.00
4	Paper / Office Supplies Store	0.00

----Haimhausen----

	venue	freq
0	Casino	0.25
1	Restaurant	0.25
2	Supermarket	0.25
3	German Restaurant	0.25
4	Arts & Crafts Store	0.00

----Hattenhofen----

	venue	freq
0	Miscellaneous Shop	0.33
1	Hotel	0.33
2	German Restaurant	0.33
3	Arts & Crafts Store	0.00
4	Paper / Office Supplies Store	0.00

----Hebertshausen----

	venue	freq
0	Italian Restaurant	1.0
1	Arts & Crafts Store	0.0
2	Paper / Office Supplies Store	0.0
3	Movie Theater	0.0
4	Museum	0.0

----Herrsching a. Ammersee----

	venue	freq
0	Hotel	0.50
1	Japanese Restaurant	0.17
2	Train Station	0.17
3	Bakery	0.17
4	Arts & Crafts Store	0.00

----Hilgertshausen-Tandern----

	venue	freq
0	Cosmetics Shop	0.50
1	Supermarket	0.25
2	Bank	0.25
3	Park	0.00
4	Museum	0.00

----Hohenbrunn----

	venue	freq
0	Italian Restaurant	0.50
1	German Restaurant	0.25
2	Light Rail Station	0.25
3	Arts & Crafts Store	0.00
4	Paper / Office Supplies Store	0.00

----Hollenbach----

	venue	freq
0	Construction & Landscaping	0.5
1	Bank	0.5
2	Arts & Crafts Store	0.0
3	Park	0.0
4	Museum	0.0

----Höhenkirchen-Siegersbrunn----

	venue	freq
0	Indian Restaurant	0.25
1	Ice Cream Shop	0.25
2	Supermarket	0.25
3	Bar	0.25
4	Arts & Crafts Store	0.00

----Inchenhofen----

	venue	freq
0	Miscellaneous Shop	0.5
1	Bavarian Restaurant	0.5
2	Arts & Crafts Store	0.0
3	Palace	0.0
4	Movie Theater	0.0

----Inning a. Ammersee----

	venue	freq
0	Café	0.33
1	Spa	0.17
2	Indian Restaurant	0.17
3	Soccer Field	0.17
4	Mediterranean Restaurant	0.17

----Ismaning----

	venue	freq
0	Hotel	0.24
1	Restaurant	0.06
2	Indian Restaurant	0.06
3	Greek Restaurant	0.06
4	Park	0.06



----Jesenwang----

	venue	freq
0	Playground	0.33
1	Automotive Shop	0.33
2	Bakery	0.33
3	Arts & Crafts Store	0.00
4	Park	0.00

----Karlsfeld----

	venue	freq
0	Shoe Store	0.1
1	Italian Restaurant	0.1
2	Indian Restaurant	0.1
3	Ice Cream Shop	0.1
4	Bakery	0.1

----Kirchheim b. München----

	venue	freq
0	Bakery	0.18
1	Gastropub	0.09
2	Post Office	0.09
3	Ski Area	0.09
4	German Restaurant	0.09

----Kissing----

	venue	freq
0	German Restaurant	1.0
1	Arts & Crafts Store	0.0
2	Mongolian Restaurant	0.0
3	Movie Theater	0.0
4	Museum	0.0

----Kottgeisering----

	venue	freq
0	Bakery	0.5
1	Market	0.5
2	Arts & Crafts Store	0.0
3	Paper / Office Supplies Store	0.0
4	Movie Theater	0.0

----Krailling----

	venue	freq
0	Italian Restaurant	0.25
1	Supermarket	0.25
2	German Restaurant	0.25
3	Health & Beauty Service	0.25
4	Palace	0.00

----Kühbach----

	venue	freq
0	Bridal Shop	0.33
1	Pizza Place	0.33
2	Beer Garden	0.33
3	Paper / Office Supplies Store	0.00
4	Movie Theater	0.00

----Landsberied----

	venue	freq
0	Soccer Field	0.33
1	German Restaurant	0.33
2	Tennis Court	0.33
3	Arts & Crafts Store	0.00
4	Outdoors & Recreation	0.00

----Maisach----

	venue	freq
0	Italian Restaurant	0.25
1	Bakery	0.12
2	Light Rail Station	0.12
3	Café	0.12
4	Supermarket	0.12

----Mammendorf----

	venue	freq
0	Supermarket	1.0
1	Arts & Crafts Store	0.0
2	Mongolian Restaurant	0.0
3	Movie Theater	0.0
4	Museum	0.0

----Markt Indersdorf----

	venue	freq
0	Athletics & Sports	0.2
1	Restaurant	0.2
2	Ice Cream Shop	0.2
3	Ski Shop	0.2
4	Mexican Restaurant	0.2

----Merching----

	venue	freq
0	Hotel	0.5
1	Bank	0.5
2	Arts & Crafts Store	0.0
3	Paper / Office Supplies Store	0.0
4	Movie Theater	0.0

----Mering----

	venue	freq
0	Plaza	0.2
1	Ice Cream Shop	0.2
2	Pizza Place	0.2
3	German Restaurant	0.2
4	Lottery Retailer	0.2

----Mittelstetten----

	venue	freq
0	Plaza	0.2
1	Supermarket	0.2
2	Nail Salon	0.2
3	German Restaurant	0.2
4	Business Service	0.2

----Moorenweis----

	venue	freq
0	Inn	0.25
1	Soccer Field	0.25
2	Pharmacy	0.25
3	Sports Bar	0.25
4	Arts & Crafts Store	0.00

----Neubiberg----

	venue	freq
0	Athletics & Sports	0.5
1	Hotel	0.5
2	Arts & Crafts Store	0.0
3	Paper / Office Supplies Store	0.0
4	Movie Theater	0.0

----Neuried----

	venue	freq
0	Café	0.29
1	Italian Restaurant	0.14
2	Kebab Restaurant	0.14
3	German Restaurant	0.14
4	Chinese Restaurant	0.14

----Obergriesbach----

	venue	freq
0	Scenic Lookout	1.0
1	Arts & Crafts Store	0.0
2	Paper / Office Supplies Store	0.0
3	Movie Theater	0.0
4	Museum	0.0

----Oberhaching----

	venue	freq
0	Brewery	0.2
1	Sporting Goods Shop	0.2
2	German Restaurant	0.2
3	Food & Drink Shop	0.2
4	Mexican Restaurant	0.2

----Oberschleißheim----

	venue	freq
0	Vietnamese Restaurant	0.25
1	German Restaurant	0.25
2	Hotel	0.25
3	Greek Restaurant	0.25
4	Arts & Crafts Store	0.00

----Odelzhausen----

	venue	freq
0	Restaurant	0.2
1	Hotel	0.2
2	Supermarket	0.2
3	Pharmacy	0.2
4	German Restaurant	0.2

----Olching----

	venue	freq
0	Italian Restaurant	0.17
1	Insurance Office	0.08
2	Dance Studio	0.08
3	Café	0.08
4	Bakery	0.08

----Ottobrunn----

	venue	freq
0	Italian Restaurant	0.14
1	Vietnamese Restaurant	0.09
2	Plaza	0.09
3	Bakery	0.09
4	Bank	0.09

----Pasing----

	venue	freq
0	Bakery	0.08
1	Café	0.06
2	Drugstore	0.06
3	Clothing Store	0.05
4	Coffee Shop	0.05

----Petersdorf----

	venue	freq
0	Health & Beauty Service	1.0
1	Arts & Crafts Store	0.0
2	Paper / Office Supplies Store	0.0
3	Movie Theater	0.0
4	Museum	0.0

----Petershausen----

	venue	freq
0	Italian Restaurant	0.2
1	Train Station	0.2
2	Café	0.2
3	Grocery Store	0.2
4	Bar	0.2

----Planegg----

	venue	freq
0	Hotel	0.29
1	German Restaurant	0.29
2	Restaurant	0.14
3	River	0.14
4	Supermarket	0.14

----Puchheim----

	venue	freq
0	Soccer Field	0.25
1	Supermarket	0.25
2	Hotel	0.25
3	Lottery Retailer	0.25
4	Arts & Crafts Store	0.00

----Pullach i. Isartal----

	venue	freq
0	Café	0.22
1	Italian Restaurant	0.11
2	Light Rail Station	0.11
3	Plaza	0.11
4	Supermarket	0.11

----Putzbrunn----

	venue	freq
0	German Restaurant	0.50
1	Italian Restaurant	0.25
2	Supermarket	0.25
3	Arts & Crafts Store	0.00
4	Palace	0.00

----Pöcking----

	venue	freq
0	Pool	0.25
1	Italian Restaurant	0.25
2	Restaurant	0.25
3	Supermarket	0.25
4	Paper / Office Supplies Store	0.00

----Pöttmes----

	venue	freq
0	Cosmetics Shop	0.50
1	Turkish Restaurant	0.25
2	Hotel	0.25
3	Paper / Office Supplies Store	0.00
4	Movie Theater	0.00

----Rehling----

	venue	freq
0	Miscellaneous Shop	1.0
1	Arts & Crafts Store	0.0
2	Mongolian Restaurant	0.0
3	Movie Theater	0.0
4	Museum	0.0

----Ried----

	venue	freq
0	Soccer Field	0.5
1	Lottery Retailer	0.5
2	Arts & Crafts Store	0.0
3	Paper / Office Supplies Store	0.0
4	Museum	0.0

----Röhrmoos----

	venue	freq
0	Electronics Store	1.0
1	Arts & Crafts Store	0.0
2	Inn	0.0
3	Movie Theater	0.0
4	Museum	0.0

----Sauerlach----

	venue	freq
0	Hotel	0.25
1	Italian Restaurant	0.12
2	Ice Cream Shop	0.12
3	Light Rail Station	0.12
4	German Restaurant	0.12

----Schiltberg----

	venue	freq
0	Concert Hall	0.5
1	Miscellaneous Shop	0.5
2	Arts & Crafts Store	0.0
3	Paper / Office Supplies Store	0.0
4	Museum	0.0

----Schmiechen----

	venue	freq
0	Furniture / Home Store	1.0
1	Inn	0.0
2	Motorcycle Shop	0.0
3	Movie Theater	0.0
4	Museum	0.0

----Schwabhausen----

	venue	freq
0	Gas Station	0.5
1	Lottery Retailer	0.5
2	Arts & Crafts Store	0.0
3	Paper / Office Supplies Store	0.0
4	Movie Theater	0.0

----Schäftlarn----

	venue	freq
0	Italian Restaurant	0.25
1	Gas Station	0.25
2	Bakery	0.25
3	Light Rail Station	0.25
4	Paper / Office Supplies Store	0.00

----Schöngeising----

	venue	freq
0	Yoga Studio	0.33
1	Office	0.33
2	Motorcycle Shop	0.33
3	Pizza Place	0.00
4	Pier	0.00

----Seefeld----

	venue	freq
0	German Restaurant	0.4
1	Supermarket	0.2
2	Historic Site	0.2
3	Furniture / Home Store	0.2
4	Arts & Crafts Store	0.0

----Sendling-Westpark----

	venue	freq
0	Restaurant	0.11
1	Hotel	0.11
2	Café	0.11
3	Bus Stop	0.11
4	Supermarket	0.11

----Sielenbach----

	venue	freq
0	German Restaurant	1.0
1	Arts & Crafts Store	0.0
2	Mongolian Restaurant	0.0
3	Movie Theater	0.0
4	Museum	0.0

----Starnberg----

	venue	freq
0	Ice Cream Shop	0.12
1	Beach Bar	0.08
2	Sushi Restaurant	0.08
3	Garden	0.04
4	Plaza	0.04

----Steindorf----

	venue	freq
0	Construction & Landscaping	1.0
1	Pool	0.0
2	Movie Theater	0.0
3	Museum	0.0
4	Nail Salon	0.0

----Straßlach-Dingharting----

	venue	freq
0	Garden	0.25
1	Tennis Court	0.25
2	German Restaurant	0.25
3	Spa	0.25
4	Photography Studio	0.00

----Sulzemoos----

	venue	freq
0	Palace	1.0
1	Arts & Crafts Store	0.0
2	Paper / Office Supplies Store	0.0
3	Movie Theater	0.0
4	Museum	0.0

----Taufkirchen----

	venue	freq
0	River	0.25
1	Hotel	0.25
2	Bakery	0.25
3	Café	0.25
4	Arts & Crafts Store	0.00

----Thalkirchen, Obersendling----

	venue	freq
0	Bus Stop	0.38
1	Tennis Court	0.12
2	Italian Restaurant	0.12
3	Trattoria/Osteria	0.12
4	Trail	0.12

----Todtenweis----

	venue	freq
0	Photography Studio	0.33
1	Bakery	0.33
2	Health & Beauty Service	0.33
3	Arts & Crafts Store	0.00
4	Paper / Office Supplies Store	0.00

----Tutzing----

	venue	freq
0	Jewelry Store	0.14
1	German Restaurant	0.14
2	Ice Cream Shop	0.14
3	Fast Food Restaurant	0.14
4	Greek Restaurant	0.14

----Türkenfeld----

	venue	freq
0	Supermarket	0.25
1	Train Station	0.25
2	Pharmacy	0.25
3	German Restaurant	0.25
4	Arts & Crafts Store	0.00

----Unterföhring----

	venue	freq
0	Supermarket	0.29
1	Beach	0.14
2	Italian Restaurant	0.14
3	German Restaurant	0.14
4	Hotel	0.14

----Unterhaching----

	venue	freq
0	Drugstore	0.23
1	Salon / Barbershop	0.08
2	Pizza Place	0.08
3	Supermarket	0.08
4	Greek Restaurant	0.08

----Unterschleißheim----

	venue	freq
0	Indie Movie Theater	0.25
1	Pizza Place	0.25
2	Bus Station	0.25
3	Cupcake Shop	0.25
4	Paper / Office Supplies Store	0.00



#### ----Vierkirchen----

	venue	freq
0	Italian Restaurant	0.5
1	Supermarket	0.5
2	Arts & Crafts Store	0.0
3	Paper / Office Supplies Store	0.0
4	Movie Theater	0.0

#### ----Weichs----

	venue	freq
0	Italian Restaurant	0.5
1	Playground	0.5
2	Arts & Crafts Store	0.0
3	Paper / Office Supplies Store	0.0
4	Movie Theater	0.0

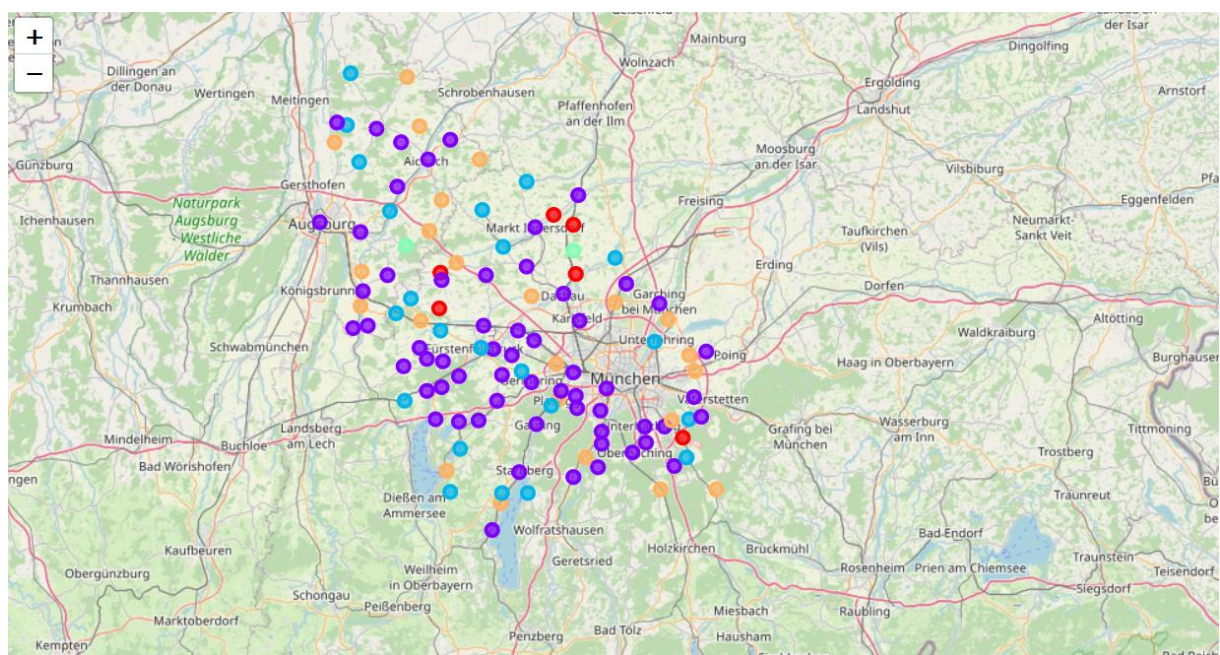
#### ----Weßling----

	venue	freq
0	Dessert Shop	0.17
1	Lake	0.17
2	Hotel	0.17
3	Supermarket	0.17
4	Light Rail Station	0.17

#### ----Wörthsee----

	venue	freq
0	German Restaurant	0.25
1	Dog Run	0.25
2	Seafood Restaurant	0.25
3	Beach	0.25
4	Arts & Crafts Store	0.00

Here you can see the clusters on the map:



## Discussion

There are certain clusters in Bavaria, but it is difficult to say, if they are meaningful or not.

## Conclusion and Future directions

The next step would be to validate the model, establish testing and refine the model. Maybe different algorithms should be tested.