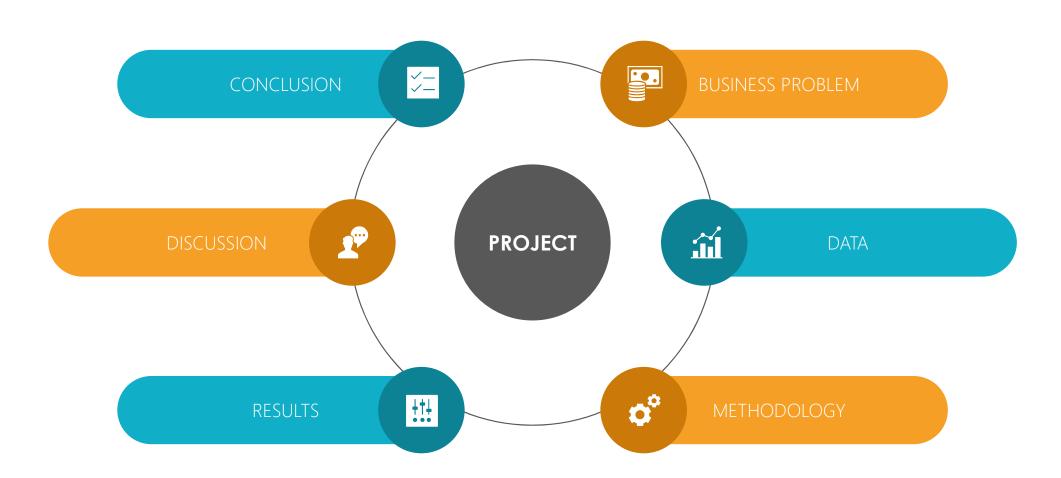
# Capstone Project: Battle of Neighboorhoods Presentation

## **Contents**



## **Business Problem**

- Target of this project is finding the most promising neighborhoods in Munich, Germany for opening new fitness centers.
- Stakeholders are fitness trainers
   who want to start their own
   business or big fitness companies
   who want to expand their business
   within Munich.

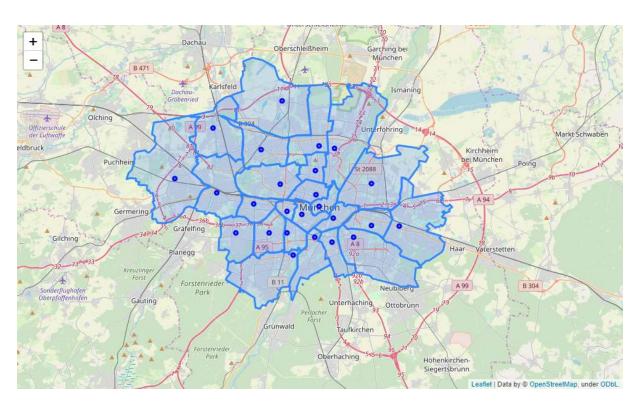


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## Data

## Geographical Data

Munich is divided into 25
 Neighborhoods.
 Total population is 1.54 Mio.
 (3<sup>rd</sup> largest city in Germany)



Source of the geojson-file is:

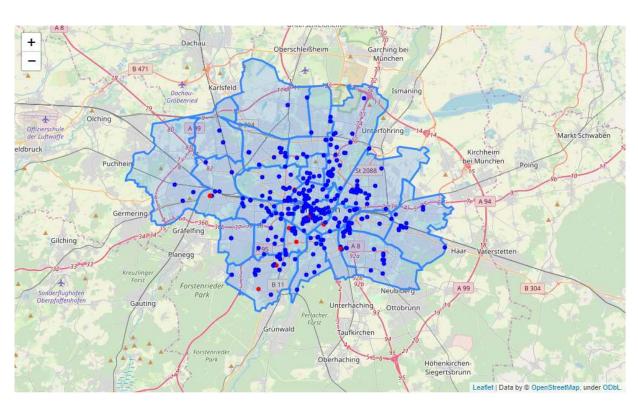
https://gist.github.com/webtobesocial

## Data

#### Fitness Center Data

- The fitness center location data in Munich is taken from FOURSQUARE venue search
- Search category is "Fitness Center"





Datasource:

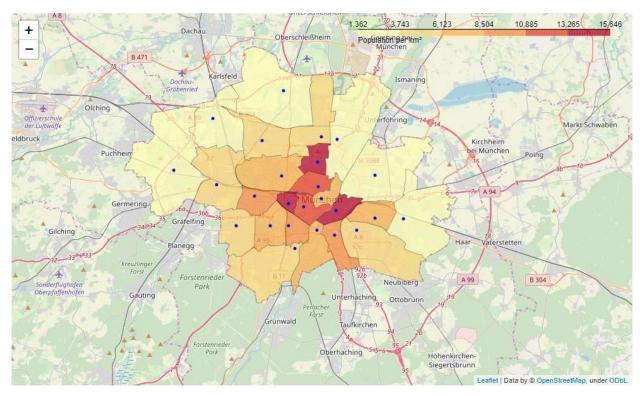
https://foursquare.com/city-guide FOURSQUARE



#### Data

#### Population Data Munich

- For clustering of the Neighborhoods 10 public datasets are used:
  - Population Density
  - Average Age
  - Single-Person Households
  - Women percentage
  - Birthrate
  - Aging Index
  - Youth Index
  - Unemployment rate
  - Welfare recipients rate
  - Migration background percentage



Example: Population Density

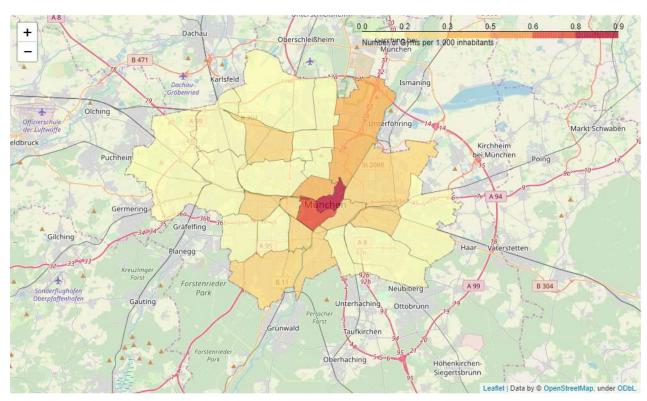
Datasource:

https://www.opengov-muenchen.de/

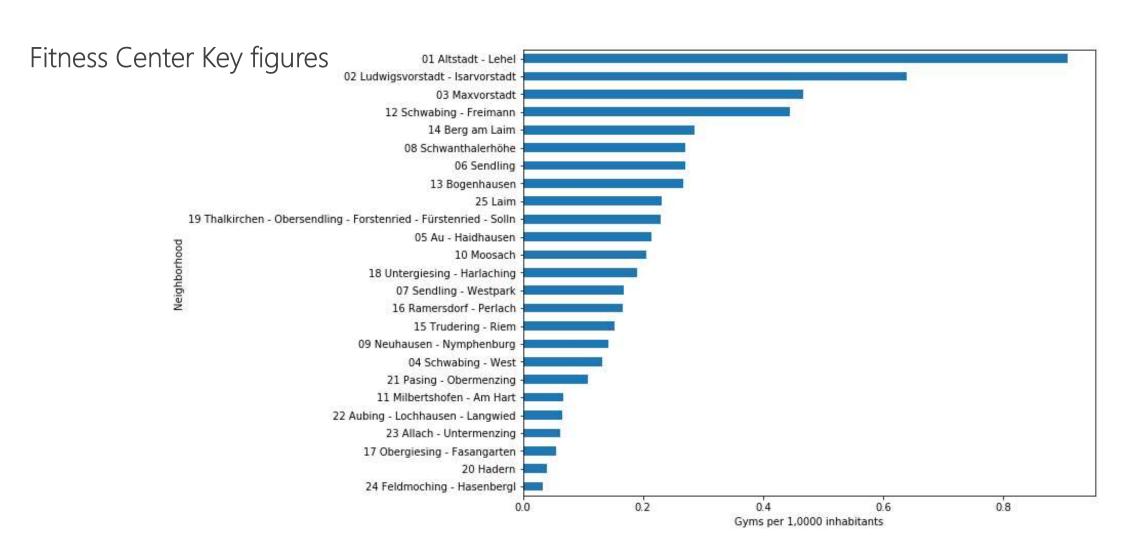


## Fitness Center Key figures

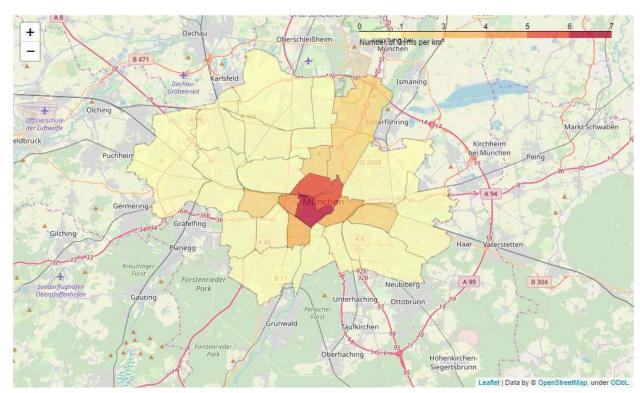
- Based on the fitness center location data from FOURSQUARE and the Population data 3 key figures for each Neighborhood are calculated:
  - Gym count
  - Gyms per 1,000 inhabitants
  - Gyms per Area km²



Gym Density per 1,000 inhabitants



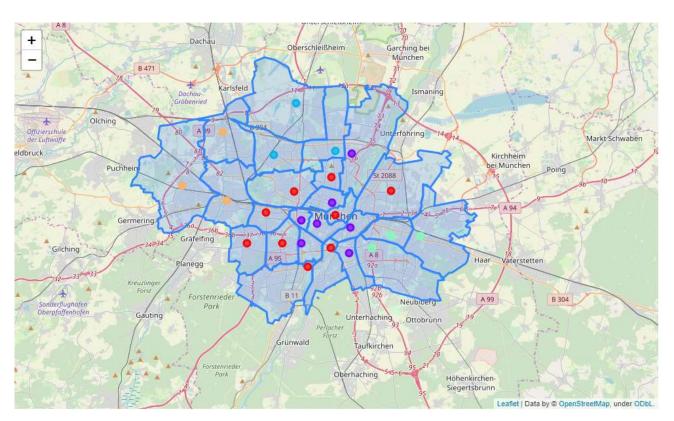
## Fitness Center Key figures



Gym Density per km²

## Clustering

 According to the population datasets (e.g. Average age, birthrate, etc.) the Neighborhoods in Munich are clustered into 5 Clusters with similar living conditions.



Neighborhood clusters in Munich

#### Cluster - Average

- For each cluster an average of the 3 fitness center key figures are calculated
- For example: Neighborhoods in Cluster 1 have an average count of 18 gyms

Cluster	avg_gym_count	avg_gyms_per_1000	avg_gyms_per_km2
0	13.555556	0.256607	1.850335
1	18.000000	0.337494	3.522278
2	6.000000	0.101572	0.477776
3	14.333333	0.201312	1.169052
4	4.333333	0.077949	0.233952

## Calculation of the Gym Index

 For each Neighborhood the deviation of the 3 key figures to the associated cluster average is calculated

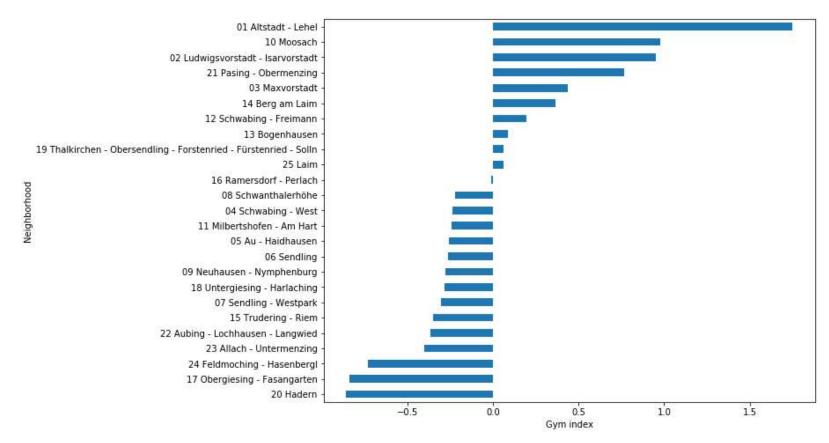
deviation\_gym\_count = 
$$\frac{gym\_count}{avg\_gym\_count}$$
 deviation\_gyms\_per\_1000 = 
$$\frac{gyms\_per\_1000}{avg\_gyms\_per\_1000}$$
 deviation\_gyms\_per\_km2 = 
$$\frac{gyms\_per\_km2}{avg\_gyms\_per\_km2}$$

 The final key figure 'Gym index' is the mean average of the 3 deviations scaled to zero:

$$gym\_index = \left(\frac{deviation\_gym\_count + deviation\_gyms\_per\_1000 + devia}{3}\right) - 1$$

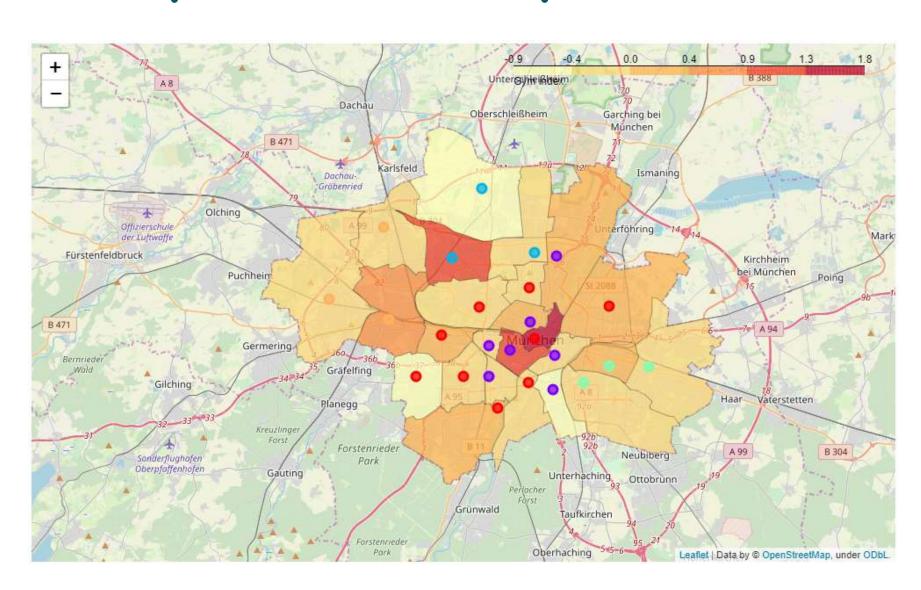
## Gym Index

A gym index of zero means no deviation to the cluster average. Values less than zero indicate Neighborhoods with less gym density than average and values greater zero indicate Neighborhoods with higher gym density than average. So negative values showing high market potentials for fitness center.



## **Results**

Gym Index shown as a choropleth map



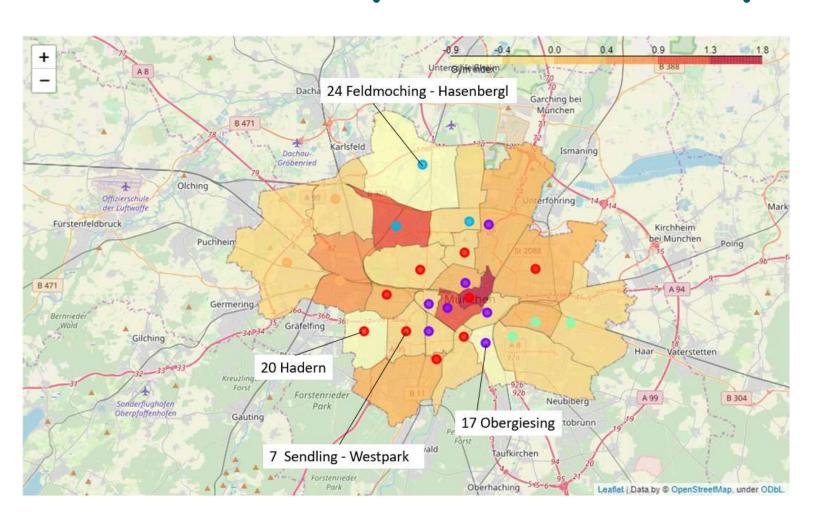
## **Results**

Top 10

Neighborhoods
with high market
potential
(gym index)

Neighborhood	Popu- lation	Pop. per_km2	Gym count	Women gym	Gyms per1000	Gyms per km2	Women %	Gym index	Distance (km)
20 Hadern	49626	5380	2	0	0.0403	0.2173	52.5	-0.8593	7.2
17 Obergiesing - Fasangarten	53937	9429	3	0	0.0556	0.5263	49.7	-0.8397	3.0
24 Feldmoching - Hasenbergl	60933	2106	2	0	0.0328	0.0692	49.6	-0.7328	9.3
23 Allach - Untermenzing	32677	2115	2	0	0.0612	0.1290	49.8	-0.4005	10.9
22 Aubing - Lochhausen - Langwied	46385	1362	3	0	0.0646	0.0879	50.1	-0.3673	12.2
15 Trudering - Riem	72006	3207	11	0	0.1527	0.4888	49.9	-0.3518	6.7
07 Sendling - Westpark	59386	7599	10	0	0.1683	1.2820	51.3	-0.3044	4.6
18 Untergiesing - Harlaching	52600	6529	10	0	0.1901	1.2345	51.2	-0.2847	2.4
09 Neuhausen - Nymphenburg	98520	7629	14	1	0.1421	1.0852	51.8	-0.2756	3.7
06 Sendling	40682	10329	11	2	0.2703	2.8205	49.9	-0.2623	3.4

#### **Discussion**

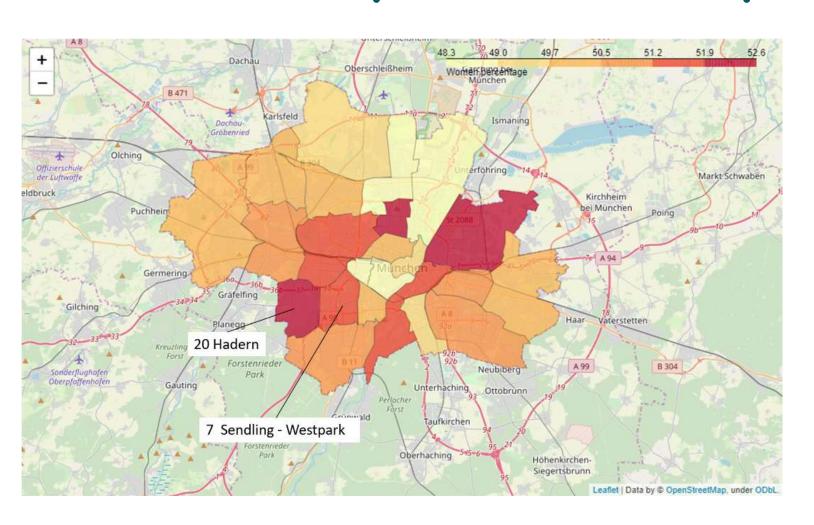


District 20 Hadern has the highest market potential according to the gym index. Neighborhood

17 Obergiesing -Fasangarten has almost the same market potential but is only about 3 kilometers away from city center what makes this Neighborhood also very interesting.

7 Sendling - Westpark is the first inner city Neighborhood with a good market potential and would be also a choice for a new opening under such restrictions.

#### **Discussion**



When we have a look at women percentage from the OpenData we can see that Neighborhood 20 Hadern has almost the highest share of women but no Women only Fitness Center.

07 Sendling-Westpark has also a quite high women percentage and also no women only gym. Both neighborhoods have a high market potential and would be very interesting for a women only fitness center opening.

The calculated *gym index* together with the OpenData about the Munich Population gives a very good basis for decision making of the stakeholders. Within the selected Neighborhood a detailed further analysis on possible exact locations on street level is necessary. Therefore the location map of all gyms in Munich from the *FOURSQUARE search* is a good starting point to find a building for the opening of a new fitness center.

#### Conclusion

If we would concentrate on **17 Obergiesing - Fasangarten** the map for decision making would look like this:

