




CAPSTONE PROJECT - THE BATTLE OF NEIGHBORHOODS

- **FIND THE POTENTIAL LOCATION FOR A NEW GYM IN STUTTGART, GERMANY**

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1. INTRODUCTION

- Stuttgart is in southwestern Germany, with population > 600,000 [1]
- The need to find an appropriate gym is increasing
- This project aims to find the potential location to open a new gym in Stuttgart
- Critical conditions: distance of gym and gym numbers

2. DATA

- The updated population data (05.2020) of Stuttgart found in stuttgart.de [2].
- The data was converted to a data frame
 - 3 columns: Borough, Neighborhood, and Population
 - Separated into two sub data frames
 - a) boroughs and corresponding populations
 - b) neighborhoods and corresponding populations

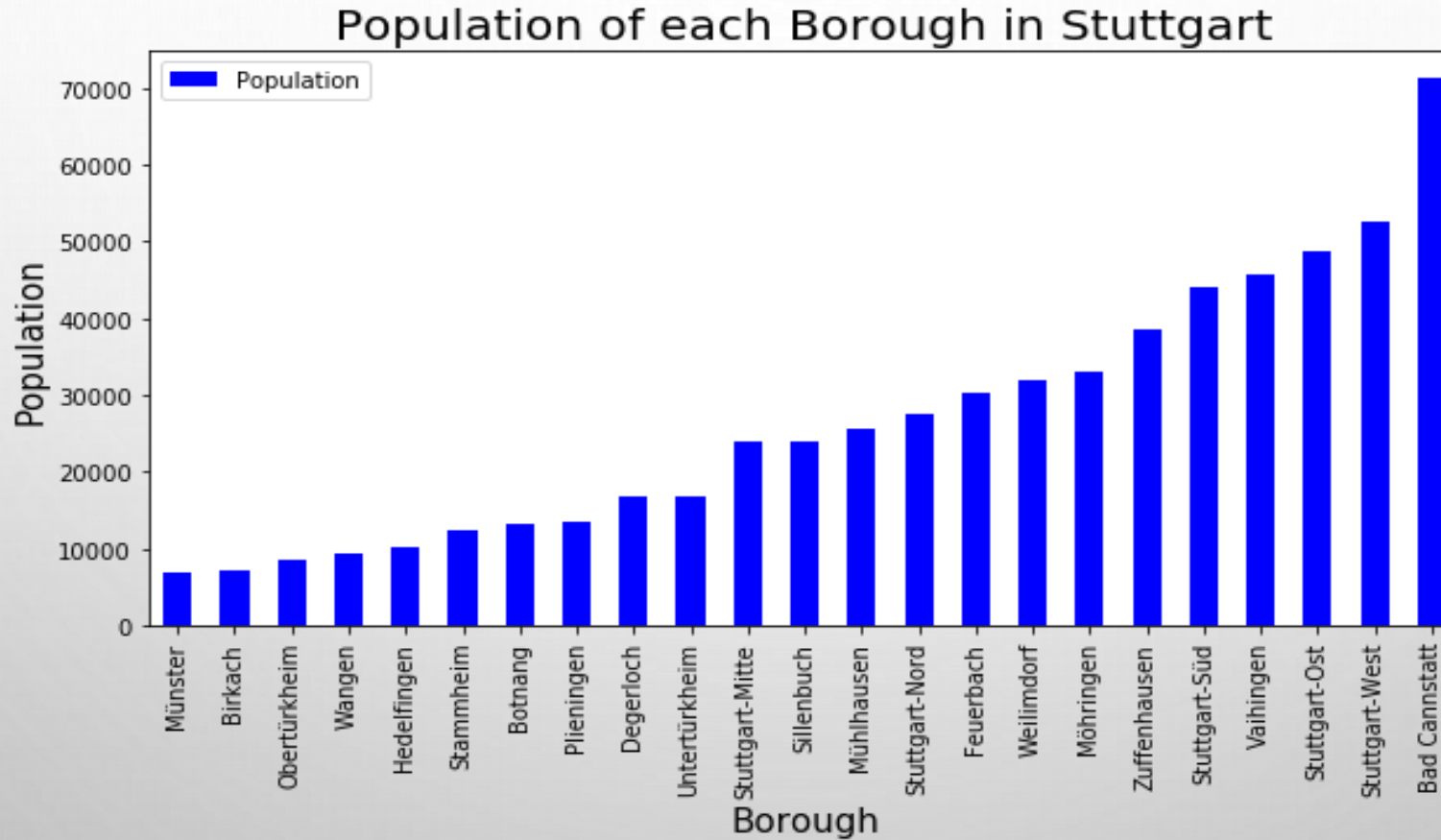
3. METHODOLOGY

- Location and venue acquisition
 - The latitude and longitude values of two sub data frames are obtained by geopy.geocoders in python
 - The gyms within 5 km of each neighborhood were collected by the Foursquare API with the category Id of '4bf58dd8d48988d175941735' (Gym/Fitness center)
 - The gym number of each borough was acquired by deleting the repeated gyms

3. METHODOLOGY

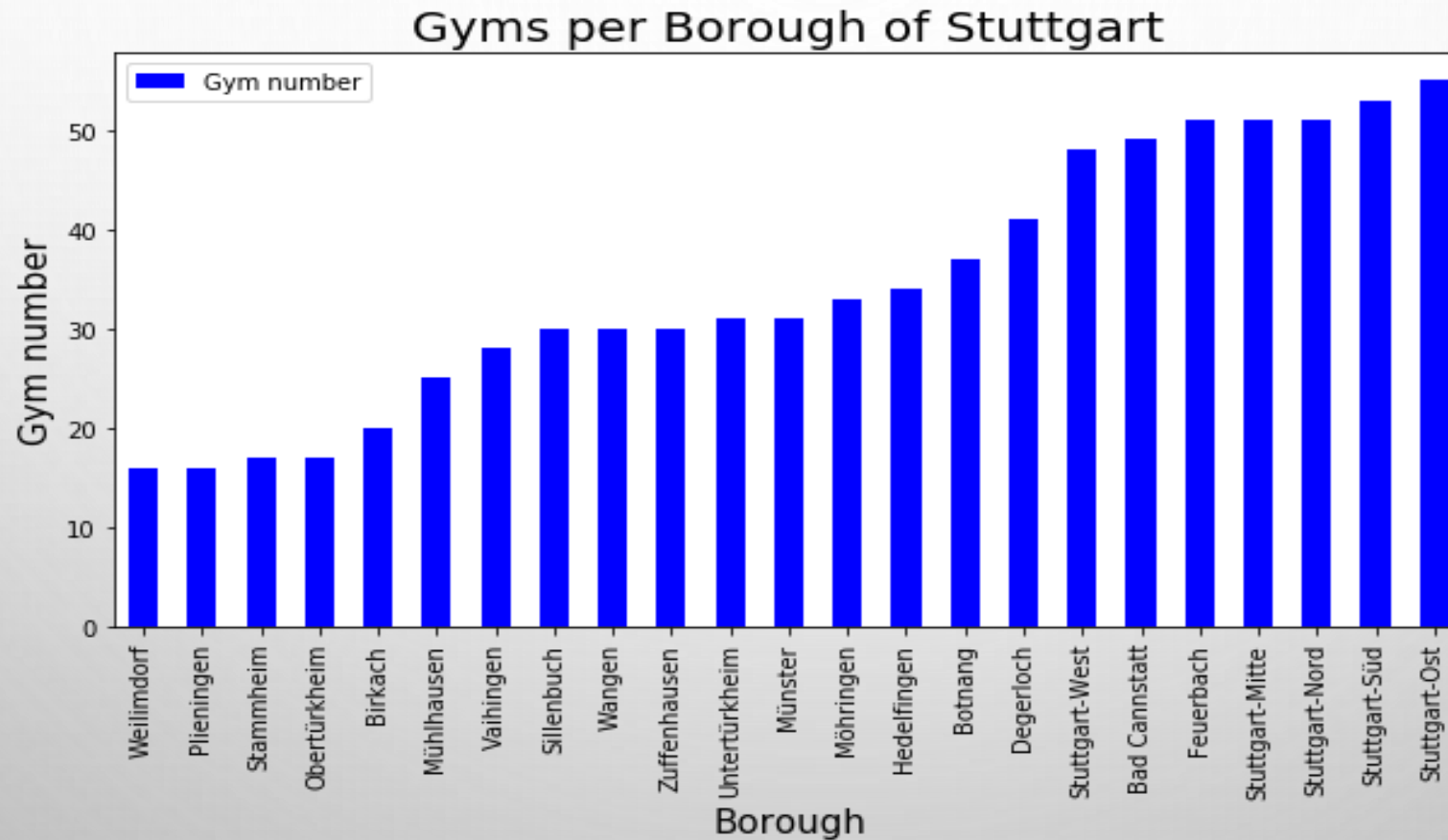
- The potential borough
 - $\text{Gym to population ratio} = \text{Gym number} / \text{Population of borough} * 10000$
 - The potential borough: with the lowest gym to population ratio
- The potential location for a new gym
 - Gyms within 1 km of each neighborhood in the chosen borough were plotted in a map (folium)
 - The potential location was proposed based on the population of the neighborhoods

4. RESULTS AND DISCUSSION



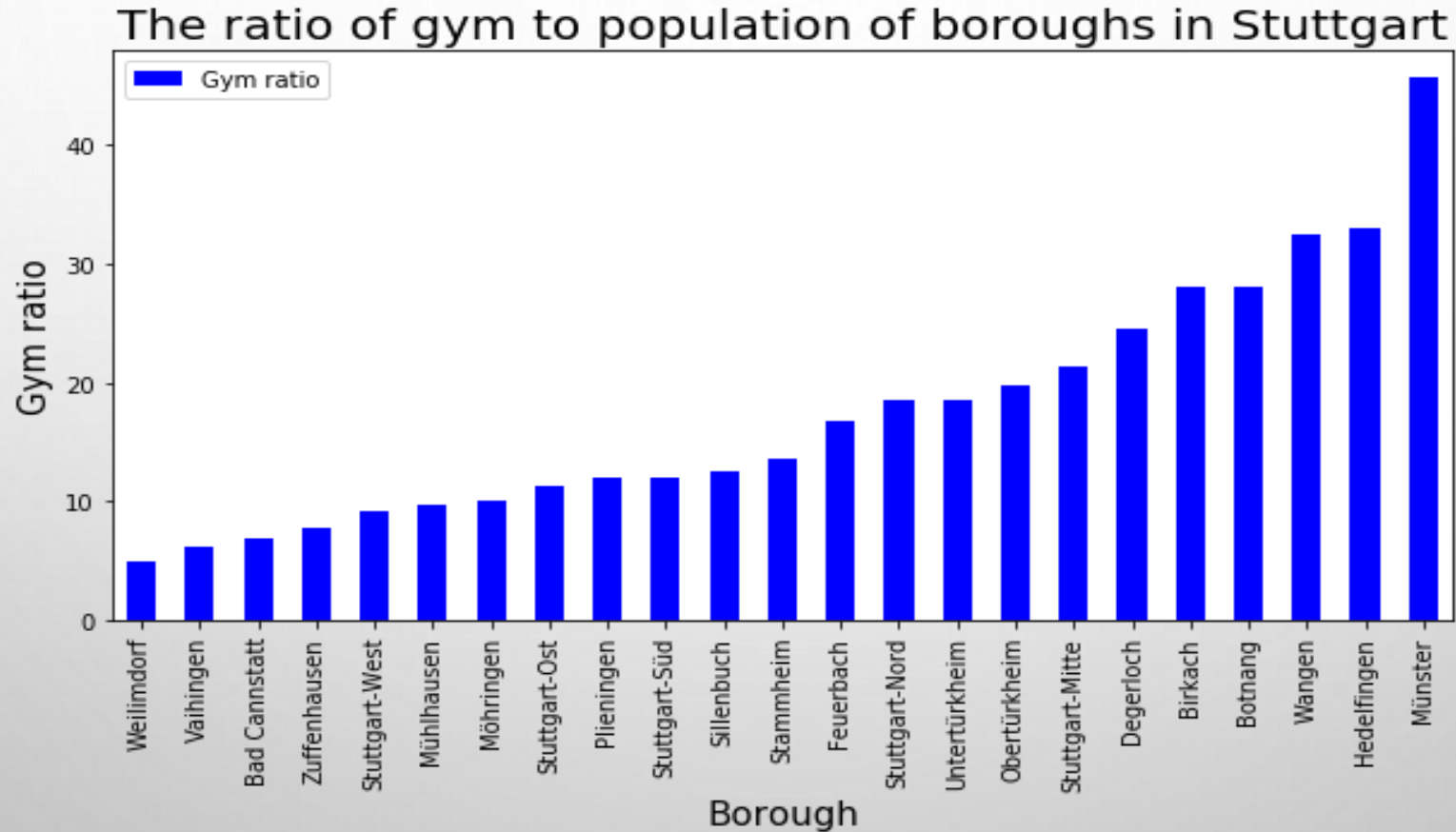
Bad Cannstatt has the highest population, followed by Stuttgart-West and Stuttgart-Ost.

4. RESULTS AND DISCUSSION



Weilimdorf has the lowest surrounding gyms compared to other boroughs.

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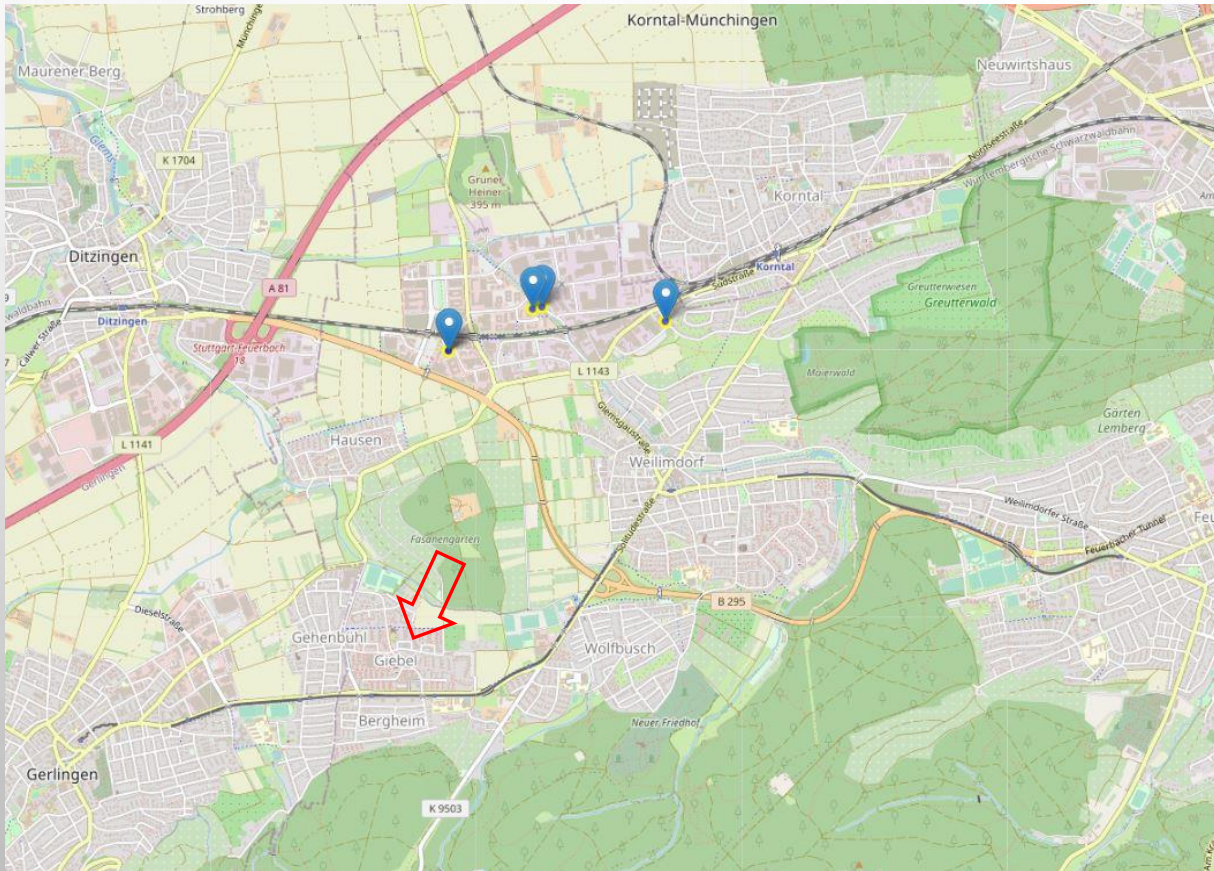
The gym to population ratio of Weilimdorf is the lowest.

4. RESULTS AND DISCUSSION

The neighborhoods and population of neighborhoods in Weilimdorf

Borough	Neighborhood	Population	Latitude	Longitude
Weilimdorf	Weilimdorf	16757	48.815276	9.112444
Weilimdorf	Weilimdorf-Nord	587	48.8268087	9.097610866
Weilimdorf	Bergheim	2954	48.8013	9.0897
Weilimdorf	Giebel	5190	48.8045564	9.0900385
Weilimdorf	Hausen	3415	48.8164542	9.0867222
Weilimdorf	Wolfbusch	2970	48.8052172	9.1085943

4. RESULTS AND DISCUSSION



No gym is found by Foursquare in the southwest or south. One gym was found in Weilimdorf (Neighborhood) by Google Maps. The ideal place for a new gym is in Giebel.

The plot of gyms in Weilimdorf, Stuttgart

5. CONCLUSION

- More gyms in or near the Stuttgart city center
- More gyms means more competition
- Weilimdorf has the lowest gym to population ratio
- Ideal location is Giebel, Weilimdorf - the low surrounding gym density and relatively high population
- This project is depending on the adequacy and accuracy of the Foursquare API
- More analyses are needed to determine the optimal location for a new gym

REFERENCE

[1] <https://en.wikipedia.org/wiki/Stuttgart>

[2] File name: btp01_

Link:

<https://www.domino1.stuttgart.de/web/komunis/komunissde.nsf/a9830f07fd8c0e7dc1257cb70033e711/93b78f94cf10ec41c125851a002bb4e2?OpenDocument>