Rents and social places density in Berlin, Germany

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Introduction

- Berlin is the capital and largest city of Germany by both area and population, and very attractive especially for young people.
- Life in Berlin can be very expensive, depending on the borough you live in.
- Lifestyle is another factor that should be considered when moving to Berlin, as it's a big and colorful city and as to offer lots of diverse venues.

Business Problem

- Real estate agencies might want offer flats in Berlin to their customers that fit in terms of money and lifestyle.

- First step is to choose a borough that is suitable for the customer, as rent index is usually given per borough. At least in Berlin/Germany.

- Three questions should be enough to find good candidates for boroughs:
  1. How much money is the customer willing to pay?
  2. How big (in terms of square meters) should the flat be?
  3. What kind of nearby venues is the customer interested in?

Data acquisition and cleaning

- A German platform[1] for renting and buying flats and houses provides data for Berlin. Both historical (from 2011) and current prices for flats can be obtained.
- The data has to be scraped first and then cleaned as we are only interested in rents and flats. We end up with prices beginning from 2011 for small ($30m^2$), medium ($60m^2$), and big ($100m^2$) size flats.
- Github user m-hoerz provides data[2] on Berlin's 12 boroughs that can be used to visualize boundaries.
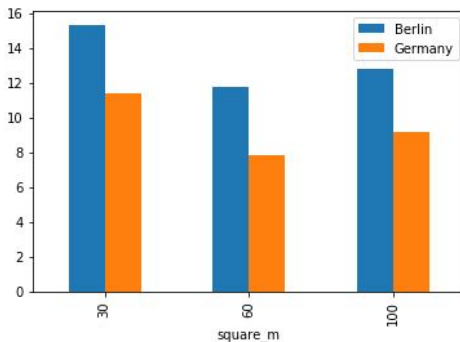- Foursquare API[3] is suitable for obtaining data on venues for each borough.

[1] https://www.wohnungsboerse.net/mietspiegel-Berlin/2825
[2] https://github.com/m-hoerz/berlin-shapes
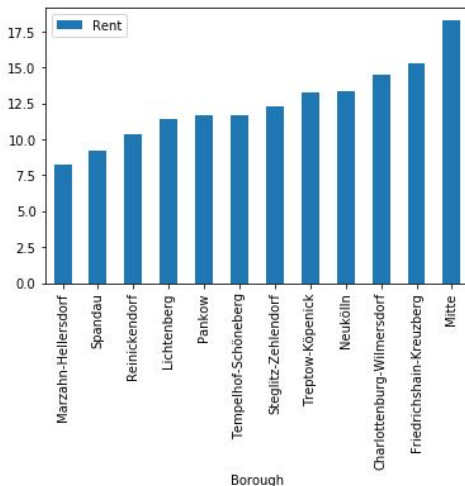[3] https://developer.foursquare.com

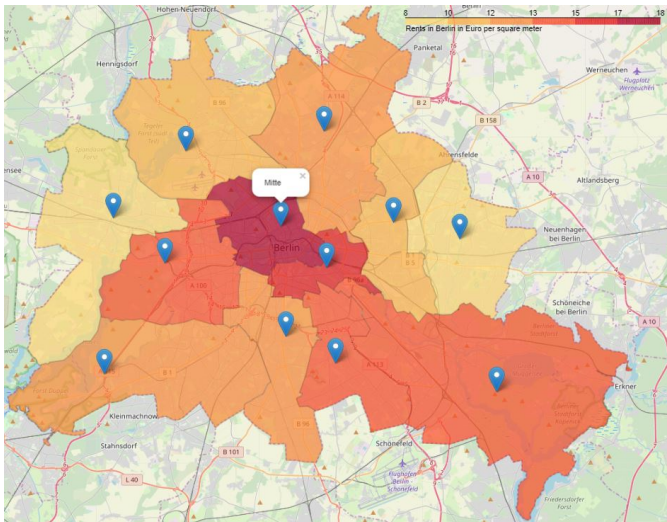# Rents comparison – Berlin vs. Germany

- Berlin is compared to the rest of Germany a very expensive city.
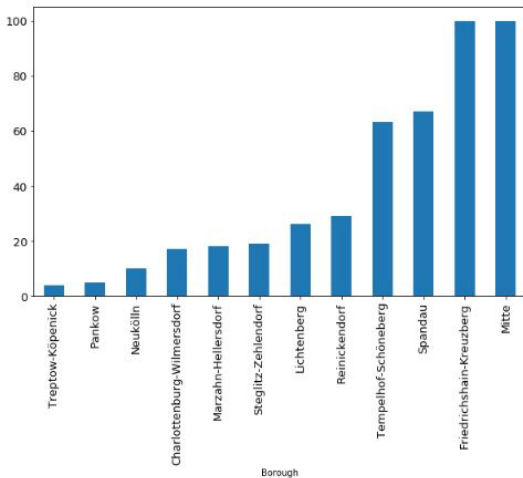- Prices are given in Euro and per square meter.

Current prices (March 2019) for rents by borough

Boroughs colorized according to rent index
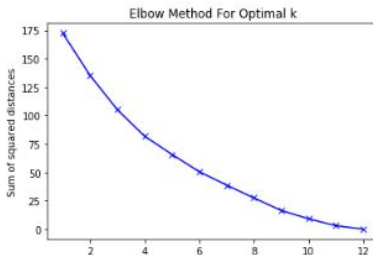
Venue count for each borough

- Boroughs located close to the center are the most expensive ones.
- These boroughs have furthermore the most number of venues.
- The boroughs Treptow-Kpenick and Pankow have the least amount of venues but are in the mid-range of rent prices.

Borough clustering

Elbow Method For Optimal k

- We used Foursquare API to determine the top 100 venues in a range of 1000 meters for each borough. This data will help to cluster boroughs and find suitable descriptions.
- The elbow method was somehow helpful to find the optimal k, number of clusters.
- I decided to continue with 4 Clusters.

Clusters and descriptions

- Finding meaningful descriptions is essential, as it may help the customers to choose suitable boroughs.

- The top 5 venues for each cluster help identifying descriptions.

Cluster 0 Bus Stop, Department Store, History Museum, Historic Site, Sculpture Garden.
Description: History & Museum (Orange)

Cluster 1 Hotel, Forest, Scenic Lookout, Mountain, Yoga Studio.
Description: Nature & Relax (Red)

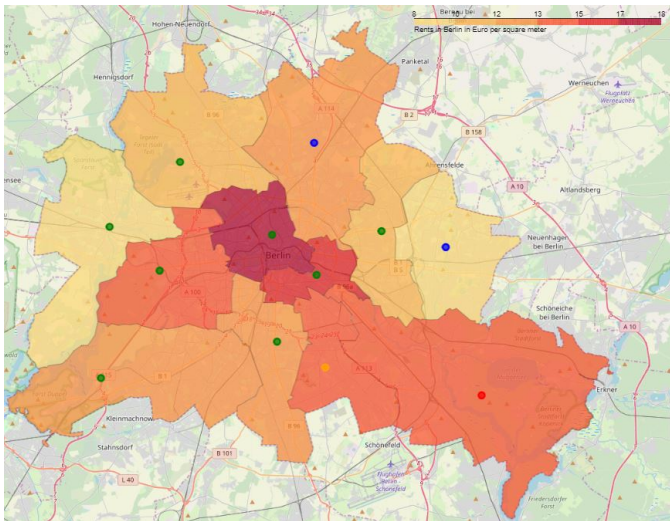Cluster 2 Supermarket, Hotel, Gas Station, Bus Stop, Yoga Studio.
Description: Supermarket & Food (Blue)

Cluster 3 Coffee Shop, Hotel, Restaurant, Cafe, Falafel Restaurant.
Description: Cafe & Restaurant (Green)

Combining rents and borough clusters

Conclusion – Part 1

- Berlin is an expensive and colorful city. Rents for flats almost doubled since 2011, and will likely keep this trend.
- Boroughs close to the center are more expensive than outlying boroughs.
- Four clusters of boroughs can be distinguished: History & Museum, Nature & Relax, Supermarket & Food, Cafe & Restaurant.

- Prices for flats are likely to increase. For potential customers, now is the best time to move to the city.
- Real estate agencies can use the data to find good candidates for boroughs, respecting money customers are willing to pay and interest in venues.

Future directions

- Data is restricted to renting flats only, but can be extended to buying and houses in general.
- Besides money and venue interest, one take take more features into account:
    - Crime rate
    - School rating (especially helpful for parents)
    - . . . and many more!