The Battle of Amsterdam Neighborhoods
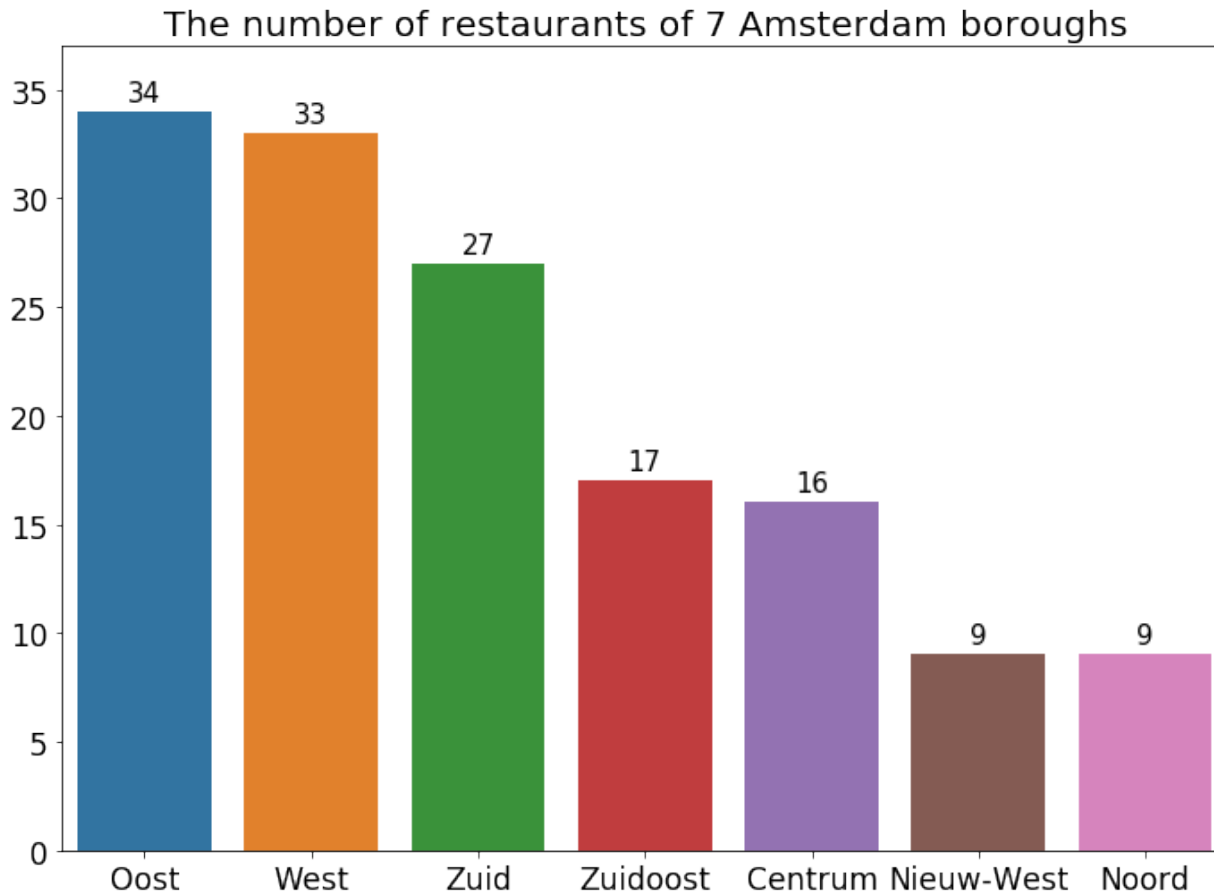
Applied Data Science Capstone

Background

- Amsterdam is a renowned international city
  - Diversity: multi-nationalities, ethnicities and cultures
- Restaurant industry in Amsterdam
  - Influenced by different cultures
  - Large extent of competition
- Aim
  - Help our client make decisions on the spot that opens his restaurant

Data

- Amsterdam borough information
  - https://en.wikipedia.org/wiki/Boroughs_of_Amsterdam
- Amsterdam venue information provided by Foursquare API
  - Venue category
  - Rating
  - Price tier
- Preprocessing
  - Filter venues with 'Restaurant' label
  - Re-label restaurant based on their cuisine types
    - E.g. 'Sushi Restaurant' and 'Ramen Restaurant' re-labelled to 'Japanese Restaurant'.
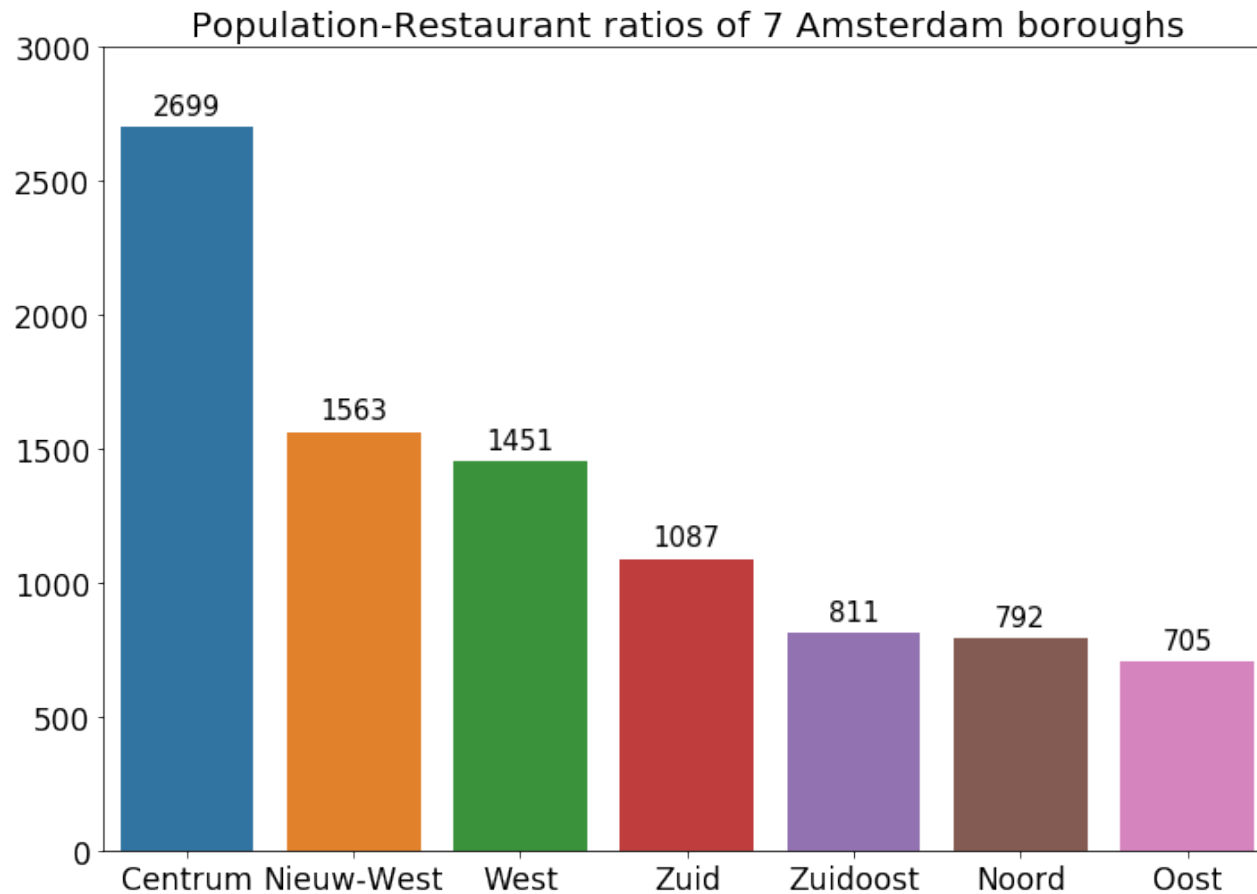
Exploratory data analysis

- Restaurant count

The number of restaurants of 7 Amsterdam boroughs

Oost and West have the highest number of restaurants. Nieuw-West and Noord have the least restaurants.
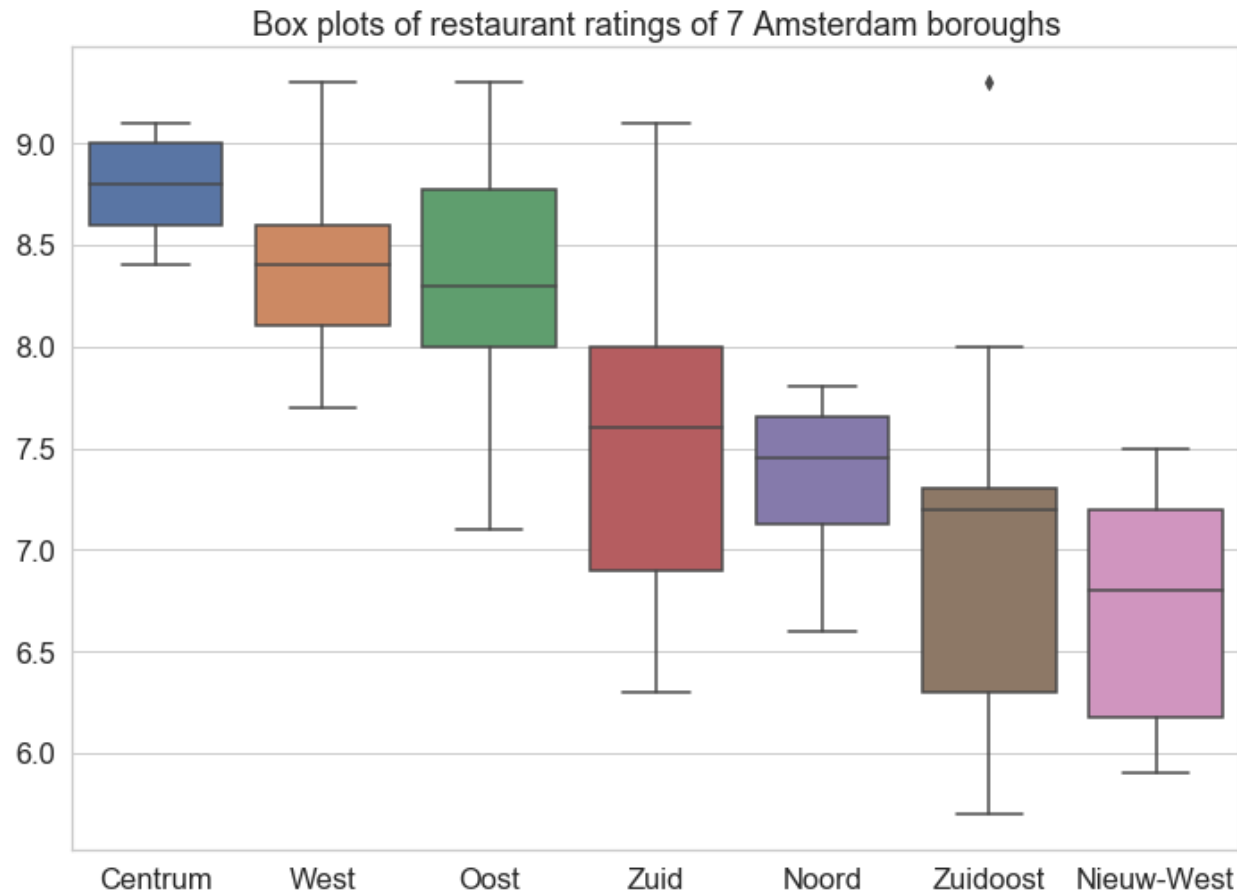
Exploratory data analysis

- Population-restaurant ratio

Population-Restaurant ratios of 7 Amsterdam boroughs

Borough	Ratio
Centrum	2699
Nieuw-West	1563
West	1451
Zuid	1087
Zuidoost	811
Noord	792
Oost	705

Centrum has the maximum population-restaurant ratio, followed by Nieuw-West and West.

Exploratory data analysis

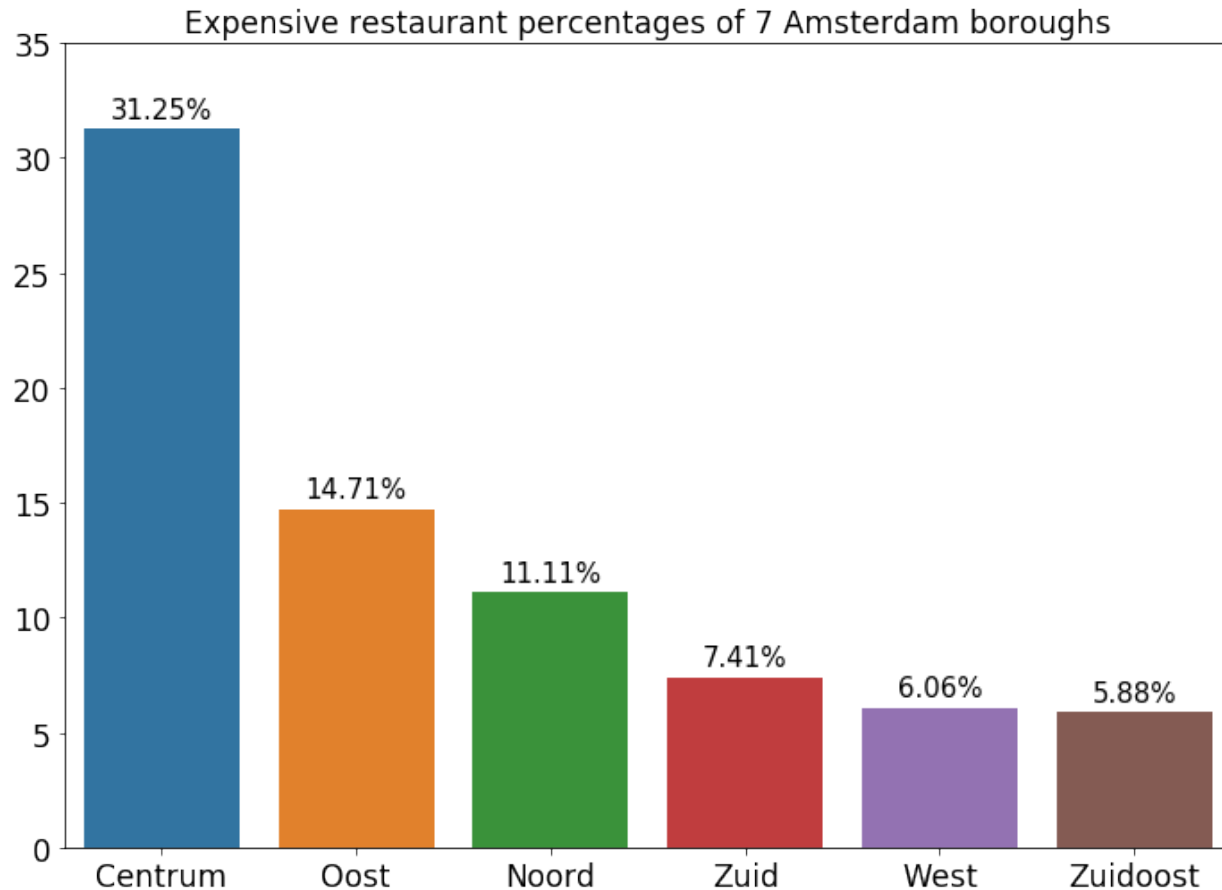- Restaurant rating

Box plots of restaurant ratings of 7 Amsterdam boroughs

The 25th percentile and 75th percentile of Centrum are both higher than the rest of the boroughs. The same goes for the median rating, with Centrum rating score 8.8 on the top.

Exploratory data analysis

- Restaurant price

Expensive restaurant percentages of 7 Amsterdam boroughs

Centrum has the highest percentage of expensive restaurants (31.25%).

Exploratory data analysis

- Japanese restaurants

Table 1: Number, median rating and price tier of the Japanese restaurants in 7 boroughs.

	Count	Median rating	Median price tier
Zuid	6	8.35	2.0
West	2	7.67	2.0
Centrum	0	NA	NA
Oost	0	NA	NA
Noord	0	NA	NA
Zuidoost	0	NA	NA
Nieuw-West	0	NA	NA

Borough clustering

Table 2: Top 5 most common restaurants of 7 boroughs

	Top 1	Top 2	Top 3	Top 4	Top 5
Centrum	French (30.77%)	Thai (15.38%)	Chinese (15.38%)	Italian (7.69%)	Asian (7.69%)
Nieuw-West	Chinese (28.57%)	Asian (14.29%)	Turkish (14.29%)	Moroccan (14.29%)	Indian-Chinese (14.29%)
Noord	Turkish (33.33%)	Fast Food (33.33%)	Tai (16.67%)	French (16.67%)	American (16.67%)
Oost	Italian (16.13%)	French (12.90%)	Turkish (12.90%)	Vegetarian (9.68%)	Asian (9.68%)
West	Italian (20.00%)	French (6.67%)	Japanese (6.67%)	Indonesian (6.67%)	Greek (6.67%)
Zuid	Japanese (27.27%)	Italian (22.73%)	Asian (9.09%)	Thai (9.09%)	French (4.55%)
Zuidoost	Chinese (20.00%)	Italian (13.33%)	Fast Food (13.33%)	Doner (6.67%)	Scandinavian (6.67%)

Borough clustering

- K-means
  - based on restaurant percentage of each cuisine type
  - One-hot encoding
  - Elbow method to determine the optimal k

Table 3: Cluster labels of 7 boroughs based on k-means clustering.

	Cluster label
Oost	1
West	1
Noord	2
Nieuw-West	3
Zuidoost	3
Centrum	4
Zuid	5

Results

- Nieuw-West and Noord have the least restaurants
- Centrum has the maximum population-restaurant ratio
- Centrum is rated higher than the other boroughs
- Centrum has mostly expensive restaurants
- Boroughs are divided into 5 clusters based on cuisine similarities
- Centrum is the suitable spot to open a high-end Japanese restaurant

Disussion

- Limitations
  - land price was not taken into consideration
  - The ideal location may be costly and beyond the budget of our client.
- Future
  - The cost factor needs to be investigated when the data are available.