



The battle of the neighbourhoods

Where to live in Rotterdam, the greatest city of Holland

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Introduction

- ▶ Rotterdam is not the best known city from Holland
 - ▶ Most tourists go to Amsterdam
 - ▶ Politically, The Hague is best known
- ▶ However, Rotterdam has a lot to offer
 - ▶ After being bombed in WW II, the city was completely rebuild
 - ▶ Nowadays, Rotterdam is a very modern city
 - ▶ In addition, all facilities you can think of are there!

Business Problem

- ▶ I'm looking for a new house, within a few months I want to move
- ▶ I've always lived in villages near Rotterdam, but now I want to go BIG!
 - ▶ As I adore Rotterdam, I really want to live in this city.
- ▶ However, where in Rotterdam is the best place to live?
 - ▶ I do know the city quite good, but really don't know which neighbourhood is the best
 - ▶ Luckily, I can now use my data science and machine learning skills to provide myself an answer.

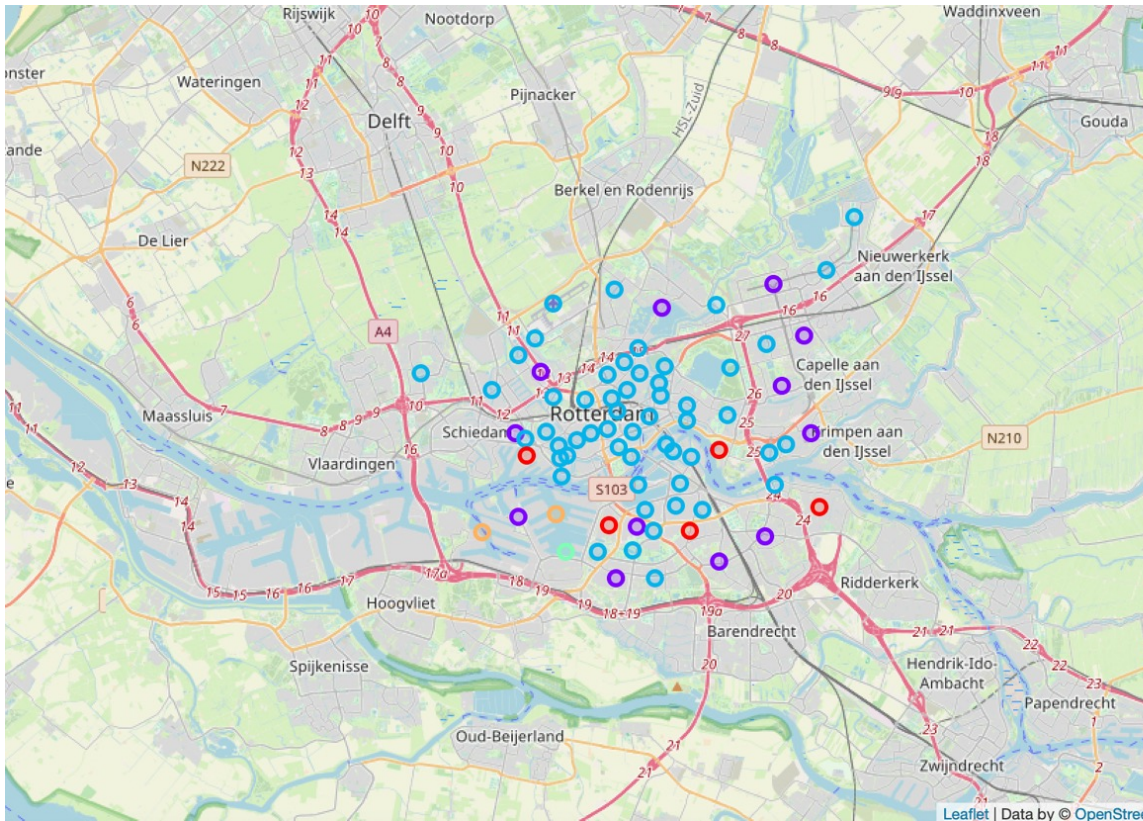
Data Description

- ▶ For this project I will use the data of neighbourhoods in Rotterdam
 - ▶ On Wikipedia, I've found a page which I can use perfectly
 - ▶ https://en.wikipedia.org/wiki/Districts_and_neighbourhoods_of_Rotterdam
 - ▶ Data will be cleaned and then used for my research
- ▶ Longitude and latitude data will be used to use as input for searching venues
- ▶ The venues in the neighbourhood will lead to clusters
- ▶ Clusters will determine what neighbourhoods will be the best to buy a house

Methodology

- ▶ The following libraries have been used
 - ▶ Pandas, Numpy, Requests, Geopy, Nominatim, Matplotlib (for cm, pyplot and colors), Folium, Kmeans (from SciKit Learn)
- ▶ With requests and pandas, webdata of neighbourhoods in Rotterdam have been scraped
- ▶ Longitude and Latitude have been added with Geopy and Nominatim
- ▶ Foursquare API was used for searching venues at each neighbourhood
- ▶ Folium was used to plot both the neighbourhoods as clusters
- ▶ K-Means Clustering method was used to create clusters ($n = 5$)

Results (Clusters on Map)



- ▶ Cluster 1 seems basic (see next slide)
- ▶ Cluster 2 has all the things you look for in a city!
- ▶ Cluster 3 and 4 seem more water/harbor centered, with a lot of food possibilities
- ▶ Cluster 5 is especially close to tram and bus stations

Results (Cluster 1)

	Neighbourhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
13	Oud-Mathenesse	Bus Stop	Tram Station	Supermarket	Spa	Smoke Shop	Chinese Restaurant	Liquor Store	Fast Food Restaurant	Pizza Place	Farmers Market
16	Kleinpolder	Supermarket	Park	Department Store	Drugstore	Liquor Store	Chinese Restaurant	Bakery	Gym Pool	Gastropub	Bus Stop
30	Hillegersberg-Zuid	Supermarket	Drugstore	Wine Bar	Bar	Department Store	French Restaurant	Candy Store	Cheese Shop	Italian Restaurant	Bakery
51	Lombardijen	Bus Stop	Supermarket	Bar	Bakery	Drugstore	Vegetarian / Vegan Restaurant	Basketball Court	Thai Restaurant	Rock Club	Intersection
52	Groot-IJsselmonde	Supermarket	Department Store	Café	Bar	Discount Store	Bakery	Shopping Mall	Drugstore	Tram Station	Fish Market
55	's-Gravenland	Pharmacy	Playground	Supermarket	Drugstore	Shopping Mall	Falafel Restaurant	Food Court	Food & Drink Shop	Flower Shop	Fish Market
57	Prinsenland	Supermarket	Pharmacy	Gym	Cosmetics Shop	Shopping Mall	Flower Shop	Sporting Goods Shop	Bookstore	Bistro	Park

Results (Cluster 2)

	Neighbourhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	
0	Stadsdriehoek	Italian Restaurant	Plaza	Market	Coffee Shop	Smoke Shop	Gourmet Shop	Szechuan Restaurant	French Restaurant	Noodle House	Sa PI
1	Oude Westen	Breakfast Spot	Museum	Bakery	Gastropub	Italian Restaurant	Pool	Beer Bar	Supermarket	Plaza	Pe
2	Cool	Bar	Coffee Shop	Café	Sandwich Place	Hostel	Japanese Restaurant	Burger Joint	French Restaurant	Residential Building (Apartment / Condo)	Be
3	C.S. kwartier	Hotel	Café	Coffee Shop	Clothing Store	Shopping Mall	Mediterranean Restaurant	Bubble Tea Shop	Men's Store	Lingerie Store	Fr Re
5	Nieuwe Werk	Restaurant	French Restaurant	Ice Cream Shop	Bistro	Speakeasy	Gastropub	Sports Bar	Steakhouse	Beer Garden	Pe
6	Dijkzigt	Bar	French Restaurant	Museum	Bakery	Burger Joint	Art Museum	Hostel	Pizza Place	Coffee Shop	Be
7	Delfshaven	Pub	Restaurant	Historic Site	Supermarket	Park	Drugstore	Coffee Shop	Plaza	Pool Hall	Cl Re
8	Bospolder	Pub	Asian Restaurant	Supermarket	Furniture / Home Store	Drugstore	Pet Store	Coffee Shop	Plaza	Park	Pe

Results (Cluster 3 & 4)

	Neighbourhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
81	Waalhaven-Zuid	Boat or Ferry	Sandwich Place	Zoo Exhibit	Farmers Market	Food Truck	Food Stand	Food Service	Food Court	Food & Drink Shop	Flower Shop

	Neighbourhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
79	Waalhaven	Boat or Ferry	Harbor / Marina	Zoo Exhibit	Farmers Market	Food Truck	Food Stand	Food Service	Food Court	Food & Drink Shop	Flower Shop
80	Eemhaven	Harbor / Marina	Gym	Zoo Exhibit	Food Stand	Food Service	Food Court	Food & Drink Shop	Flower Shop	Fish Market	Fish & Chips Shop

Results (Cluster 5)

	Neighbourhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
40	De Esch	Tram Station	Concert Hall	Supermarket	Field	Restaurant	Shopping Mall	Farm	Food Service	Food Court	Food & Drink Shop
43	Vreewijk	Tram Station	Pizza Place	Kebab Restaurant	Department Store	Farm	Food Stand	Food Service	Food Court	Food & Drink Shop	Flower Shop
53	Beverwaard	Tram Station	Fast Food Restaurant	Zoo Exhibit	Farm	Food Truck	Food Stand	Food Service	Food Court	Food & Drink Shop	Flower Shop
66	Oud-Charlois	Bus Stop	Tram Station	Zoo Exhibit	Farmers Market	Food Truck	Food Stand	Food Service	Food Court	Food & Drink Shop	Flower Shop
78	Nieuw-Mathenesse	Garden	Turkish Restaurant	Tram Station	Fast Food Restaurant	Zoo Exhibit	Farm	Food Stand	Food Service	Food Court	Food & Drink Shop

Discussion

- ▶ After examining all clusters and knowing my personal wish, conclusion is....
 - ▶ Cluster 2 is the cluster with the best neighbourhoods for my new
 - ▶ Cluster 2 also exists of the most neighbourhoods and looking to the map, it's also the most centralized cluster of all 5.
- ▶ The information in this model could be seen as general and not too specific
 - ▶ However, I really think it can help people to decide where to live in a certain city.
 - ▶ For Rotterdam, I would be very happy to apply my model to anyone that is looking to live in the city of Rotterdam.
 - ▶ In addition, I would also be very happy to keep continuing improving this model, to give the best advice.
- ▶ The K-Means Clustering method has again shown that it has really an added value in machine learning.
 - ▶ I really enjoyed learning all the machine learning methods and was able to apply 1 in my final project.