IBM Capstone Project

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The Battle of Neighborhood (Rotterdam and The Hague)

- To compare the neighborhoods of the two cities in South Holland province of the Netherlands.

- Determining how similar or dissimilar they are

- Location data from Wikipedia

- Coding and data analysis in Python

- The main target audience
  - the travelers to the Netherlands

Business problem

- To assist the visitors/travelers (to the Netherlands) and anyone interested to find customer's preferred choice restaurants.

- List of restaurants, marked on the map, in clusters based on the customers' (users) venue likes from Foursquare API.

Data - geographical

- From Wikipedia,

- BeautifulSoup, one of the available libraries in Python, to extract (Name, Municipality, Coordinates) data.

- Creating map via folium

Article Talk

List of cities, towns and villages in South Holland

From Wikipedia, the free encyclopedia

This is a list of settlements in the province of South Holland, in the Netherlands.

Name	Municipality	Coordinates
Alblasserdam	Alblasserdam	51°52'00"N 4°39'40"E
Kortland	Alblasserdam	51°52'00"N 4°41'15"E
Poortugaal	Albrandswaard	51°51'30"N 4°23'40"E
Rhoon	Albrandswaard	51°51'25"N 4°25'20"E
Aarlanderveen	Alphen aan den Rijn	52°08'25"N 4°43'40"E
Alphen aan den Rijn	Alphen aan den Rijn	52°08'05"N 4°39'35"E

Exploratory data analysis

List of nearby neighborhood in Rotterdam and The Hague with categories

	name	id	categories	lat	lng
0	Sugo	54e35ace498e94443cfd14e5	Pizza Place	51.921030	4.477747
1	THOMS	5676cb0e498e19ce9f0f106f	Restaurant	51.921856	4.481555
2	Urban Residences Rotterdam	508aaff7e4b01ceeb29e0971	Residential Building (Apartment / Condo)	51.920041	4.477572
3	Stadsbrouwerij Thoms	5b23df7895d986002c24dda9	Beer Garden	51.922837	4.480854
4	The James	5ae23ca865211f0039a4f537	Hotel	51.921074	4.477826

There are 100 unique categories from all the returned venues in Rotterdam neighborhood.

There are 80 unique categories from all the returned venues in The Hague neighborhood.

	name	id	categories	lat	lng
0	Baladi Manouche	555b50bd498e2843efb7c8c7	Bakery	52.078805	4.303832
1	Kua	52f529ae11d203e7b26d4453	Mexican Restaurant	52.078638	4.304469
2	Grapes&Olives	4cb8d4150180721e0db69061	Wine Bar	52.079949	4.303191
3	Korzo	4b42f16ef964a5201cdb25e3	Theater	52.078690	4.305699
4	Albert Heijn XL	4b10ff34f964a5204c7723e3	Supermarket	52.079887	4.295971

Clustering Neighborhoods

The top 5 venues for each neighborhood in Rotterdam:

	Neighborhood	Borough	latitude	longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Groeneweg	Rotterdam	51.98472	4.59722	0	Beach	Flower Shop	Metro Station	Yoga Studio	Diner
1	Heijplaat	Rotterdam	51.89306	4.42083	1	Harbor / Marina	Bus Stop	Boat or Ferry	Supermarket	Food Truck
2	Hoek van Holland	Rotterdam	51.97778	4.13333	1	Boat or Ferry	Supermarket	Restaurant	Drugstore	Bus Stop
3	Hoogvliet	Rotterdam	51.86250	4.36250	1	Supermarket	Gym / Fitness Center	Metro Station	Shopping Mall	Furniture / Home Store
4	Kandelaar	Rotterdam	51.95694	4.39861	2	Historic Site	Restaurant	French Restaurant	Monument / Landmark	Fast Food Restaurant

12 neighborhoods are marked on Rotterdam map in three clusters.

Clustering Neighborhoods

The top 5 venues for each neighborhood in The Hague:

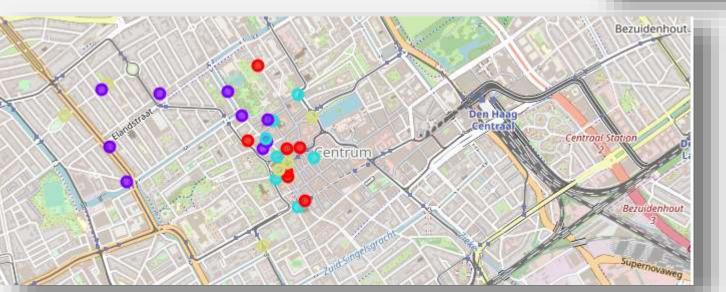|	Neighborhood	Borough	latitude	longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Den Haag (The Hague)	Den Haag (The Hague)	52.07639	4.29861	0	Restaurant	Coffee Shop	Bakery	Bar	Café
1	Haagoord	Den Haag (The Hague)	52.05972	4.40417	1	Restaurant	Supermarket	Soccer Field	Furniture / Home Store	Shopping Mall

2 neighborhoods are marked on The Hague (Den Haag) map in two clusters.

Section 2 – Satisfactory categorization (likes)

Through Foursquare for the unique list of venues, number of likes for each of the venue (Restaurant) is retrieved and stored in a satisfactory category column.

Den Haag (The Hague)

Rotterdam

Finding the statistical analysis of the data frame

Restaurants in Rotterdam

Statistics	Likes
Count	24.00
Mean	83.70
Standard deviation	80.23
Min	13.00
25%	30.75
50%	46.50
75%	99.00
Max	291.00

Restaurants in The Hague

Statistics	Likes
Count	29.00
Mean	41.93
Standard deviation	37.36
Min	6.00
25%	18.00
50%	31.00
75%	54.00
Max	174.00

Result

- Rotterdam

Index	Name	Categories	Latitude	Longitude	Total likes	Satisfactory category	Cluster label
3	Little V	Vietnamese Restaurant	51.921807	4.48458	291	Excellent	2
16	Happy Italy	Italian Restaurant	51.922947	4.485218	251	Excellent	2
21	Vapiano	Italian Restaurant	51.922971	4.47181	240	Excellent	2
18	Spirit	Vegetarian / Vegan Restaurant	51.924282	4.488177	189	Excellent	2
0	THOMS	Restaurant	51.921856	4.481555	132	Excellent	2
23	Trattoria Gusto	Italian Restaurant	51.916827	4.480223	102	Excellent	2

Result

- The Hague

Index	Name	Categories	Latitude	Longitude	Total likes	Satisfactory category	Cluster label
28	't Goude Hooft	Restaurant	52.078294	4.30892	174	Excellent	0
11	Bar & Restaurant Milú	Restaurant	52.078222	4.307831	110	Excellent	0
12	SET Restaurant	Japanese Restaurant	52.077037	4.307828	91	Excellent	0
3	Giuliano's	Italian Restaurant	52.076784	4.307886	87	Excellent	0
15	Irodion	Greek Restaurant	52.075522	4.309413	77	Excellent	0
0	Kua	Mexican Restaurant	52.078638	4.304469	64	Excellent	0

Discussion

Using Foursquare and retrieving 100 venues and in particular focusing on category in which the word restaurant was stated, has helped to have consistency in identification of a specific category in this project. Although, I was able to prepare a list of restaurants marked on the map of both cities in clusters. However, in determining the satisfactory category, which was through the Foursquare venue users likes, the statistic shows that the number of likes for the restaurants in Rotterdam city had a higher range than the likes for the restaurants in The Hague. For a restaurant in Rotterdam in order to be categorized "Excellent" at least 99 likes were needed, whereas, for restaurants in The Hague only more than 54 likes were required. Future project could take such variations in their analysis.

Conclusion

- Rotterdam
  - Cluster label "2" is the recommended area to visitors/travelers.
    - Recommended restaurants are:
      - Little V
      - Happy Italy
      - Vapiano
      - Spirit
      - THOMS
      - Trattoria Gusto

- The Hague
  - Cluster label "0" is the recommended area to visitors/travelers.
    - Recommended restaurants are:
      - 't Goude Hooft
      - Bar & Restaurant Milú
      - SET Restaurant
      - Giuliano's
      - Irodion
      - Kua

Thank you