Neighborhood Recommender System

Based on previous Venues Rating

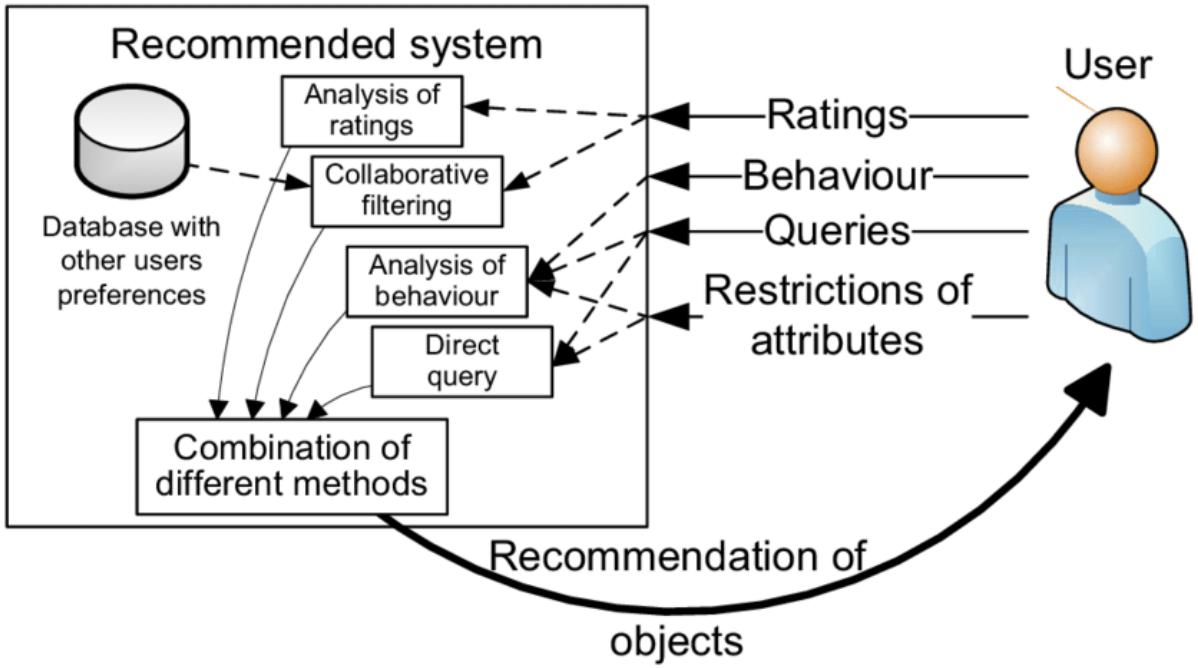
Capstone Project

IBM Data Science Professional Certificate

Coursera

Introduction

- This web app will recommend the user a neighborhood to book a hotel based on previous user ratings to venues (ratings from wherever in the world).
- The app will then have two main inputs, the first one will be the previous ratings of the user to different venues in whichever city/town, the second input will be a place or destination (in longitude and latitude) to which the user is looking to find a zone or hotel to stay. These inputs will be processed through a recommendation system, after that, the algorithm will already have insights to recommend a zone that is more likely for the user to find venues near that he or she will be likely to enjoy, and a list of hotels in that zone.



Data to be used

- Dataset generated by the user ratings containing the venues he/she has visited with the rating he/she has given.
- Dataset of the venues on a given city obtained via Foursquare.
- Dataset of the different neighborhoods in NYC with its latitude and longitude.

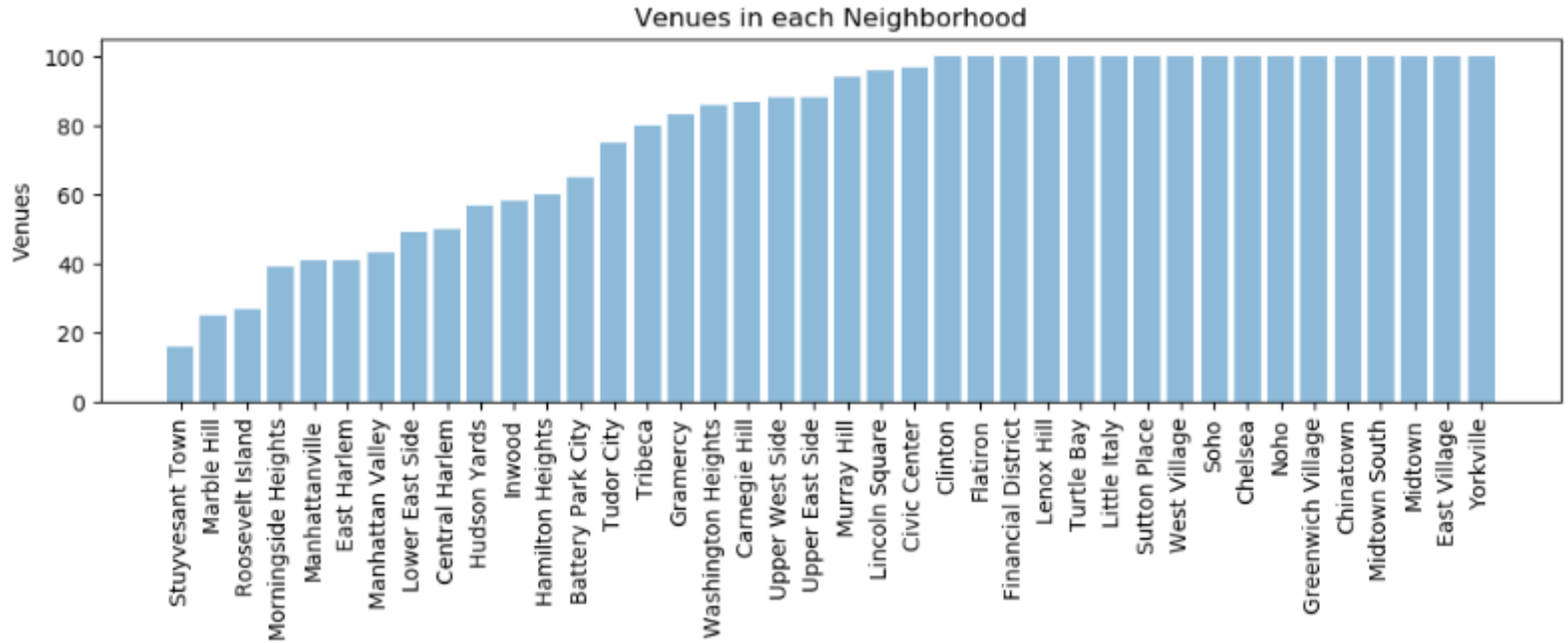
	venue	rating
0	Adult Boutique	30
1	Gastropub	40
2	Golf Course	40
3	River	50
4	Rock Climbing Spot	50
5	Spa	40
6	Yoga Studio	50

Neighborhood	
Battery Park City	65
Carnegie Hill	87
Central Harlem	50
Chelsea	100
Chinatown	100
Civic Center	97
Clinton	100
East Harlem	41
East Village	100

	Borough	Neighborhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585

Methodology

- First with the NYC coordinates dataset we send a query to Foursquare, one for each neighborhood. To get the top 100 venues in a max. radius of 500 yd. In response to that query we get a json file which we transform into a pandas data frame, and we can make the first exploratory analysis to check how many venues we have in each neighborhood.



- Then the data frame is transformed with “one hot” to get the dummies of each kind of venue in each neighborhood.

	Neighborhood	Accessories Store	Adult Boutique	Afghan Restaurant	African Restaurant	American Restaurant	Antique Shop	Arcade	Arepa Restaurant	Argentinian Restaurant
0	Marble Hill	0	0	0	0	0	0	0	0	0
1	Marble Hill	0	0	0	0	0	0	0	0	0
2	Marble Hill	0	0	0	0	0	0	0	0	0
3	Marble Hill	0	0	0	0	0	0	0	0	0
4	Marble Hill	0	0	0	0	0	0	0	0	0

- Once the dummies are created, a new data frame must transform that into a new frame with the mean frequency, also grouping all the venues of each neighborhood.

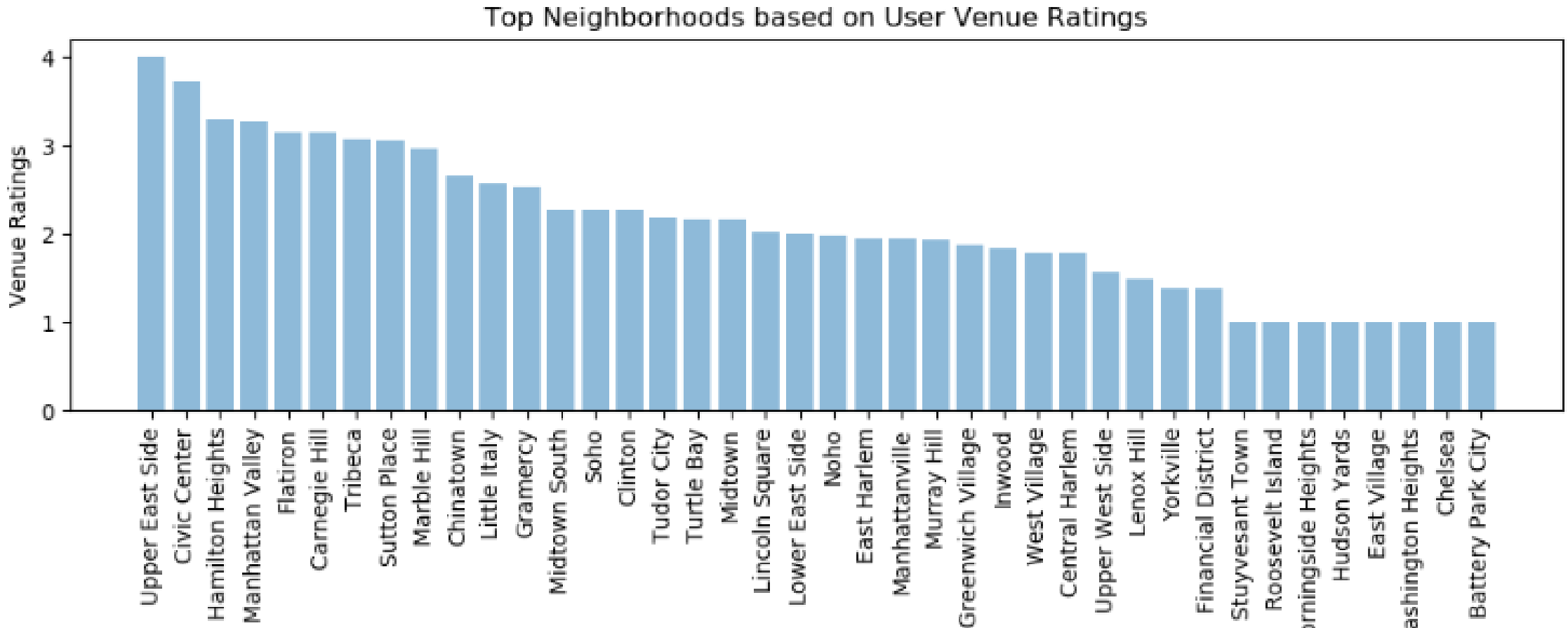
Neighborhood	Accessories Store	Adult Boutique	Afghan Restaurant	African Restaurant	American Restaurant	Antique Shop	Arcade	Arepa Restaurant	Argentinian Restaurant
Battery Park City	0.0	0.0	0.0	0.00	0.015385	0.0	0.0	0.0	0.000000
Carnegie Hill	0.0	0.0	0.0	0.00	0.011494	0.0	0.0	0.0	0.011494
Central Harlem	0.0	0.0	0.0	0.06	0.040000	0.0	0.0	0.0	0.000000
Chelsea	0.0	0.0	0.0	0.00	0.040000	0.0	0.0	0.0	0.000000
Chinatown	0.0	0.0	0.0	0.00	0.030000	0.0	0.0	0.0	0.000000

Results

- Then a multiplication of the “mean frequency neighborhood” data frame and the “user ratings” data frame to get a new weighted data frame which will be used in the recommender system, this new data frame will be sorted by the total column, to help us determine which neighborhood is a better match for the user.

	Neighborhood	Accessories Store	Adult Boutique	Afghan Restaurant	African Restaurant	American Restaurant	Antique Shop	Arcade	Arepa Restaurant	Argentinian Restaurant
35	Upper East Side	0.0	0.0	0.0	0.0	0.011364	0.000000	0.0	0.0	0.0
5	Civic Center	0.0	0.0	0.0	0.0	0.030928	0.010309	0.0	0.0	0.0
13	Hamilton Heights	0.0	0.0	0.0	0.0	0.000000	0.000000	0.0	0.0	0.0
20	Manhattan Valley	0.0	0.0	0.0	0.0	0.000000	0.000000	0.0	0.0	0.0
10	Flatiron	0.0	0.0	0.0	0.0	0.010000	0.000000	0.0	0.0	0.0

- The recommendations sorted



Conclusion

- With this recommender system you can predict which neighborhood in a given city will have good venues matches regarding your previous ratings.
- The best match for the user is Upper East Side Neighborhood with a total rating of 4. And there are also 8 neighborhoods that does not have even one venue matching the user ratings, beneath the radius.