Customers satisfaction evaluation for Starbucks shops in Manhattan by scores in Foursquare

The Battle of Neighborhoods

Applied data science capstone Project

Author: Linlin Yin
Date: 11/17/2020

Introduction

Description of the problem

Evaluating the customers satisfaction of each shop is an essential problem for business owners and operators.

Based on Foursquare location data, we want to know the customers satisfaction level of each shop comparing to the average level or shops nearby, for example, one shop has lower rating and lower popularity; another shop has the same rating and lower popularity.

Introduction

Background: Who is interested?

Evaluating the customers satisfaction is a very important factor to make business decision such as opening a new shop or market strategy.

Anyone in the business management team of Starbucks or other coffee shops (such as owner, manger), or need making a business decision (such as determining if and how to marketing for a shop) will be interested in this report.

Introduction

Background: Methods and Issues

There are many methods to evaluate customers satisfaction (such as a survey for customers) but all methods have different kinds of limitations.

On the other hand, we usually compared the interested shop with other shop to get "relative" satisfaction level. But each shop is different than others and their customers satisfaction, such as number of reviews are usually influenced by many factors (for example, shops may have different customer populations). Simply comparison between different shops can be biased or misleading.

Introduction

Background: Advantages of using Foursquare data

With the development of the big-data, more user generated review data (such as Foursquare or Yelp) were collected for each shop. Those data provided a direct way to compare different kinds of scores (such as user rating) between shops in the same category. When integrating with location information (nearby shops), many bias factors can be adjusted (for example, shops in the same location have the same customer population), and the score between shops will be comparable and a direct reflection of customers satisfaction of the shop. This can be an important criterion for shop evaluation.

Data

The same New York neighborhood information as in the course will be used to extract neighborhood information.

Foursquare location data for shops in each neighborhood will be queried.

Then all coffee shops in the shop list will be selected and Foursquare API will be used to extract all information/scores related to each shop, including Rating, count of Rating, Count of Likes, and Count of Tips.

Methods

1. Venues (Starbucks) will be compared with nearby Venues in the same category (Other coffee shops);

2. Two types of "Other coffee shops" : (1) In the same neighborhood; (2) Nearest 5 coffee shops;

3. Four scores will be considered: Reviews (Rating) and Popularity (Number of ratings; Number of Likes; Number of Tips);

4. T test will be used to compare score of Starbucks vs "Other coffee shops" defined above. P<=0.05 will be considered as significant;

5. All Starbucks will be assigned to categories based on test result: Better/Worse review; Higher/Lower Popularity; Or similar as other shops;

Analysis Results Outline

1. Overview of coffee shops in Manhattan
   1. Overall count and score distribution in shop level;
   2. Overall count and score distribution in neighborhood level;

2. Scores of Starbucks vs scores of other coffee shops
   1. Overall: Starbuck vs other Coffee Shops;
   2. Each Starbuck vs other Coffee Shops;

Overview of coffee shops in Manhattan
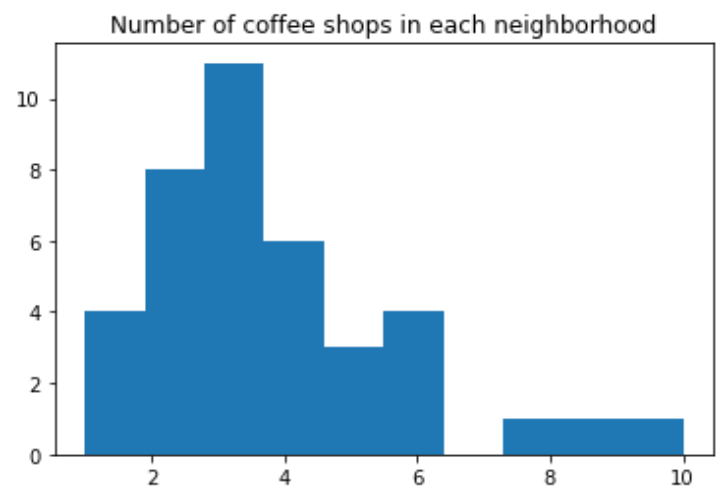
Number of Coffee Shops in Manhattan

Brand	Count
Not Starbucks	125
Starbucks	18

Brand	Count
Starbucks	15
Blue Bottle Coffee	9
La Colombe Torrefaction	5
Oslo Coffee Roasters	4
787 Coffee	3
Oslo Coffee Roasters	3

Number of different coffee shops (top 6).

Overall Summary: Neighborhood

## Number of coffee shops in each Neighborhood

Neighborhood	Count
Financial District	10
Chelsea	9
Carnegie Hill	8
Upper East Side 6	6
Midtown	6
Soho	6
Yorkville	6

Overall Summary: Scores

Distribution of Scores

Name	Description	Mean	SD	25%-75%	Min-Max
Rating	User Rating Score	8.26	0.64	7.8-8.4	5.4-9.3
Tier	Cheap/Expensive	Cheap 117 Moderate 15 Expensive 1			
Number of Ratings	Number of "Rating"	294	418	49-360	0-3123
Number of Like	Number of "Like"	219	321	34-270	0-2439
Number of Tip	Number of "Tip" (Review)	61	93	9-78	0-687

Overall Summary
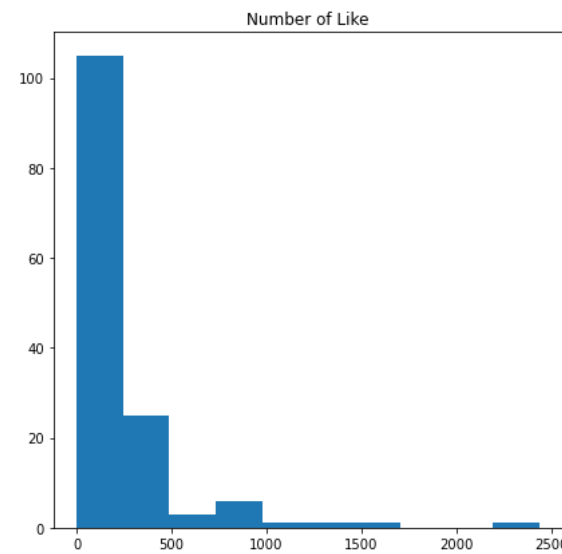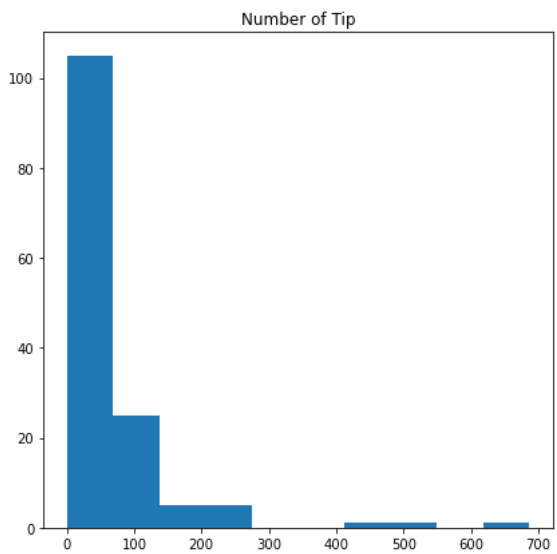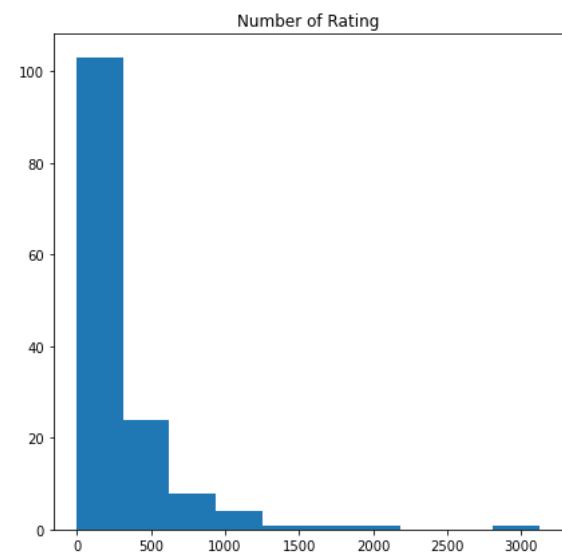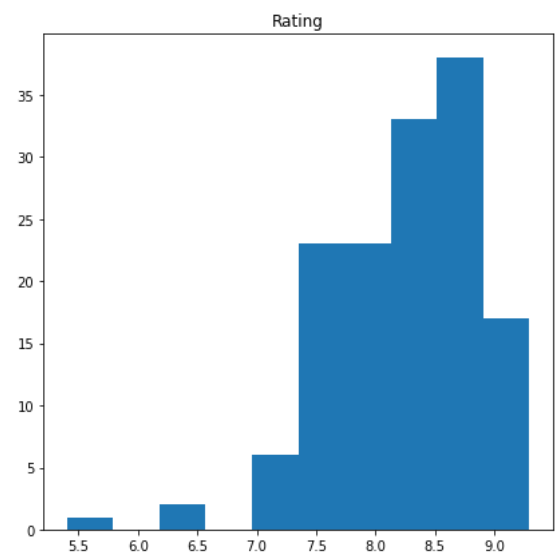
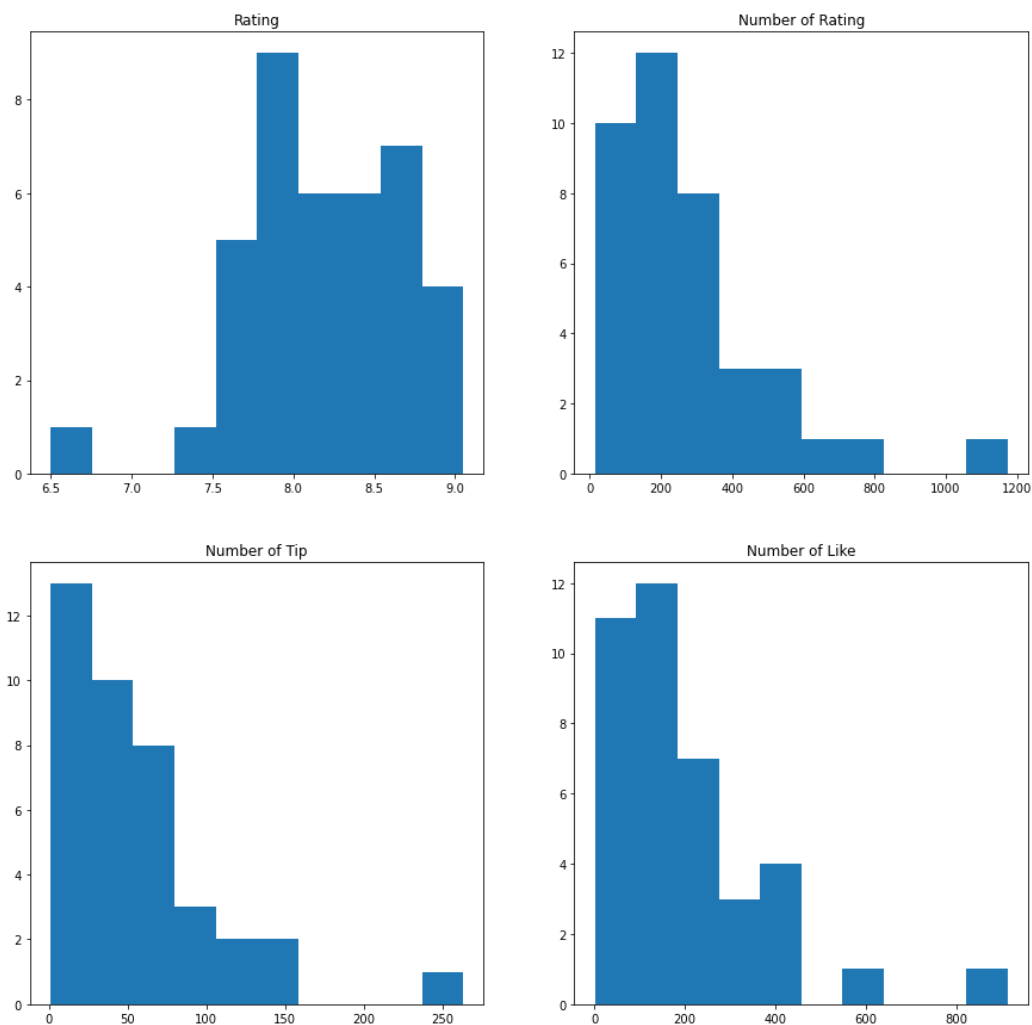# Overall Summary: Scores in Neighborhood level

Summary of Scores in Neighborhood level

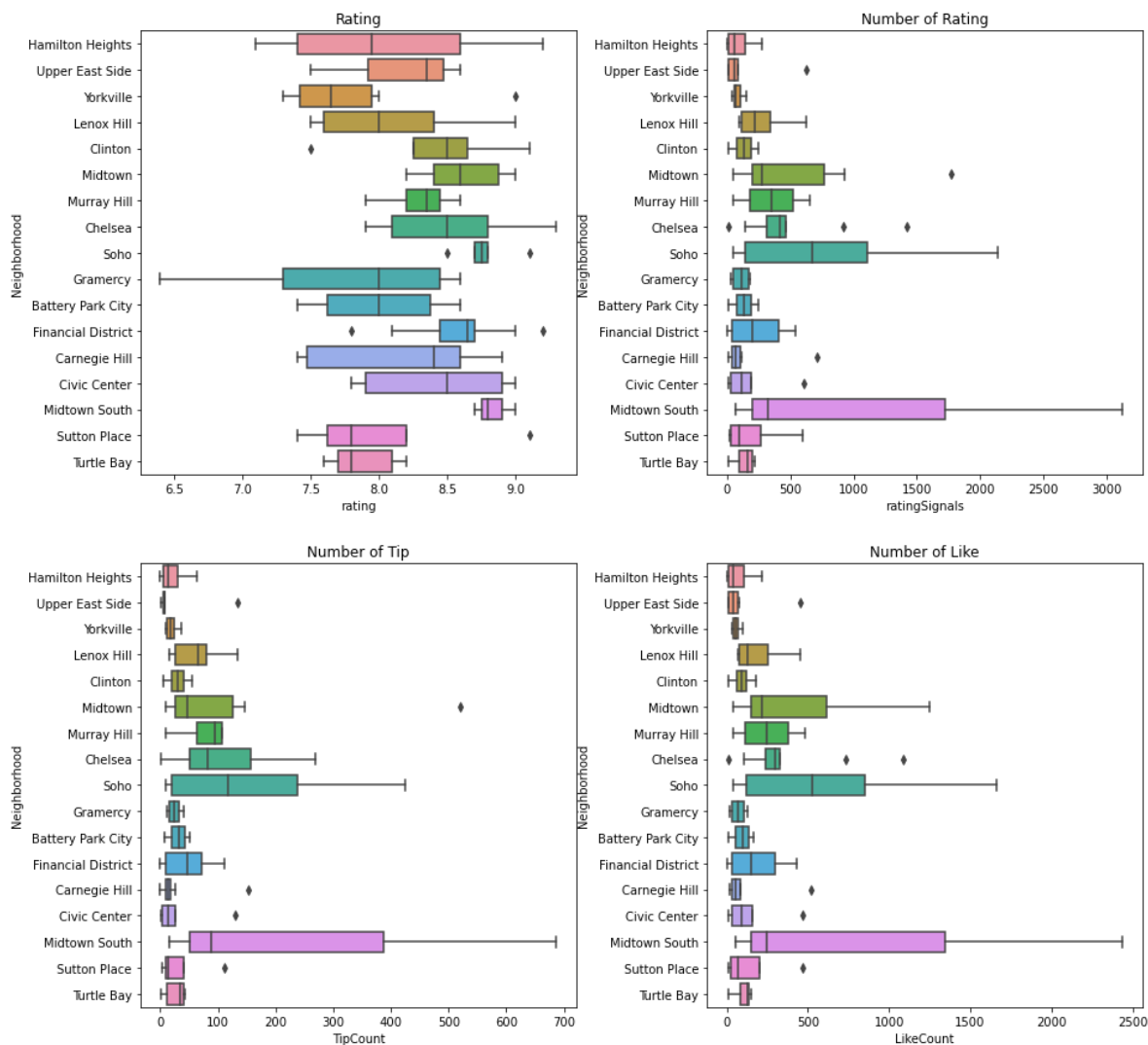| Name	Mean	SD	25%-75%	Min-Max
Rating	8.18	0.5	7.9-8.6	6.5-9.0
Number of Ratings	272	227	131-346	15-1172
Number of Like	198	180	76-261	1-913
Number of Tip	56	50	25-70	1-263

Overall Summary: Scores in Neighborhood level

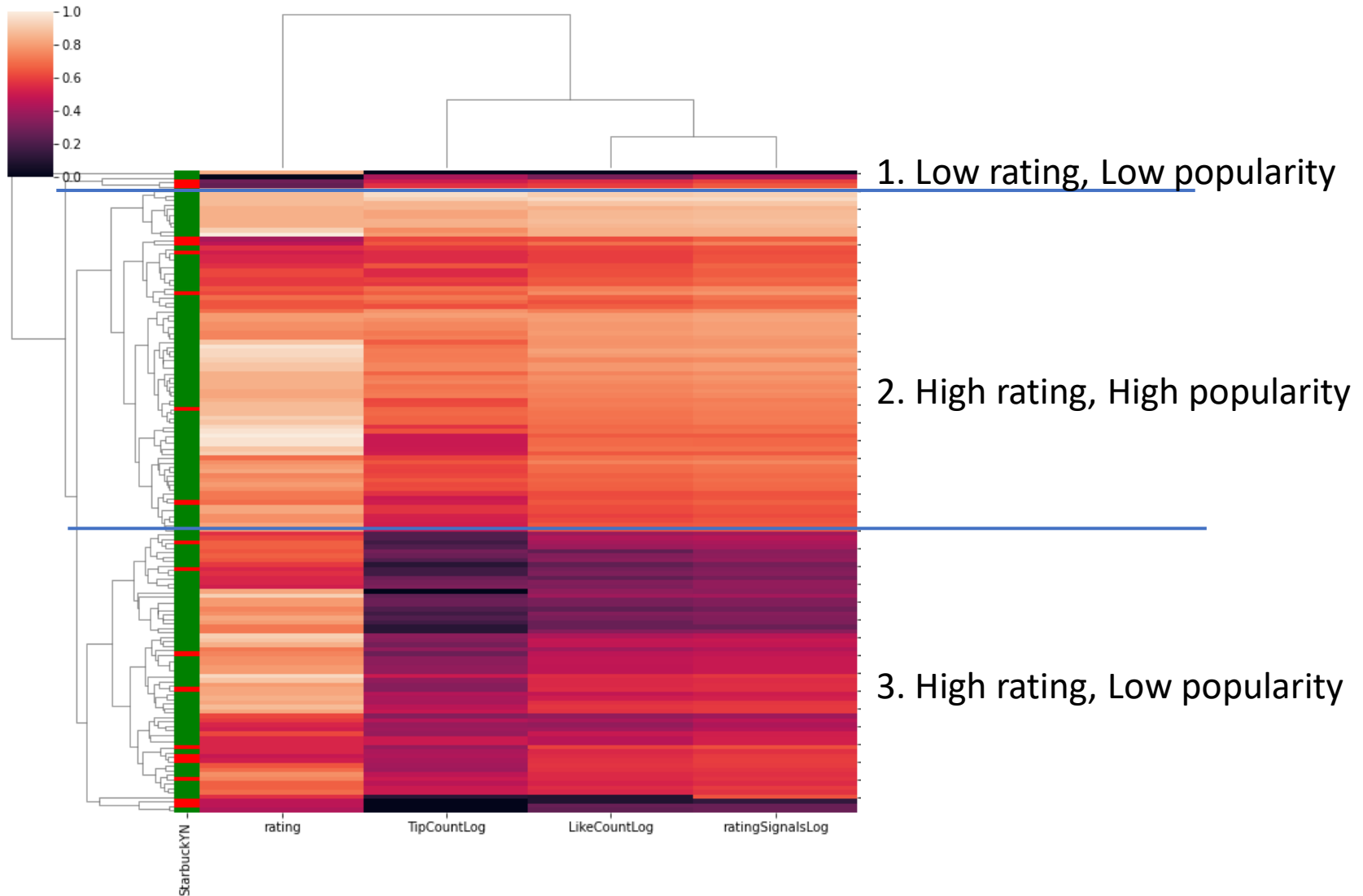## Distribution of Scores in Neighborhood level

Overall Summary: Neighborhood

Distribution of Scores in each Neighborhood (with at least 4 shops)

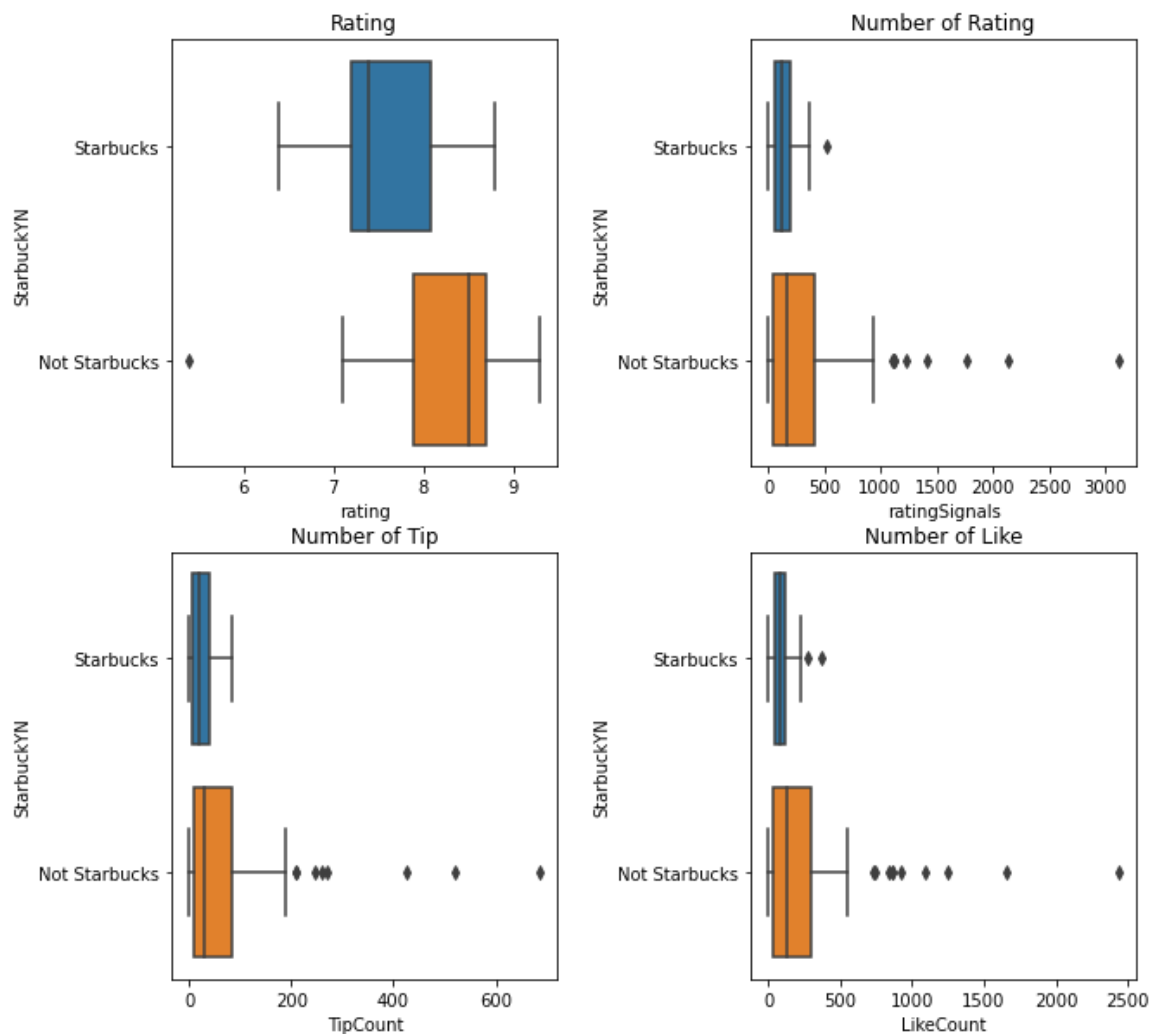# Summary: Starbucks vs Not Starbucks, heatmap

Three clusters (types) in heatmap

Summary: Starbucks vs Not Starbucks

Score Distribution

Summary: Starbucks vs Not Starbucks

Score Difference summary

		Missing	Overall	Not Starbucks	Starbucks	P-Value
n			143	125	18	
rating, mean (SD)		0	8.3 (0.6)	8.4 (0.6)	7.6 (0.7)	<0.001
TipCountLog, mean (SD)		0	3.3 (1.4)	3.3 (1.4)	2.7 (1.4)	0.078
ratingSignalsLog, mean (SD)		0	4.8 (1.4)	4.9 (1.5)	4.5 (1.4)	0.249
LikeCountLog, mean (SD)		0	4.5 (1.5)	4.6 (1.5)	4.1 (1.3)	0.223
message, n (%)	Cheap	0	126 (88.1)	109 (87.2)	17 (94.4)	0.663
	Expensive		1 (0.7)	1 (0.8)		
	Moderate		16 (11.2)	15 (12.0)	1 (5.6)	

Difference in each Shop

Each Starbucks shop was compared with "Other coffee shops" defined in methods

|	Neighborhood	Venue	Venue ID	RatingCompare	RatingPopularityCompare	LikePopularityCompare	TipPopularityCompare
0	Marble Hill	Starbucks	55f81cd2498ee903149fcc64	No Difference	No Difference	No Difference	No Difference
1	Marble Hill	Starbucks	57655be738faa66160da7527	Significantly Lower	Significantly Lower	Significantly Lower	Significantly Lower
2	Washington Heights	Starbucks	4aafdf93f964a520f66420e3	Significantly Lower	No Difference	No Difference	Significantly Higher
3	Upper East Side	Starbucks	5c01826e60d11b002c912004	Significantly Lower	No Difference	No Difference	No Difference
4	Upper East Side	Starbucks Reserve	57eeb8e3498e1dd086ebf03f	No Difference	No Difference	No Difference	No Difference
5	Yorkville	Starbucks	4a819c70f964a52006f71fe3	No Difference	No Difference	No Difference	No Difference
6	Yorkville	Starbucks	4b69efa9f964a52014bd2be3	Significantly Lower	Significantly Higher	Significantly Higher	Significantly Higher
7	Roosevelt Island	Starbucks	4b0807abf964a520890223e3	Significantly Lower	No Difference	No Difference	No Difference
8	Lincoln Square	Starbucks	4abb899bf964a520f18320e3	Significantly Lower	No Difference	No Difference	No Difference
9	Chelsea	Starbucks Reserve Roastery	5c13bf838afbe0002de55061	No Difference	No Difference	No Difference	No Difference
10	Manhattan Valley	Starbucks	4fdc9a79e4b0735a6deafc25	No Difference	No Difference	No Difference	No Difference
11	Gramercy	Starbucks	4a704000f964a52040d71fe3	Significantly Lower	No Difference	No Difference	No Difference
12	Battery Park City	Starbucks Reserve	4ce41f161594236ac316fb49	No Difference	No Difference	No Difference	No Difference
13	Financial District	Starbucks	4a9ff5d9f964a520ba3d20e3	Significantly Lower	Significantly Higher	Significantly Higher	Significantly Higher
14	Carnegie Hill	Starbucks	57fd457a498e39cd34012586	No Difference	No Difference	No Difference	Significantly Lower
15	Carnegie Hill	Starbucks	5330323b498e2836f173cf9e	Significantly Lower	No Difference	No Difference	No Difference
16	Sutton Place	Starbucks	4ad13d14f964a520a3dd20e3	No Difference	No Difference	No Difference	No Difference
17	Tudor City	Starbucks	5d7bb678290f5e00075785d9	Significantly Lower	Significantly Lower	Significantly Lower	Significantly Lower

Distribution of Starbucks scores vs other coffee shops
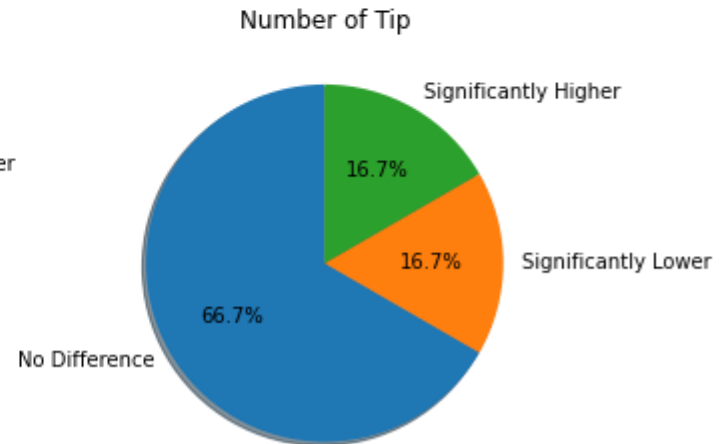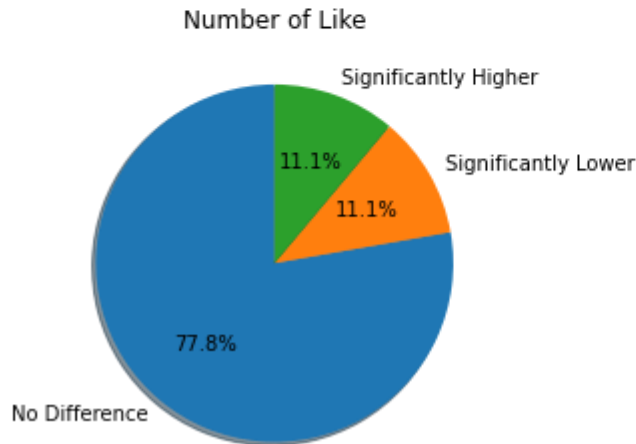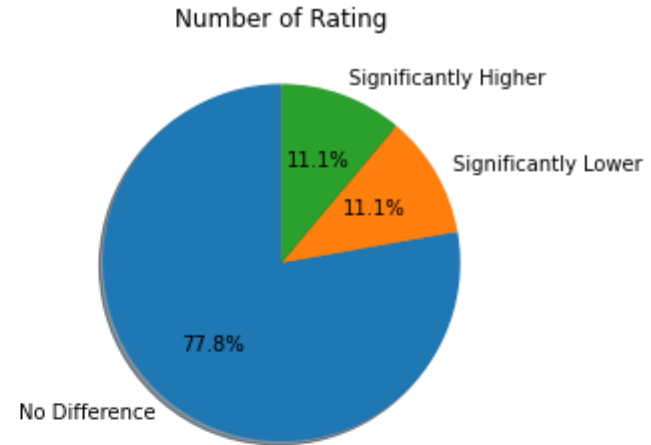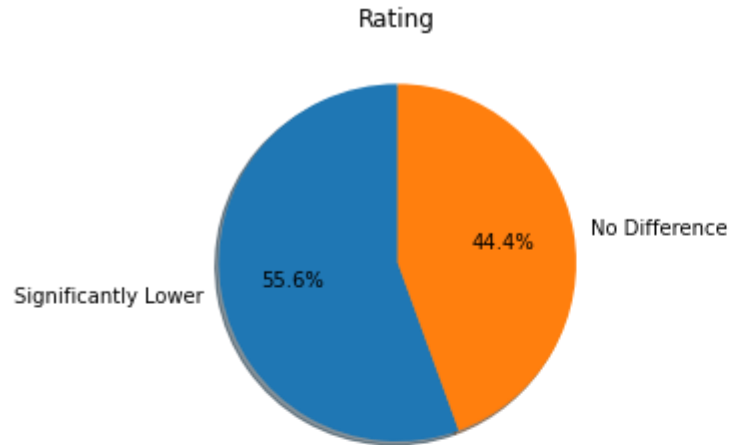
Distribution of Starbucks scores vs other coffee shops

Neighborhood	Count
Same as other shops	12
Lower Rating & Higher Popularity	3
Lower Rating & Lower Popularity	2
Same Rating & Lower Popularity	1
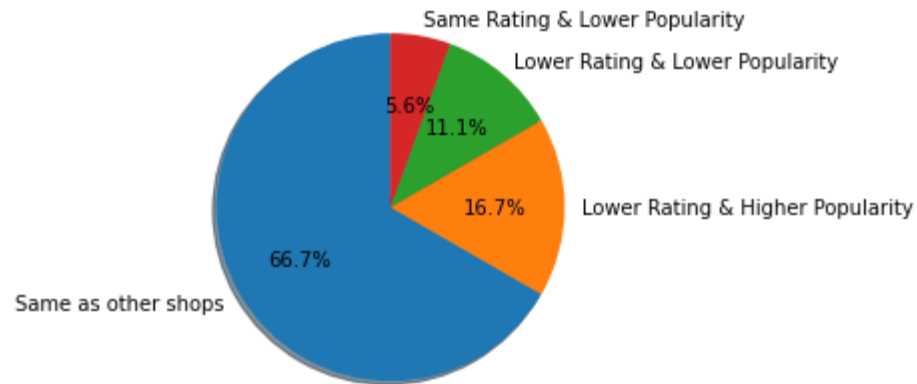
Discussion

we find that
(1) The scores in Foursquare system can be used in shop evaluation effectively;

(2) We successfully identified Starbucks coffee shops with lower customer rating or popularity;

(3) Based on those findings, we will recommend further actions should be taken to improve the customer experiences for shops with lower rating, and further marketing activities should be taken to promote shops with lower popularity scores but normal rating scores.

Discussion

This is an example about how to use Foursquare location data to evaluate the customers satisfaction level of any shop.

It can be used in many other types of shops (such as hotel or restaurant) or evaluation (such as customer tips).

Our methods and results can provide supports for business decisions and can be helpful for management team of any shop (Starbucks as example here).

Conclusion

In this report, we used Starbucks in Manhattan as an example, demonstrated how to use Foursquare location data to evaluate the customer satisfaction level of each shop.

We extracted, visualized, and compared rating and popularity scores for Starbucks coffee shops with their nearby coffee shop competitors and identified Starbucks shops with significantly worse or better rating, or higher or lower popularity.

Our methods and results can provide supports for business decisions and can be applied in other similar shops evaluations and resolve similar questions in these situations.