

Business Analysis for Barbeque Restaurants

Group 7

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Background and Objectives

We are interested in barbeque restaurants, so we want to know which business attributes have significant effect on their attraction to customers.

Also, we will analyze review text to see what customers like and dislike about any specific restaurant, and then give suggestions to business owners accordingly.

We are interested in the following attributes.

- 1.Outdoor seating availability
- 2.Free wifi availability
- 3.Noise level
- 4.Free parking availability
- 5.Ambience
- 6.Price

Data Cleaning

a. Data Selection

The original yelp dataset contains 8.62 million reviews and 16 thousand business. We filter businesses by the keyword “barbeque” and remove businesses with empty attributes. This leaves us with 1466 businesses and 247896 associated reviews.

8.62 million reviews
16 thousand businesses

Keyword 'Barbeque'
Remove empty attributes

248 thousand reviews
1466 businesses

Data Cleaning

a. Texts Cleaning

We did the following steps to clean texts in the review dataset.

- 1.Remove the punctuations, digits and hashtags.
- 2.Convert to lower cases.
- 3.Remove stopwords.
- 4.Tokenization(split texts into individual words).
- 5.Stemming(extract base forms of words by removing affixes).

Example:

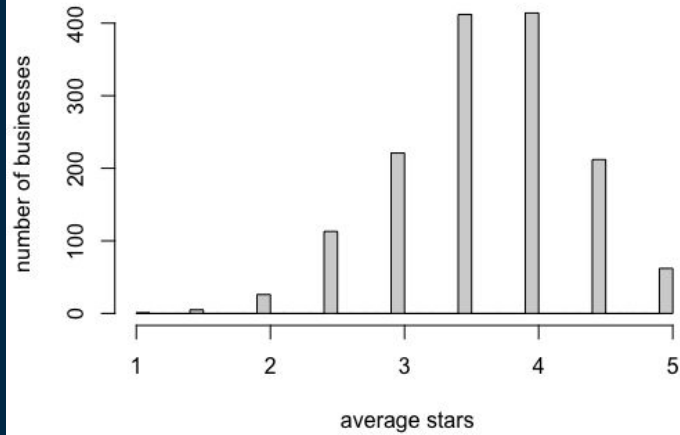
I got a burger with caramelized onions, a red wine sauce and blue cheese
the first time



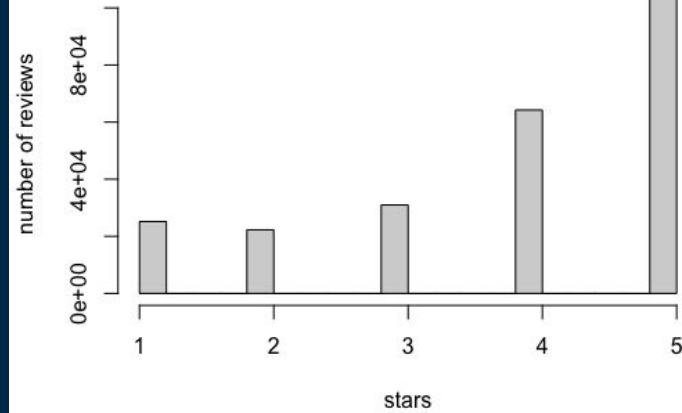
got burger caramelized onion red wine sauce blue cheese first time

Data distribution

Histogram of stars in businesses



Histogram of stars in reviews



Business Attributes Analysis

We divided businesses into two categories according to their average stars, lower than 3.5 or higher than 4.0, and then fit a logistic regression model by the following business attribute variables.

- 1.Ambiance: casual or not casual
- 2.Outdoor seating: available or unavailable
- 3.Noise level: quiet or loud
- 4.Free parking: available or unavailable
- 5.Free wifi: available or unavailable
- 6.Price: range from 1 to 4

Business Attributes Analysis

Noise level-loud

P-value = 2.5×10^{-5}



Estimated coefficient = -0.20

Outdoor Seating-available

P-value = 0.01



Estimated coefficient = 0.06

Free wifi



P-value = 0.12

Free parking



P-value = 0.74

Ambiance



P-value = 0.53

Price



P-value = 0.90

Review Texts Analysis



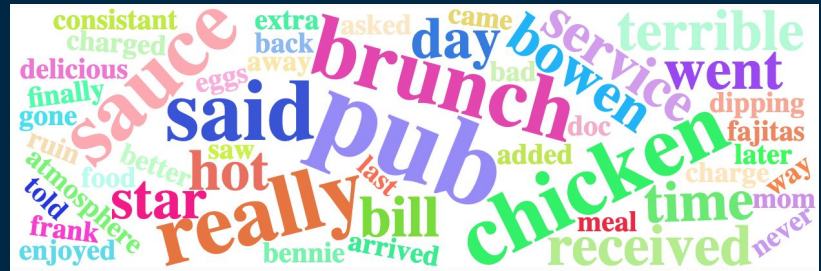
Positive review



Negative review

We use word cloud to show business owners what customer mentioned most in reviews.

Negative



Word2Vec

We select these target words according to the word frequency. All of the target words are nouns.

Food Place Service Pork Ribs Meat Chicken Beef Staff Atmosphere

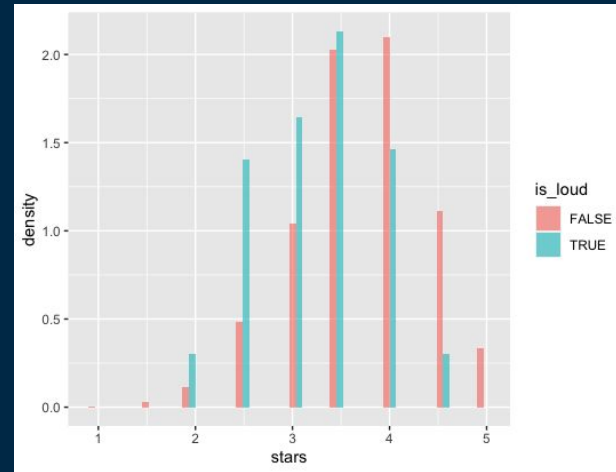
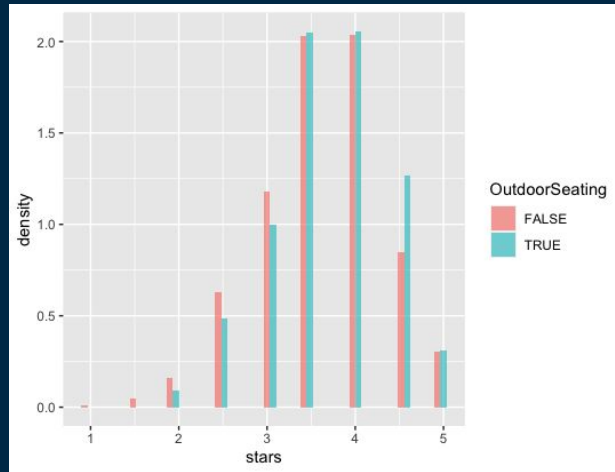
Use positive reviews to build the word2vec model. There are two model architectures behind Word2Vec: CBOW and skip-gram. We use CBOW here, because it performs well on a large scale dataset and runs fast.

Word2Vec

Target word	Top 10 related words
Price	Reasonable, fair, tag, reasonably, steep, higher, moderate, lower, high, decent, low
Meat	Sweats, cuts, coma, lovers, eater, marinated, smoked, piles, loaf, slabs
Staff	Friendly, member, members, helpful, friendliest, friendliness, wait, attentive, courteous, polite
Service	Customer, impeccable, prompt, slow, speedy, costumer, friendly, exceptional, quick, fast

General Suggestions

1. Barbeque restaurants should provide outdoor seating to customers
2. Barbeque restaurants should pay attention to noise level and reduce noise.



Specific Suggestions

We will give specific suggestions to a business, Terry Black's Barbeque, for example. This restaurant has 6292 positive reviews and 414 negative reviews. The ratio is $6292/414 = 15.2$.

Our suggestion:

Aspects that is doing well

1. Beef, pork and ribs quality
2. Atmosphere

Aspects that need to be improved

1. Service
2. Food price
3. Cut of meat

Specific suggestions

The atmosphere is great overall.

340 positive reviews and 12 negative reviews mentioned atmosphere-related words. $340/12 = 24.3 > 15.2$

Review Example:

1. AMAZING!!!! Absolutely a great atmosphere, mouth-watering food and friendly workers!
2. Delicious BBQ. Had the sliced beef sandwich and potato salad. Love the porch atmosphere. Hard 8 you've met your match!
3. Cool atmosphere also.

Specific suggestions

Customer service could be better.

542 positive reviews and 54 negative reviews mentioned service-related words. $542/54 = 10.0 < 15.2$

Review Example:

1. Good but staff was rude and felt imposed upon when answering questions. Treated my family with disrespect.
2. The food at Terry Blacks is awesome! The service is another story.
3. Let's start with the 1 thing that any restaurant worth it's salt should have going for it: CUSTOMER SERVICE. Right. And this place gets a ZERO.

Specific suggestions

The food prices could be adjusted. People prefer barbeque restaurants with fair and reasonable price.

580 positive reviews and 104 negative reviews mentioned price-related words. $580/104 = 5.6 < 15.2$

Review Example:

1. At first, I wanted this place to succeed. That was before they jacked up their prices and pissed off the local neighborhood with their smog. Now I'm rooting for its failure.
2. The food is okay, and you get it fast. There's plenty of free parking. The amount of money I paid, though, left me wondering what is special about this place.
3. No way was I paying \$16 for 1 RIB !

Shiny App

https://zhaozihan.shinyapps.io/yelp_analysis/

The background is a dark blue field decorated with a pattern of small squares and thin vertical lines. The squares are in three colors: orange, teal, and light blue. Some squares are solid, while others are hollow. The vertical lines are thin and white, extending from the top or bottom of the frame. The word "THANKS" is centered in a large, orange, sans-serif font.

THANKS