Topics Mentioned in Restaurant Reviews

Yelp Dataset Challenge, Round 8 (2016)

Katharina Roesler
katroesler@gmail.com

Abstract

Hello

Introduction

What makes for a great restaurant experience? Do people care only about the food, or do they also evaluate restaurants' service and value for their money? Which topic is most strongly related to review stars? To answer these questions, I examine 1,630,712 Yelp restaurant reviews from 26,630 restaurants. I develop measures of whether reviews mention food, service, and/or money that help classify reviews with 93, 88, and 91 percent test set accuracies, respectively. I then use these measures to compare reviews and assess the relative importance of food, service, and value for

Data and Methods

In order to obtain labeled data, I labeled 148 restaurant reviews as to whether they mentioned the food, service, and/or money. I created three regular expressions to capture measures of each topic.

Food

The first topic I attempt to capture is food. I consider any review that includes any word matching the following regular expression as mentioning food:

```
(^|\W)food|meal|ingredients|fresh|tast|delicious|flavou?r|yum
```

By this measure, 74.3 percent of reviews mention food, compared to 91.9 percent according to my labelling.

Service

I defined service to be whether the reviewer discussed the employees, speed and waiting, or the accuracy of his or her order. I did not consider discussion of the restaurant's cleanliness, atmosphere, food delivery, or busy state to be service. For instance, one review says, "Pricey and somewhat slow service, though the amazing meals are worth a stop...", qualifying as a review of service due to the words "service" and "slow." The regular expression I use to measure whether a review mentions service is as follows:

(^|\W)service|server|waiter|waitress|staff|host(ess)?\W|employee|manager|...
worker|busboy|cashier|proff?ess?ional|rude|polite|friendly|courteous...
|speed|fast|slow|time|wait|minute|hour|while|immediate|quick...
|(?<=mess up) order|(?<=screw up) order|order (right|wrong))

According to this measure, 73.8 percent of reviews mention service, compared to 56.8 percent in my labelling.

Money

(cheap|expensive|deals?|bucks?|afford|spen(d|t)|charg|price|$|dollar|money)

According to this measure, 33.6 percent of reviews mention money, compared to 29.7 percent in my labelling.

Results

Classification Accuracy

In order to validate the utility of these measures, I split my labeled data set into training and test sets (70-30). I use the training set to predict whether reviews mention food, service, and/or money using each topic's measure, as well as the review's word count. This results in test set accuracies of 93, 88, and 91 percent, respectively.

For each topic, the coefficient for the topic measure is positive and statistically significant. For instance, an increase of one standard deviation in the measure for service is associated with 6.4 times greater odds that the review mentions service.[1] That is, if my measure suggests that the review mentions service, then it is 13.3 times more likely to be about service than if my measure suggests that it doesn't.[2]

Although the classification of reviews is fairly accurate and easy to interpret, it is even easier to use the regular expression measures themselves to label reviews. This also results in fairly accurate labels, with 78, 85, and 90 percent accuracies for food, service, and money respectively. For this reason I use these measures to classify reviews as mentioning or not mentioning food, service, and/or money.

Topic Distribution

In addition to estimating the percentages of reviews mentioning food, service, and money, it is interesting to know topics' relationships to one another. Figures 1 and 2 show the number of reviews mentioning each topic for labeled reviews and for classified reviews, respectively.

The distribution of topics is similar in the inferred

bar plot of review stars by topic mentioned

[1] The log odds coefficient for the measure is 1.8576, and $e^{1.8576} = 6.4$.

[2] $\frac{6.4}{SD(\text{measure})} = \frac{6.4}{0.481} = 13.3$

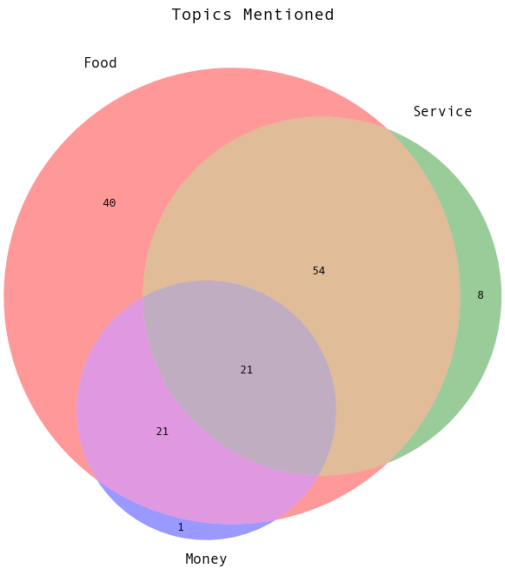


Figure 1: Labeled Reviews

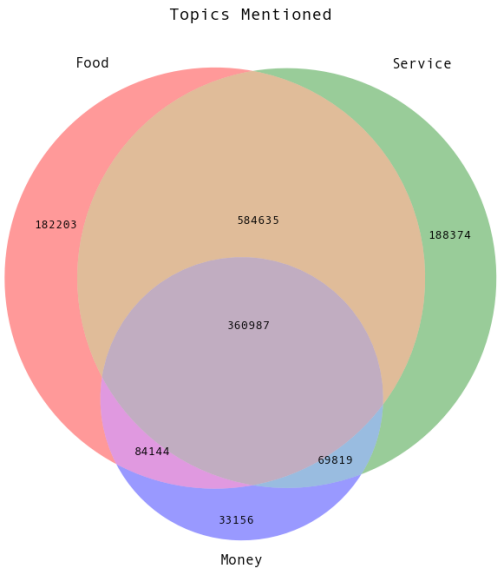
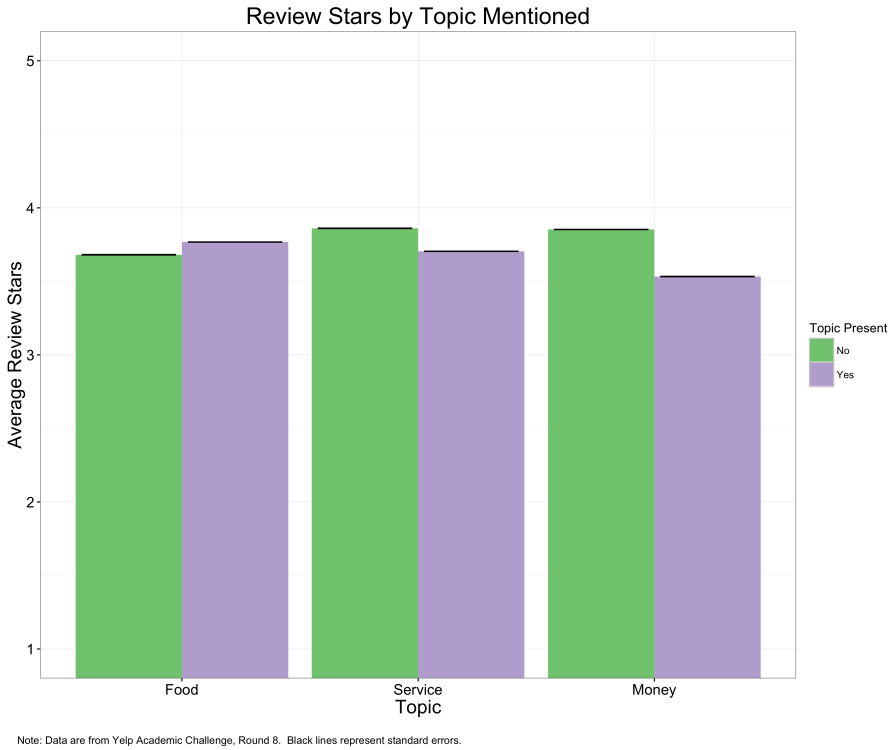


Figure 2: Classified Reviews



linear regression showing that food and money really matter, service a bit - controlling for each other

Conclusion

Entertaining if you have little ones - but slightly overpriced because of that. Service was attentive but but a bit slow. They appeared a little short staffed (they close at 6pm on Sundays and had a decent crowd in there right up to close).
I had the ribs - not bad. Beer was cold; decent options for kids. (Review *fIW-BuYkTW3Ja2loSYTjVYw*)