# RESTAURANT RATING PREDICTION

# Outline

- Question
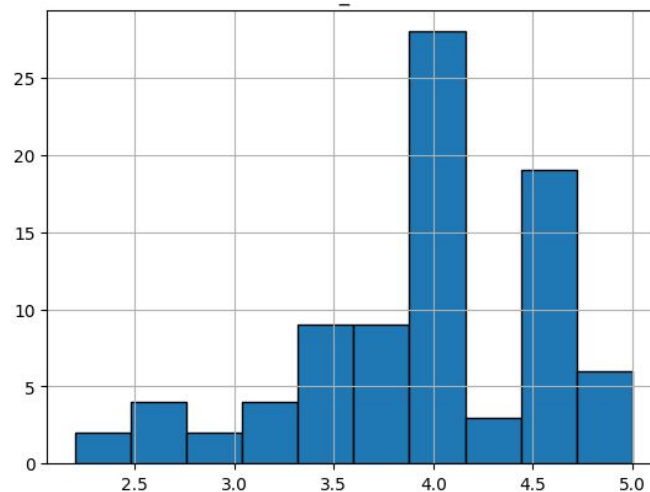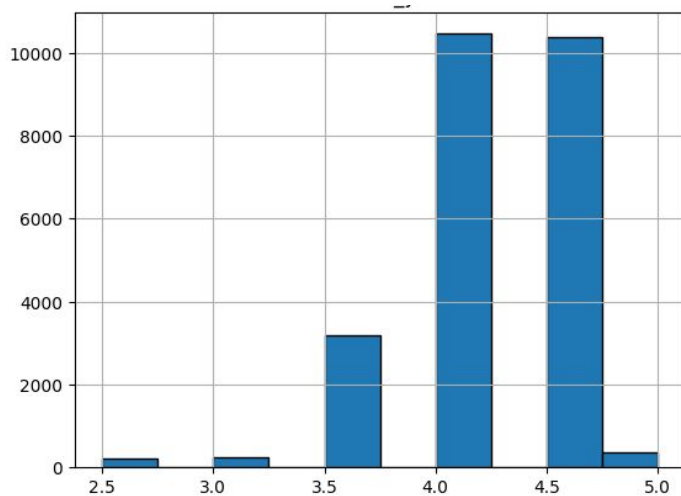- Data Cleaning and EDA
- Modeling
- Recommendations

# Question

1. What features are associated with high Yelp rating for new business owners?
2. What can these new business owners do to improve their ratings on Yelp?
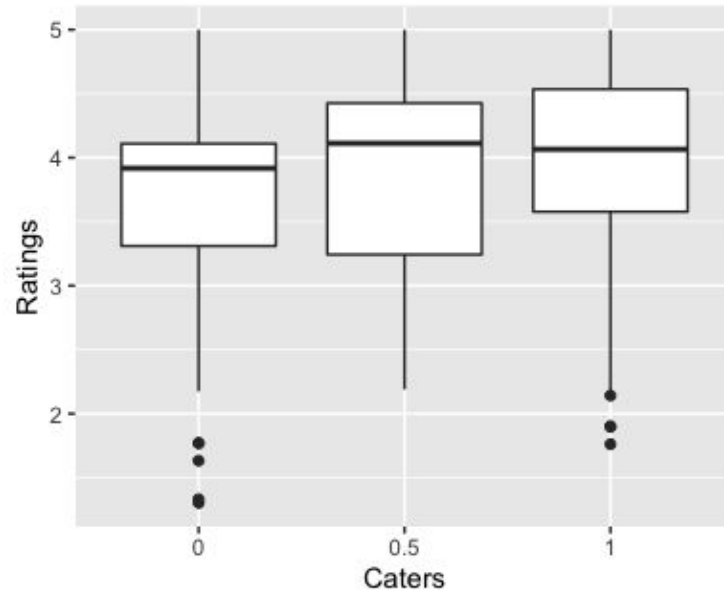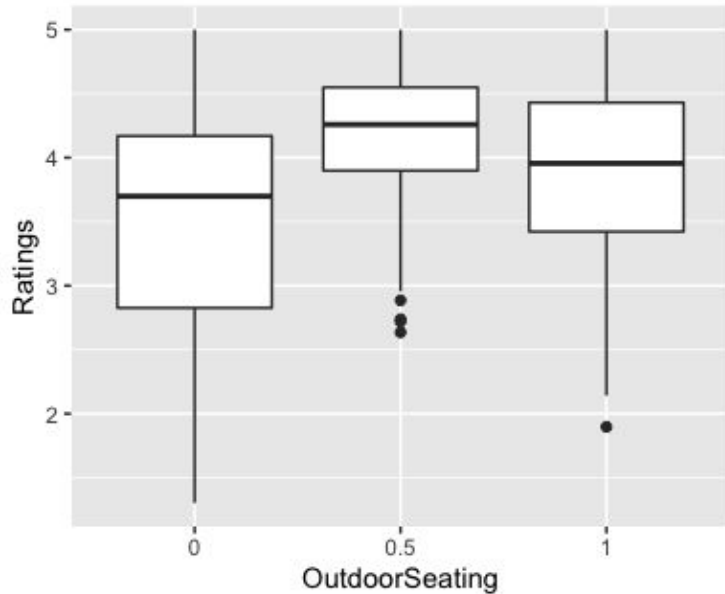
# Data Cleaning & EDA

- Standardized star ratings using z-scores.
- Distribution of Star Ratings of an American restaurant before and after standardizing:

# EDA

- We had 3 levels for each factor level where 0 denoted "Yes" , 0.5 denoted missing and 1 denoted "No" .
- We see that restaurants that had Outdoor Seating or Catering services had a higher rating.

# Model Building

- We fit a  linear regression model with Food Type, Ambience,Outdoor Seating, Restaurant Reservation, Caters, Drive- Thru  and Restaurant Takeout but had an  R-Squared value of 26.77%
- For a better prediction, we decided to use Random Forest.
- LVQ Method for feature selection.
- Important features : Type of Restaurant, Classy/Casual Ambiance, Catering Service, Reservations, Outdoor Seating, Delivery, Drive-Thru, TakeOut

# Final Model

- Model Prediction of a Healthy Restaurant, when No is selected for all attributes:

| Prediction | X1.5 | X2 | X2.5 | X3 | X3.5 | X4 | X4.5 | X5 |
|---|---|---|---|---|---|---|---|---|
| 1.5 | 0.43 | 0.03 | 0.11 | 0.10 | 0.05 | 0.21 | 0.06 | 0.01 |

- Model Prediction of a Healthy Restaurant, when Yes is selected for only Ambience_Casual and Restaurant TakeOut

| Prediction | X1.5 | X2 | X2.5 | X3 | X3.5 | X4 | X4.5 | X5 |
|---|---|---|---|---|---|---|---|---|
| 4 | 0.00 | 0.01 | 0.24 | 0.08 | 0.06 | 0.49 | 0.12 | 0.00 |

# Recommendations

- We based our recommendations based on the high frequency words that appeared for low ratings and high ratings.
- A recommendation for a Healthy Restaurant would be:

| Things to Avoid: | Things to Consider: |
|---|---|
| Things to be careful about are 'disappointed spicy ketchup' , 'quite pricey beans', and 'hard fried chicken' . | You should consider serving 'vegan gluten free' , 'artichoke crab cakes', 'vanilla ice cream' ,'egg white frittata', 'baklava ice cream' , 'soy ice cream' , 'best acai bowls' , and  'gluten free pancakes' . |

# The End