# Predicting Restaurant Business Success in Pennsylvania

Team 23

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EDA

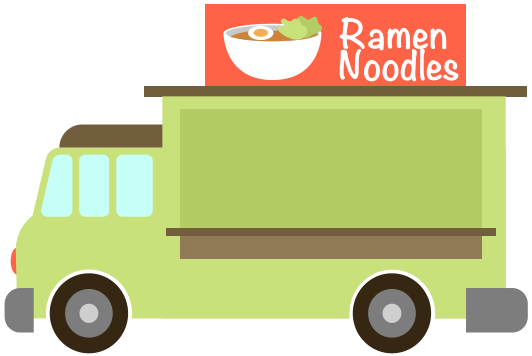
Topic Modelling &
Sentiment Analysis

Predictive Analysis

# Scope

## Business

Restaurants

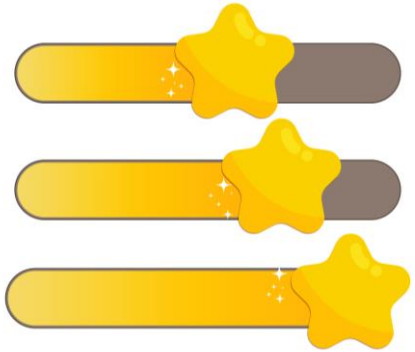



## Geography

Pennsylvania

## Data

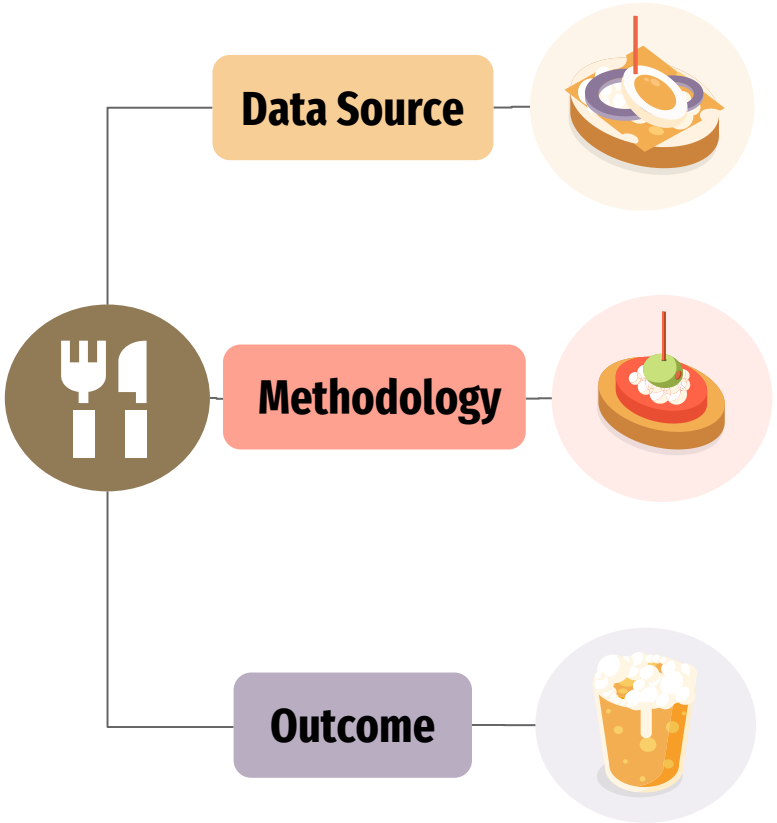
Business Attributes,
User Reviews



# Introduction

## Objective

Build a data-driven model for predicting business success, gauged by customer ratings and reviews.

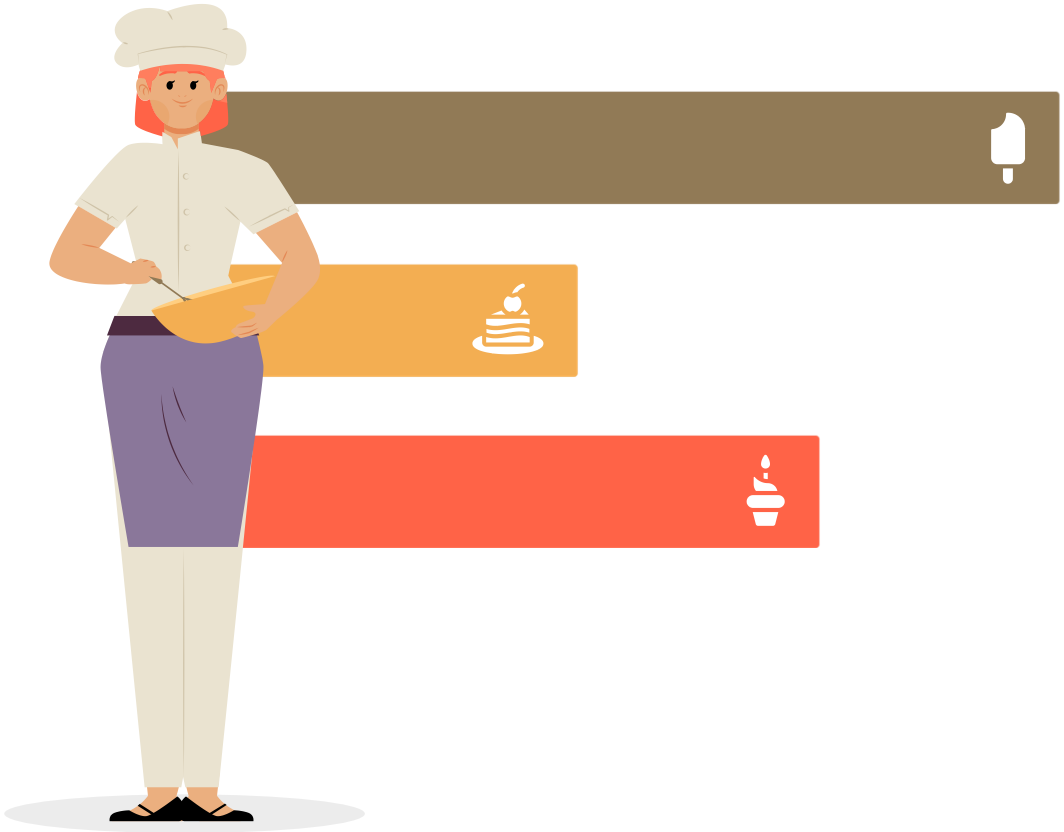



## Yelp dataset

- Business attributes
- Customer reviews
- Ratings

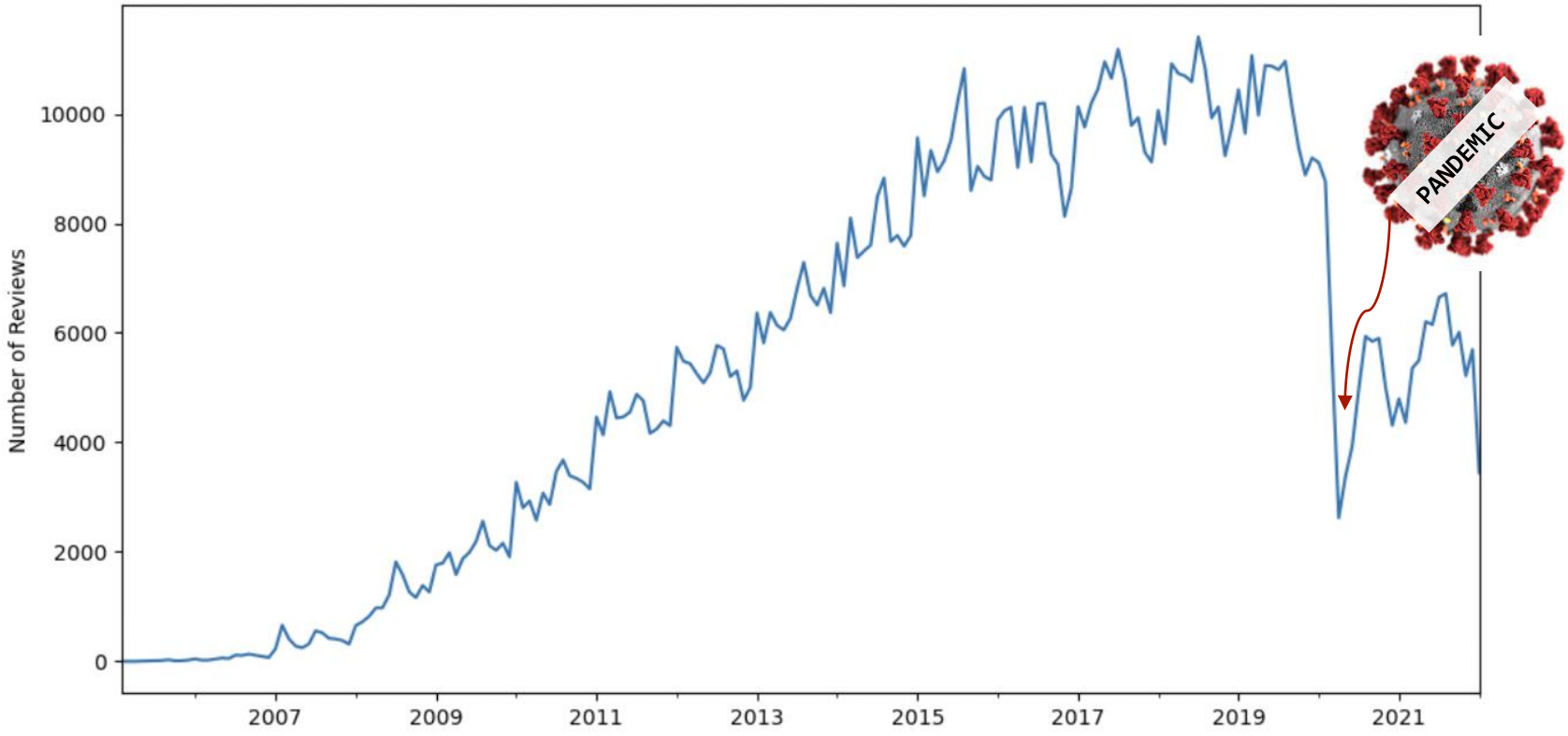
- Data Pre-processing
- Defining Success
- Feature Selection
- Model Development
- Model Evaluation
- Analysis

- Predictive model with reasonable accuracy
- Actionable insights to thrive

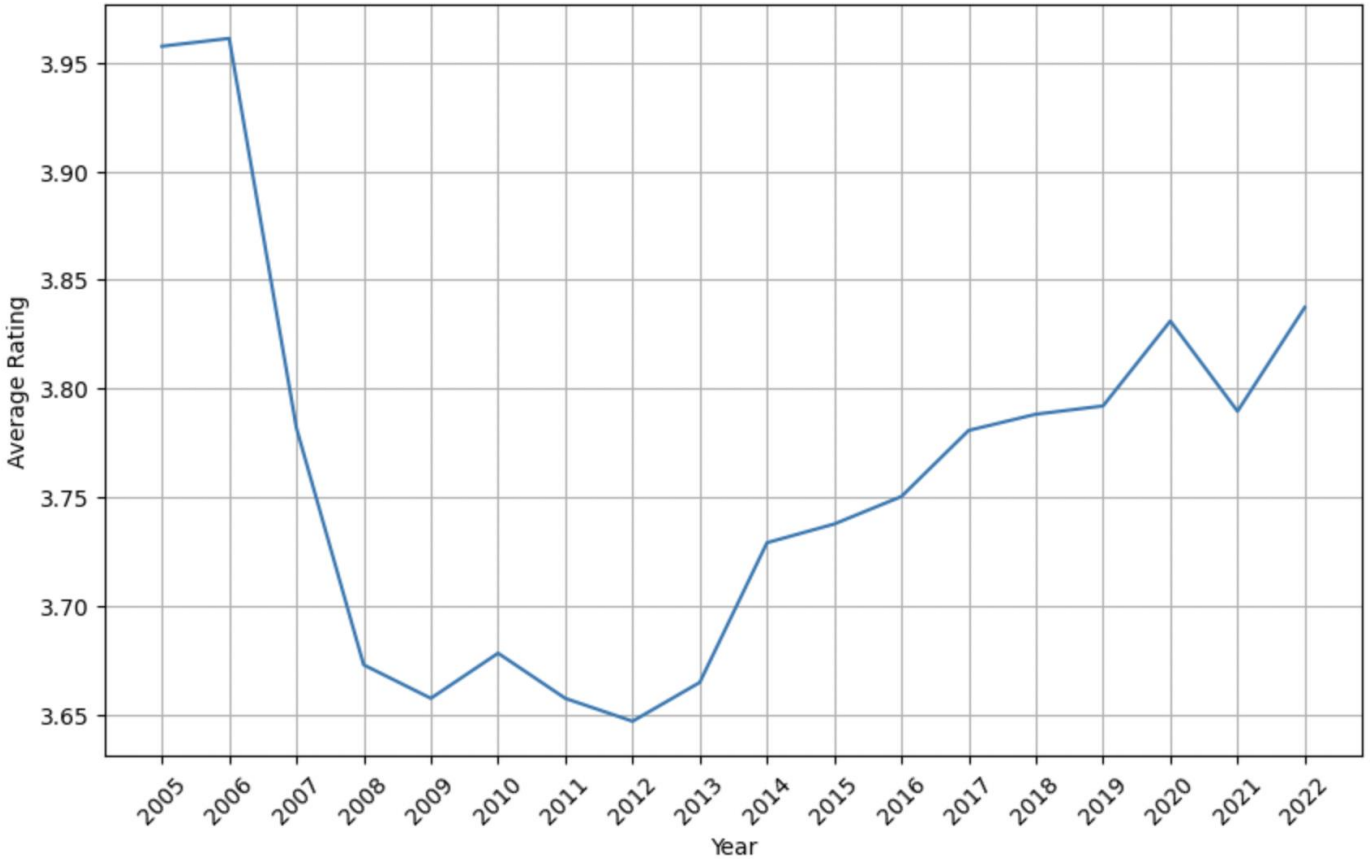


# Exploratory Data Analysis

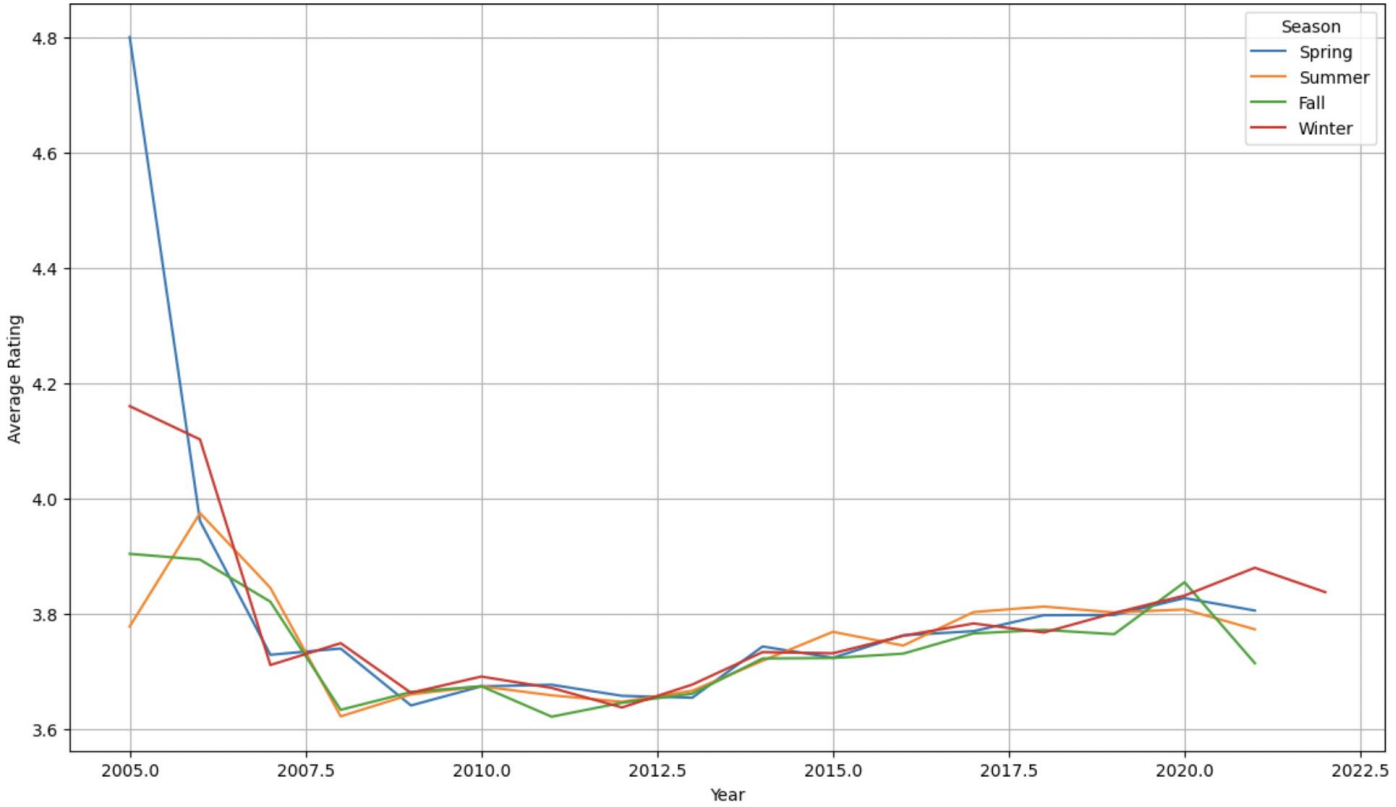
# No. of Reviews Over Time in PA



# Stability of Restaurant Rating



# Seasonal Average Rating

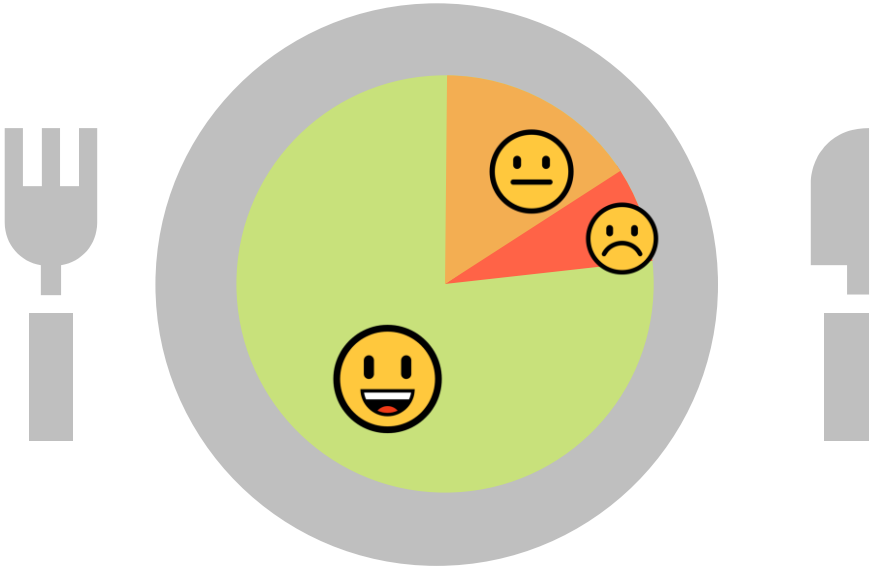


# Sentiment Analysis

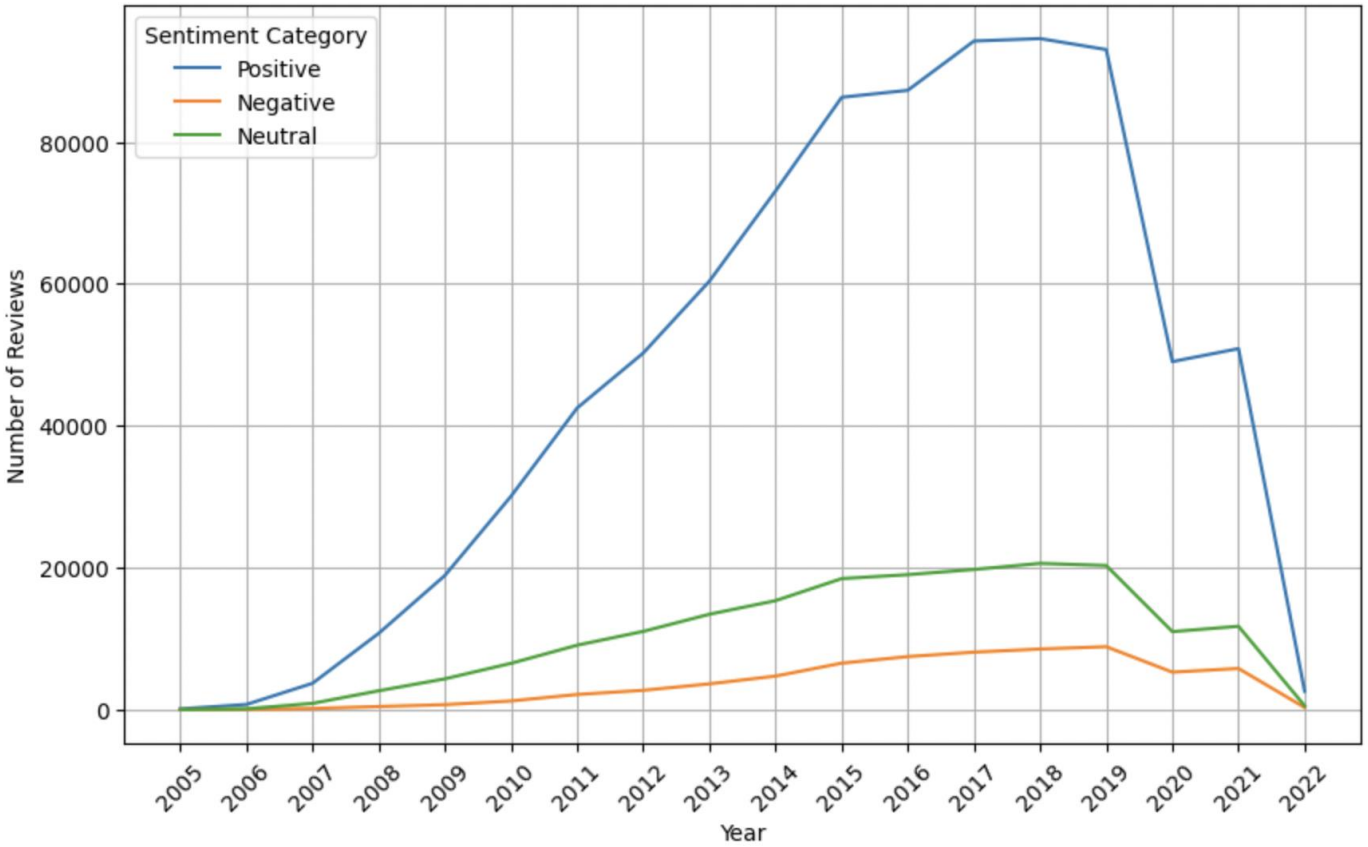
77 % Positive

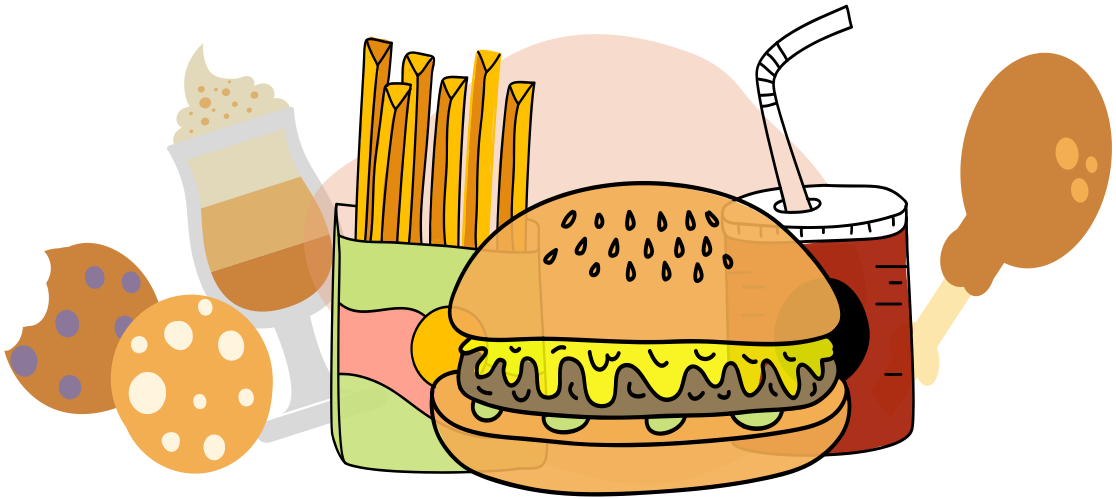
16 % Neutral

6 % Negative



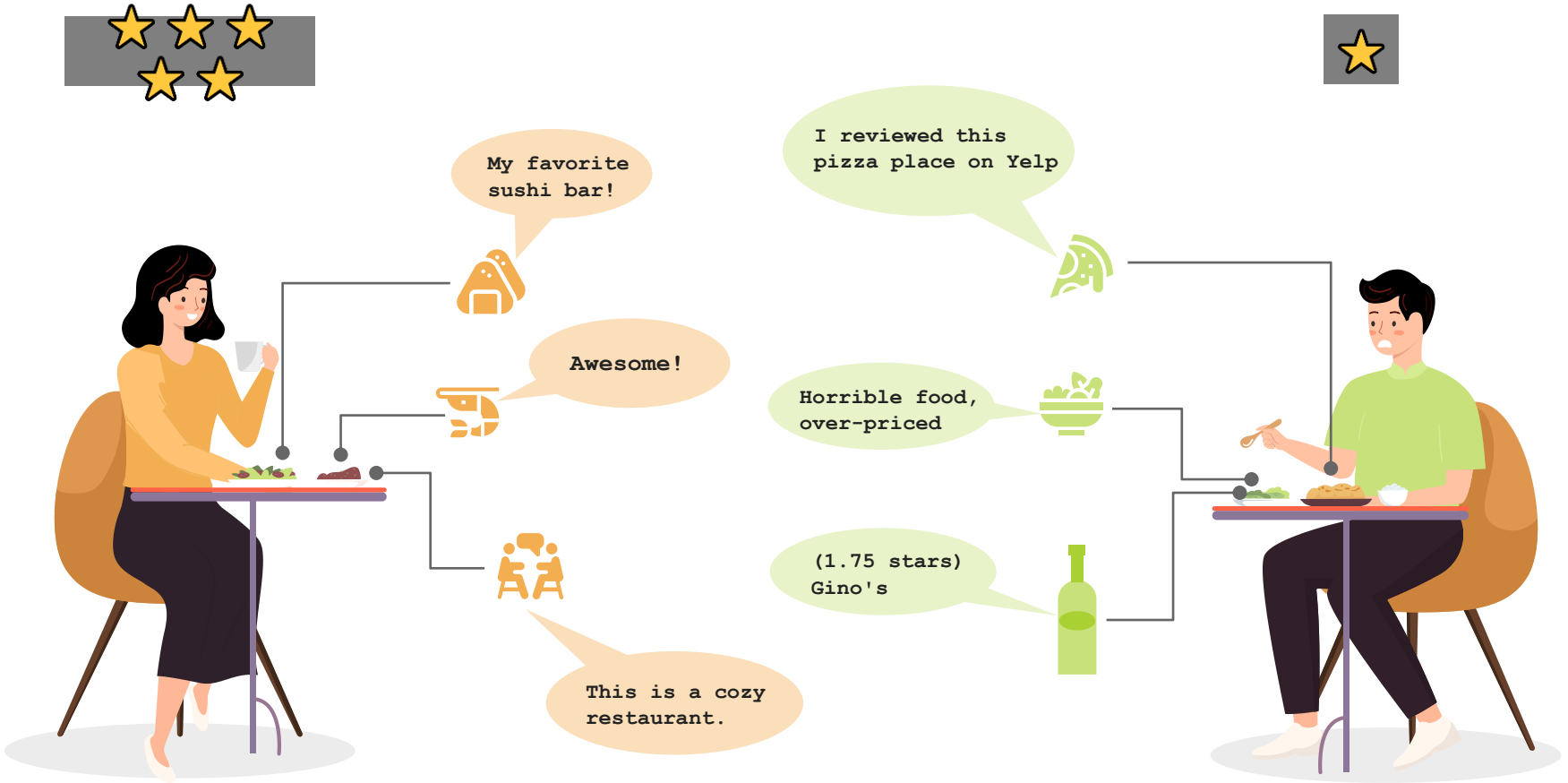
# Sentiment Trend



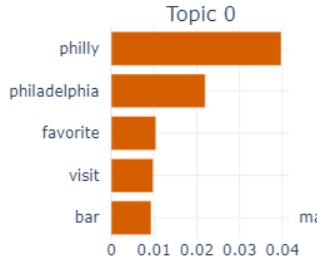


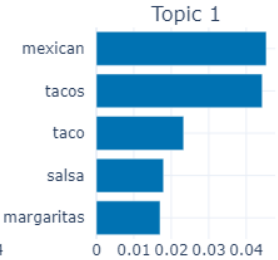
# Topic Modelling

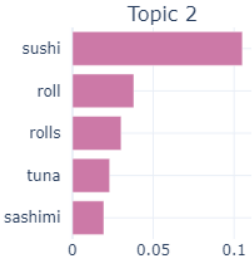
# Representation

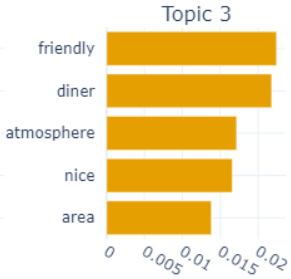


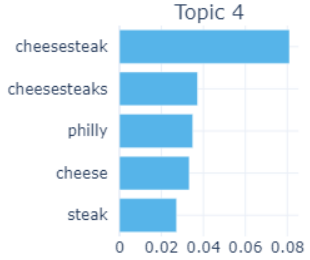
# Topic Word Score

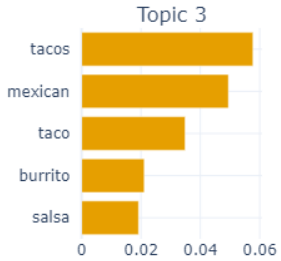


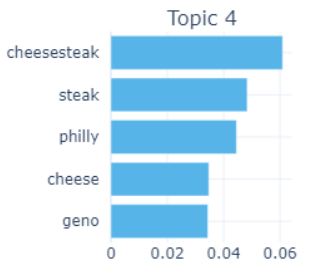



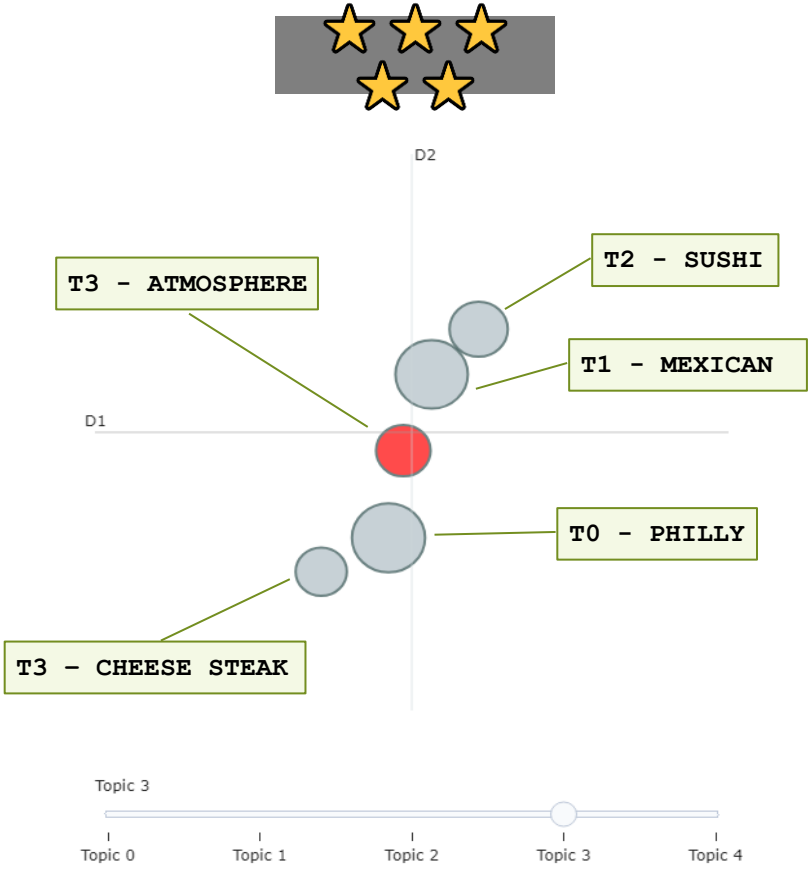



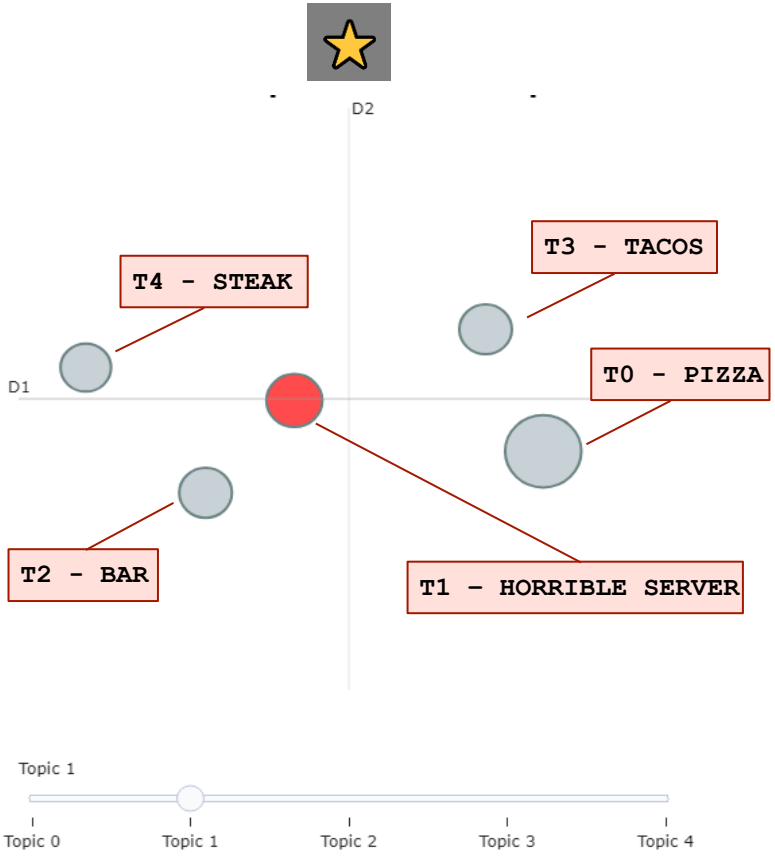





# Inter-topic Distance Map



# Predictive Modeling

# Features used for Predictive Modelling

**Is_Successful**

A variable indicating the success

**Ratings**

Average rating of the business

**Dominant_Topic**

Most dominant topic for each business

**2005-2022**

Yearly average star ratings

**Review_count**

Total no. of reviews the business received

**0-4**

Normalized score of top topics

**0-4 Sentiment**

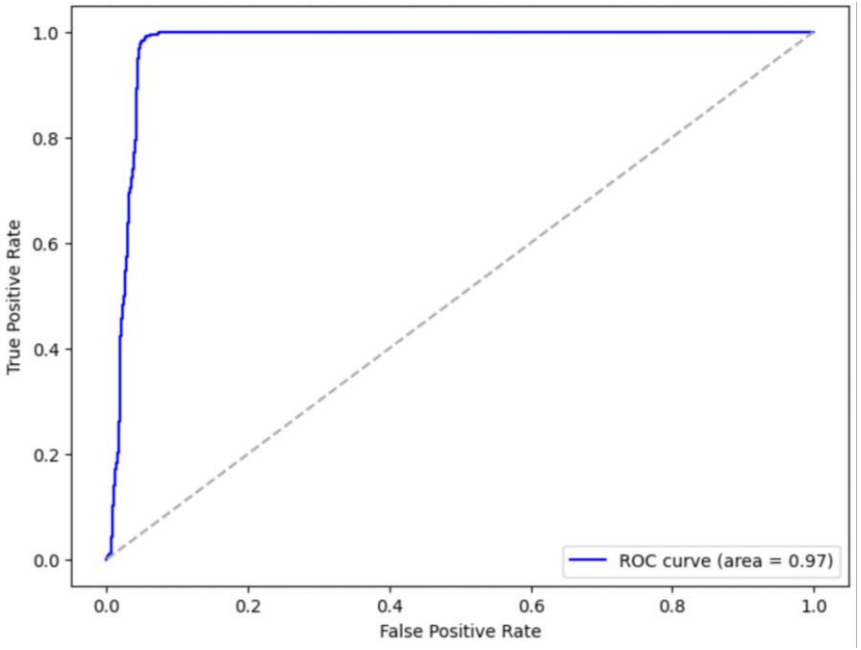
Average sentiment scores for top topics

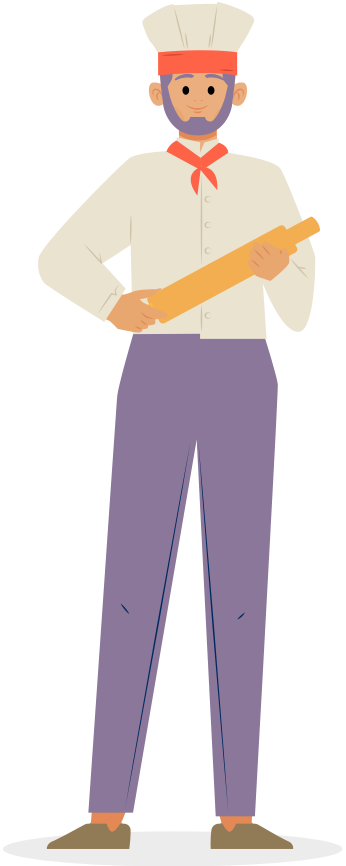
**Yearly _Sentiment**

Yearly average sentiment scores

# Results

## ROC Curve



## Accuracy

Used logistic regression to achieve **93.5%** accuracy

# Conclusion

## New Restaurant

### Mexican & Japanese

Based on top 5 topics in 5-star reviews, we can suggest opening a new restaurant

## Careful Consideration

### Menu & Service

Based on 1-star reviews, service and menu are things to consider for a restaurant business

## Atmosphere

### Aesthetic & Welcoming

Ambience and greeting play a huge role in having a positive experience

## Bar

### Good & Bad

Bar is common in both 1- and 5-star reviews, while the good ones soar, the bad ones plummet

# Recommendations

## Monitoring

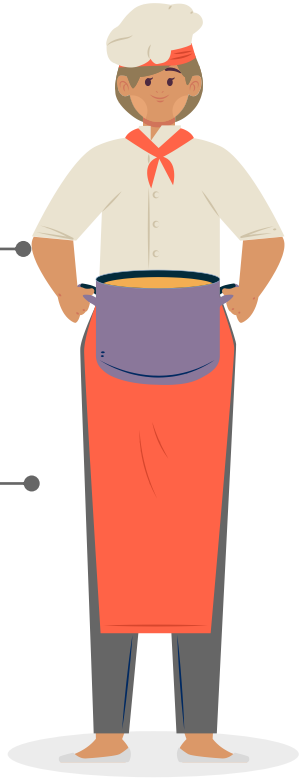
### Continuous Improvement

Conduct periodic reviews to understand and improve according to customer preferences

## Flexibility

### Shock Absorbers

Build a flexible and profitable business model to withstand the adverse effects of market



# THANK YOU!