# FoodHub Data Analysis

## MIT-IDSS Data Science & Machine Learning

Oct 13, 2024

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# Executive Summary

## Conclusions

- There is little to no correlation between cost, prep time, and delivery time across the board
- Ratings appear to be affected by cost (higher cost associated to higher ratings) and delivery time (higher delivery time associated with lower ratings) but not food preparation time
- American, Japanese, and Italian Restaurants generate the most revenue for the company

## Actionable Insights & Recommendations

- Improve Ratings: Weekend deliveries are faster than weekday deliveries (28 mins vs 22 min), occur more often, and result in the higher earnings. Monitor weekend performance and provide additional incentives for weekday deliveries to decrease average delivery time
- Increase Growth: 555 (29.24%) of Total orders cost more than $20: Promotions should be given to restaurants that have higher priced items to drive growth
- Identify Inefficiencies: 200 (~10.54%) of all orders take more than 60 total minutes for preparation and delivery. Identify drivers responsible for high delivery times, as they impact overall satisfaction
- Reward Star Customers: 75% of customers order 2 or fewer orders. Offer promotions to repeat customers to drive growth and increase the number of orders

# Business Problem Overview and Solution Approach

Business Problem Statement:

- FoodHub (the company), has collected customer order data and aims to improve the overall customer experience by identifying trends in customer demand for different restaurants and evaluate operational efficiency of it's partnered restaurants to ultimately drive growth.

Solution Approach / Methodology

Exploratory Data Analysis (EDA) will be conducted on 2 levels:

- Univariate : Examine individual variables like cost_of_the_order, food_preparation_time , delivery_time, and rating to identify trends, outliers, and patterns in order value, preparation speed, and customer satisfaction.
- Multivariate : Explore relationships such as Cuisine Type vs. Cost and Prep Time, Effect of Cost and time on Ratings, and identify top performers to understand factors driving customer satisfaction and demand.

# Data Overview

1898x9 dataset containing total customer orders taken from NY restaurants of various cuisines. Variables include the cost of the order, when the order was placed (weekday/weekend) the rating(3,4,5,Not Given), and the times taken to prepare and deliver the food (minutes).

| Column Name | Data Type | Missing Values |
|---|---|---|
| order_id | int | 0 |
| customer_id | int | 0 |
| restaurant_name | object | 0 |
| cuisine_type | object | 0 |
| cost_of_the_order | float | 0 |
| day_of_the_week | object | 0 |
| rating | object | 0 |
| food_preparation_time | int | 0 |
| delivery_time | int | 0 |

1898 total rows, 9 Columns. 0 Missing data.

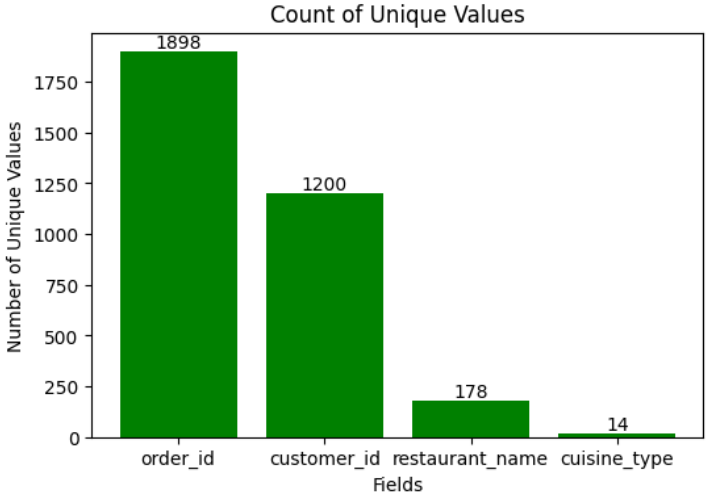
Food preparation time after an order is placed ranges from 20 to 35 minutes; with the average taking 27.37 Minutes.

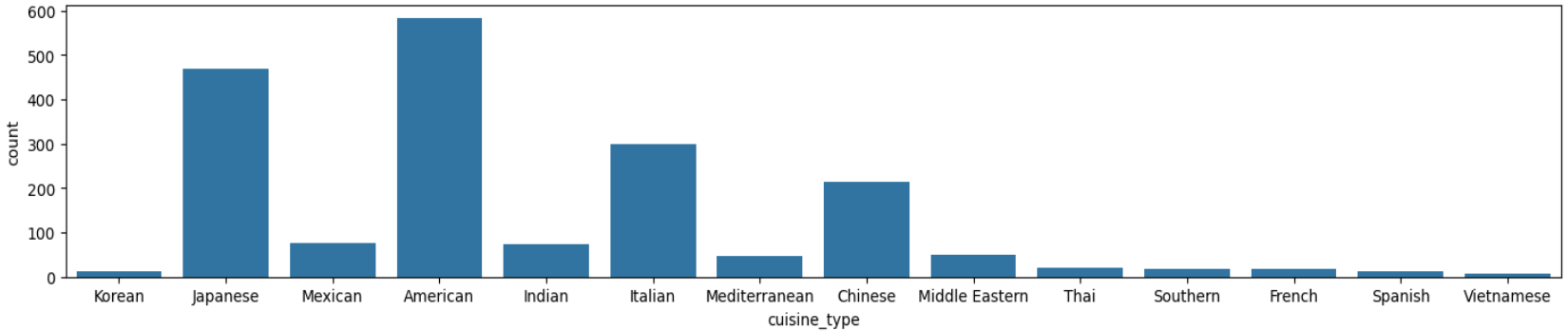
Of the 1898 total orders, 736 (~0.38%) were not given a rating.

# Univariate Analysis – Data Profile

Orders, Customers, Restaurants and Cuisines

- 1898 total Orders from 1200 unique customers at 178 restaurants across 14 different cuisines



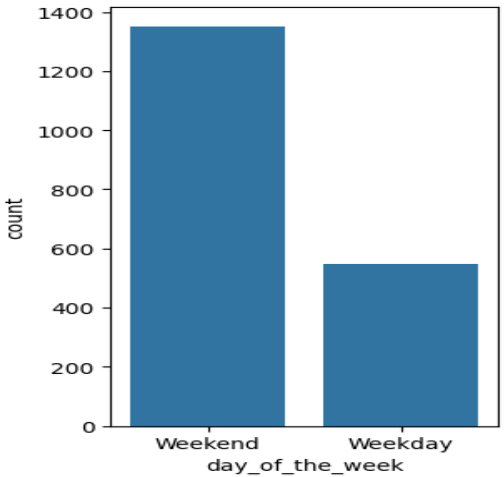



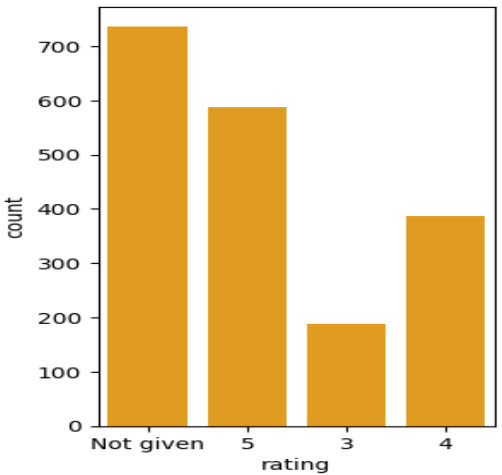
# Univariate Analysis – Categorical Variables

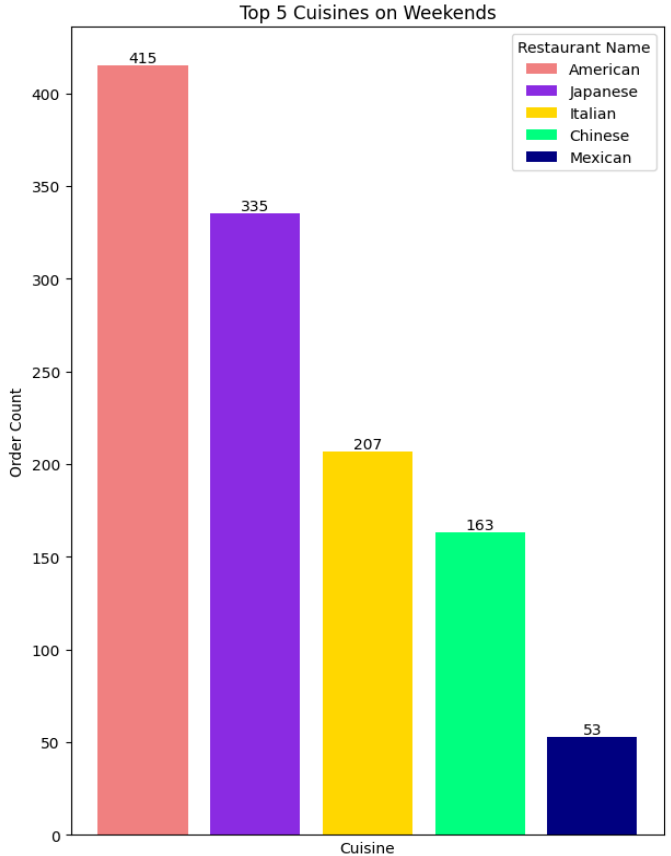
The weekend receives more than double the orders received on Weekdays

- American is the most popular cuisine on weekends, with 415 orders

Most orders are not given a rating, followed by 5, 4, 3

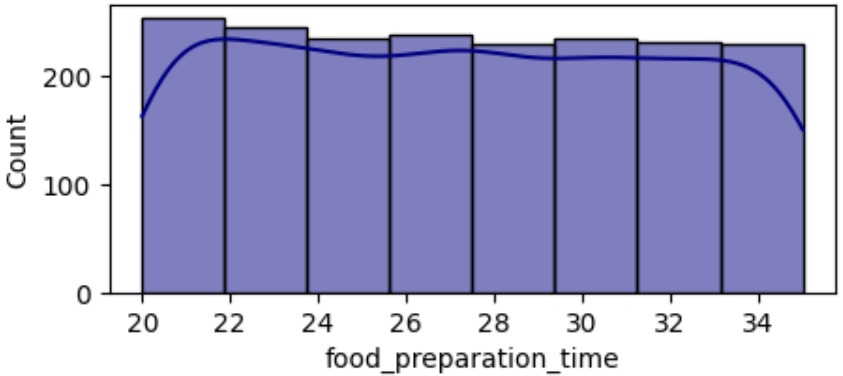


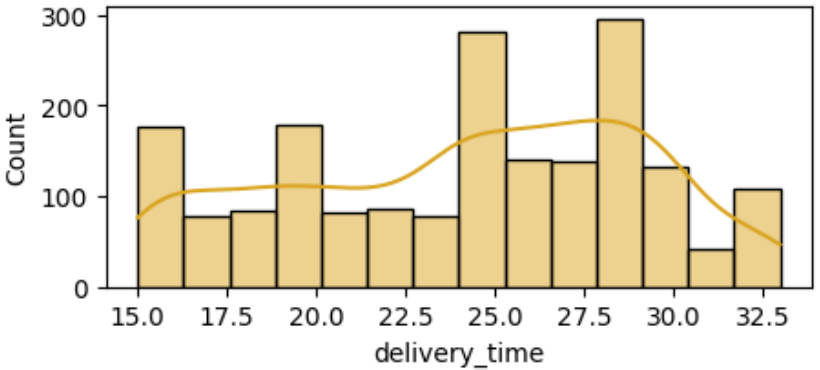



# Univariate Analysis – Central Tendency : Prep + Delivery Time

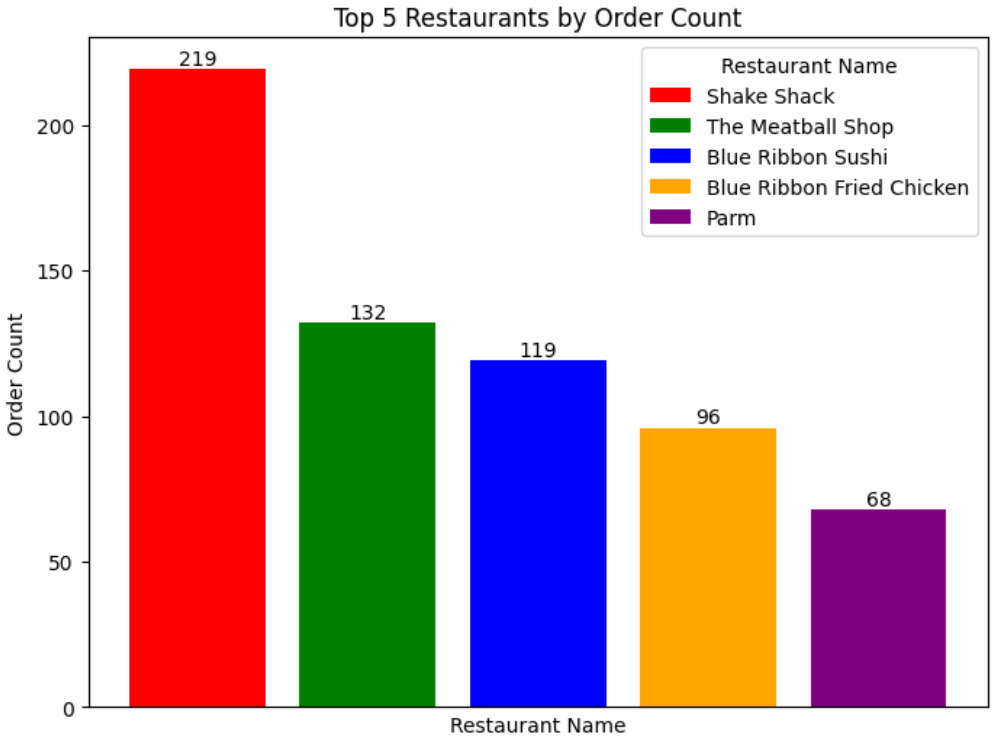
Food Preparation Time appears uniformly distributed across the board with a median time of 27 Minutes



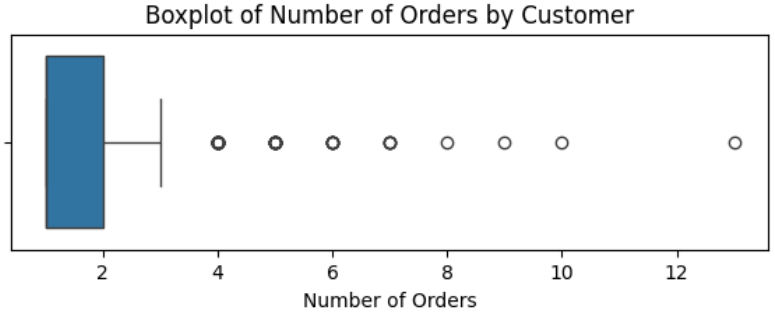

The mean delivery time for these orders is 24.16 minutes



# Univariate Analysis – Restaurant Orders



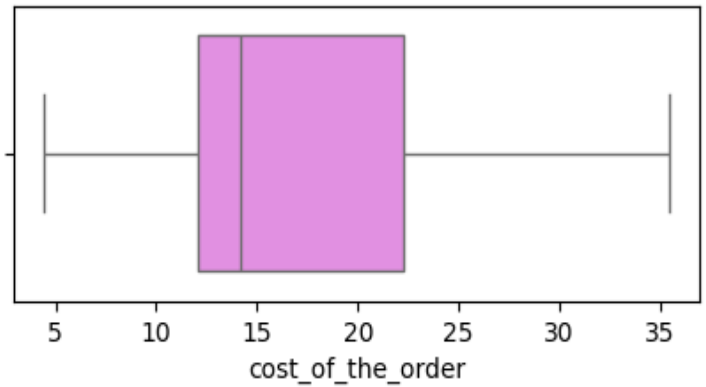

The 20% discount vouchers should be given to customers 52832, 47440, 83287 who had 13,10, and 9 orders, respectively.



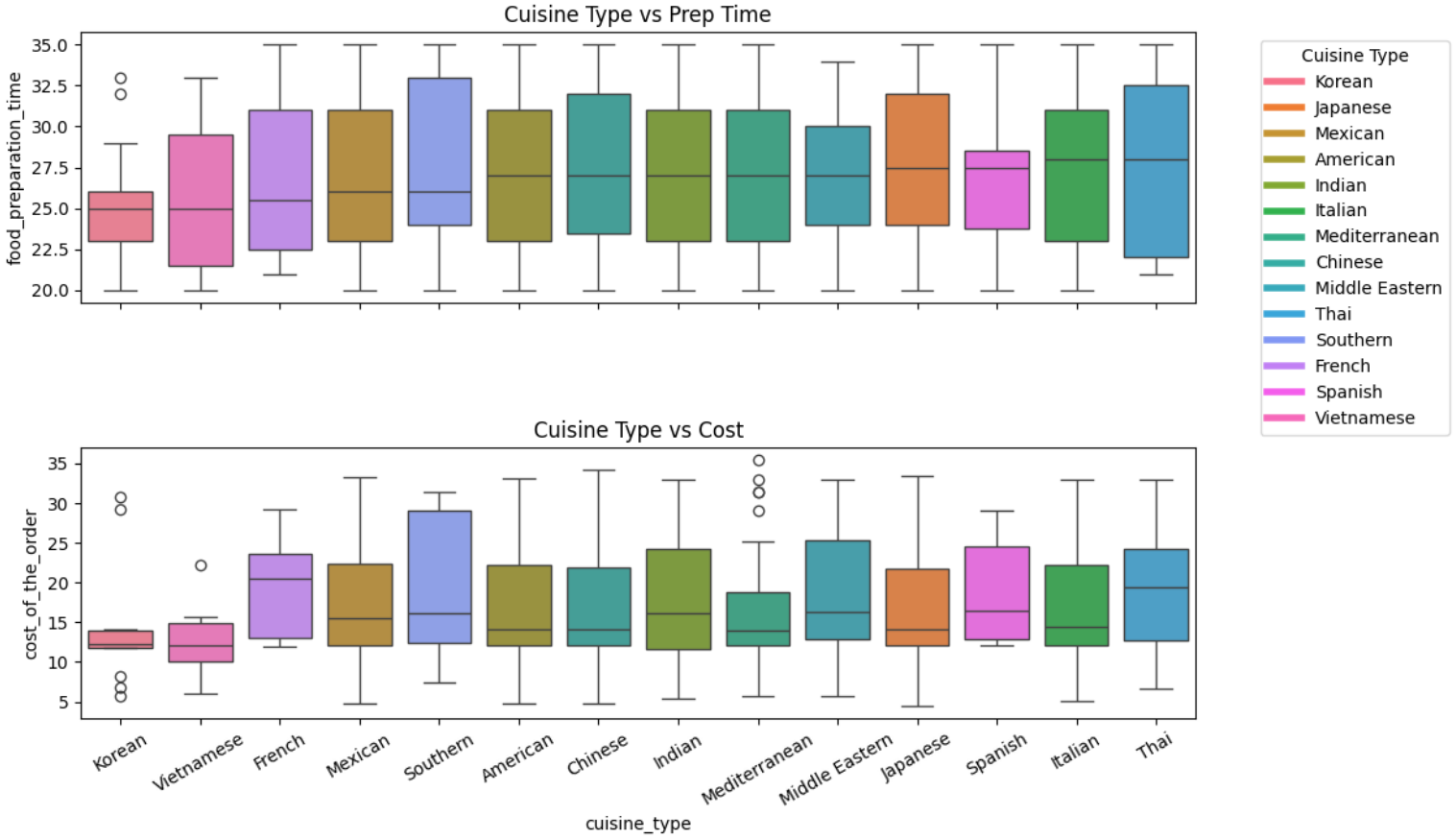
# Univariate Analysis – Cost of Order

Cost of the order has a median value of ~$14 and is slightly right skewed.

- 555 (29.24%) of Total orders cost more than $20

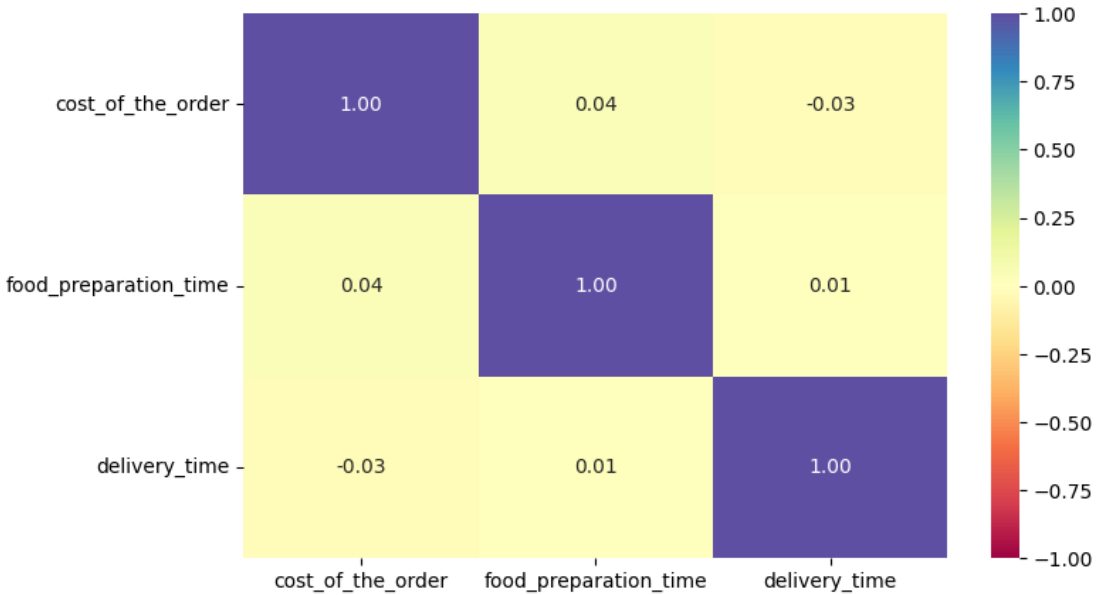



# Multivariate Analysis - Cuisine Vs Prep Time and Cost




Korean and Vietnamese Cuisine tend to have the lowest cost and the lowest prep time.

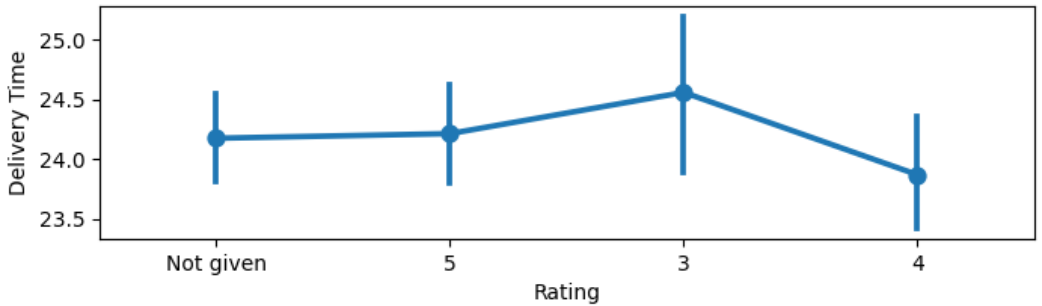
# Multivariate Analysis – Correlations

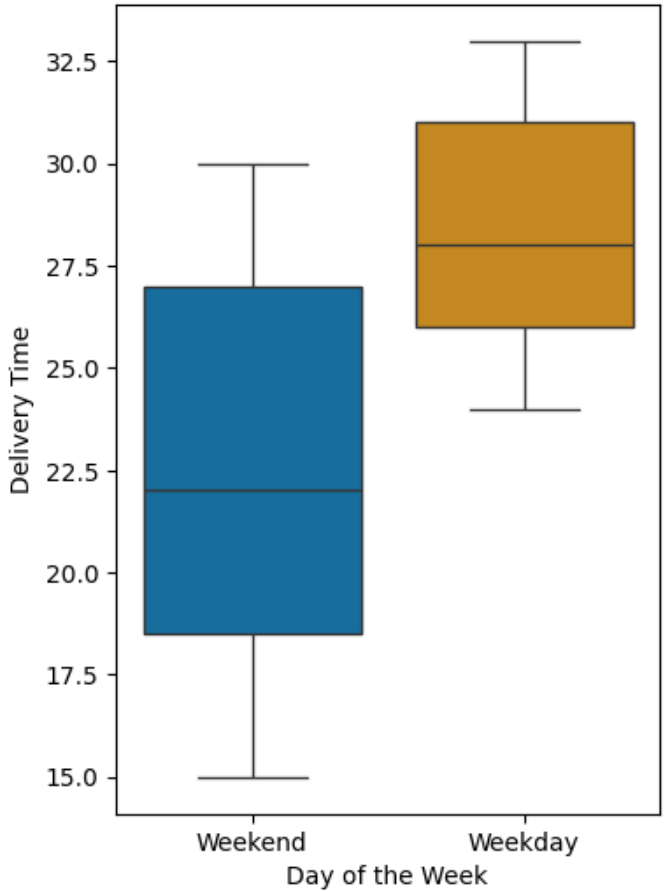



- Overall, across all cuisines, there is little to no correlation between cost, prep time, and delivery time.

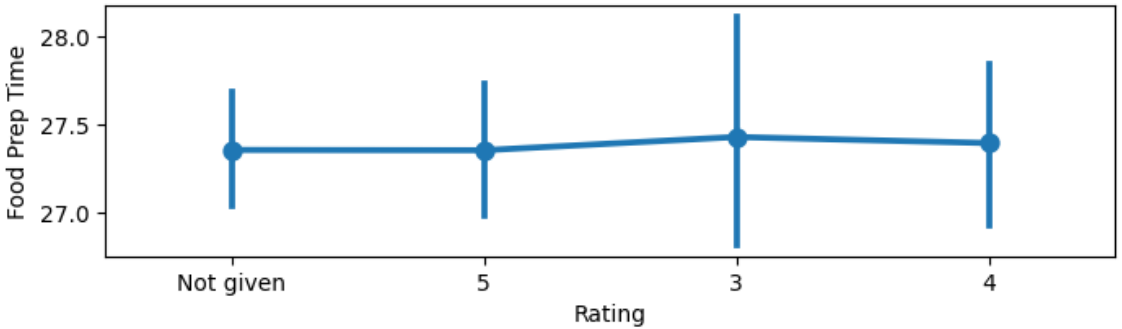
# Multivariate Analysis – Delivery Time

- Delivery Times tend to be longer on the weekday compared to the weekend
  - The mean delivery time on weekdays and weekends is around 28 minutes and 22 minutes, respectively
- The lowest ratings are seen with the highest delivery times

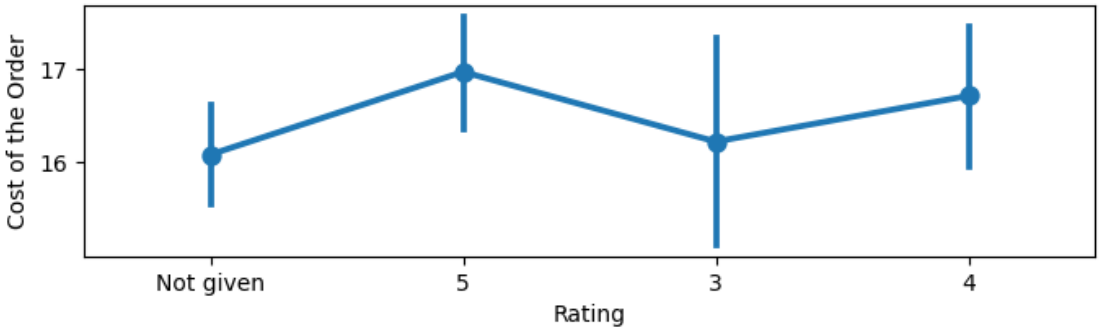


# Multivariate Analysis – Ratings vs Prep Time and Cost

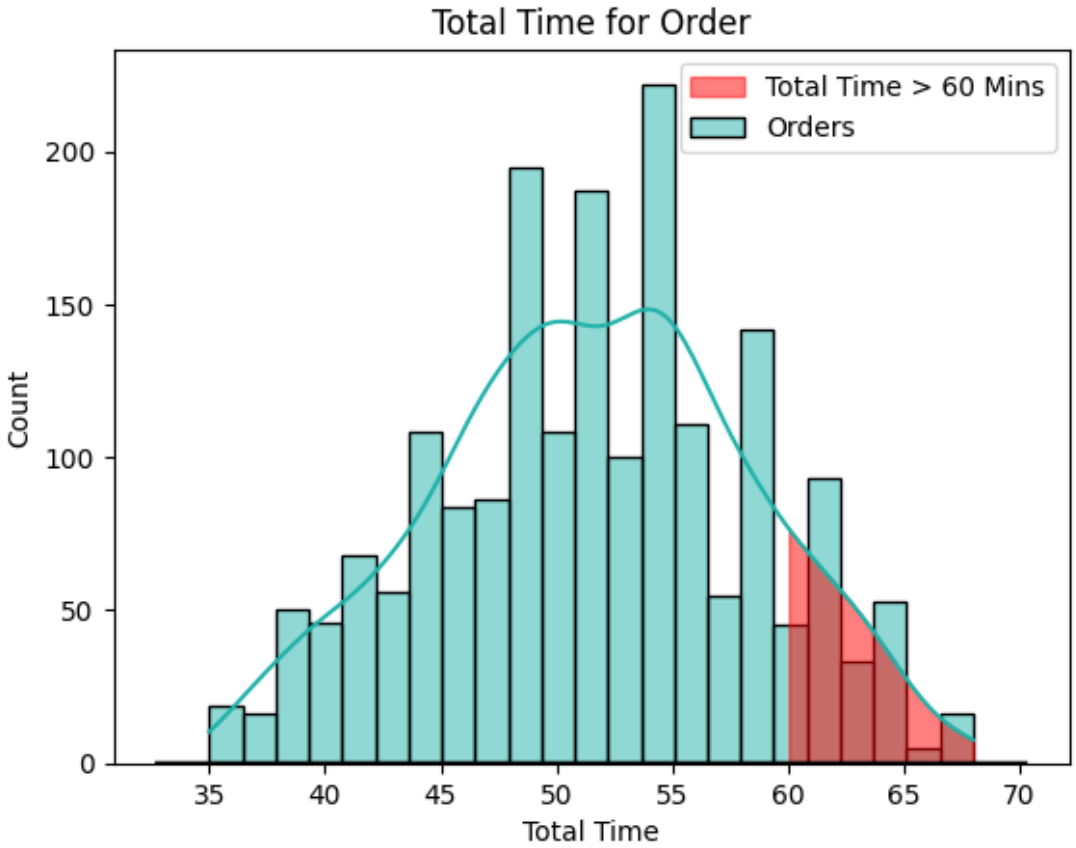



- Rating do not appear to be affected by Food Preparation Time as the prep time appears consistent across all levels of ratings

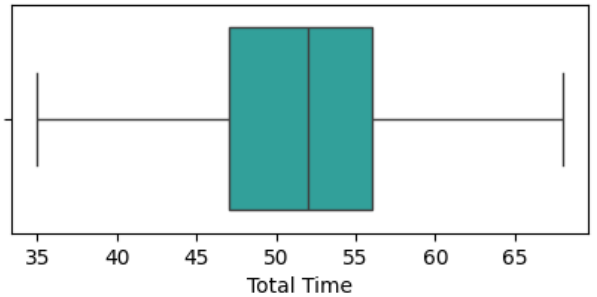



- The highest ratings are associated with a higher cost of order.

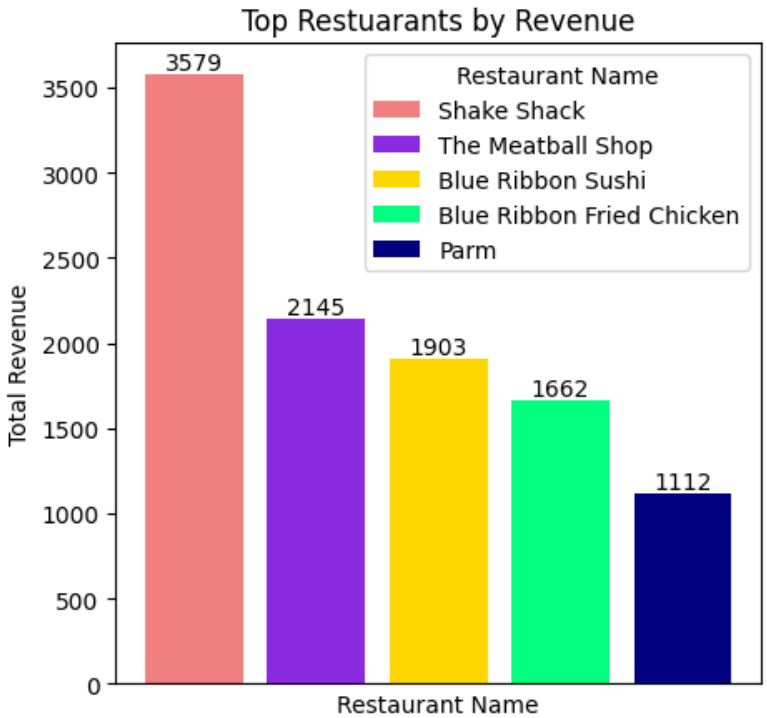
# Multivariate Analysis – Total Time For Orders




- 200 (~10.54%) of all orders take more than 60 total minutes for preparation and delivery.



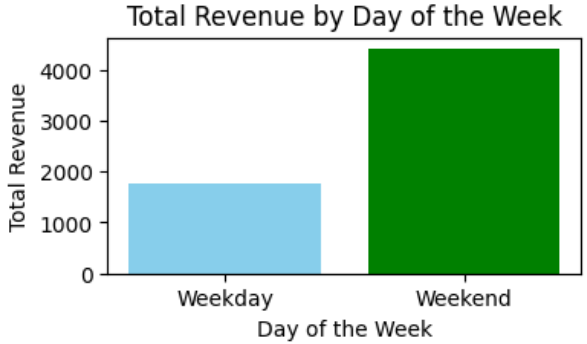
# Multivariate Analysis – Top Revenue Generating Restaurants



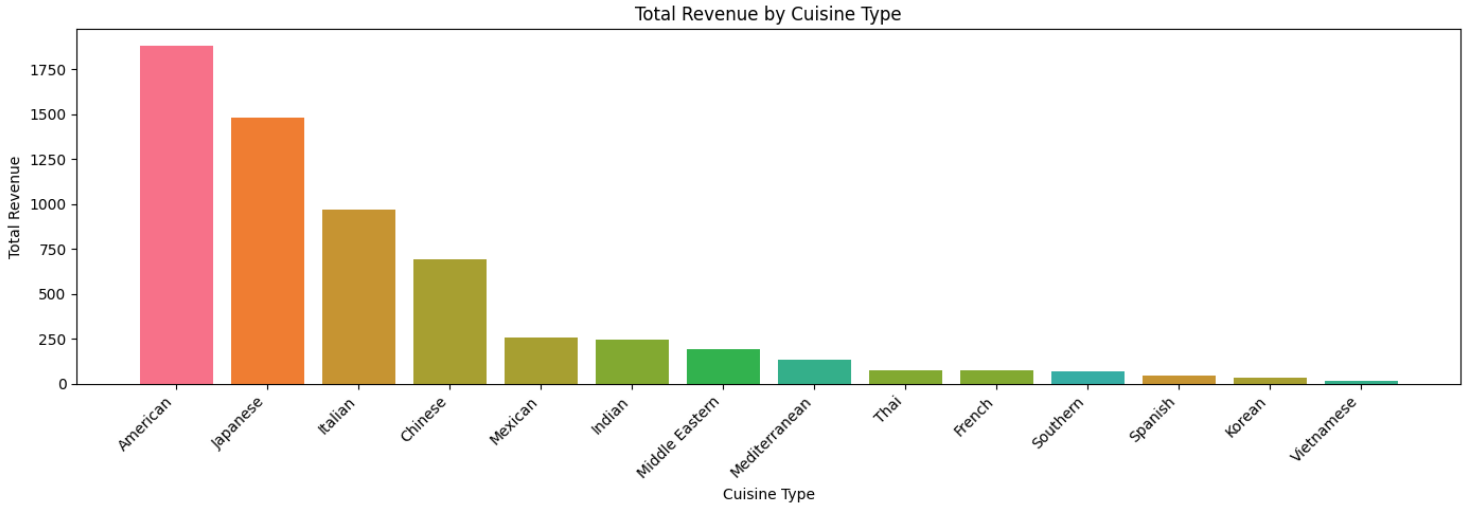

- The top 5 most ordered from restaurants also have the top 5 highest revenue totals
- Only the top 4 restaurants qualify for the promotional offer, having more than 50 rating counts and with an average rating greater than 4

| restaurant_name | rating |
|---|---|
| The Meatball Shop | 4.511905 |
| Blue Ribbon Fried Chicken | 4.328125 |
| Shake Shack | 4.278195 |
| Blue Ribbon Sushi | 4.219178 |

# Multivariate Analysis – Revenue Generated For Company




- Across all orders, the net revenue is around $6,166.30



# APPENDIX

Great Learning

# Happy Learning !