FoodHub Analysis

by Bhargavi Patel

2/9/2025

Contents

Business Problem Overview and Solution Approach

- The main focus of this analysis is to enhance the FoodHub customer experience by identifying trends in the data.
- As the number of restaurants continues to grow in New York, FoodHub's Data Science team wants to understand their customer experience better:
    - Which restaurants and cuisines are most popular?
    - Food ordering trends on different days of the week
    - Delivery times
    - Customers' typical expenditure on food orders
    - How customers rate their food ordering experiences
- As we identify more problems and find ways to improve, FoodHub will prevail as the best food delivery service in New York, which will increase company profits.

Data Overview

Variable	Description
order_id	Unique ID of the order
customer_id	ID of the customer who ordered the food
restaurant_name	Name of the restaurant
cuisine_type	Cuisine ordered by the customer
cost_of_the_order	Cost of the order
day_of_the_week	Indicates whether the order is placed on a weekday or weekend (The weekday is from Monday to Friday and the weekend is Saturday and Sunday)
rating	Rating given by the customer out of 5
food_preparation_time	Time (in minutes) taken by the restaurant to prepare the food. This is calculated by taking the difference between the timestamps of the restaurant's order confirmation and the delivery person's pick-up confirmation.
delivery_time	Time (in minutes) taken by the delivery person to deliver the food package. This is calculated by taking the difference between the timestamps of the delivery person's pick-up confirmation and drop-off information

- Filename: foodhub_order.csv
- Rows: 1898
- Columns: 9
- Contains both
- numerical and categorical data

Overview of the Data

1898 orders

1200 customers

178 restaurants

14 cuisine types

Weekends have 2.5 times as many orders as weekdays

Food prep times range from 20-35 min Delivery times range from 15-33 min Orders cost between $4.47 and $35.41 Ratings range from 3 to 5

39% of orders are not rated and had the string “Not given” as a rating

The data appears normal and tidy with no missing data. However, orders without ratings were removed for some analyses.

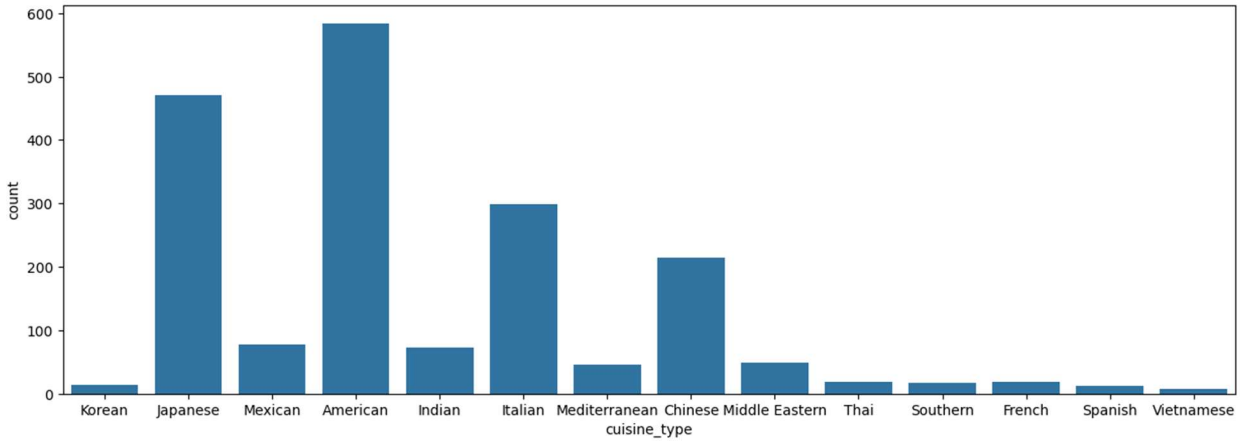
Exploratory Data Analysis

First we performed univariate analyses on the numerical data to discover central tendencies or skewness.

The histograms for rating and cost_of_the_order are on the following pages.

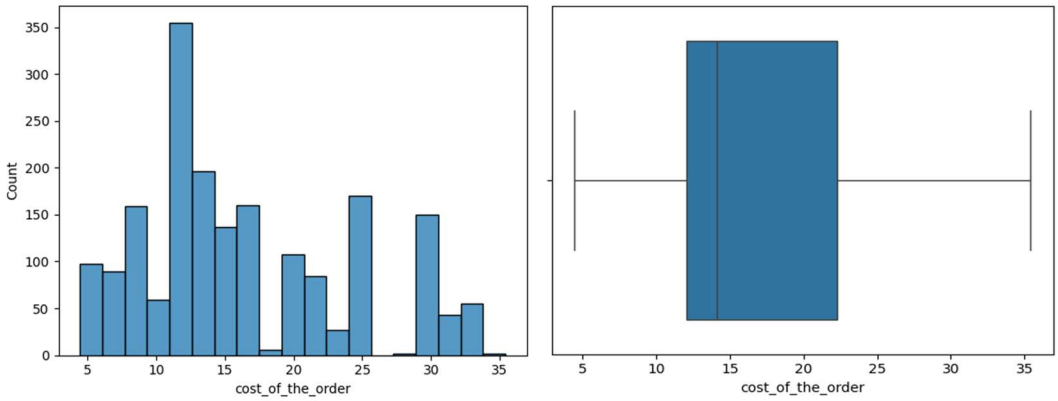
rating ("Not given" removed)	mean: 4.34 skewness: left	median: 5
cost_of_the_order	mean: $16.50 skewness: right	median: $14.15
food_preparation_time	mean: 27 skewness: none	median: 27
delivery_time	mean: 24 skewness: none	median: 25

Univariate Analysis - Cuisine type



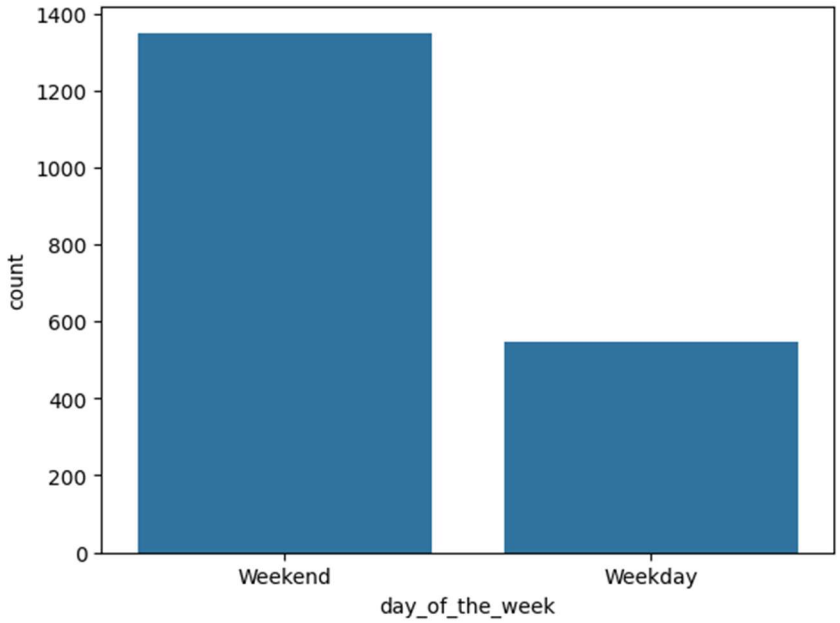
- The top 4 cuisines are American, Japanese, Italian, and Chinese
- The other 10 cuisine types have less than 100 orders each
- American is the most popular, even more popular than the trailing 10 types combined
- There is a wide range in popularity among the cuisine types. The range is from 7 orders (Vietnamese) to 584 (American).

Univariate Analysis - Cost of the order



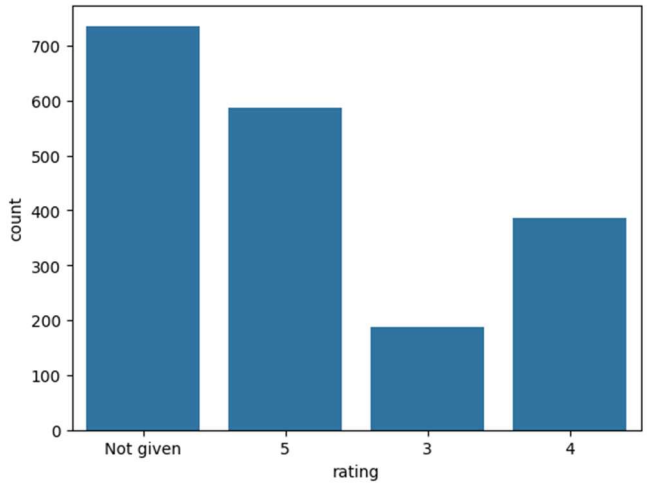
- Most orders seem to be between $12 and $17

Univariate Analysis - No. Of Orders, Weekdays and Weekends



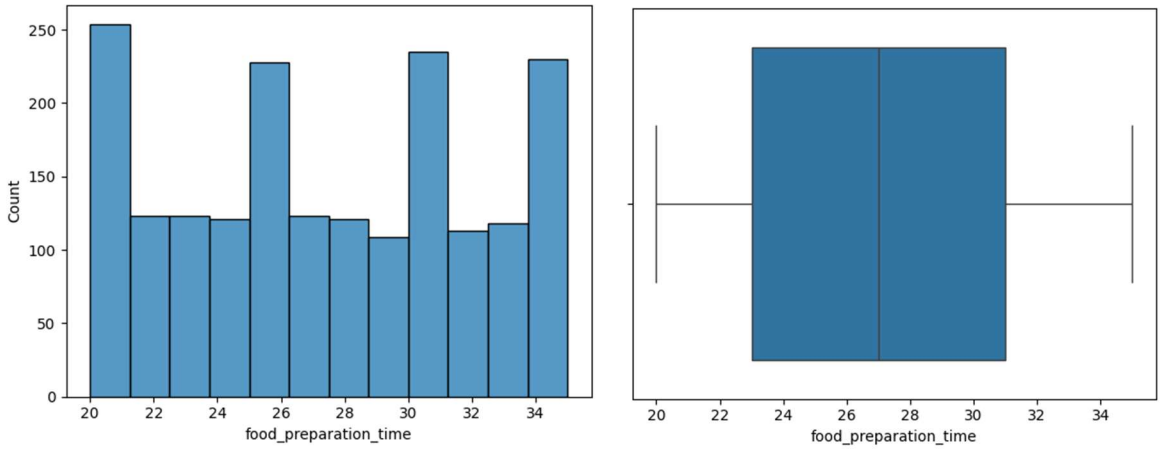
- Most orders are placed in weekends
- Of this sample, 1351 orders were placed on the weekend.

Univariate Analysis – No. of Orders by Rating



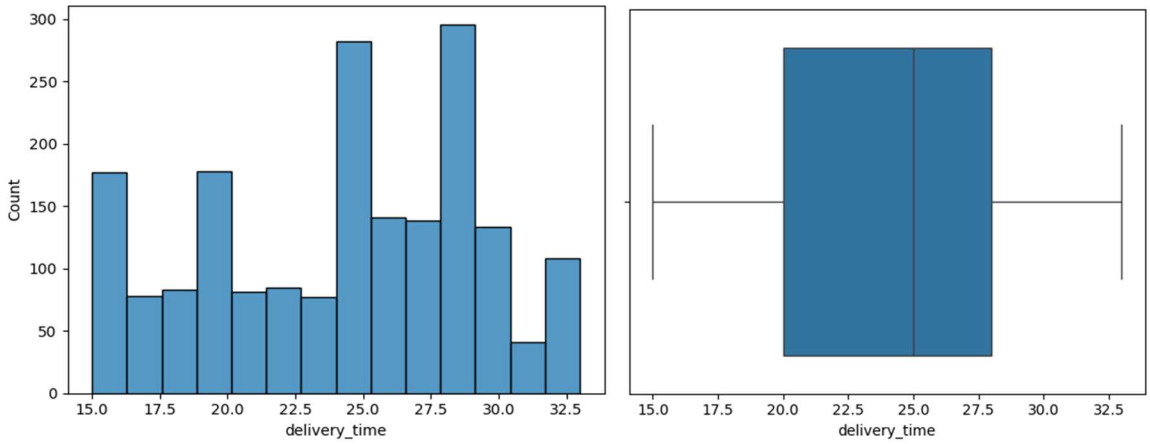
- There are no 1-start or 2-start ratings in this dataset

Univariate Analysis – Food Preparation Time



- Food took 20min to 35min to prepare food

Univariate Analysis – Delivery time



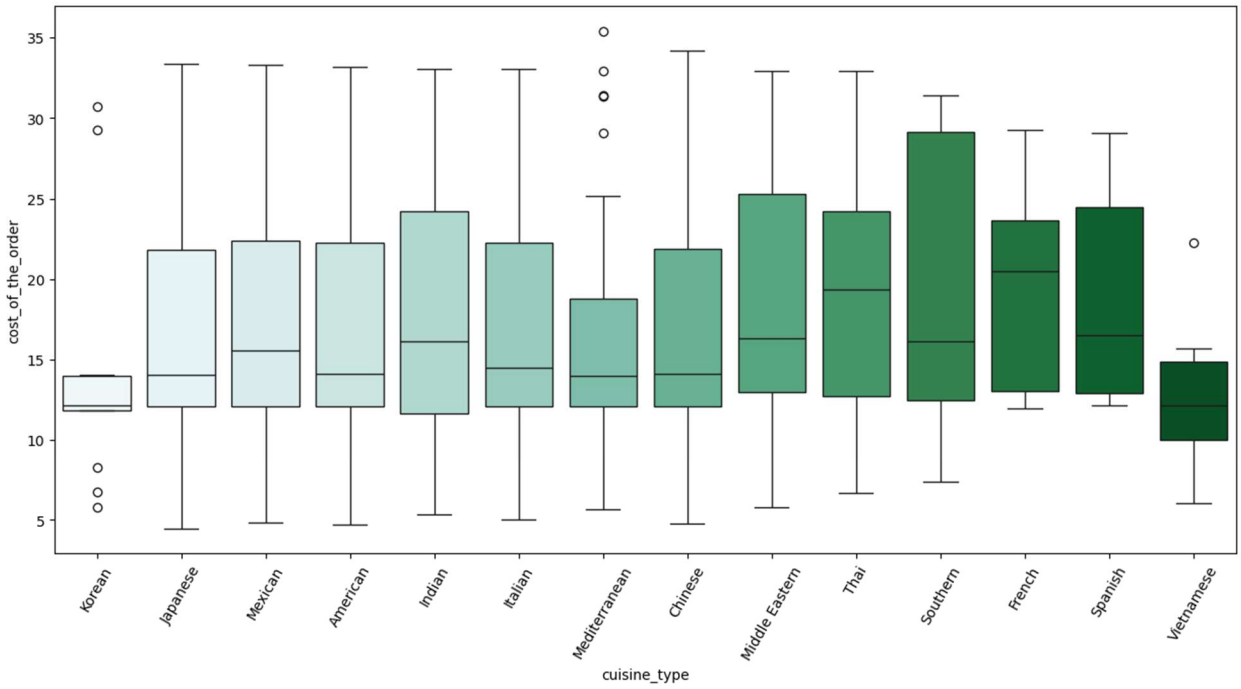
- The minimum time spent delivering an order was 15 minutes, and the maximum time was 33 minutes. The range of delivery times is therefore 18 minutes.
- The mean delivery time for this dataset is 24.16 minutes

- The top five restaurants include Shake Shack, the Meatball Shop, Blue Ribbon Sushi, Blue Ribbon Fried Chicken, Parm were frequented the most by FoodHub customers.
- American Cuisine is the most popular on the weekends
- There were 555 orders and 29.24% that cost above 20 dollars
- The company has decided to give 20% discount vouchers to the top 3 most frequent customers. Find the IDs of these customers and the number of orders they placed.

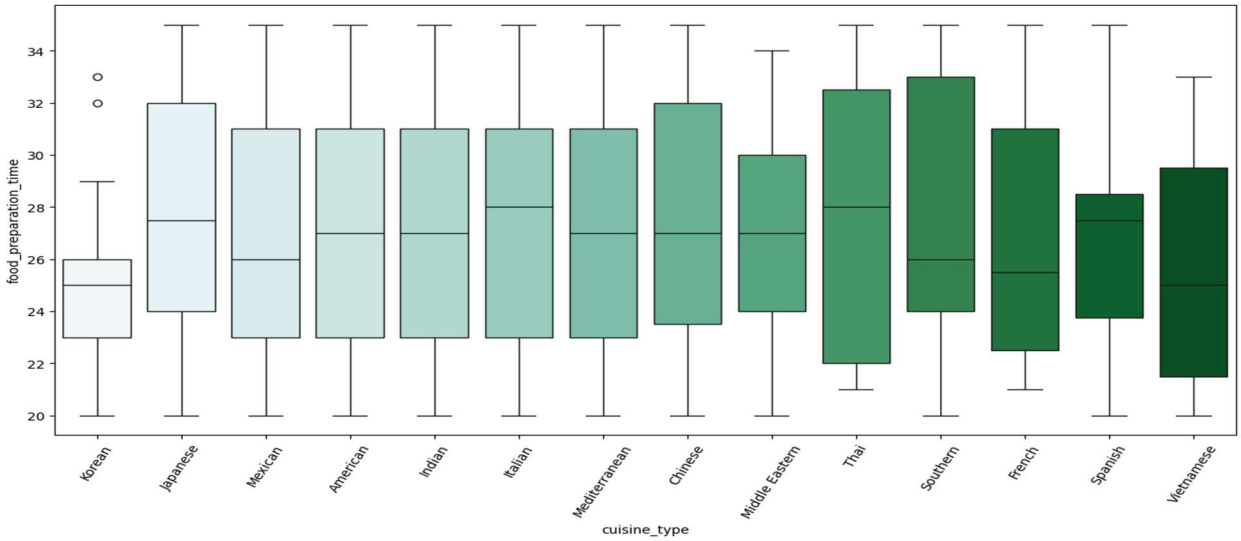
52832	13
47440	10
83287	9

Multivariate Analysis – Cuisine vs Cost of the order

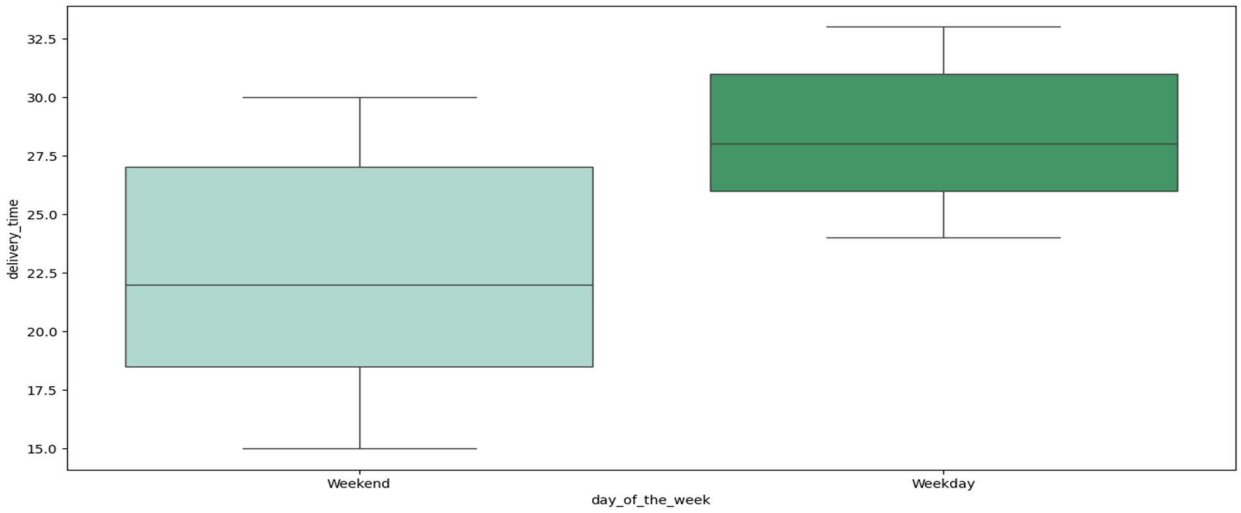
- The graph on the next page shows the average order cost by cuisine, ranked by order count.
- The more popular cuisines on the left seem to have similar averages in price
- The less popular cuisines on the right have higher costs per order on average, but with less confidence (since there are so few data points collected)



Multivariate Analysis – Cuisine vs Food Preparation time

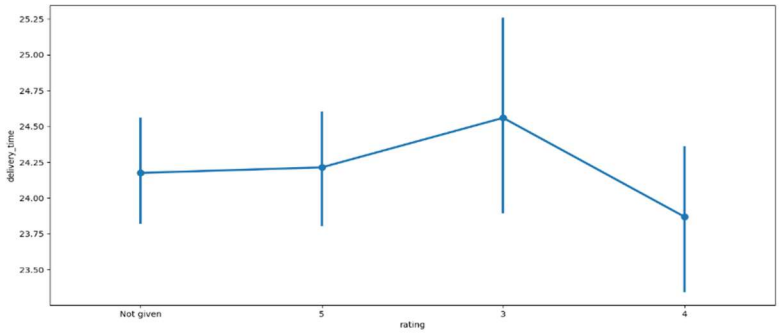


Multivariate Analysis – Day of the Week vs Delivery time

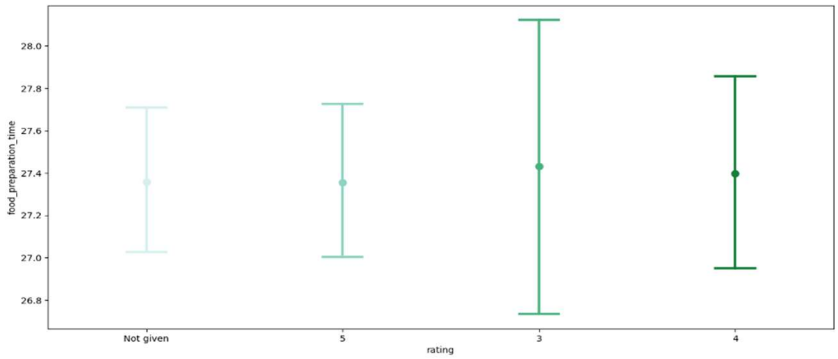


- The spread of delivery times on weekdays is much smaller than the spread of delivery times of weekends. This could be due to the greater number of orders on Weekends, which could lead to a greater variability than the smaller number of orders placed on Weekdays.

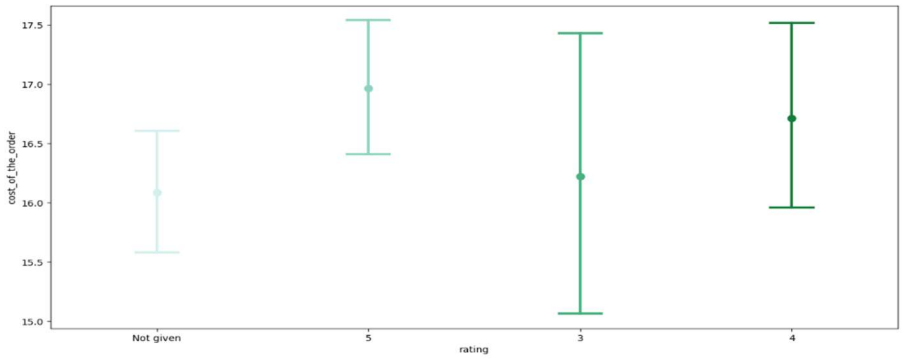
Multivariate Analysis – Rating vs Delivery time



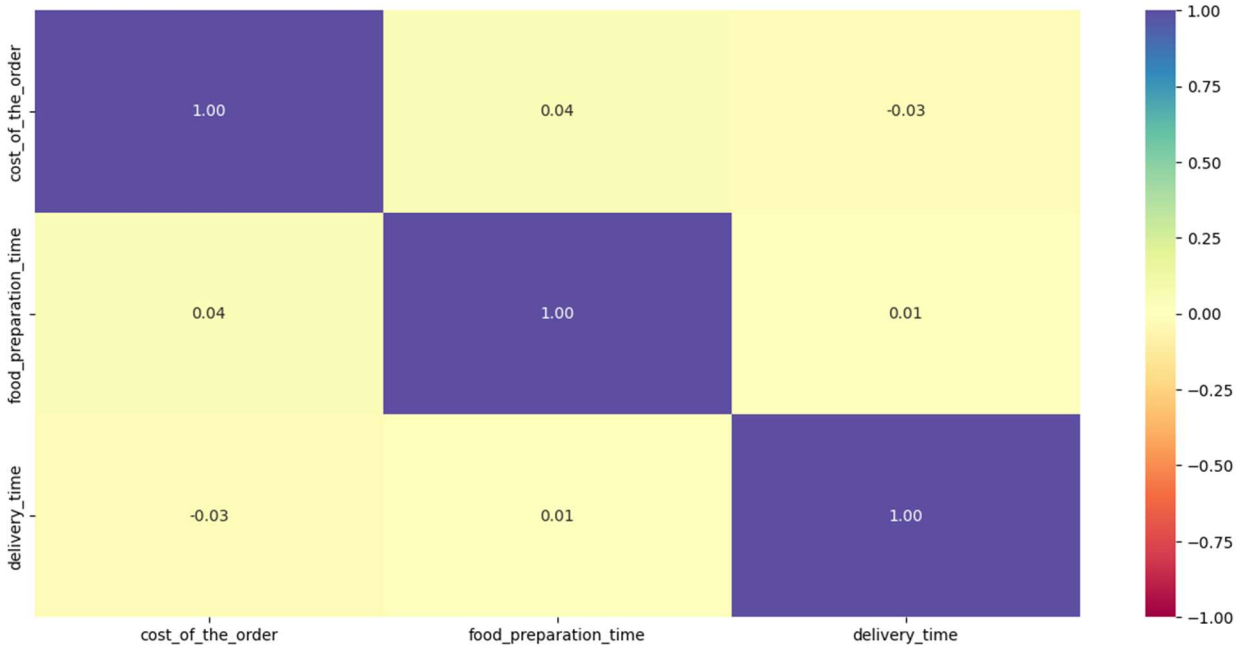
Multivariate Analysis – Rating vs Food preparation time



Multivariate Analysis – Rating vs Cost of the order



Exploratory Data Analysis: Correlation



- There are no significant correlations between the following numerical variables: cost of the order, food preparation time, and delivery time.
- As the time to prepare food increases, the cost of the of the order increases slightly.
- Cost of the order has a slightly negative correlation with delivery time, indicating:
    - As cost of the order increases, the delivery time decreases slightly.

- FoodHub wants to provide a promotional offer in the advertisement of the restaurants. The condition to get the offer is that the restaurants must have a rating count of more than 50 and the average rating should be greater than 4

	restaurant_name	rating
0	Shake Shack	133
1	The Meatball Shop	84
2	Blue Ribbon Sushi	73
3	Blue Ribbon Fried Chicken	64
4	RedFarm Broadway	41

	restaurant_name	rating
0	The Meatball Shop	4.511905
1	Blue Ribbon Fried Chicken	4.328125
2	Shake Shack	4.278195
3	Blue Ribbon Sushi	4.219178

- FoodHub charges the restaurant 25% on the orders having cost greater than 20 dollars and 15% on the orders having cost greater than 5 dollars

	order_id	customer_id	restaurant_name	cuisine_type	cost_of_the_order	day_of_the_week	rating	food_preparation_time	delivery_time	Revenue
0	1477147	337525	Hangawi	Korean	30.75	Weekend	Not given	25	20	7.6875
1	1477685	358141	Blue Ribbon Sushi Izakaya	Japanese	12.08	Weekend	Not given	25	23	1.8120
2	1477070	66393	Cafe Habana	Mexican	12.23	Weekday	5	23	28	1.8345
3	1477334	106968	Blue Ribbon Fried Chicken	American	29.20	Weekend	3	25	15	7.3000
4	1478249	76942	Dirty Bird to Go	American	11.59	Weekday	4	25	24	1.7385

- The net revenue is around 6166.3 dollars
- Percentage of orders that take more than 60 minutes: 10.54%
- The mean delivery time on weekdays is around 28 minutes
- The mean delivery time on weekends is around 22 minutes

Conclusions

- Cuisine Type: American, Italian, and Japanese cuisines are the most popular, indicating a diverse preference among the customers. This suggests that these cuisines drive a significant portion of the order volume.

- Delivery Times: The analysis revealed that the mean delivery time on weekends is slightly higher than on weekdays, suggesting operational strain or increased demand during weekends.

- Customer Loyalty: A small group of customers places orders more frequently than others. This highlights the potential for implementing targeted loyalty programs.

- Rating Impact: Restaurants with higher ratings tend to have more orders, underscoring the importance of customer satisfaction. Additionally, restaurants fulfilling the promotional offer criteria (more than 50 ratings and an average rating above 4) are poised to attract more customers.

- Revenue Insights: The analysis on revenue generation from different order costs showed that orders above $20 contribute significantly to the company's revenue, emphasizing the importance of attracting higher-value orders.

- Total Delivery Time: A noteworthy percentage of orders take over 60 minutes to deliver, indicating room for improvement in the delivery process to enhance customer satisfaction.

Recommendations

- Targeted Promotions for Popular Cuisines: Develop marketing campaigns focusing on American, Italian, and Japanese cuisines. Collaborate with restaurants offering these cuisines for exclusive deals or discounts to attract more customers.

- Weekend Delivery Optimization: Analyze the delivery process to identify bottlenecks causing delays on weekends. Consider strategies like increasing the number of delivery personnel or using AI-driven route optimization tools.

- Loyalty Program Enhancement: Design personalized loyalty programs for frequent customers, offering rewards such as discounts, free delivery, or exclusive access to new menu items from top-rated restaurants.

- Quality Improvement Initiatives: Work closely with restaurants that have potential but lower ratings to improve their offerings. This could include quality assurance programs, customer feedback analysis, and operational support.

- High-Value Order Incentives: Create incentives for customers to place higher-value orders, such as tiered rewards or bundling popular items at a discounted rate. Analyze order data to identify popular items that can be bundled together.

- Delivery Time Reduction: Invest in technology or partnerships that can reduce preparation and delivery times, particularly for orders taking longer than 60 minutes. This could include real-time tracking systems for more efficient order dispatching and delivery.

- Feedback Loop: Establish a robust feedback loop with both customers and restaurant partners to continuously monitor and improve food quality, delivery times, and overall service.