

Foodhub _ Demand Analysis

Project: Python Foundations

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Background

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**Foodhub is a Mobile Food
Delivery App servicing New York**

Offering

178 Restaurant Choices

**14 Cuisine
Types**

**Delivery
7 Days a
Week**

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Executive Summary

The purpose of this data exploration study is to understand customer demand of different restaurants and how existing data can be used to increase customer satisfaction. Below are key insights and findings from the analysis; highlighting key areas for improvement, further analysis, and opportunities for growth.

- Order Trend and Cuisine Preferences
 - A significant amount of Foodhub orders are concentrated on four cuisine types: American, Japanese, Italian, and Chinese.
 - Weekend orders are dominate – indicating a preference for weekend orders and delivery.
 - Recommend adding more restaurants concentrating on the top four cuisine types and reducing the amount of non-performing/low-demand restaurants on the platform.
- Delivery Performance
 - The average weekend delivery time is 22 minutes.
 - There were 200 orders that exceeded 60 minutes ~ 10%. Recommend further analysis to enhance overall customer satisfaction.
- Rating Challenges
 - 40% of total orders are missing ratings.
 - Recommend implementing a customer satisfaction campaign to encourage more ratings.

Executive Summary, cont...

- Cost per Order and Revenue Streams
 - 50% of all orders fall within the cost per order range of \$10 - \$20. This indicates this is the sweet spot for customer orders.
 - Approximately 30% of all orders are placed with the top four restaurants. Recommend adding similar restaurants and offerings to potentially increase revenue.
- Further Analysis
 - It is recommended to conduct further analysis exploring geographic areas around New York. This will provide greater insights into regional cuisine preferences, cost per order preferences, and delivery time statistics. This will help management make more informed strategic decisions on restaurants partnerships and marketing efforts.
 - Further analyze the correlation matrix to add three additional data points (revenue, rating, cuisine type) and determine if there is any correlation to revenue with the various key metrics collected.
 - Further analysis regarding days of week and determine if Friday orders have an influx and should be considered weekend orders.

In conclusion, optimizing our restaurant partnerships, addressing delivery time outliers, and encouraging consumer ratings can lead to increased customer satisfaction and revenue generation. A continued focus on data-driven decisions will help us maintain a high performing food delivery app and maintain a competitive edge in the food delivery industry.

Business Problem Overview and Solution Approach

Foodhub would like to understand the demand of different restaurants to help them enhance the overall customer experience.

- **Solution/ Methodology Approach**

- Identify some of the underlying factors that may affect the customer selections and customer experience (delivery times, costs of orders, etc...).
- Compile the data needed from past orders, create a data dictionary, and upload file into a Python notebook.
- Conduct Exploratory Data Analysis:
 - Univariate Analysis
 - Multivariate Analysis
- Provide Insights and recommendations gleaned from the data.



Data Overview

Data Dictionary	
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

Rows	Columns
1898	9

Column	Dtype
order_id	int64
customer_id	int64
restaurant_name	object
cuisine_type	object
cost_of_the_order	float64
day_of_the_week	object
rating	object
food_preparation_time	int64
delivery_time	int64

- **Rating** has an "object" Dtype – according to the Data Dictionary this appears to be an "integer" – further investigation is needed

Data Overview, Cont...

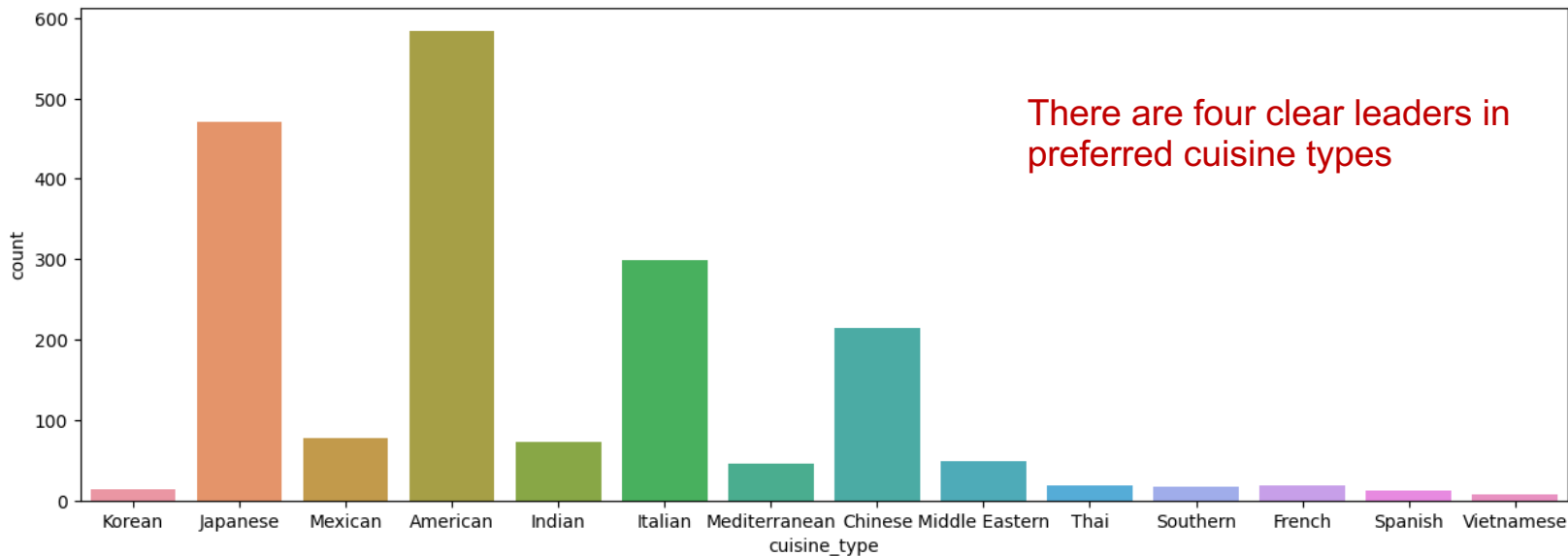
Other Notable Observations:

- There are three (3) datatypes in the dataset:
 - * float64(1)
 - * int64(4)
 - * object (4)
- There are NO missing values in the data
- 736 orders have a “Not Given” rating
- **Food Preparation Time: (Once the order is placed)**
 - * **Minimum Time:** 20 Minutes
 - * **Average Time:** ~28 Minutes (27.37 Min)
 - * **Maximum Time:** 35 Minutes



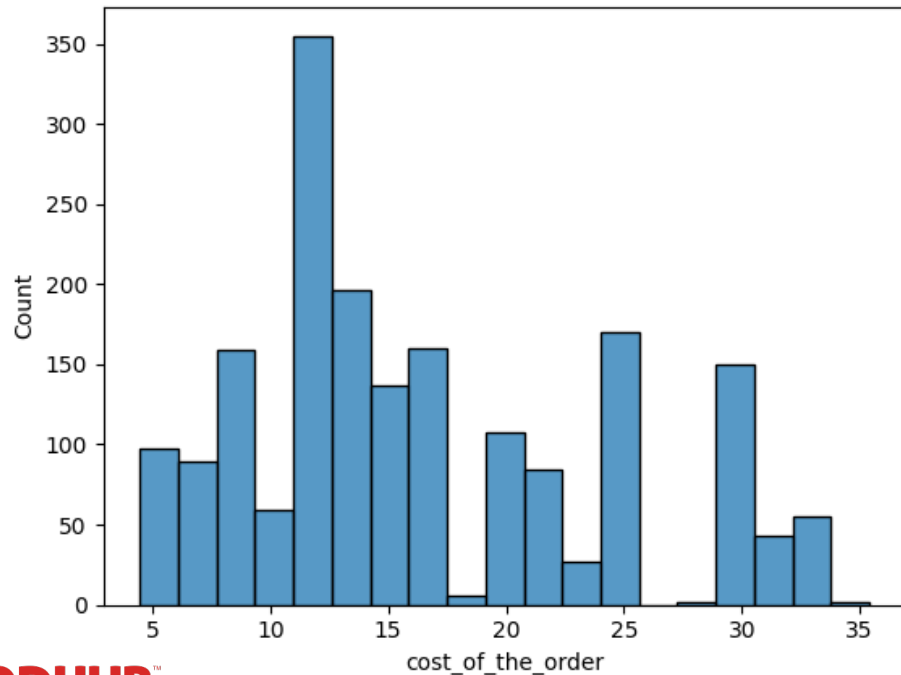
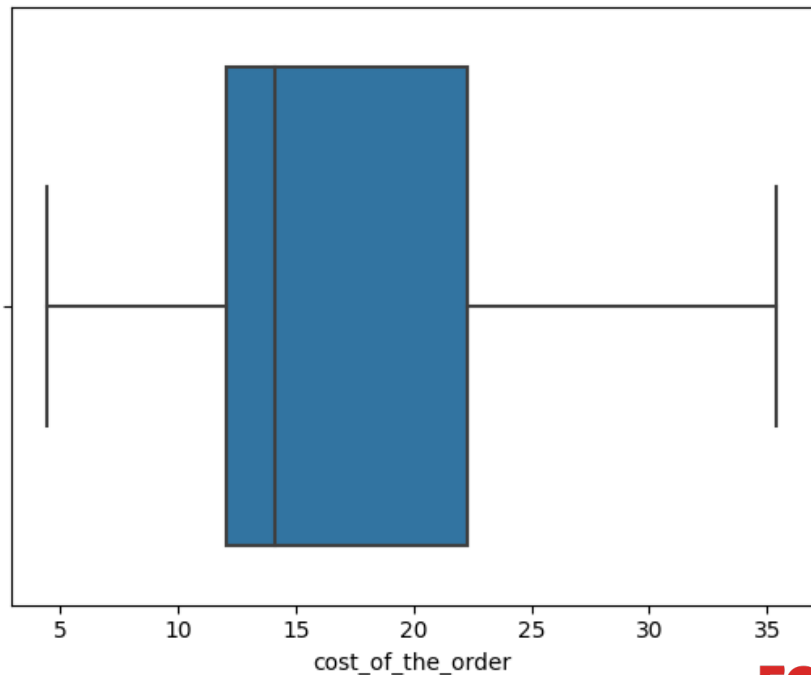
EDA - Univariate Analysis – Data Overview

- This dataset consists of **1898** unique orders from **1200** unique customer IDs.
- Customers have a choice of **178** restaurants with **14** cuisine types.



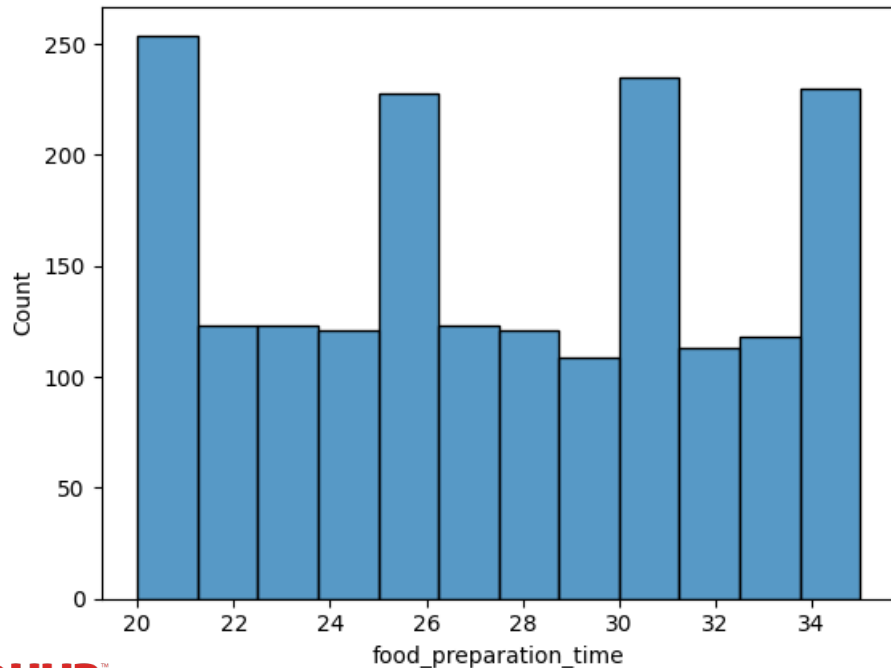
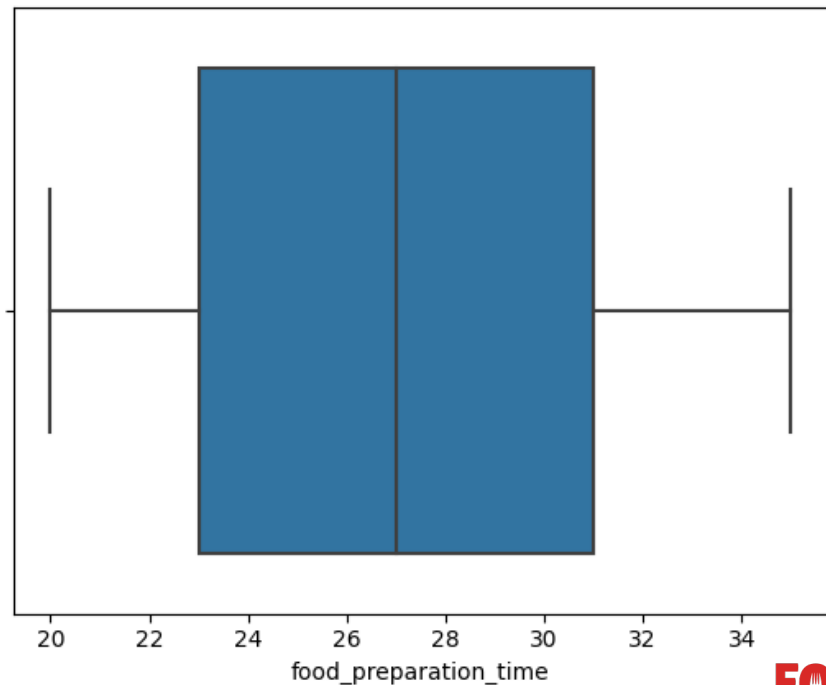
EDA _ Univariate Analysis - Cost Per Order

- The average cost per order is ~ \$14.75.
- It appears that over 50% of total orders fall within the \$10 - \$20 cost per order range.
- **29.24%** (555) of all orders are **greater than \$20**.



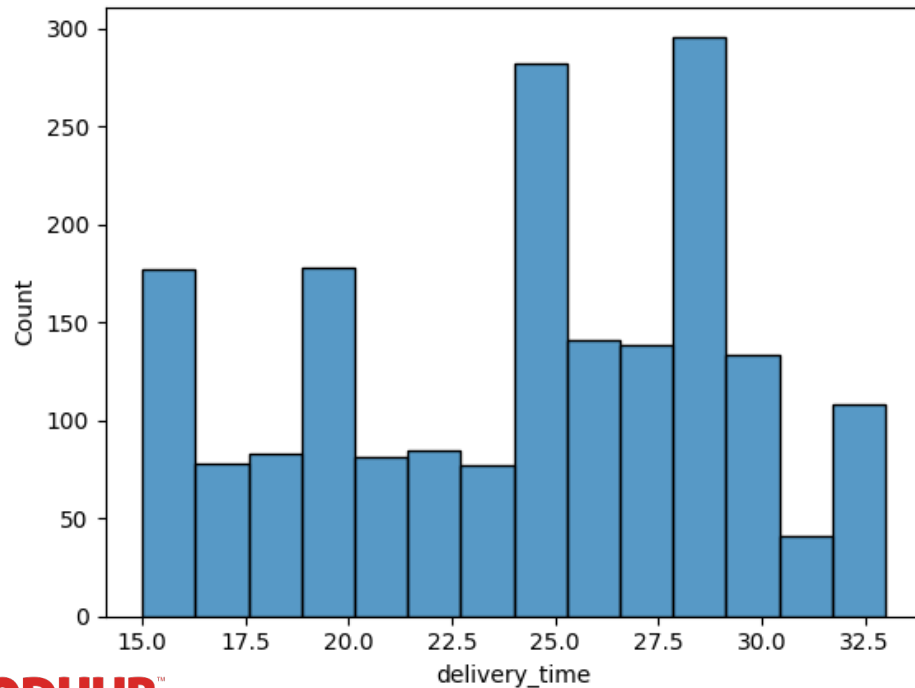
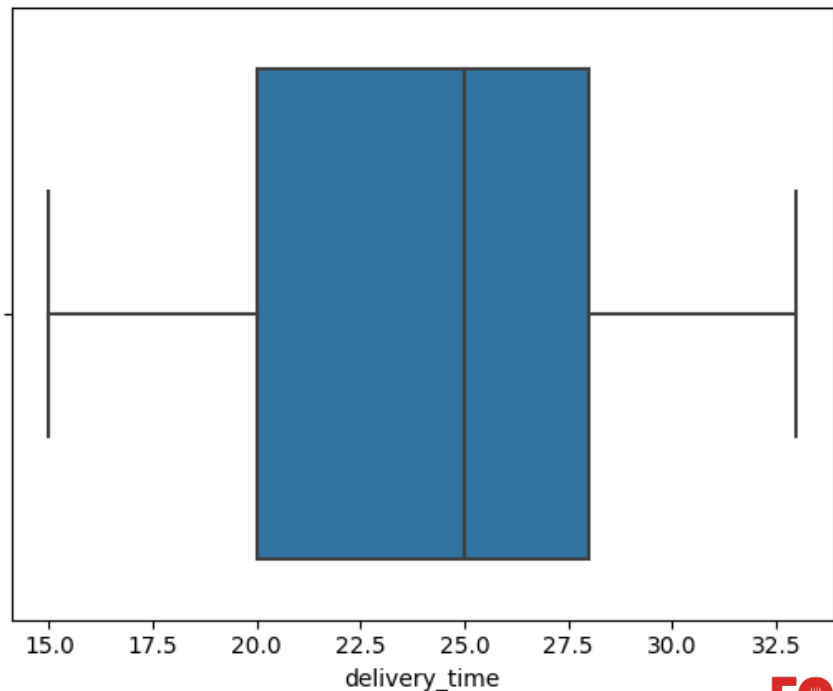
EDA _ Univariate Analysis - Food Preparation Time

- The average preparation time per order is ~ **28 Minutes**.
- It appears the time to prepare an order upon order confirmation is evenly distributed.
- The time for preparing **all** orders is between **20 – 35 minutes**.



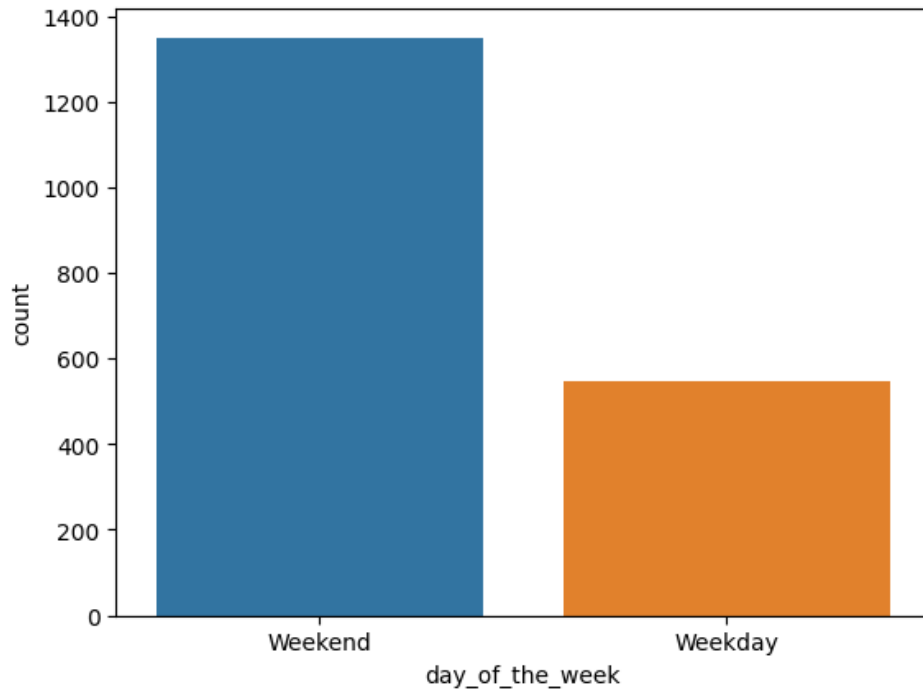
EDA _ Univariate Analysis - Delivery time

- The **Average** delivery time is **24.16** minutes.
- The box plot shows the delivery time to be slightly left-skewed.
- A majority of the orders appear to have a delivery time greater than 22 Minutes.



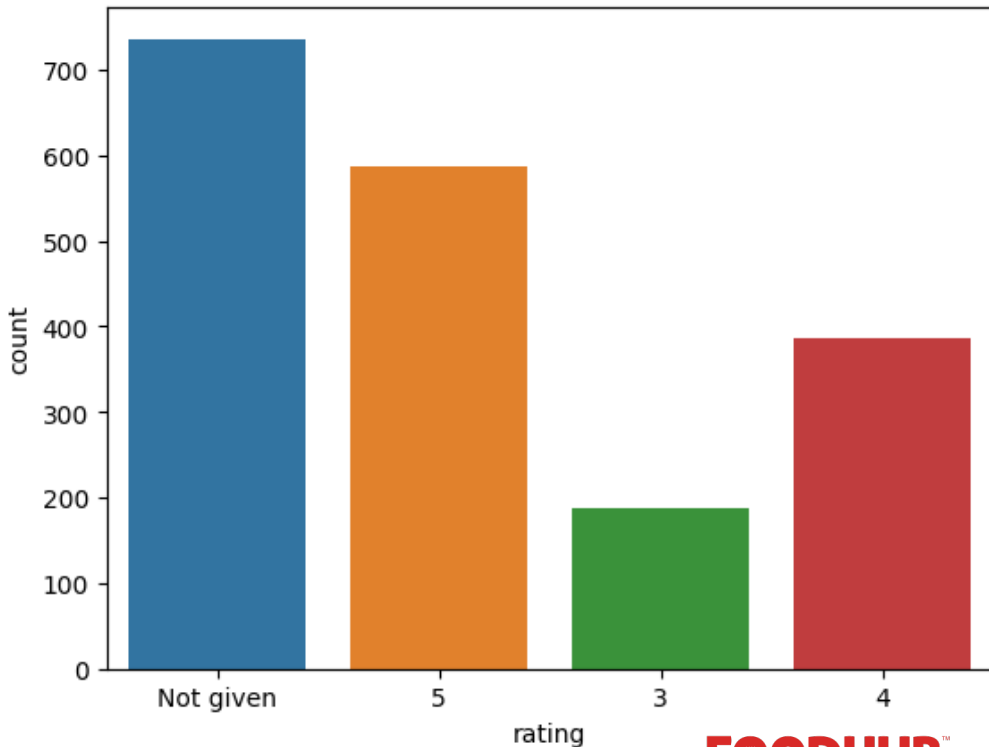
EDA _ Univariate Analysis - Day of the Week

- Approximately **71% of all orders** are places during the **weekend** (Saturday and Sunday).



EDA _ Univariate Analysis - Rating

- Approximately **40%** of all orders have not been given a rating.
- Of the ratings that have been given ~ **31%** have received a “5” rating.



Not given	736
5	588
4	386
3	188

EDA _ Univariate Analysis – Industry Analysis

- 5 top restaurants capture ~ **33%** of the total orders received overall.
- Of the 14 types of cuisine types there are **five cuisine types** that capture over **85%** of the market share during the weekend:
 - American and Japanese Cuisine reflect ~ **55%** of the total order demand

Top 5 Restaurants	# of Orders
Shack Shack	219
The Meatball Shop	132
Blue Ribbon Sushi	119
Blue Ribbon Fried Chicken	96
Parm	68

Top 5 Cuisine Types (Weekend)	# of Orders
American	415
Japanese	335
Italian	207
Chinese	163
Mexican	53

EDA _ Univariate Analysis – Top Customers

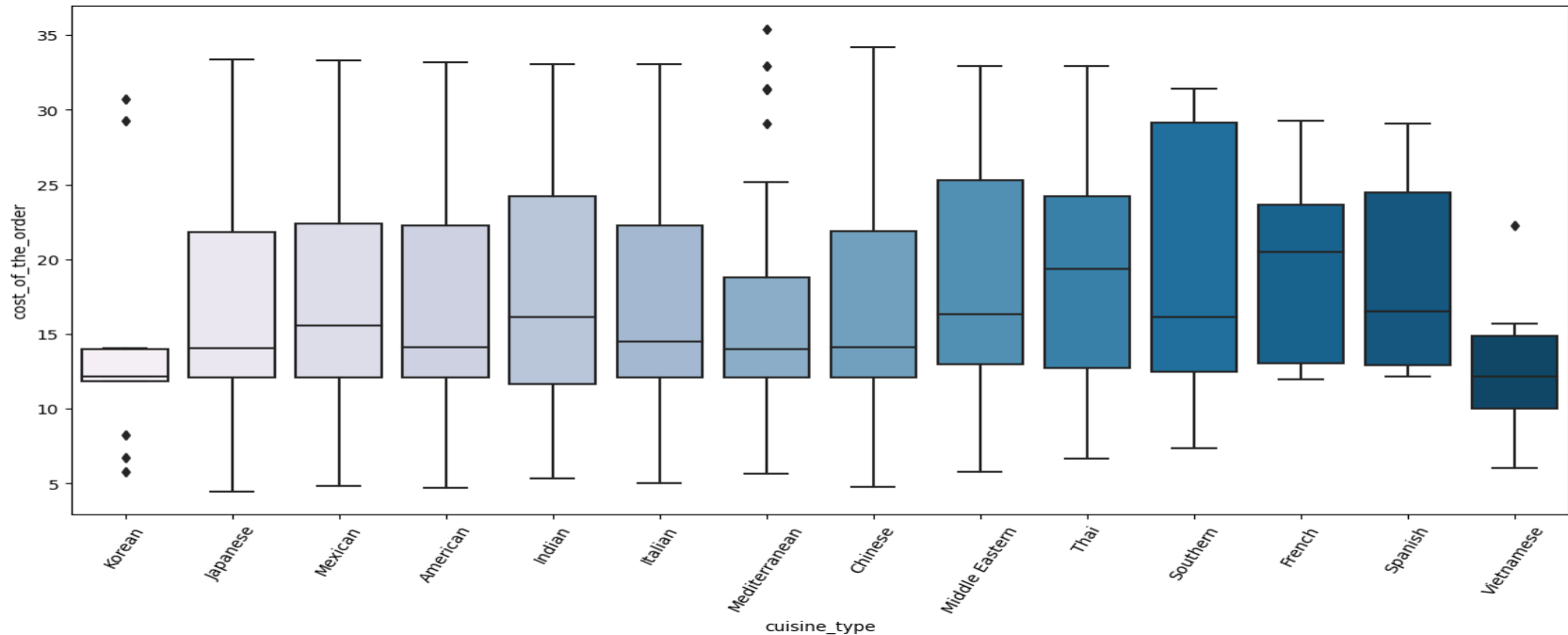
- The top 3 most frequent users are identified below to receive a discount voucher for 20% off as a thank you for their trust in the FoodHub app.

Top 3 Frequent Users	# of Orders Placed
52832	13
47440	10
83287	9



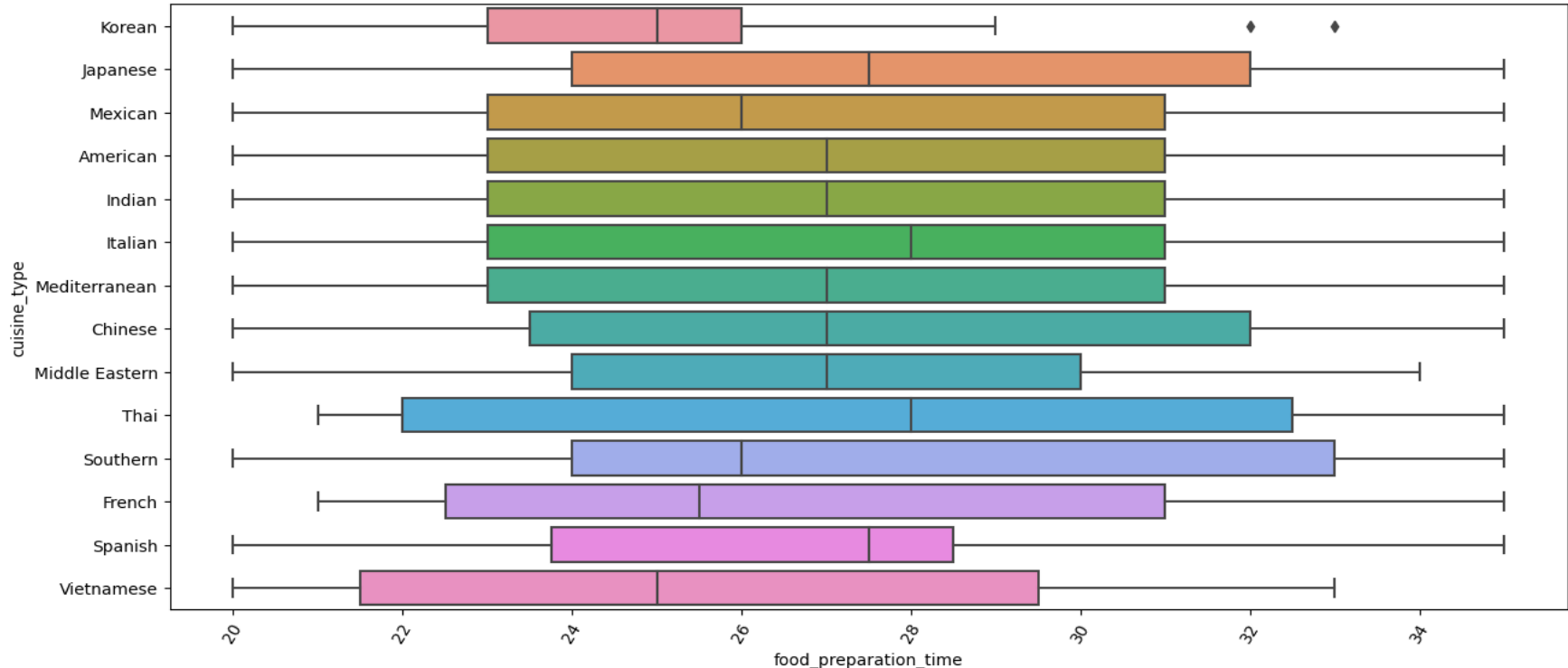
EDA _ Multivariate Analysis – Cuisine types/Cost of the Order

- Most of the the cost per order for all cuisine types are right skewed with the exception of Thai, French, & Vietnamese.
- It appears every cuisine type has an average cost per order under \$20.
- French and Thai cuisine types have the highest average cost per order.
- Southern has the highest (**max**) cost per order ~ **\$29** & Vietnamese the lowest (**min**) cost per order at ~ **\$10**.



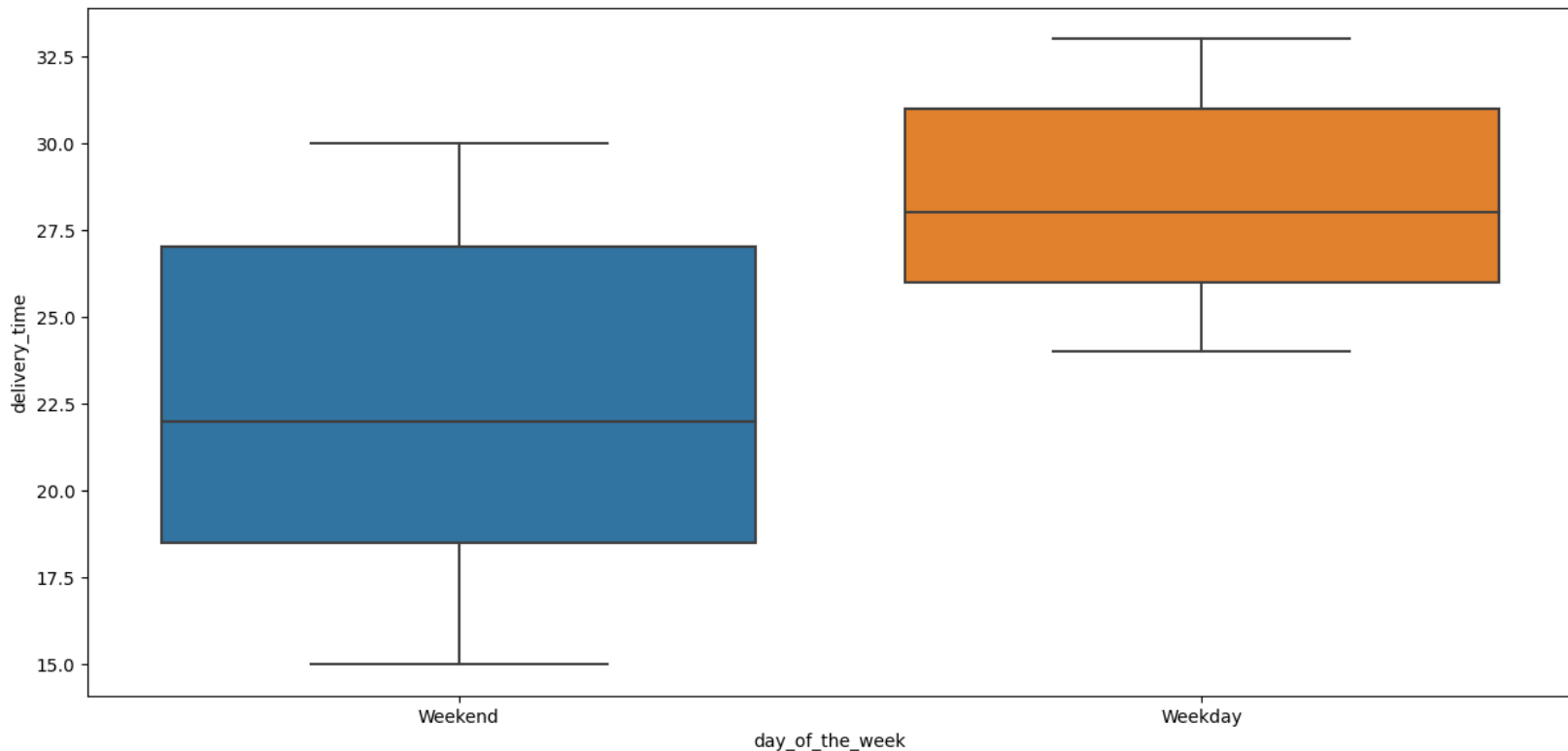
EDA _ Multivariate Analysis – Food Preparation Time/Cuisine Type

- Spanish cuisine prep time is heavily left skewed and Southern is heavily right skewed.
- The average prep time for all cuisine types appears to fall between 25 – 28 minutes.
- Southern as the highest (**max**) prep time ~ **33 Minutes** and Vietnamese lowest (**min**) prep time is ~ **21.5 Minutes**.



EDA_ Multivariate Analysis – Delivery Time/Day of Week

- The average delivery time for Weekends is ~ 22 minutes
- The average delivery time for Weekdays is ~ 28 minutes
- The **weekend delivery** time **does not** appear to **exceed 30 minutes**



EDA _ Multivariate Analysis – Restaurant/Revenue Generated

- Shake Shack is the top revenue generating restaurant at \$3579.53

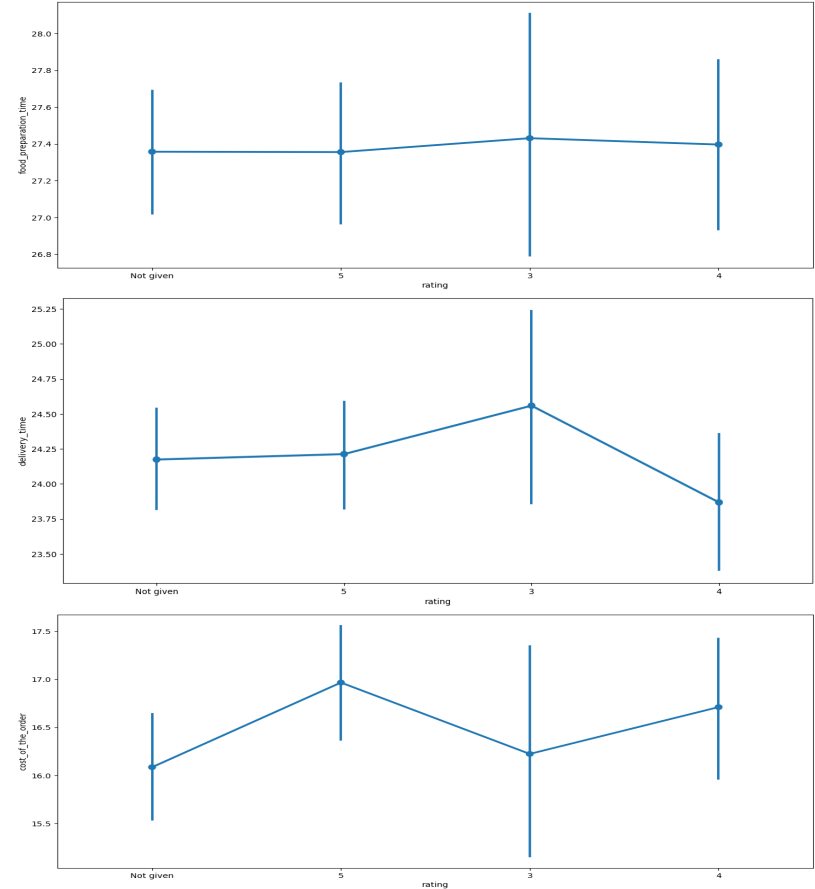


Restaurant Name (Top 14)	Revenue Generated
Shake Shack	\$3579.53
The Meatball Shop	\$2145.21
Blue Ribbon Sushi	\$1903.95
Blue Ribbon Fried Chicken	\$1662.29
Parm	\$1112.76
RedFarm Broadway	\$ 965.13
RedFarm Hudson	\$ 921.21
TAO	\$ 834.50
Han Dynasty	\$ 755.29
Blue Ribbon Sushi Bar & Grill	\$ 666.62
Rubirosa	\$ 660.45
Sushi of Gari 46	\$ 640.87
Nobu Next Door	\$. 623.67
Five Guys Burgers and Fries	\$ 506.47

EDA _ Multivariate Analysis – Other Observations

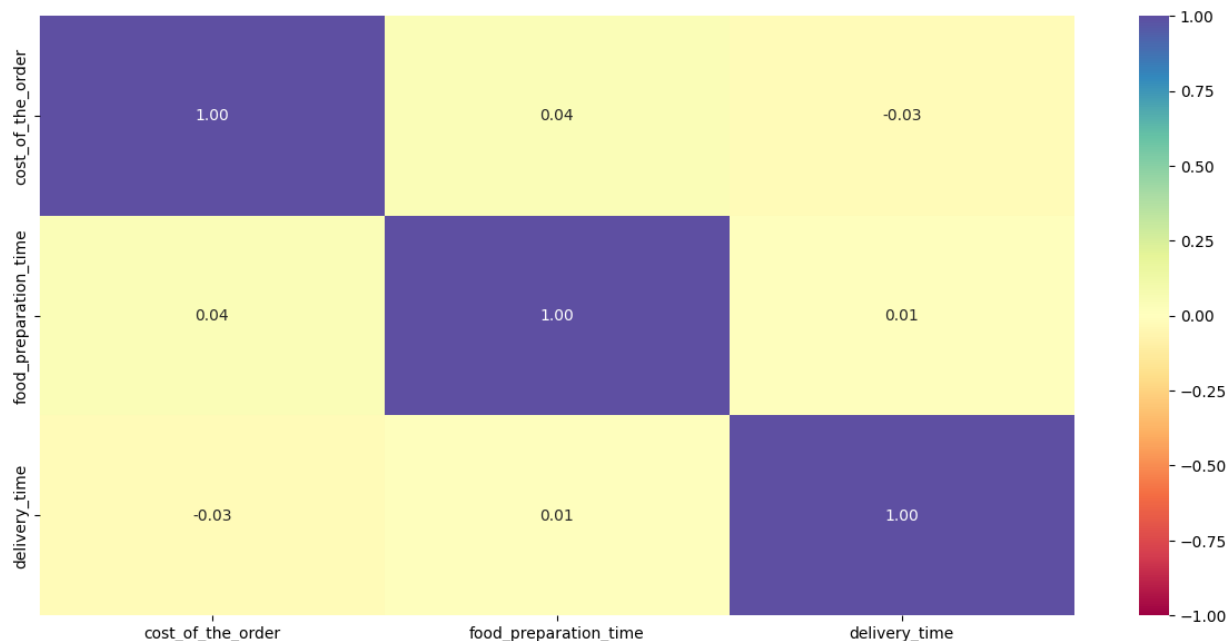
- It appears if delivery time is above 24.25 minutes causes lower ratings given.
- It appears the higher cost per order often results in a higher rating given.
- It does not appear total food preparation time does not have significant impact on type of rating given.

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EDA _ Multivariate Analysis - Correlation Matrix

- There does not appear to be strong correlation in regards cost per order, delivery time, or food preparation time.



EDA _ Multivariate Analysis – Industry Analysis

- There are 4 restaurants with over 50 ratings given and have an average rating greater than 4.

Promotional Offer

Restaurants	# of Ratings	Average Rating > 4
Shake Shack	133	4.2
The Meatball Shop	84	4.5
Blue Ribbon Sushi	73	4.2
Blue Ribbon Fried Chicken	64	4.3

EDA _ Multivariate Analysis - Other

- **Approximate Net Revenue Generated**

- \$6166.30

- **Deliveries Greater than 60 Minutes**

- Total Deliveries: 200

- % of Total Deliveries: 10.54%

- **Average Delivery time**

- Weekdays: 28 Minutes

- Weekends: 22 Minutes



Conclusions

- A majority of the total orders are for 4 cuisine types:
 - American (1st)
 - Japanese (2nd)
 - Italian (3rd)
 - Chinese (4th)
- Most orders are placed on the weekends:
 - Average delivery time: 22 Minutes.
 - The weekend delivery time does not appear to exceed 30 minutes.
- Obtaining ratings appears to be a challenge – 40% of orders are missing a rating.
- Over 50% of all orders fall within \$10 - \$20 per order.
- The average food preparation time is 28 minutes.
- There is not a strong correlation between delivery time, total preparation time, & cost of the order.
- 30% of all orders are placed for the top four restaurants.

Recommendations

- Add more American, Japanese, Italian, and Chinese restaurants and options to the platform:
 - Increase customer satisfaction.
 - Increase revenue/net revenue generation.
- Look at the list of restaurants offered and drop non-performing/low demand restaurants from the platform.
- Increase the resolution of days of the week to each day to see if Friday has more influence for the weekend than Sunday.
- Further analyze the 200 orders that resulted in a delivery time of over 60 minutes
 - What restaurant was the order placed from?
 - What day(s) of week are the orders placed?
 - Determine if the restaurant(s) needs to be removed from the platform to increase customer satisfaction and reduce average delivery times.
- Create a customer satisfaction campaign(s) to encourage ratings
- Further analysis may be needed to understand geographic regions where order is placed to further understand geographic/cuisine demand, cost per order, and delivery time statistics
- Further analyze the correlation matrix to add 3 additional data points (revenue, rating, cuisine type) and determine if there is any correlation to revenue and/or customer satisfaction.