FoodHub Orders Analysis

Project: FoodHub
Course: Data Science/Business Analytics

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Executive Summary

The analysis of the food orders dataset is aimed at providing insights into restaurant demand and customer behavior. The analysis covered data from a food ordering platform FoodHub in New York City, and uncovered key insights:

- Customer's favorite restaurants in terms of number of orders and average ratings are Shake Shack, The Meatball Shop, Blue Ribbon Sushi, Blue Ribbon Fried Chicken and Parm.
- Above 80% of FoodHub's revenues are generated by the four most popular cuisines: American, Japanese, Italian and Chinese.
- Customer's tend to be indifferent to an order's cost, preparation and delivery time while rating orders.
- More than 70% of orders are placed on weekends which affects delivery time, but does not affect food preparation time.
- High demand restaurants charge a lower price than restaurants with very few orders.

Based on these findings, I would recommend FoodHub to focus on developing their restaurant portfolio with ones that serve American, Japanese, Italian or Chinese cuisine in New York City. FoodHub should also consider promoting the most popular restaurants with discounts and free delivery options in order to attract more customers and drive their revenue further. To stimulate demand for cuisines with low orders and boost their revenue generated from them, FoodHub should focus on adding restaurants that serve these cuisines and offer a variety of dishes at an average price or lower.

Business Problem

A food aggregator company, FoodHub, allows it's customers to place food orders via an app that notifies the restaurant to prepare the food and a driver to pick up and deliver the food to the customer.

FoodHub's online portal has stored data of orders placed by it's registered customers.

FoodHub wants to analyze the data of orders in New York City, to gain insights about the demand of restaurants and enhance their customer's food ordering experience.

Solution Approach

A thorough analysis of the dataset is conducted via a univariate and multivariate analysis to extract valuable insights from the data.

Firstly, each variable’s statistical summaries and distribution's will be analyzed to look for valuable insights.

Secondly, the important variables will be compared to each other in an extensive multi-variate analysis to derive useful relationships between them.

Lastly, Foodhub’s revenue is analyzed to understand how customer’s preferences in food are influencing their business.

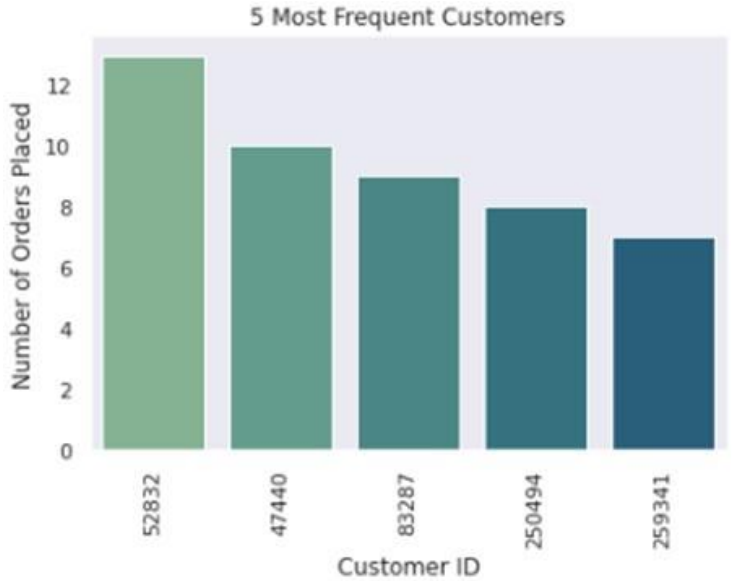
Data Overview

- The dataset includes 1898 records, 9 fields, 0 duplicates and 0 missing values.
- 3 data types exist: The Order ID, Customer ID, Food Preparation time and Food Delivery time are integers. Restaurant name, Cuisine, Day the order is placed and the Rating fields are objects. The Cost of the orders are floats.
- An order is placed either on a weekend or a weekday. No data is available for the particular day an order is placed.
- Orders are rated on a scale of 1 to 5. 39%(736 orders)are not given a rating.
- Once an order is placed, food preparation time ranges from 20 to 35 mins with 27 mins as an average.
- On average, customers receive their orders 50 mins after they place it.
- There are 178 different restaurants, 14 unique cuisine types and 700 customers who have placed more than 1 order.
- The cost per order ranges from $4.47/order to $35.41/order with an average cost of $16.5/order.

Univariate Analysis - Customers

Insights

- 1200 different customers have placed orders.
- 58% of customers have placed more than 1 order.
- 13 is the highest number of orders a single customer has placed, followed by 10 and 9 orders.
- The top 5 most frequent customers have all placed at least 6 orders.

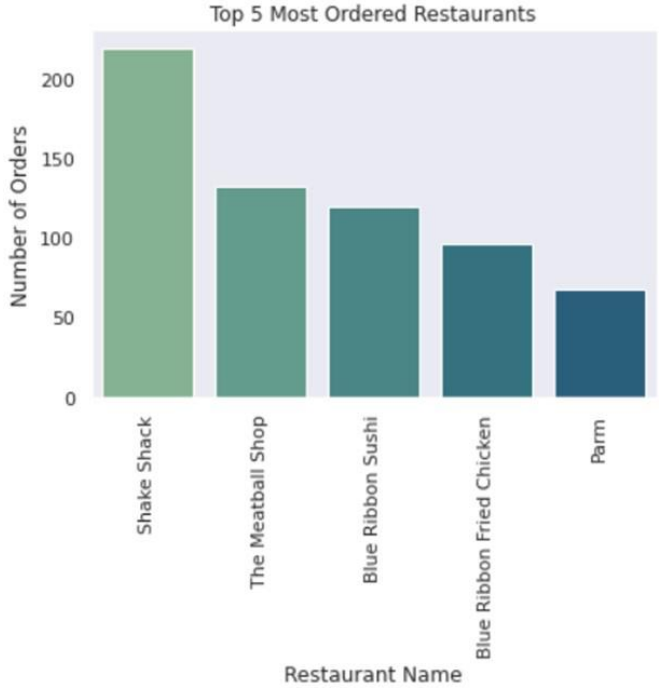


Top 3 Most Frequent Customers	
Order ID	# of Orders
52832	13
47440	10
83287	9

Univariate Analysis - Restaurants

Insights

- Shake Shack is the restaurant of choice for most customers in New York City with more than 200 orders.
- 2 of the top 5 most ordered restaurants are Blue Ribbon's: Sushi and Fried Chicken.
- The Meatball Shop is the 2nd most ordered restaurant, but receives roughly only half the orders as Shake Shack.
- The 5 most ordered restaurants make up nearly a third of all orders placed, indicating a strong customer preference towards them.

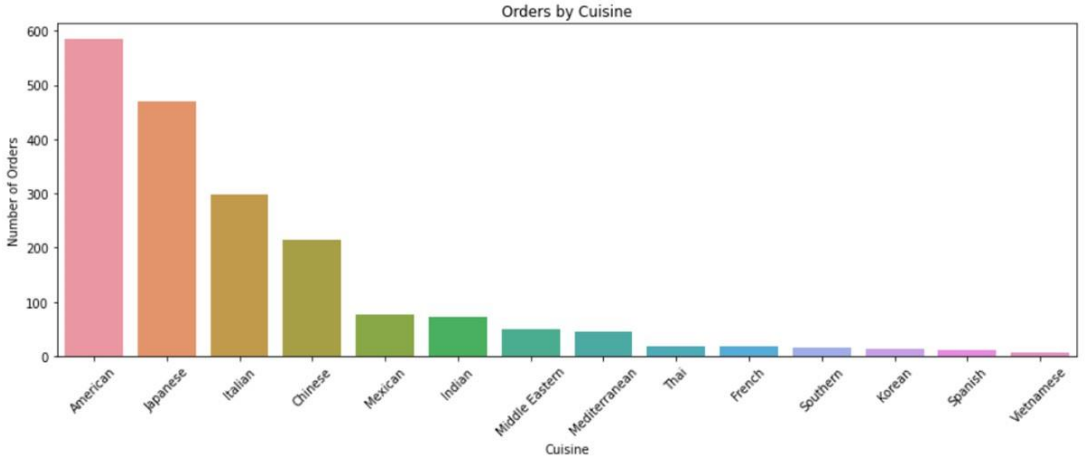


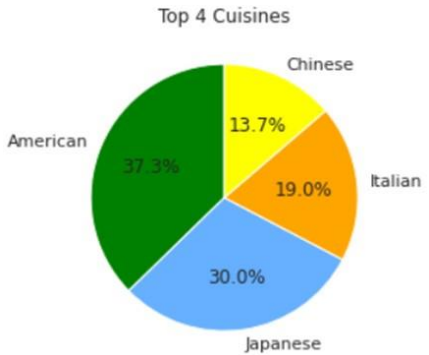
Restaurant	% of Total Orders
Shake Shack	11.5%
The Meatball Shop	7%
Blue Ribbon Sushi	6.3%
Blue Ribbon Fried Chicken	5%
Parm	3.6%

Univariate Analysis - Cuisine

Insights

- The cuisine in most demand is American, followed by Japanese.
- Cuisines Vietnamese, Spanish, Korean, Southern, French and Thai have incredibly low demand.
- The orders for American, Japanese, Italian and Chinese cuisines make up more than 80% of total orders placed.
- Of the top 4 ordered cuisines, American and Japanese are ordered more than 67% of the time.

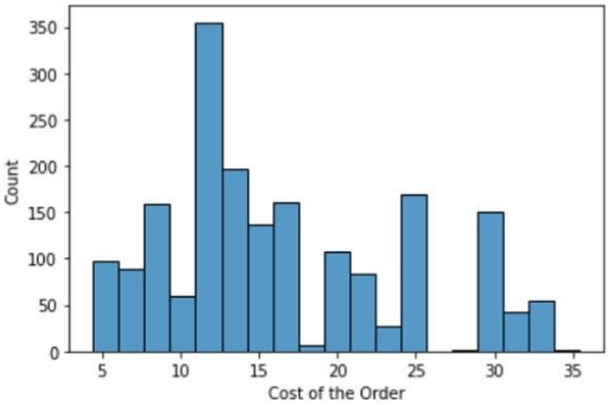


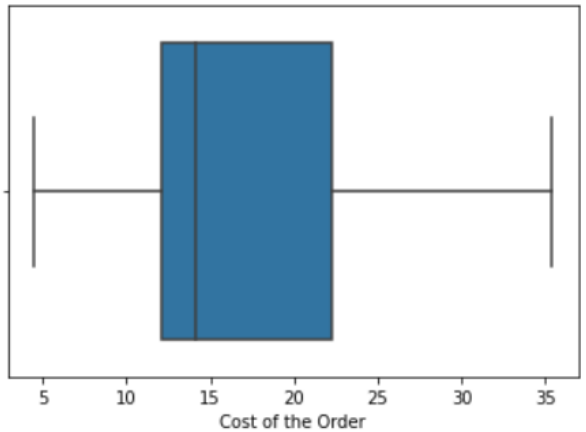


Univariate Analysis – Cost per Order

Insights

- An order costs $16.5 on average.
- 29.2% of the orders cost more than $20, but most of the orders(75%) cost less than $22.3.
- Orders have a large variation in costs: $4.47 to $35.41, which could be attributed to multiple factors: restaurant, cuisine type, type of order or food preparation time.
- Interestingly, no orders cost between $26 and $28.
- The costs seem to have a right-skewed distribution with no outliers.





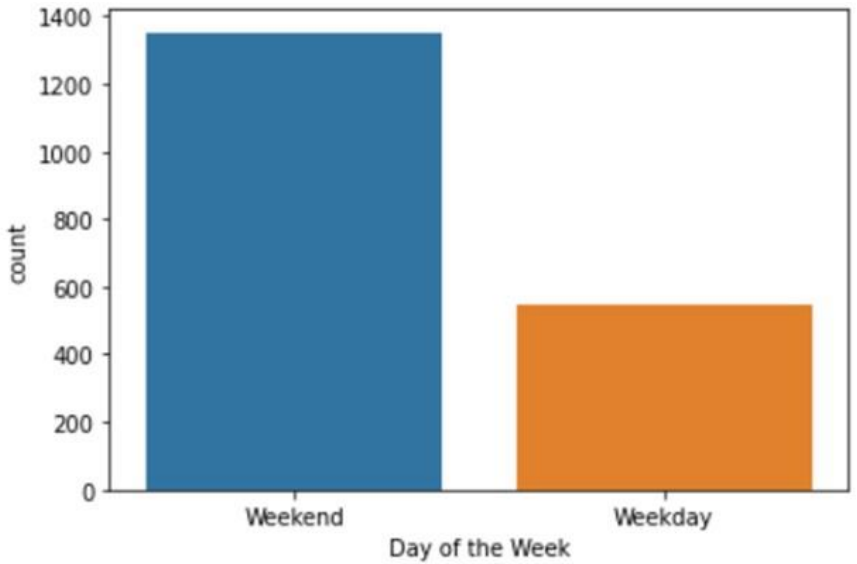
Statistical Summary

Mean	$16.5
Median	$14.14
STDEV.	$7.48
Minimum	$4.47
Maximum	$35.41
IQ1	$12.08
IQ3	$22.3

Univariate Analysis – Day of the Week

Insights

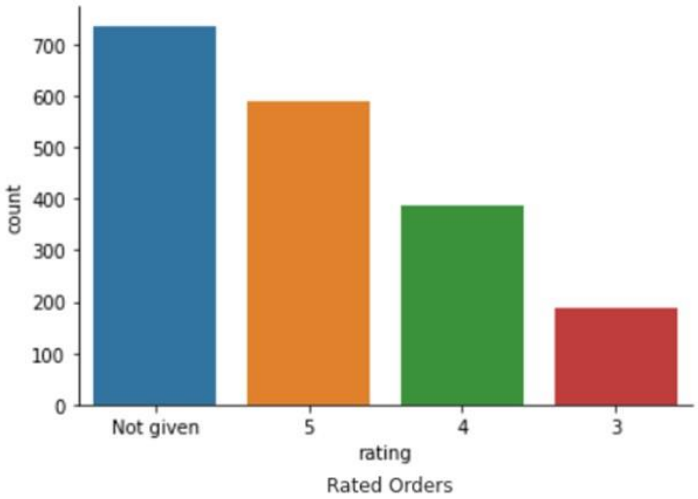
- Orders are placed either on a weekend or a weekday. No data is available for a particular day or time an order is placed.
- More than 70% of orders are placed on weekends.
- Orders placed on weekends are more than double the orders placed on weekdays.

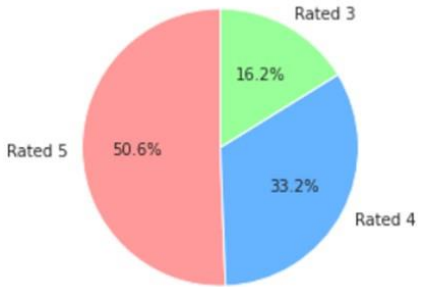


Univariate Analysis – Ratings(Scale 1:5)

Insights

- Most than 700 orders are not rated.
- Amongst rated orders, 50.6% are rated a 5.
- Only 16.2% of rated orders are rated a 3.
- More than 83% of rated orders are rated a 4 or 5, possibly inferring that customers tend to rate orders they like.
- Generally, ratings vary based on food quality for the cost paid(restaurant/cuisine/cost of order),food preparation and delivery time.

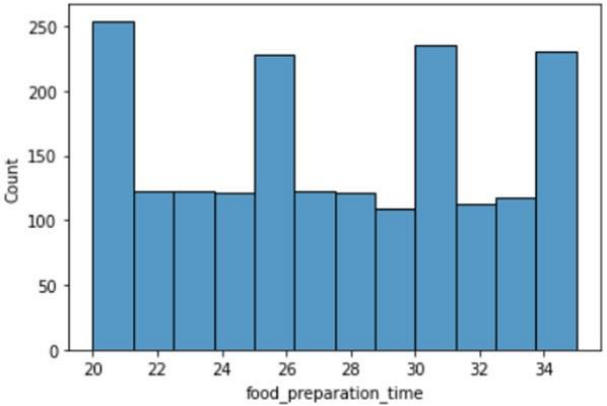


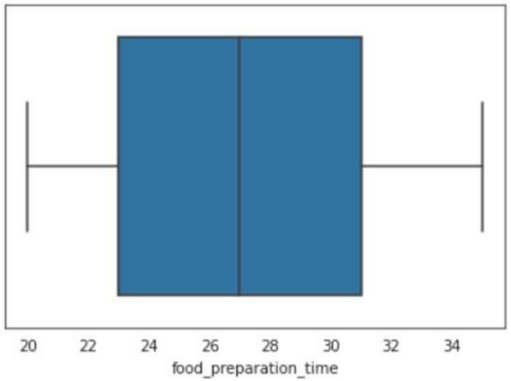


Univariate Analysis – Food Preparation Time(mins)

Insights

- An order takes 27 mins to be prepared on average.
- Only 25% of orders take less than 23 mins to be prepared.
- Food Preparation time ranges from 20 to 35 mins.
- There isn't any skewness in the food preparation time distribution.
- Food Preparation Time could potentially vary between different restaurants, cuisine types and type of order.





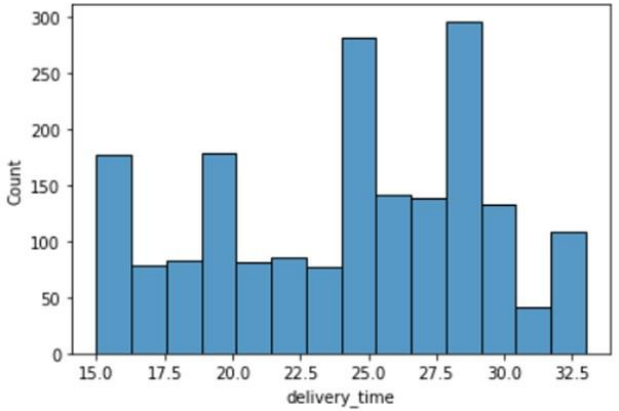
Statistical Summary

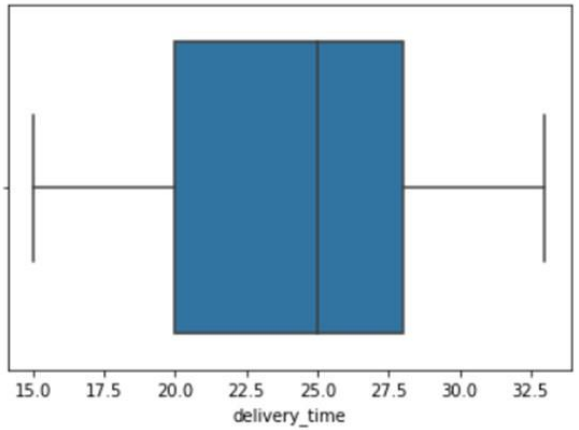
Mean	27.37
Median	27
STDEV.	4.63
Minimum	20
Maximum	35
IQ1	23
IQ3	31

Univariate Analysis – Food Delivery Time(mins)

Insights

- An order takes 24 mins to be delivered on average.
- Only 25% of orders take less than 20 mins to be delivered.
- 50% of the orders take between 20 and 28 mins to be delivered.
- Food Delivery time ranges from 15 to 33 mins.
- Delivery times could depend on day and time of order but there isn't enough data on when an order is placed to make a valid assumption.





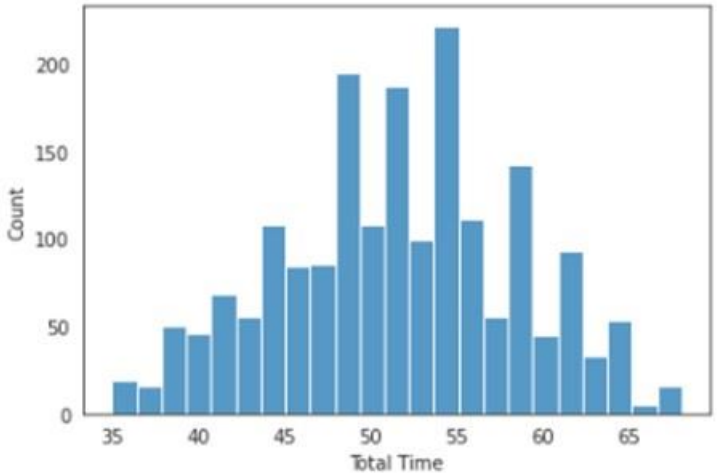
Statistical Summary

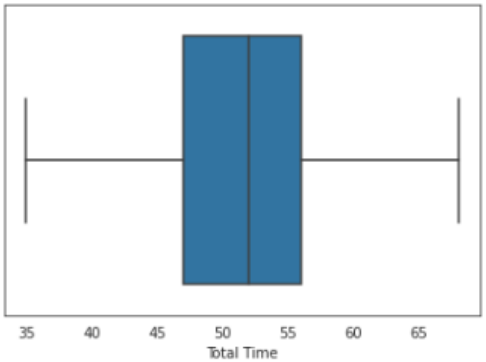
Mean	24.16
Median	25
STDEV.	4.97
Minimum	15
Maximum	33
IQ1	20
IQ3	28

Univariate Analysis – Total time to receive order(Prep+Delivery)(mins)

Insights

- Customer's receive their orders 52 minutes after they place it on average.
- Only 25% of orders take less than 47 mins to be prepared and delivered.
- 50% of the orders take between 47 and 56 mins to be prepared and delivered.
- 200 orders(10.54%) take more than an hour to reach the customer once an order is placed.





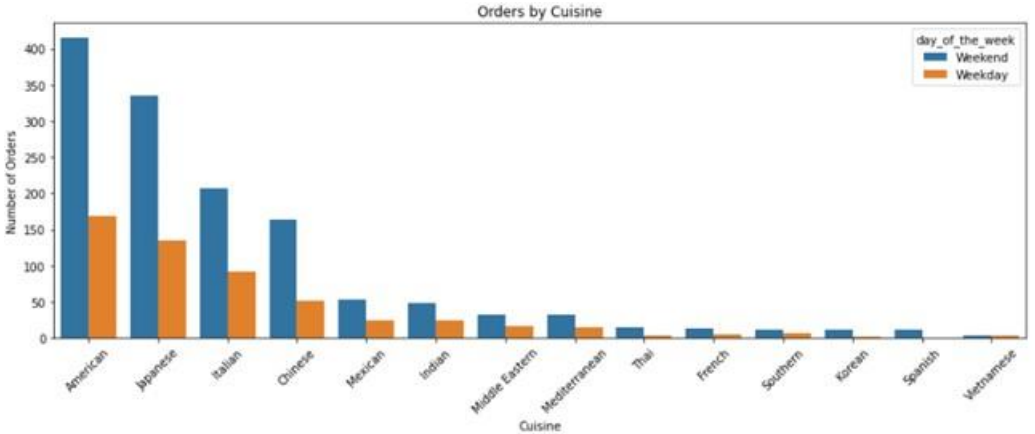
Statistical Summary

Mean	51.5
Median	52
STDEV.	6.83
Minimum	35
Maximum	68
IQ1	47
IQ3	56

Multivariate Analysis – Cuisine v Day of the Week

Insights

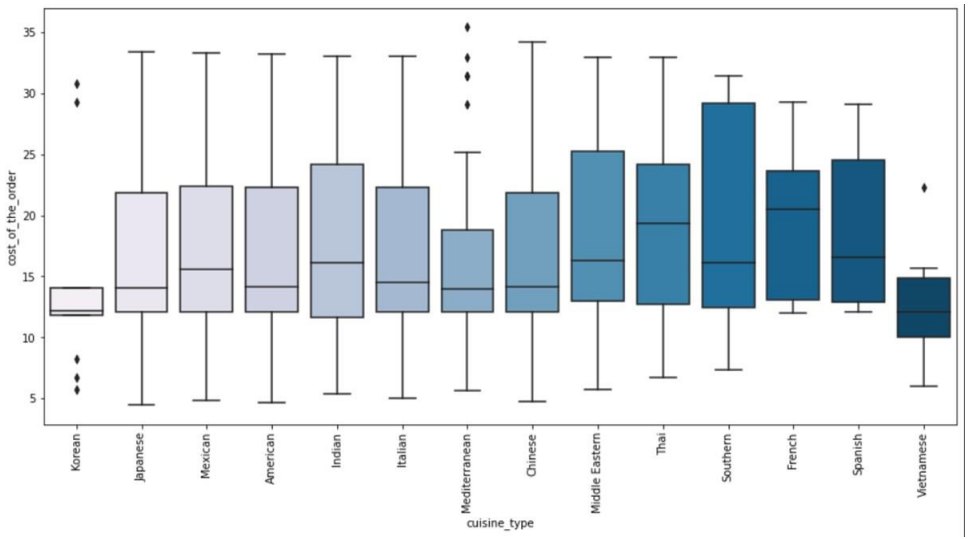
- The day of the week does not seem to influence customer's choice of cuisine.
- The American cuisine is the most popular cuisine on both weekdays and weekends.
- Barely any orders are placed for Korean, Thai, Spanish or Vietnamese cuisine on weekdays.
- All the cuisines are ordered more than twice the times on weekends as compared to weekdays.



Multivariate Analysis – Cuisine v Cost of the Order

Insights

- At least 50% of orders from the 4 most ordered cuisines(American, Japanese, Italian, Chinese) cost less than the average for all orders($16.5).
- The 4 most ordered cuisines could be offering a large variety of dishes considering the range of costs.
- The cuisines in most demand charge $1 less than the rest on average.
- The cuisines in least demand have a lower range of costs but tend to sell at a higher price than the average.
- Mediterranean, Korean and Vietnamese cuisines could be serving special dishes that cost a lot higher than their average.

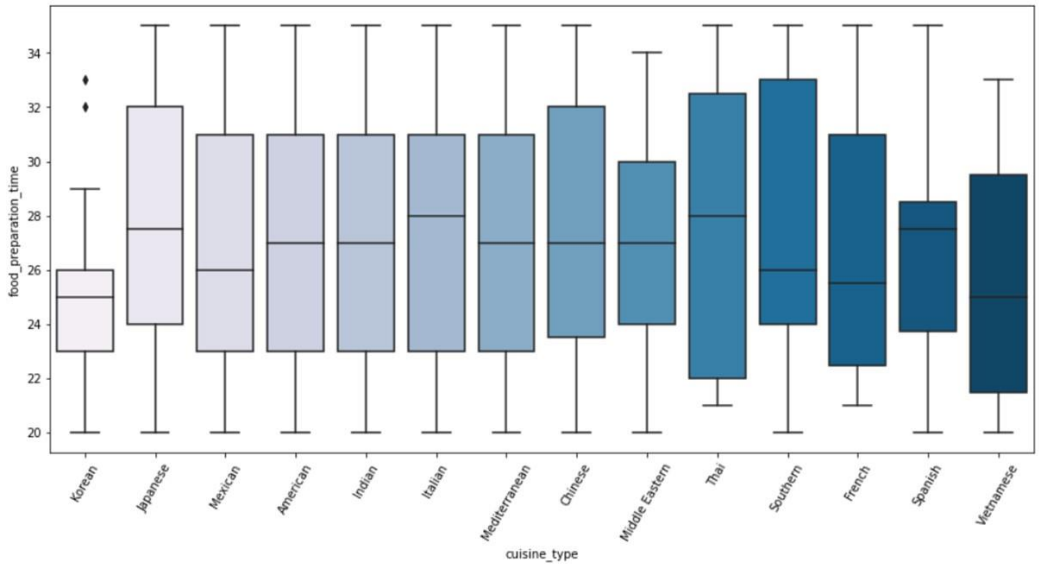


Average Cost/Order	
Top 4 most ordered cuisines	Rest
$16.30	$17.30

Multivariate Analysis – Cuisine v Food Preparation Time

Insights

- Although they receive much more orders, the cuisines in most demand take roughly the same time to prepare their food compared to cuisines with low orders.
- Most of the cuisines seem to have a similar range of food preparation times.
- Cuisines with low demand tend to prepare their dishes quicker, possibly due to lack of orders.
- 75% of Korean cuisine orders take less than the average time to be prepared, but there are 2 orders that take much longer.

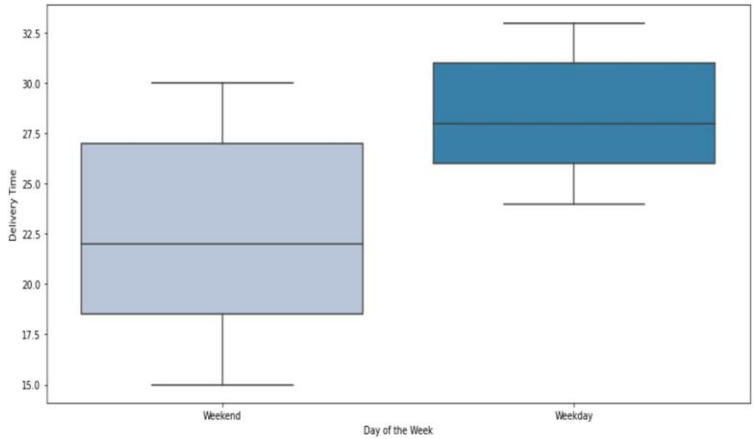


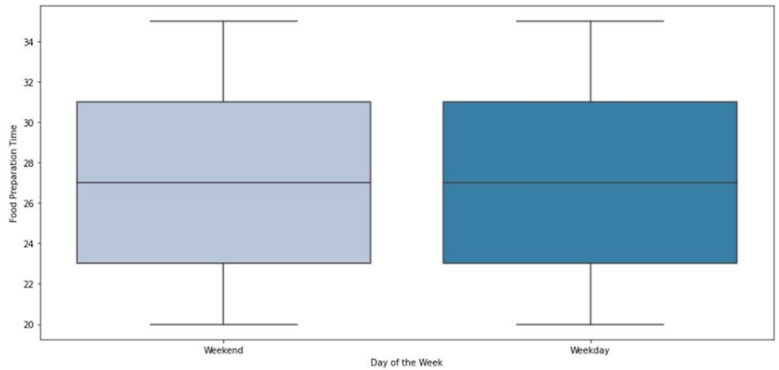
Multivariate Analysis – Food Prep/Delivery Time v Day of the Week

Insights

- Interestingly, food preparation time is the same on weekends and weekdays although there are many more orders on weekends.
- Orders take longer to be delivered on weekdays, possibly due to traffic.
- Customers place more orders on weekends and orders are delivered 5 mins quicker on average than on weekdays.
- Expectedly, delivery times vary more on weekends, possibly due to larger fluctuations in traffic conditions.
- On Average, it takes an order 6 more minutes to be delivered on a weekend than on a weekday.

Mean Delivery Times	
Weekend	Weekday
28 minutes	22 minutes

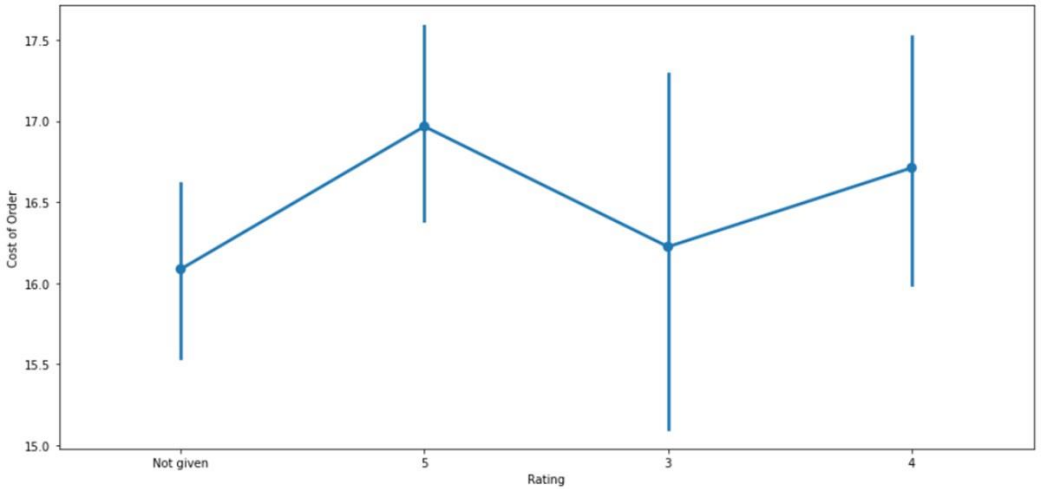




Multivariate Analysis – Rating v Cost of Order

Insights

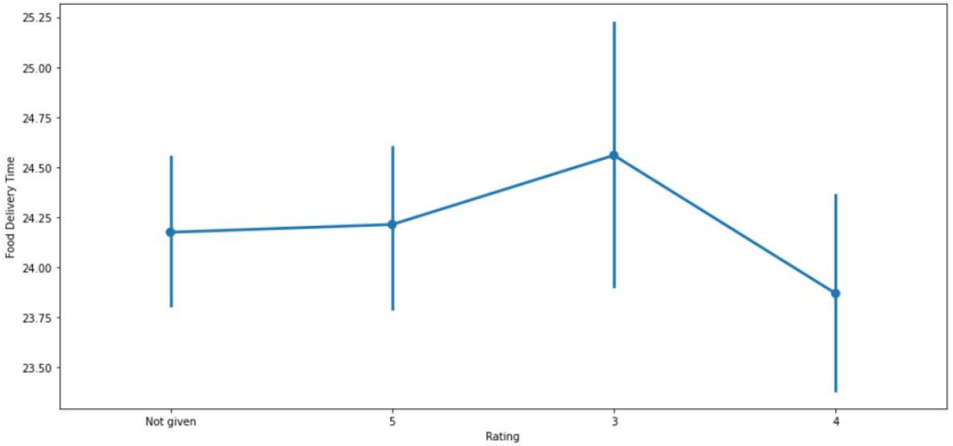
- The cost of the order does not seem to be a criteria for customers while rating orders.
- Surprisingly, orders rated a 3 cost lesser than orders rated a 4 and 5 on average.
- Orders rated a 5 cost more than orders rated a 4.
- The orders not rated cost the least, validating our insight that customer's do not consider cost while rating orders.

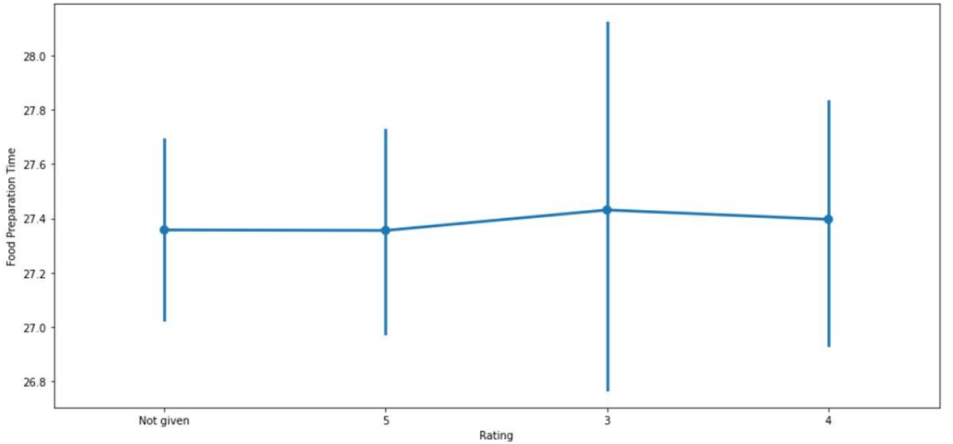


Multivariate Analysis – Rating v Food Prep and Delivery Time

Insights

- Orders rated a 5 take longer to be delivered and cost more than orders rated a 4, suggesting that food quality is more important for customers than cost or delivery time of orders, unless the orders are delivered later than average
- Orders rated a 3 take the longest to be delivered on average, possibly suggesting that customers do rate orders if they receive it late.
- The orders not rated take longer to be delivered than the ones rated a 4, validating the insight that customer's do not consider delivery time while rating orders.
- Food Preparation time does not seem to have any influence on customer's rating of orders.

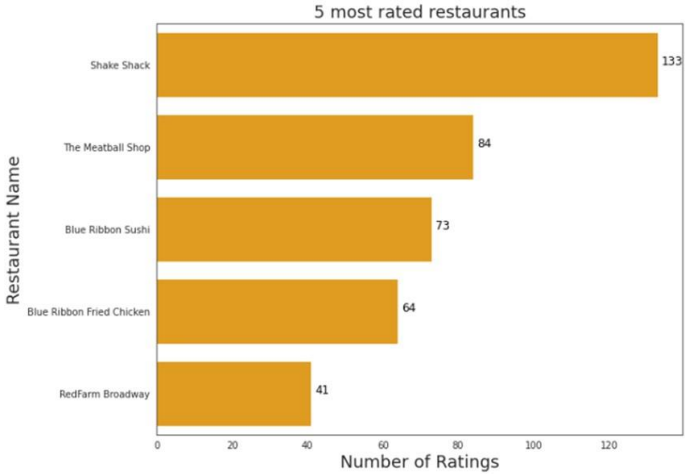


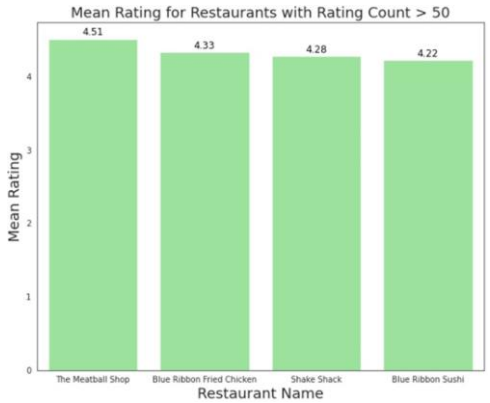


Multivariate Analysis – Restaurants v Ratings

Insights

- 4 out of the 5 most ordered restaurants received the most number of ratings: Shake Shack, Meatball Shop, Blue Ribbon's Sushi and Fried Chicken.
- Amongst the 4 restaurants mentioned above, the Meatball shop has the highest average rating.
- Surprisingly, the 5th most ordered restaurant(Parm) does not feature on this list. Only 39 of it's orders have been rated.
- Considering number of orders, number of ratings and average ratings, it is fair to conclude that Shake Shack, Blue Ribbon's Sushi and Friend Chicken, and The Meatball Shop are the customer's favorite restaurants in New York City.

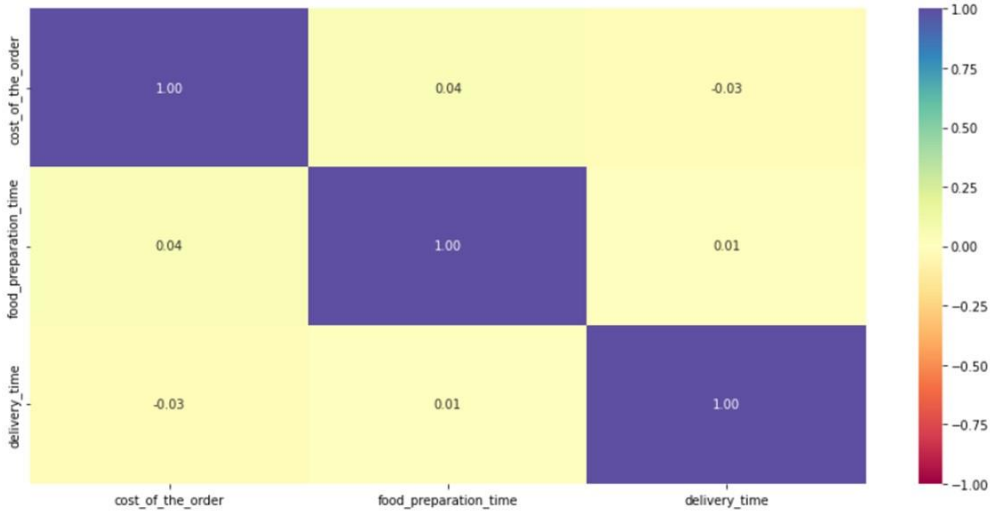




Multivariate Analysis – Cost of Order v Food Prep and Delivery Time

Insights

- The prices set by restaurants for orders is not correlated to the time it takes them to prepare the order.
- The cost of the orders is not affected by the variation in the delivery time.
- Food preparation time is completely independent of food delivery time.
- The orders not rated cost the least, validating our insight that customer's do not consider cost while rating orders.



Revenue by Cuisine and Cost

FoodHub makes money by charging restaurants 25% on the orders costing greater than $20 and 15% on the orders costing greater than $5.

- FoodHub makes a total of $6166.03 in revenue.
- 60% of FoodHub's revenue comes from only 30% of it's orders.
- More than 80% of Foodhub's total revenue comes from 4 cuisines, emphasizing the stark difference between the top 4 cuisines ordered and the rest.

Cuisine Type	% of Total Revenue
American	30.46%
Japanese	23.97%
Italian	15.68%
Chinese	11.19%
Mexican	4.16%
Indian	4.01%
Middle Eastern	3.14%
Mediterranean	2.21%
Thai	1.27%
French	1.24%
Southern	1.11%
Spanish	0.77%
Korean	0.54%
Vietnamese	0.26%

Cost Range($)	Revenue($)	Orders	Average Cost($)
>20	3,688.73	555	26.58
5-20	2,477.57	1334	12.38

Thank you

Arpan Dinesh
03/05/2023