The FoodHub Co.

Project : FoodHub Data Analysis
Course : Python Foundations

Document Version : 1.0
Document Owner : Rahul Kulkarni
Document ID : Project 1 - FoodHub.pdf
Submission Date : 24th June 2023

Contents

- Executive Summary
- Business Problem Overview and Solution Approach
- Data Overview & Analysis
- EDA - Univariate Analysis
- EDA - Multivariate Analysis
- Appendix

Executive Summary

Executive Summary – Business Context

- **Business Context:** FoodHub, a food aggregator company offers access to multiple restaurants through a single smartphone app. The app allows the restaurants to receive a direct online order from a customer, and then assigns a delivery person from the company to pick up the order post confirmation from the restaurant. The delivery person then uses the map to reach the restaurant and waits for the food package. Once the food package is handed over to the delivery person, the person confirms the pick-up in the app, and drops-off the food to the customer's location. After delivering the food package to the customer, the delivery person confirms the drop-off in the app. The customer can then rate the order in the app. The FoodHub company earns money by collecting a fixed margin of the delivery order from the restaurants
- **The Problem Statement :** The FoodHub company has stored the data of the different orders made by the registered customers in their online portal. The company wants to analyze the data to get a fair idea about the demand of different restaurants which will help them in enhancing their customer experience.
- **Solution Approach:** In order to resolve the above problem, we will undertake the following 3 key tasks:
  - Perform a deep-dive on FoodHub dataset using libraries such as numpy and pandas for data manipulation, and seaborn and matplotlib for data visualisation
  - Perform exploratory data analysis to delivery key findings, insights and recommendations
  - Identify areas of growth and opportunities for improvement, that will lead to a better customer experience.

Executive Summary – Key Actionable Insights

- **Summarised Key Insights:**
  - A staggering circa. 39% of orders have not been rated by the customers, whereas 31% have provided a rating of '5', 20% a rating of '4' and 10% have provided a rating of '3'
  - Circa 63% of customers have placed only single orders as opposed to 37% who have placed multiple orders.
  - Over 90% of restaurants have been used repeatedly as opposed to 10% that have had unique orders
  - Although, the median cost of order is within $15 dollars for Japanese, American, Italian, Mediterranean and Chinese cuisines, American cuisine seems to be the most popular choice for customers, whereas Vietnamese seems to be the least popular choice.
  - Weekends are very busy than compared to the weekdays The average Food Preparation Time on the weekend and weekdays is the same (27 minutes) while the average Delivery Time is higher on weekdays (22 minutes) as opposed to the weekends (28 minutes). Although weekends are much busier than weekdays, the delivery times are quicker on weekends than compared to weekdays.
  - The top 5 revenue generating restaurants include 2 American, 2 Italian, and 1 Japanese type cuisines. The top restaurants with average customer rating of above 4 are: The Meatball Shop, Blue Ribbon Fried Chicken, Shake Shack, and Blue Ribbon Sushi

Executive Summary – Key Actionable Insights (Cont'd)

- **Summarised Key Insights:**
  - As the time to deliver the food increases, the rating decreases and vice-versa i.e. Rating improves when food is delivered in the shortest time period than expected.
  - As the food preparation time increases, the rating decreases and vice-versa i.e. Rating improves when food preparation time is shorter than expected
  - As the cost of the order increases, the rating increases. This is very likely since exotic cuisines are rich and tasteful and thereby expensive
  - As food preparation time increases, the cost increases and the time to deliver gets longer. Moreover, as delivery time decreases, the cost of the order increases and vice-versa. This probably implies that faster delivery will add more to the cost and vice-versa.

Executive Summary - Conclusion

- 63% of the customers (1200) have only placed single orders, whereas 37% (698) of customers placed multiple orders
- Only 3 restaurants (Shake Shack:219, The Meatball Shop:132, Blue Ribbon Sushi:119) have placed orders above the 100 mark
- Orders placed over the weekend are circa. 2.5 times than those placed over the weekdays. (Weekday Orders: 547 - 29% | Weekend Orders: 1352 - 71%)

Executive Summary – Our Recommendation

Based on our key observations and insights, we recommend the following areas of improvement / opportunities that will drive business growth and lead to a better customer experience

- **Implement Customer Incentivisation Scheme to increase orders on Weekdays & Weekends:**
  - **Weekday Customers:** Since majority of the orders are placed over the weekend than compared to the weekday, it's critically important to understand the needs of the customer and incentivise them such that it boosts overall sales / net revenue. Understanding the location of the customer on weekdays (office / home) and thereby managing the supply chain to optimise the delivery timelines would be the key to get new orders.
  - **Weekend Customers:** Since weekend customers constitute a large number of orders, it is also important to make them feel valued as a loyal customer by offering them certain benefits such as freebies / discounts so that they can increase the amount on the order. Incentivising schemes such as Loyalty Points, Badges and Reward that can be redeemed in the next targeted purchase will certainly boost order sales.

Executive Summary – Our Recommendation (Cont'd)

- **Implement Cross Selling ('You May Also Like') feature to boost orders to be placed in other restaurants:** Only 3 restaurants seem to be very popular and the go-to place for ordering food since we have seen them cross the 100 order mark. Although it's important to understand customer feedback as to why they haven't ordered as much from other restaurants, it could be well worth an opportunity to cross-sell similar food-items along with prices and customer ratings from other restaurants. This could effectively increase orders for other restaurants and will boost overall sales / revenue if the customer orders a companion food item from relevant restaurants. For example: A customer ordering a burger from Shake-Shack could also order a companion Japanese bubble Tea from Nobu Next Door.

- **Implement Customer Feedback ('How Was Your Experience?') feature to enhance Customer Experience:** Over 60% of customers have placed only single orders as opposed to 30% who have placed multiple orders. It is critically important to do a full root-cause analysis (RCA) to identify and eliminate issues that might be causing a poor customer experience and thereby demotivating customers to place repeat orders. Typically, issues such as Incorrect Food Items Delivered, Poor Packaging, Poor Food Quality, Extended Food Delivery Time, Incorrect Amount on Invoice play a critical role leading to poor customer satisfaction. A customer feedback in the App (objective form / subjective narrative) can be used to capture customer feedback, which can then be relayed to the appropriate supply chain partner (restaurant / delivery driver etc) in order to optimise customer experience.

Business Problem Overview & Solution Approach

Business Problem Overview and Solution Approach

- **Business Context:** FoodHub, a food aggregator company offers access to multiple restaurants through a single smartphone app. The app allows the restaurants to receive a direct online order from a customer, and then assigns a delivery person from the company to pick up the order post confirmation from the restaurant. The delivery person then uses the map to reach the restaurant and waits for the food package. Once the food package is handed over to the delivery person, the person confirms the pick-up in the app, and drops-off the food to the customer's location. After delivering the food package to the customer, the delivery person confirms the drop-off in the app. The customer can then rate the order in the app. The FoodHub company earns money by collecting a fixed margin of the delivery order from the restaurants

- **The Problem Statement :** The FoodHub company has stored the data of the different orders made by the registered customers in their online portal. The company wants to analyze the data to get a fair idea about the demand of different restaurants which will help them in enhancing their customer experience

- **Solution Approach:** In order to resolve the above problem, we will undertake the following 3 key tasks:

  - Perform a deep-dive on FoodHub dataset using libraries such as numpy and pandas for data manipulation, and seaborn and matplotlib for data visualisation

  - Perform exploratory data analysis to delivery key findings, insights and recommendations

  - Identify areas of growth and opportunities for improvement, that will lead to a better customer experience

Data Overview & Analysis

Data Overview & Analysis

- The FoodHub App has the following Data-Structure:

#	Columns	Data-type	Total Rows	Description
1	Order_id	Integer 64	1898	Order ID of the customer
2	customer_id	Integer 64	1898	Customer ID of the customer
3	restaurant_name	Object	1898	Name of the Restaurant
4	cuisine_type	Object	1898	Type of Cuisine
5	cost_of_the_order	Float 64	1898	Cost / Total Bill of the Order
6	day_of_the_week	Object	1898	Day the Order was placed (Weekday / Weekend)
7	rating	Object	1898	Customer Rating
8	food_preparation_time	Integer 64	1898	Time taken to prepare the food since the order is placed via App until picked up by the driver
10	delivery_time	Integer 64	1898	Time taken to deliver the food after it's picked up by the driver from the restaurant until it's delivered to the customer

- Total No. Of Columns: 9 | Total No. Of Rows: 1898
- Column Data-types: Float (1), Integer 64 (4) & Object (4)
- Missing Values: There are No missing values in the data-set

Data Overview & Analysis

- Statistical Summary: The minimum and maximum Food Preparation Time is 20.00 minutes and 35.00 minutes respectively, while the average Food Preparation Time is circa. 27 minutes

	count	mean	std	min	25%	50%	75%	max
order_id	1898.0	1.477496e+06	548.049724	1476547.00	1477021.25	1477495.50	1.477970e+06	1478444.00
customer_id	1898.0	1.711685e+05	113698.139743	1311.00	77787.75	128600.00	2.705250e+05	405334.00
cost_of_the_order	1898.0	1.649885e+01	7.483812	4.47	12.08	14.14	2.229750e+01	35.41
food_preparation_time	1898.0	2.737197e+01	4.632481	20.00	23.00	27.00	3.100000e+01	35.00
delivery_time	1898.0	2.416175e+01	4.972637	15.00	20.00	25.00	2.800000e+01	33.00

- Ratings Statistics: Total No. Of Orders that are Not Rated - 736

#	Not Given	5	4	3
1	736	588	386	188

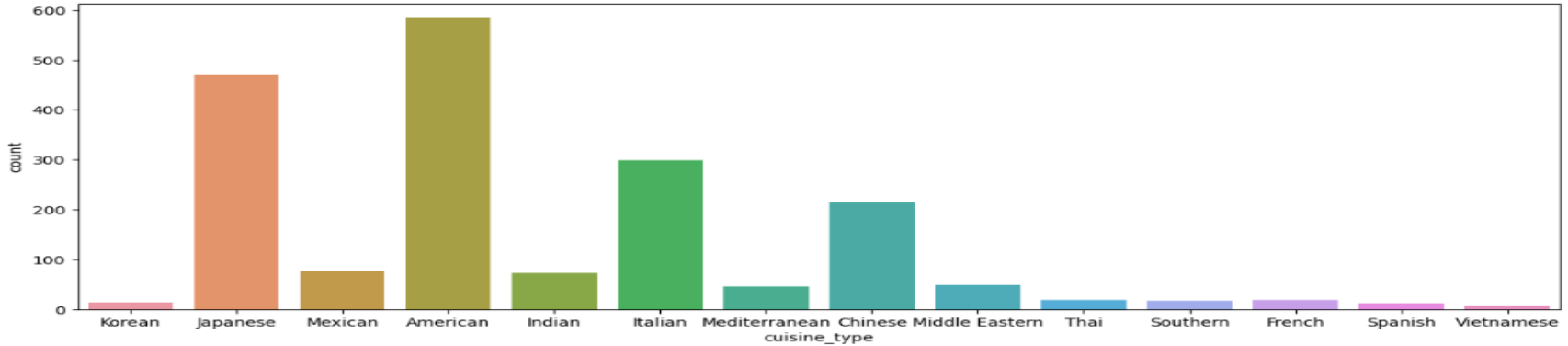
Data Overview & Analysis – Key Observations & Insights

- **Key Observations:**
  - The minimum and maximum Food Preparation Time is 20.00 minutes and 35.00 minutes respectively, while the average Food Preparation Time is around 27 minutes
  - The minimum and maximum Food Delivery Time is 15.00 minutes and 33.00 minutes respectively, while the average Delivery Time is around 24 minutes
  - The minimum and maximum Cost of the Order is $ 4.47 and $ 35.41 respectively, while the average Cost of the Order is $ 16
- **Key Insights:**
  - The average Food Preparation Time on the weekend and weekdays is the same (27 minutes) while the average Delivery Time is higher on weekdays (22 minutes) as opposed to the weekends (28 minutes)
  - A significant proportion of customers (circa. 39%) have 'Not Given' any rating, whereas 31% have provided a rating of '5', 20% a rating of '4' and 10% have provided a rating of '3'

EDA - Univariate Analysis

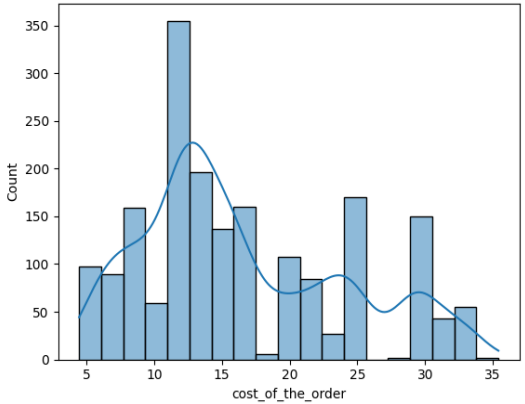
EDA - Univariate Analysis

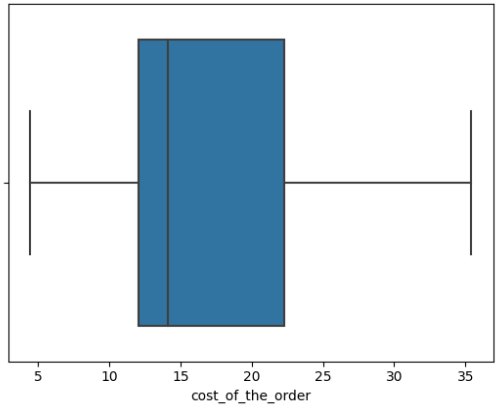
- **Order ID :** There are 1898 unique Order ID's
- **Customer ID :** There are 1200 unique Customer ID's
- **Restaurant Names :** There are 178 unique Restaurants
- **Cuisine Types :** There are 14 unique Cuisine Types. American cuisine is the most popular cuisine, followed by Japanese, Italian and Chinese as the second, third and fourth most popular choice, respectively. The demand for Mexican and Indian cuisine seems to be similar, which is supposedly the 5th best choice. Middle Eastern cuisine seems to be the 6th most popular, followed by Mediterranean cuisines. Thai, Southern and French cuisines seems to be of a similar demand and fall in the 8th position of the most popular cuisines. The demand for Spanish, Korean and Vietnamese cuisine seem to be very low.



EDA - Univariate Analysis

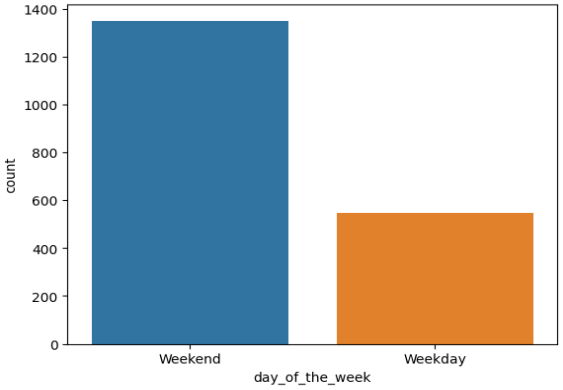
- **Cost Of The Order :**
  - Highest Orders: There are circa 340 orders between $12- $12.99
  - Minimum: The minimum cost of the order is $5
  - Q1: 25% of the cost of the order are less than $12.5
  - Q3: 75% of the cost of the order are less than $22.5
  - Maximum: The maximum cost of the order is $35 dollars
  - Median: The median cost of order is a little less than $15
  - Mode: The mode in this case is $12.18
  - Most customers seem to have placed an order that costs between $11-$13
  - Outliers: There are no outliers
  - Skewness: From the plot, it can be observed that it is a right skewed graph and there are some orders that are in the range of over $25-$35



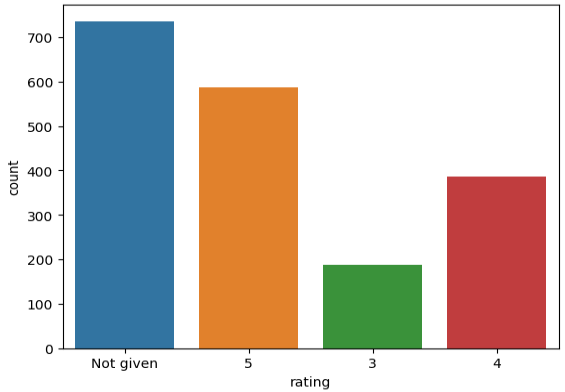


EDA - Univariate Analysis

- **Day Of The Week :**
  - Unique Values: Orders are placed both on Weekdays and Weekends
  - Orders: Circa 1350 orders are placed over the weekend than compared to 550 orders placed over the weekdays, which infers that weekends are very busy than compared to the weekdays.

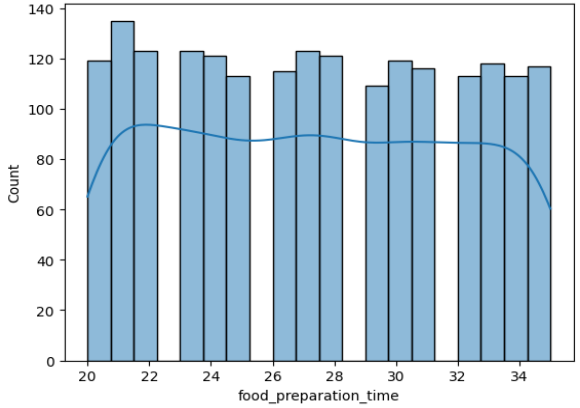


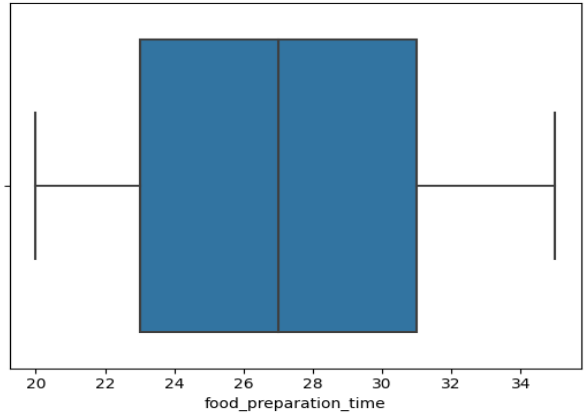
- **Rating :**
  - Unique Values: Not Given, 5, 4 and 3
  - Circa. 38% of orders (735) were not rated by the customers.
  - Circa. 30% (590) orders have received a rating of 5.
  - Circa. 20% (385) orders have received a rating of 4.
  - Circa. 10% (190) orders have received a rating of 3.



EDA - Univariate Analysis

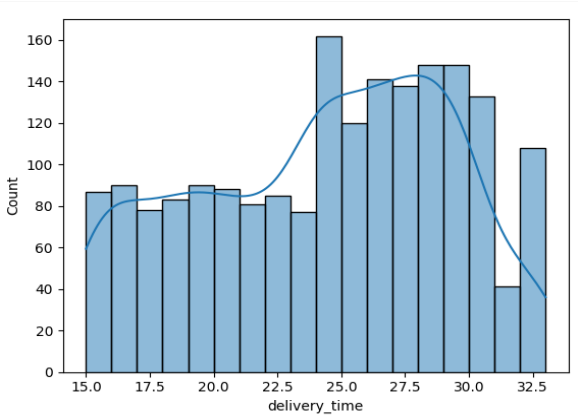
- **Food Preparation Time :**
  - Highest Orders: Circa.135 orders were prepared in 21 minutes
  - Minimum: The minimum food preparation time was 20 minutes
  - Q1: 25% of the food preparation time was well within 23 minutes
  - IQR (Q3-Q1): 50% of the food preparation time lies between 23-33 minutes
  - Q3: 75% of the food preparation time was under 33 minutes
  - Maximum: The maximum time required to prepare food was 35 minutes
  - Median & Mean: The median and mean food preparation time were both approx. 27 minutes.
  - Outliers: There are no outliers

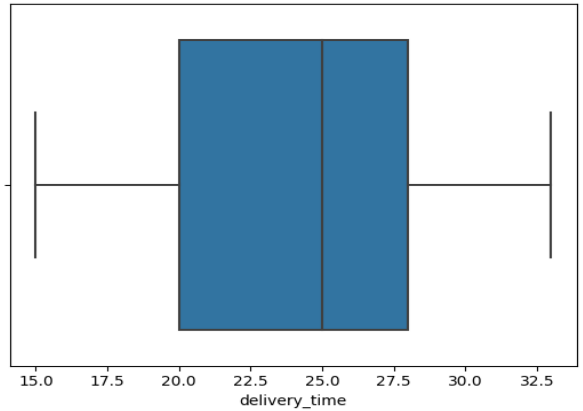




EDA - Univariate Analysis

- **Delivery Time :**
  - Highest Orders: Circa. 162 orders were delivered under 25 minutes
  - Minimum: The least delivery time was 15 minutes
  - Q1: 25% of the delivery time was within 20 mins
  - IQR (Q3-Q1): 50% of the delivery time was between 20-28 mins
  - Q3: 75% of the delivery time was under 28 mins
  - Maximum: The maximum time required to deliver food was 33 mins
  - Median & Mode : The median and mode time required to deliver food was 25 and 24 minutes, respectively. The median and mode are very close to each other
  - Mean: The mean delivery time is 24.16 mins
  - Outliers: There are no outliers





EDA - Univariate Analysis

- **Top 5 Restaurants in terms of numbers of Orders :**

#	Restaurant	Total No. Of Orders
1	Shake Shack	219
2	The Meatball Shop	132
3	Blue Ribbon Sushi	119
4	Blue Ribbon Fried Chicken	96
5	Parm	68

- **Most Popular Weekend Cuisine :** American
- **Precentage Of Orders that cost more than $20 :** Circa. 29.24% (Total Orders: 555 of 1898)
- **Mean Order Delivery Time :** 24.16 minutes
- **Top 3 most frequent customers to avail of 20% discount vouchers :**

#	Customer ID	Total No. Of Orders
1	52832	13
2	47440	10
3	83287	9

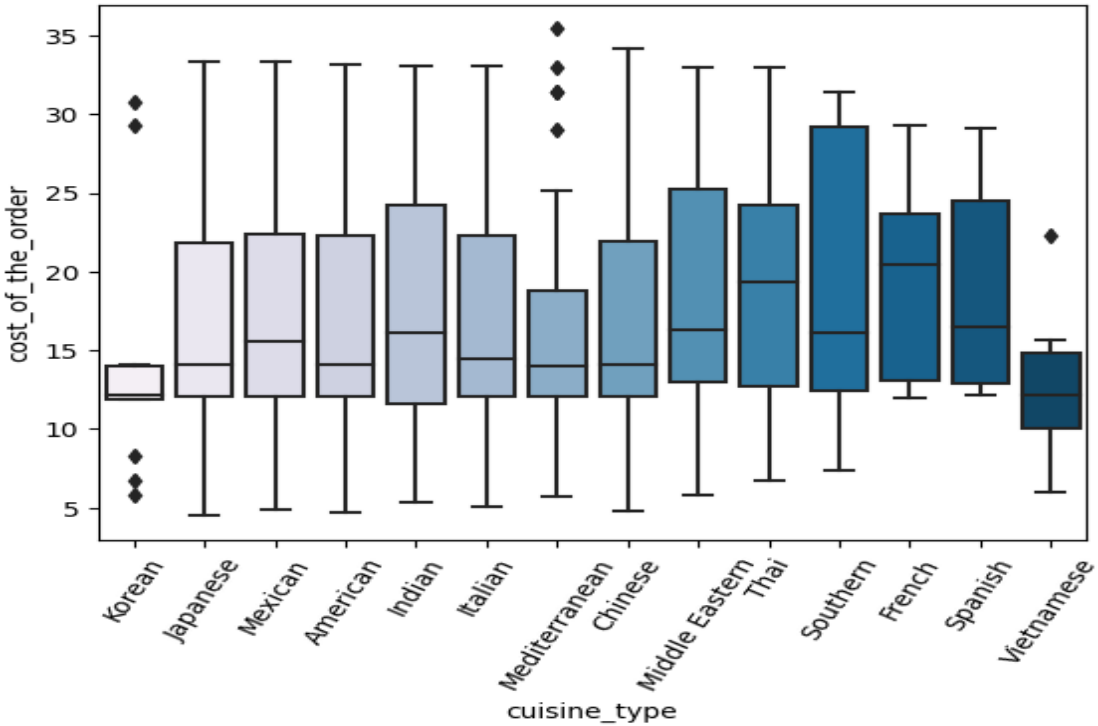
EDA - Univariate Analysis – Key Observations & Insights

- **Key Observations :**
  - There are 1898 unique Order ID's, 1200 unique customers and 698 repeat customers and 14 unique Cuisine types
  - American cuisine is the most popular cuisine, followed by Japanese and Italian. The demand for Spanish, Korean and Vietnamese cuisine seem to be very low.
  - Most customers seem to place an order that costs between $11-$13.
  - The minimum and maximum food preparation time was 20 and 35 minutes, respectively. Whereas the minimum and maximum delivery time was around 15 and 33 minutes, respectively.
  - Shake Shack is the top restaurant with 219 orders.
- **Key Insights :**
  - Circa 63% of customers have placed only single orders as opposed to 37% who have placed multiple orders.
  - Over 90% of restaurants have been used repeatedly as opposed to 10% that have had unique orders
  - American cuisine is the most popular, whereas Vietnamese seems to be the least popular choice
  - A staggering 38% of orders have not been rated by the customers, which might lead to skewness
  - 6% of the orders were prepared in under 20 minutes, while 4% of the orders were delivered in under 15 minutes
  - Weekends are very busy than compared to the weekdays.

EDA - Multivariate Analysis

EDA - Multivariate Analysis

- **Cuisine vs Cost of the Order :**
  - Highest Cost Of Order: Chinese cuisine has the highest cost of order $34 dollars compared with all other cuisines
  - Lowest Cost of Order: Japanese cuisine has the lowest cost of order, approx. $4.47 dollars as compared with all other cuisines
  - Median Cost Of Order: 50% of the cost of order was within $15 dollars for Japanese, American, Italian, Mediterranean and Chinese cuisines

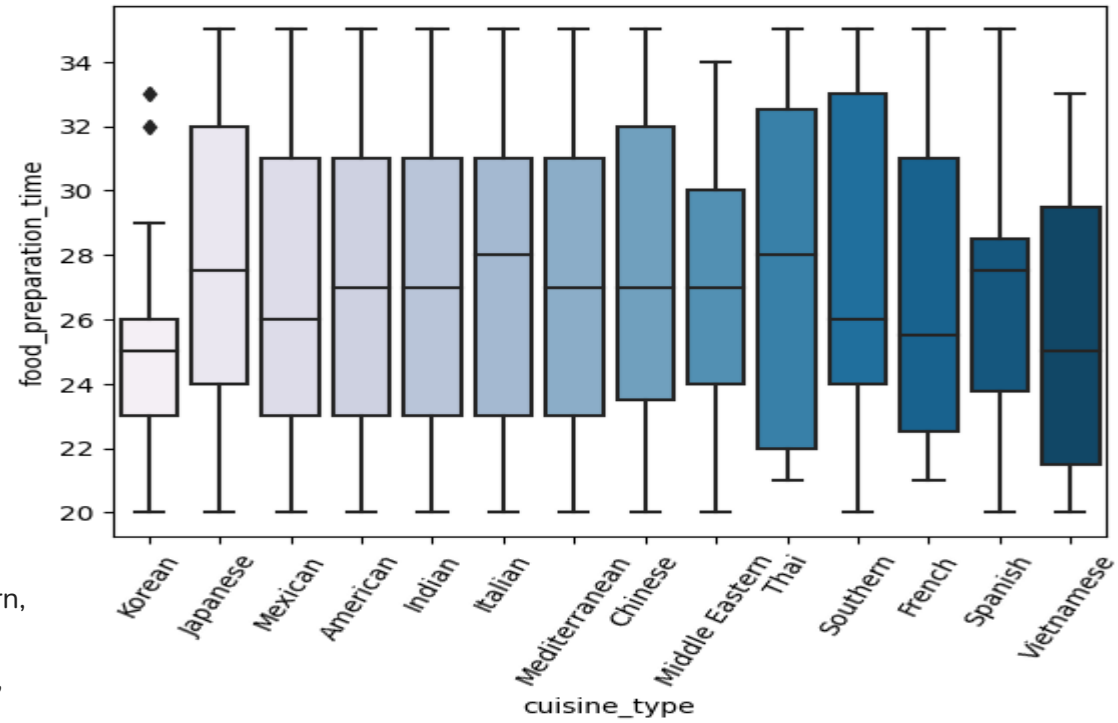


EDA - Multivariate Analysis

- **Cuisine vs Cost of the Order (Cont'd) :**
  - Q1: 25% of the cost of order is the lowest for Vietnamese, whilst it was the same for Japanese, Mexican, American and Italian cuisine. Except for Korean, French and Vietnamese cuisines, all other cuisines had 25% of the cost of order below $13.
  - Q3: 75% of the cost of order is the lowest for Korean and highest for Southern cuisines. Except for Korean, Mediterranean, Southern and Vietnamese cuisines, all other cuisines had 75% of the cost of order below $25.
  - IQR for the various cuisines: Korean: 2.18, Japanese: 9.75, Mexican:10.28, American:10.18, Indian:12.56, Italian: 10.18, Mediterranean: 6.69, Chinese: 9.78, Middle Easter Cuisine: 12.32, Thai: 11.49, Southern: 16.68, French: 10.06, Spanish:11.58, and Vietnamese:5.65
  - Outliers: The Mediterranean and Korean cuisine have 4 and 5 outliers respectively, indicating that the prices are out of the normal range for these orders
  - American is the most popular cuisine, the median cost of the order is less than $15, and 75% of the cost of orders are less than $25. Japanese is the second most popular cuisine, 50% of the cost of orders is also below $15 and 75% of the cost of orders are less than $25. 50% of the cost of order for the American and Japanese cuisine are between $12.5 and $23.
  - Italian cuisine seems to be the third most popular and it exhibits similar traits: 50% of the cost of order is just under $15, although 75% of the cost of the order is under $22.5.

EDA - Multivariate Analysis

- **Cuisine vs Food Preparation Time:**
  - Highest Food Prep Time: Except for Korean, Middle Eastern and Vietnamese, all other cuisines have a maximum food preparation time of 35 mins
  - Lowest Food Prep Time: Except for Thai and French, all other cuisines have a minimum food preparation time of 20 mins
  - Median Food Prep Time: The median food preparation time is within 26 minutes for Korean, Mexican, Southern, French and Vietnamese as compared to Japanese, American, Indian, Italian, Mediterranean, Chinese, Middle Eastern, Thai and Spanish cuisines , which is under 28 minutes

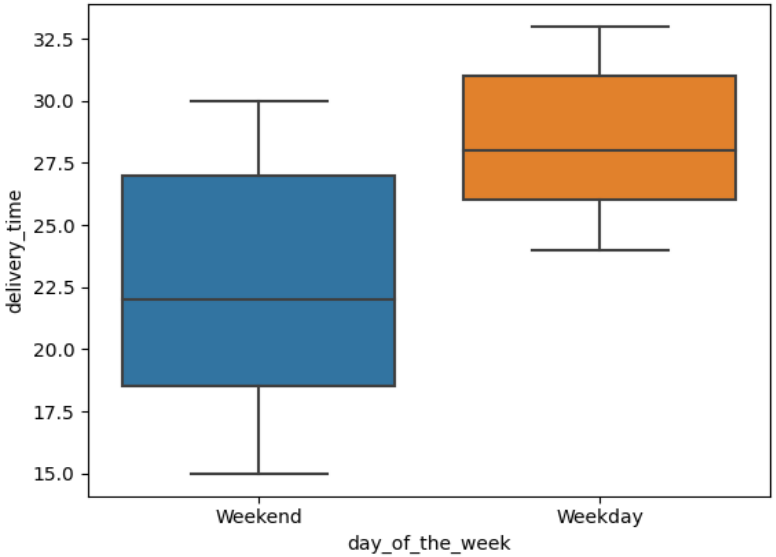


EDA - Multivariate Analysis

- **Cuisine vs Food Preparation Time(Cont'd) :**
  - Q1: 25% of the food preparation time is under 23 mins for Korean, Mexican, American, Indian, Italian, Mediterranean and just under 24 mins for Japanese, Chinese, Middle Easter, Southern, Spanish cuisines and just under 22.5 mins for Thai, French and Vietnamese cuisines
  - Q3: 75% of the food preparation time is between 32 and 33 mins for Thai and Southern cuisines; within 32 mins for Japanese, Mexican, American, Indian, Italian, Mediterranean, Chinese and French cuisines. Within 30 mins for Middle Eastern, Vietnamese and Spanish cuisines and 26 minutes for Korean cuisine.
  - IQR for food prep time: The middle 50% food preparation time for all cuisines was between 8-10 mins except for Middle Eastern, Spanish, and Korean cuisines. The 50% of food prep time for Japan, Mexican, American, Indian, Italian, Mediterranean, and Vietnamese cuisine was 8 minutes. For Chinese and French cuisine, it was 8.5 minutes, for Thai: 10.5 mins, for Southern: 9 mins, for Middle Eastern: 6 mins, for Spanish: 4.75 mins and for Korean: 3 mins
  - Outliers: The Korean cuisine has 2 outliers (32 and 33 mins), indicating that some of the food items were outside of the normal range for these orders

EDA - Multivariate Analysis

- **Day of the Week vs Delivery Time:**
  - Min Delivery Time: The minimum delivery time is 15 mins on the weekend as opposed to 24 mins on the weekday
  - Highest Delivery Time: The maximum delivery time is 30 mins on the weekend as opposed to 33 min on the weekday
  - Median & Mean Delivery Time: The median and the mean time to deliver is 22 mins over the weekend as compared to 28 mins over the weekday
  - Q1: 25% of the delivery times on a weekend is under 20 mins as compared to that on a weekday, which is under 26 mins



  - Q3: 75% of the delivery times on a weekend is under 27 mins as compared to that on a weekday, which is 31 mins.
  - IQR for food prep time: The middle 50% of delivery time over the weekend is 8.5 mins as compared to that on a weekday, which is 5 mins

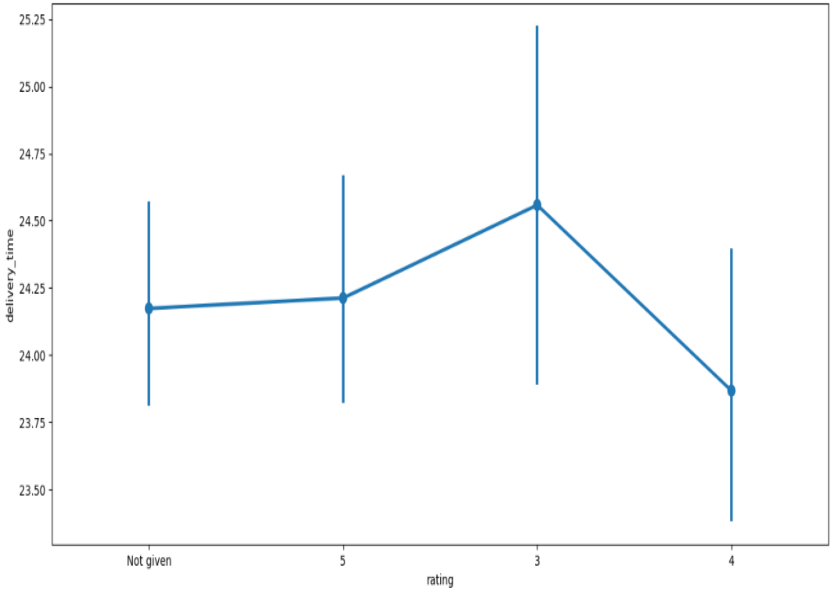
EDA - Multivariate Analysis

- **Revenue Generated by top 14 Restaurants :** The top 14 revenue generating restaurants include 3 American, 3 Italian, 4 Japanese and 4 Chinese

#	Restaurant Name	Total Revenue	Cuisine Type
1	Shake Shack	3,579.53	American
2	The Meatball Shop	2145.21	Italian
3	Blue Ribbon Sushi	1903.95	Japanese
4	Blue Ribbon Fried Chicken	1662.29	American
5	Parm	1112.76	Italian
6	RedFarm Broadway	965.13	Chinese
7	RedFarm Hudson	921.21	Chinese
8	TAO	834.50	Chinese
9	Han Dynasty	755.29	Chinese
10	Blue Ribbon Sushi Bar & Grill	666.62	Japanese
11	Rubirosa	660.45	Italian
12	Sushi of Gari 46	640.87	Japanese
13	Nobu Next Door	623.67	Japanese
14	Five Guys Burgers and Fries	506.47	American

EDA - Multivariate Analysis

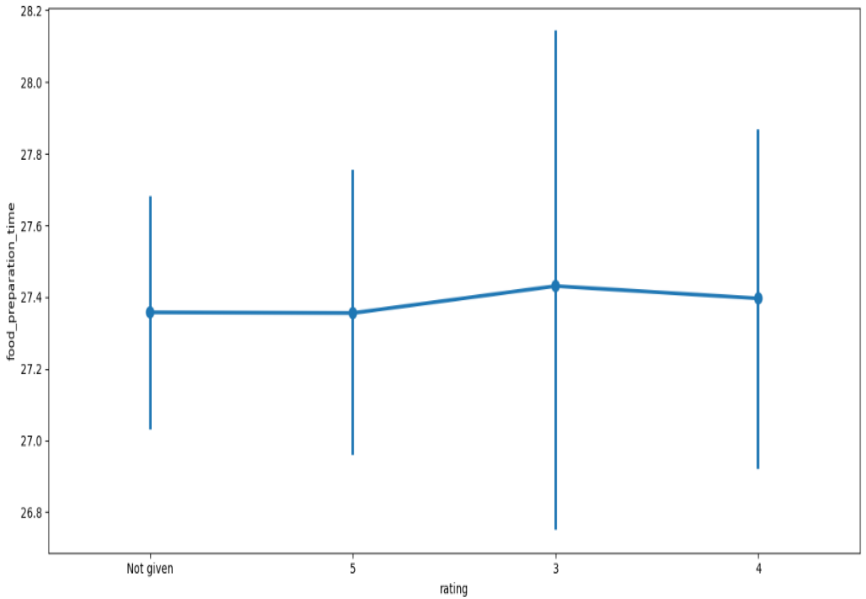
- **Rating vs Delivery Time :**
  - 5 Rating: The rating is 5 when the average delivery time is approx. 24.25 mins for a 95% confidence level between 23.75 and 24.75 mins
  - 4 Rating: The rating is 4 when the average delivery time is approx. 23.85 mins for a 95% confidence level between 23.25 and 24.50 mins
  - 3 Rating: The rating is 3 when the average delivery time is approx. 24.52 mins for a 95% confidence level between 23.75 and 25.25 mins
  - No Rating: There is no rating given to subset of the data with an average delivery time of 24.20 mins for a 95% confidence level between 23.85 and 24.65 mins



  - As the time to deliver the food increases, the rating decreases and vice-versa i.e. Rating improves when food is delivered in the shortest time period than expected.

EDA - Multivariate Analysis

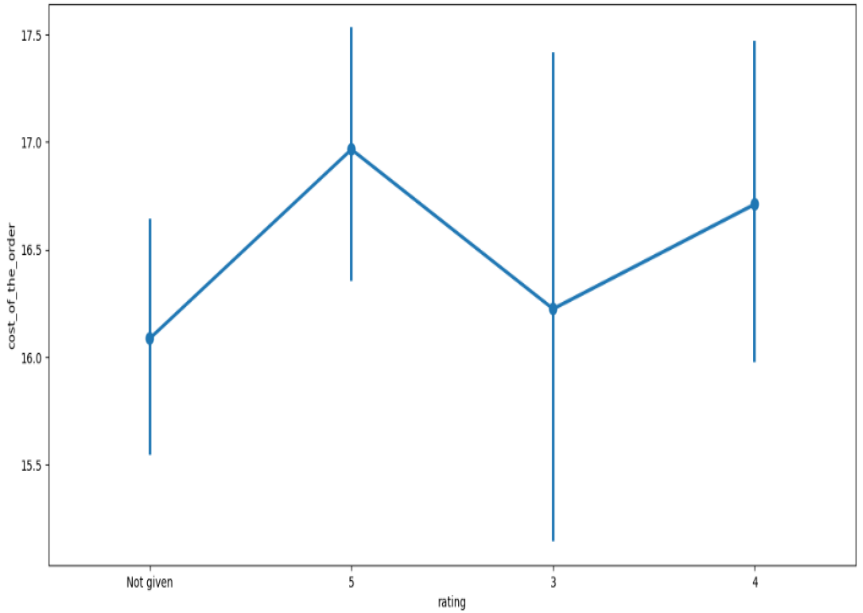
- **Rating vs Food Preparation Time :**
  - 5 Rating: The rating is 5 when the average delivery time is approx. 27.38 mins for a 95% confidence level between 26.95 and 27.75 mins
  - 4 Rating: The rating is 4 when the average delivery time is approx. 27.4 mins for a 95% confidence level between 26.95 and 27.95 mins
  - 3 Rating: The rating is 3 when the average delivery time is approx. 27.42 mins for a 95% confidence level between 25.75 and 28.75 mins
  - No Rating: There is no rating given to subset of the data with an average delivery time is approx. 27.38 mins for a 95% confidence level between 27.0 and 27.7 mins



  - As the food preparation time increases, the rating decreases and vice-versa i.e. Rating improves when food preparation time is shorter than expected

EDA - Multivariate Analysis

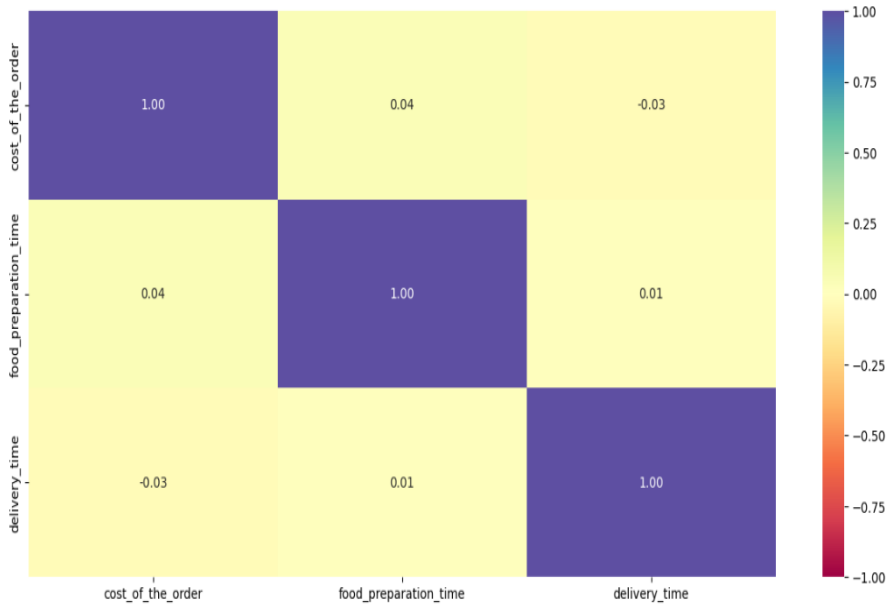
- **Rating vs Cost Of Order :**
  - 5 Rating: The rating is 5 when the average cost of the order is approx. $17 for a 95% confidence level of cost of orders between $16.45 and $17.65
  - 4 Rating: The rating is 4 when the average cost of the order is approx. $16.75 for a 95% confidence level of cost of orders between $15.85 and $17.5
  - 3 Rating: The rating is 3 when the average cost of the order is approx. $16.25 for a 95% confidence level of cost of orders between $15.25 and $17.5
  - No Rating: There is no rating given to subset of the data with the average cost of the order is approx. $16.15 for a 95% confidence level of cost of orders between $15.6 and $16.6



  - As the cost of the order increases, the rating increases. This is very likely since exotic cuisines are rich and tasteful and thereby expensive

EDA - Multivariate Analysis

- **Correlation Amongst Variables :**
  - There is positive (although insignificant) correlation of 0.04 between cost of the order and food preparation time. As food preparation time increases, the cost increases.
  - There is also a positive (although insignificant) correlation of 0.01 between food preparation time and delivery time. As food preparation time increases, the time to deliver gets longer
  - There is a negative (although insignificant) correlation of -0.03 between delivery time and cost of the order. As delivery time decreases, the cost of the order increases and vice-versa. This probably implies that faster deliver will add more to the cost and vice-versa.



EDA - Multivariate Analysis

- **Restaraunts elgible for Promotional Offer** in the advertisement of the restaurants include 1 Italian, 2 American, and 1 Japanese

#	Restaurant Name	Average Rating	Cuisine Type
1	The Meatball Shop	4.511905	Italian
2	Blue Ribbon Fried Chicken	4.328125	American
3	Shake Shack	4.278195	American
4	Blue Ribbon Sushi	4.219178	Japanese

- **FoodHub Net Revenue :** Given, that FoodHub charges the restaurants 25% on the orders having costs greater than $20 and 15% on the orders having costs greater than $5, the net revenue generated by the company across all orders is $6,166.3
- **Percentage of Order > 60 mins :** The percentage of orders that take more than 60 minutes to get delivered from the time the order is placed is: 10.54 %
- **Mean Delivery Time (Weekdays vs Weekends) :**
  - The mean delivery time on weekdays is around 28 minutes
  - The mean delivery time on weekends is around 22 minutes

EDA - Multivariate Analysis – Key Observations & Insights

- **Key Observations :**
  - American is the most popular cuisine, the median cost of the order is less than $15 dollars, and 75% of the cost of orders are less than $25. Japanese is the second most popular cuisine, 50% of the cost of orders is also below $15 and 75% of the cost of orders are less than $25. 50% of the cost of order for the American and Japanese cuisine are between $12.5 and $23. Italian cuisine seems to be the third most popular and it exhibits similar traits i.e. 50% of the cost of order is just under $15 dollars, although 75% of the cost of the order is under $22.5.
  - Except for Korean, Middle Eastern and Vietnamese, all other cuisines have a maximum food preparation time of 35 minutes. Whereas, except for Thai and French, all other cuisines have a minimum food preparation time of 20 minutes
  - The minimum and maximum delivery time on the weekend is 15 and 30 minutes, respectively. Whereas, the minimum and maximum delivery time on the weekday is 24 and 33 minutes, respectively. Also, the mean delivery time on weekdays and weekends is around 28 and 22 minutes, respectively
  - The rating is 5 when the average delivery time is approx. 24.25 mins within a 95% confidence interval of 23.75 and 24.75 mins, the rating is 4 when the average delivery time is approx. 23.85 mins within a 95% confidence interval of 23.25 and 24.50 mins, and the rating is 3 when the average delivery time is approx. 24.52 mins within a 95% confidence interval of 23.75 and 25.25 mins

EDA - Multivariate Analysis – Key Observations & Insights

- **Key Observations (Cont'd) :**
  - The rating is 5 when the average food preparation time is approx. 27.38 mins within a 95% confidence interval of 26.95 and 27.75 mins, the rating is 4 when the average food preparation time is approx. 27.4 mins within a 95% confidence interval of 26.95 and 27.95 mins, and the rating is 3 when the average food preparation time is approx. 27.42 mins within a 95% confidence interval of 25.75 and 28.75 mins
  - The rating is 5 when the average cost of the order is approx. $17 within a 95% confidence interval of cost of orders between $16.45 and $17.65, the rating is 4 when the average cost of the order is approx. $16.75 within a 95% confidence interval of cost of orders between $15.85 and $17.5, and the rating is 3 when the average cost of the order is approx. $16.25 within a 95% confidence interval of cost of orders between $15.25 and $17.5
  - There is an insignificant positive correlation between cost of the order and food preparation time. an insignificant positive correlation between food preparation time and delivery time, and an insignificant negative correlation between delivery time and cost of the order.
  - The top restaurants with average customer rating of above 4 are: The Meatball Shop, Blue Ribbon Fried Chicken, Shake Shack, and Blue Ribbon Sushi
  - The net revenue generated by the FoodHub across all orders is $6,166.3
  - The percentage of orders that take more than 60 minutes to get delivered from the time the order is placed is: 10.54 %

EDA - Multivariate Analysis – Key Observations & Insights

- **Key Insights :**
  - Chinese cuisine has the highest cost of order $34, whereas Japanese has the lowest when compared to other cuisines. Although, the median cost of order is within $15 dollars for Japanese, American, Italian, Mediterranean and Chinese cuisines, American cuisine seems to be the most popular choice for customers. The Mediterranean and Korean cuisine have 4 and 5 outliers respectively, indicating that the prices are out of the normal range for these orders
  - The food preparation time for Korean cuisine has 2 outliers (32 and 33 mins), indicating that some of the food items were outside of the normal range for these orders
  - Although weekends are much busier than weekdays, the delivery times are quicker on weekends than compared to weekdays.
  - The top 5 revenue generating restaurants include 2 American, 2 Italian, and 1 Japanese type cuisines
  - As the time to deliver the food increases, the rating decreases and vice-versa i.e. Rating improves when food is delivered in the shortest time period than expected.

EDA - Multivariate Analysis – Key Observations & Insights

- **Key Insights (Cont'd) :**
  - As the food preparation time increases, the rating decreases and vice-versa i.e. Rating improves when food preparation time is shorter than expected
  - As the cost of the order increases, the rating increases. This is very likely since exotic cuisines are rich and tasteful and thereby expensive
  - As food preparation time increases, the cost increases and the time to deliver gets longer. Moreover, as delivery time decreases, the cost of the order increases and vice-versa. This probably implies that faster delivery will add more to the cost and vice-versa.
  - There are 4 top restaurants with an average customer rating of above 4 that are eligible for promotional advertisement offer include 1 Italian, 2 American, and 1 Japanese cuisine type restaurants

Conclusion

- 63% of the customers (1200) have only placed single orders, whereas 37% (698) of customers placed multiple orders
- Only 3 restaurants (Shake Shack:219, The Meatball Shop:132, Blue Ribbon Sushi:119) have placed orders above the 100 mark
- Orders placed over the weekend are circa. 2.5 times than those placed over the weekdays. (Weekday Orders: 547 - 29% | Weekend Orders: 1352 - 71%)

Our Recommendation

Based on our key observations and insights, we recommend the following areas of improvement / opportunities that will drive business growth and lead to a better customer experience

- **Implement Customer Incentivisation Scheme to increase orders on Weekdays & Weekends :**
  - **Weekday Customers:** Since majority of the orders are placed over the weekend than compared to the weekday, it's critically important to understand the needs of the customer and incentivise them such that it boosts overall sales / net revenue. Understanding the location of the customer on weekdays (office / home) and thereby managing the supply chain to optimise the delivery timelines would be the key to get new orders.
  - **Weekend Customers:** Since weekend customers constitute a large number of orders, it is also important to make them feel valued as a loyal customer by offering them certain benefits such as freebies / discounts so that they can increase the amount on the order. Incentivising schemes such as Loyalty Points, Badges and Reward that can be redeemed in the next targeted purchase will certainly boost order sales.

Our Recommendation (Cont'd)

- **Implement Cross Selling ('You May Also Like') feature to boost orders to be placed in other restaurants :** Only 3 restaurants seem to be very popular and the go-to place for ordering food since we have seen them cross the 100 order mark. Although it's important to understand customer feedback as to why they haven't ordered as much from other restaurants, it could be well worth an opportunity to cross-sell similar food-items along with prices and customer ratings from other restaurants. This could effectively increase orders for other restaurants and will boost overall sales / revenue if the customer orders a companion food item from relevant restaurants. For example: A customer ordering a burger from Shake-Shack could also order a companion Japanese bubble Tea from Nobu Next Door.

- **Implement Customer Feedback ('How Was Your Experience?') feature to enhance Customer Experience :** Over 60% of customers have placed only single orders as opposed to 30% who have placed multiple orders. It is critically important to do a full root-cause analysis (RCA) to identify and eliminate issues that might be causing a poor customer experience and thereby demotivating customers to place repeat orders. Typically, issues such as Incorrect Food Items Delivered, Poor Packaging, Poor Food Quality, Extended Food Delivery Time, Incorrect Amount on Invoice play a critical role leading to poor customer satisfaction. A customer feedback in the App (objective form / subjective narrative) can be used to capture customer feedback, which can then be relayed to the appropriate supply chain partner (restaurant / delivery driver etc) in order to optimise customer experience.

APPENDIX

Appendix - Notes

- Further analysis would be required on a comprehensive dataset to provide customer segmentation strategies

Great Learning

Happy Learning !