

FOODHUB DATA ANALYSIS

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AGENDA

- EXECUTIVE SUMMARY
- BUSINESS PROBLEM OVERVIEW & SOLUTION APPROACH
- DATA OVERVIEW
- EDA - UNIVARIATE ANALYSIS & KEY QUESTIONS
- EDA – MULTIVARIATE ANALYSIS & KEY QUESTIONS
- RECOMMENDATIONS & CONCLUSIONS

EXECUTIVE SUMMARY

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- Various lifestyles have led to increased number of restaurants in New York promoting the innovation of online food delivery service known as FoodHub
- Foodhub is a smartphone app that will be utilized to access multiple restaurants in providing fast and efficient online food delivery service
 - The app allows restaurants to receive direct online orders as well as customers ratings
- Foodhub app produces revenue via charging fixed margin order cost from restaurants
 - The app would make available promotional offers to top-rated restaurants that produces the most orders
- Food aggregator company hired Data Scientist team to perform data analysis on the FoodHub to investigate its performance on business improvement
- Observational Outcome:
 - During weekends, order volumes are much higher compared to weekdays
 - Thus promotional offers can be more utilized on weekends to increase orders
 - Weekends delivery time is decreased when compared to weekdays
 - Evidence of customers rating discrepancy (~39% orders were not rated) -> App should be redesigned to be more interactive
 - >1hour total delivery time were found in ~11% of total orders -> can lead to customers complains and dissatisfaction

BUSINESS PROBLEM OVERVIEW & SOLUTION APPROACH

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- FoodHub app is utilized to provide online delivery services of food from various New York's restaurants to customers' designated locations
- Based on rapid increased of restaurants in New York; the Data Scientist team wants to analyze the productivity of the app by investigating the customer experiences by understanding:
 - Restaurants demands and cuisine preference → which is more favorable
 - The customers' financial costs of ordered food
 - The trend within orders during weekdays and weekends
 - How long is takes for any food to be prepared and delivered
 - Company revenue by utilizing the online delivery services
 - Customers' rating analysis based on experiences
 - The trend among customers when making use of the online delivery services
 - Promotional offers and its benefits to company's decision making
 - Promotions can be given when demand is established for the online delivery services

DATA OVERVIEW

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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

- Dataframe consist:
 - 1898 rows -> Observations
 - 9 columns -> Variables
- Data consist 0 null values
- Missing data -> 736
 - Missing from "rating" variable labelled as "Not Given"
- Days of the week -> Categorical Variable
 - Sum up orders being ordered on weekdays or weekends
- Rating variable consist 3, 4, and 5 rating reviews

DATA STRUCTURE

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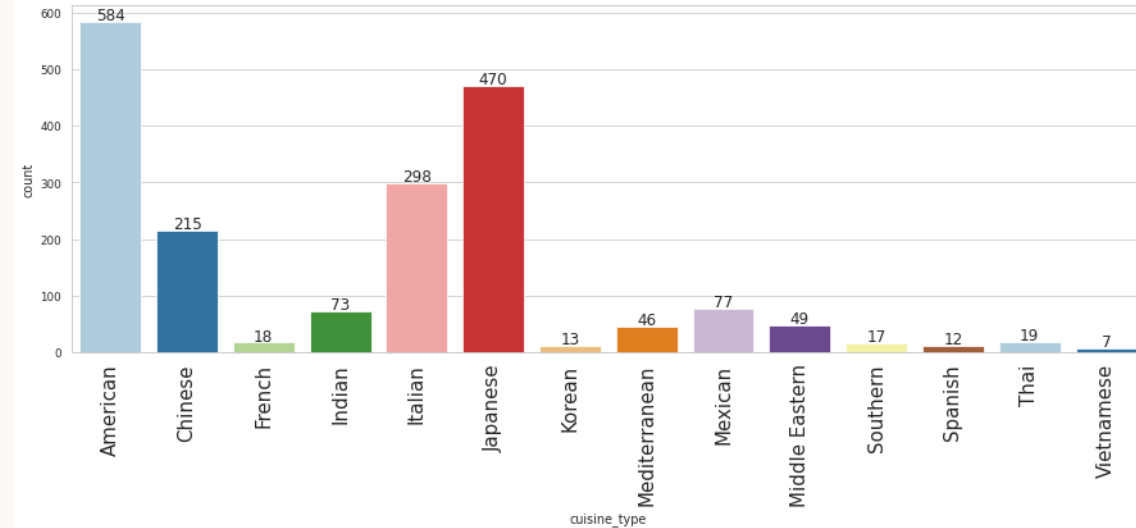
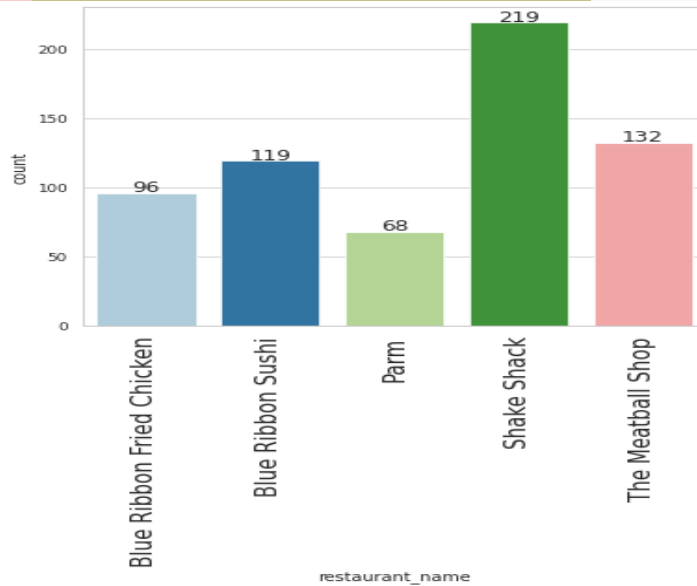
	order_id	customer_id	cost_of_the_order	food_preparation_time	delivery_time	Revenue	total_time
count	1898.00	1898.00	1898.00	1898.00	1898.00	1898.00	1898.00
mean	1477495.50	171168.48	16.50	27.37	24.16	3.25	51.53
std	548.05	113698.14	7.48	4.63	4.97	2.30	6.83
min	1476547.00	1311.00	4.47	20.00	15.00	0.00	35.00
25%	1477021.25	77787.75	12.08	23.00	20.00	1.81	47.00
50%	1477495.50	128600.00	14.14	27.00	25.00	2.12	52.00
75%	1477969.75	270525.00	22.30	31.00	28.00	5.57	56.00
max	1478444.00	405334.00	35.41	35.00	33.00	8.85	68.00

EVALUATIONS

- 1898 different orders demonstrated
 - 1200 customer_id's observed
 - 698 customers repeat (1898-1200)
 - ~37% orders produced by repeat customers ($698/1898 * 100$)
- Cost of order
 - Avg --> \$16.50
 - Std --> 7.48
 - Range --> \$4.47 - \$35.41
- Food Prep Time
 - Avg --> 27mins
 - Std --> 5mins
 - Range --> 15(min) - 33(max) mins
- Delivery time
 - Avg --> 24mins
 - Std --> 5mins
 - Range --> 15-33mins
- Thus, 736 orders out of 1898 orders are not rated

EDA: UNIVARIATE ANALYSIS

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Observations:

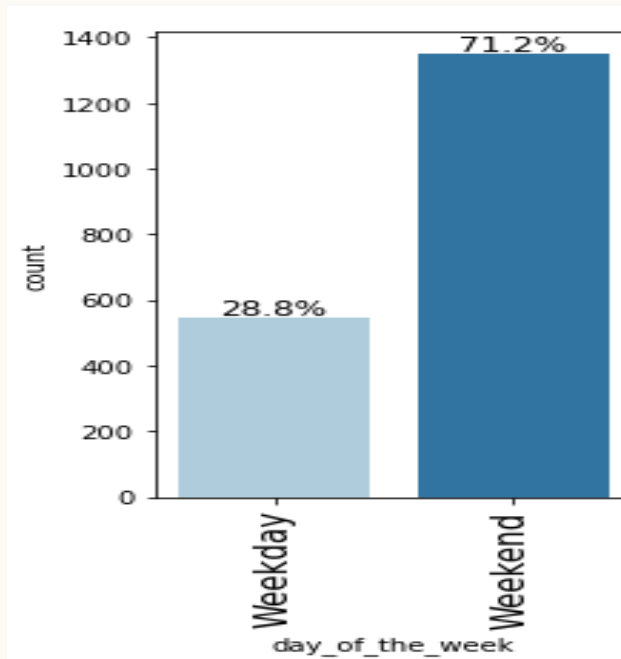
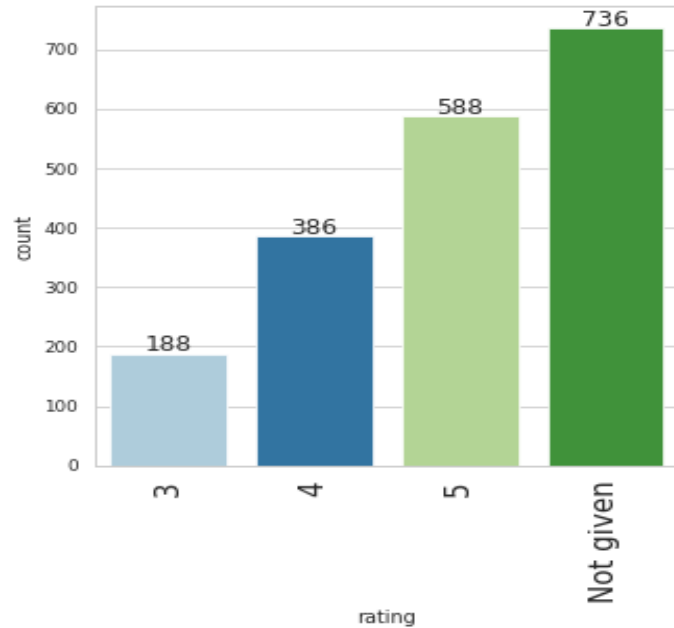
- Top 5 restaurants: Shake Shack, Meatball shop, Blue Ribbon Sushi, Blue Ribbon Fried Chicken, and Parm
 - Made up ~33% of all orders
- All restaurants were visited mostly by Foodhub customers

Observations:

- American, Italian, and Japanese cuisine consist the most data but American cuisine is the most popular during weekends while Korean and Vietnamese cuisine are least popular
- Plot is left skewed signifying the median cost of an order < the mean
 - Thus, there are more orders that cost <\$16.50

EDA: UNIVARIATE ANALYSIS

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Observations:

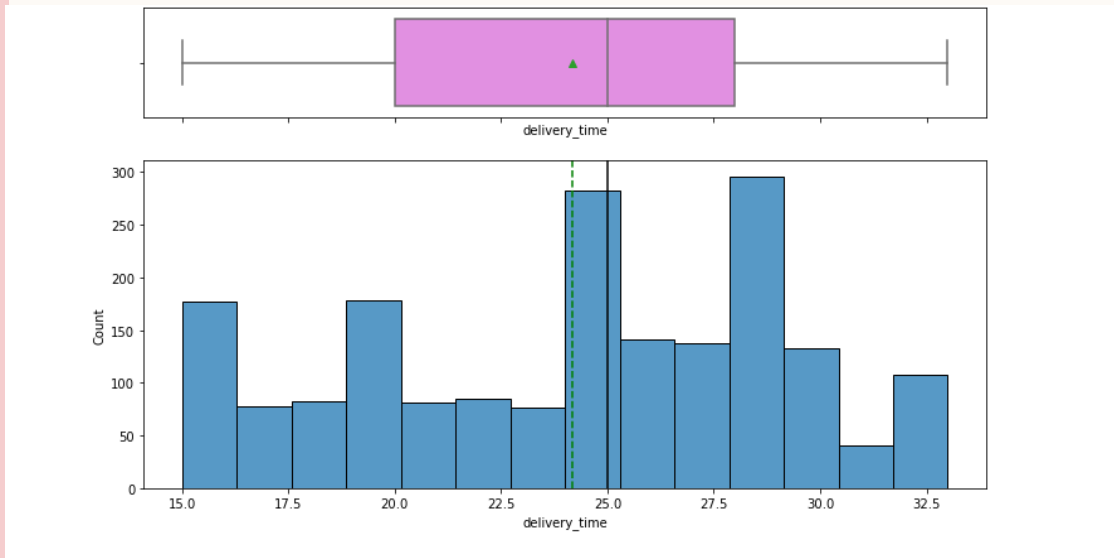
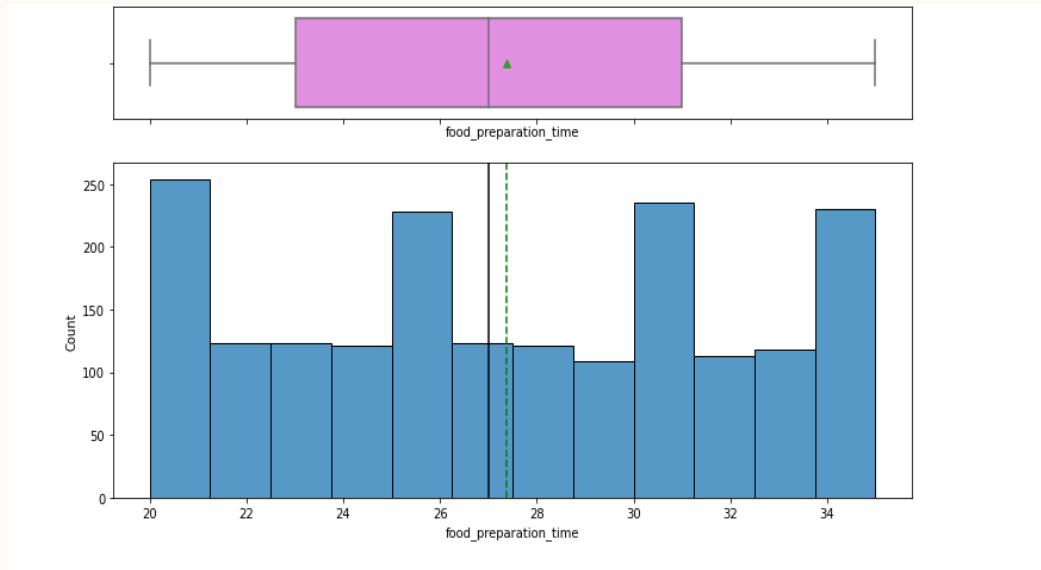
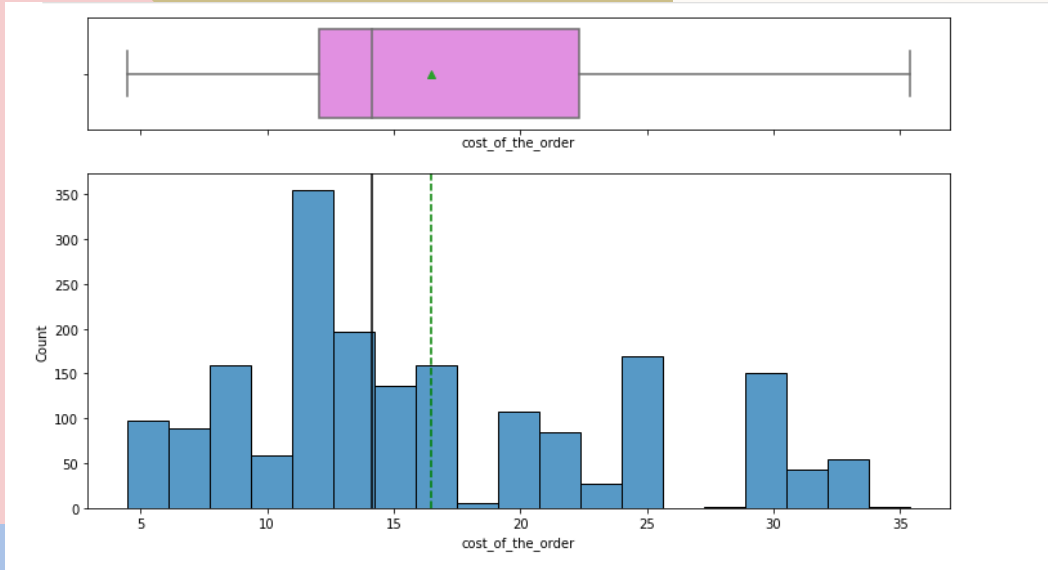
- Rating
 - 39% orders not included
 - 61% orders received ratings
 - 588 order: 5 stars
 - 386: 4 stars
 - 188: 3 stars
 - No order with 0-2 stars

Observations:

- Most orders occurred during weekends
 - ~1350 (~70% of total orders) were weekend orders

EDA: UNIVARIATE ANALYSIS

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OBSERVATIONS

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- Cost of Order
 - Highest #: \$11-\$12
 - Avg cost is ~\$17 with std \$7
 - Min --> \$4.5 ; Max --> \$35
 - 50% of order cost fall within \$12 - \$22
 - 29.24% of orders cost over \$20
 - Left Skewness plot --> More orders cost less than ~\$17
- Food Prep Time
 - There is Uniform Distribution --> Plot not skewed
 - Take ~27mins for preparation w/std of 4.63mins
 - Min --> 20min; Max--> 35mins
 - 50% of time spent for food prep ~23-31mins
- Delivery Time
 - Highest #: 24-25mins
 - Orders took ~24mins to deliver w/std 5mins
 - Min --> 15mins; Max --> 33mins
 - Plot is slightly right skewed --> More orders took more than 24mins for arrival
 - The mean delivery time --> 24.16mins

OBSERVATIONS CONT'D

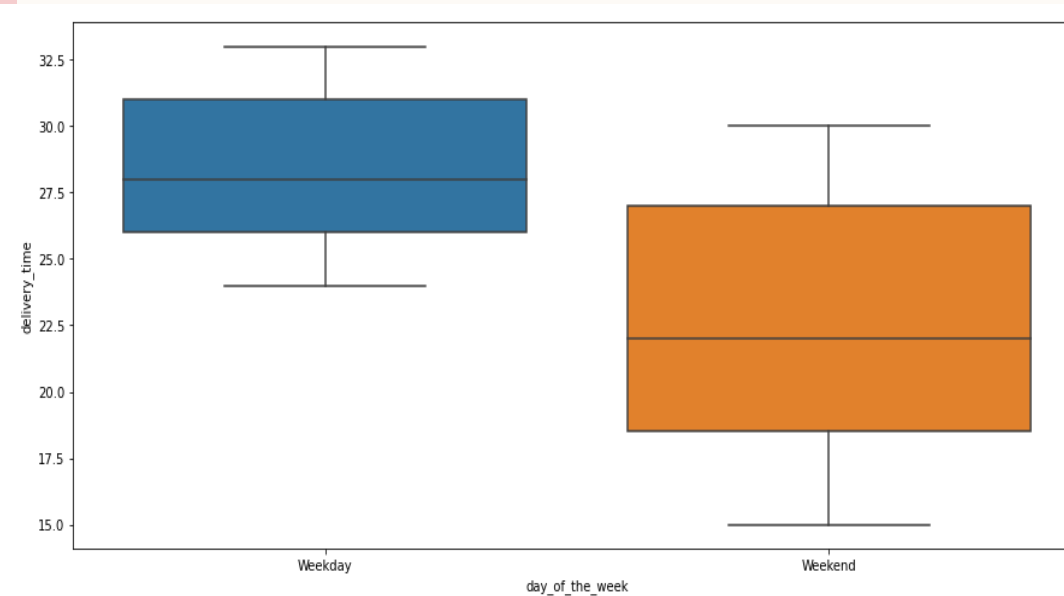
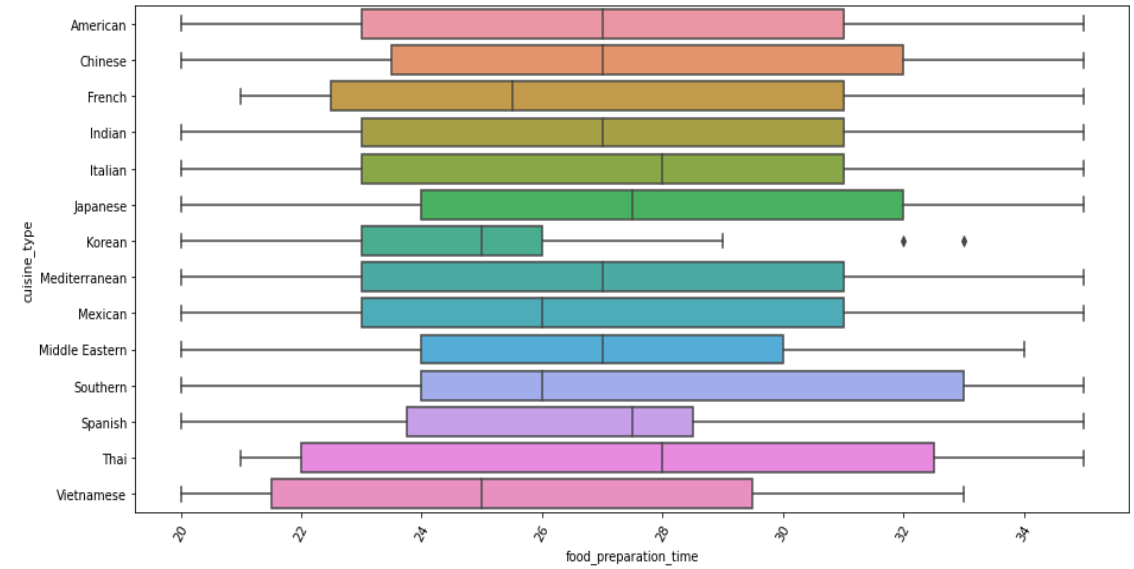
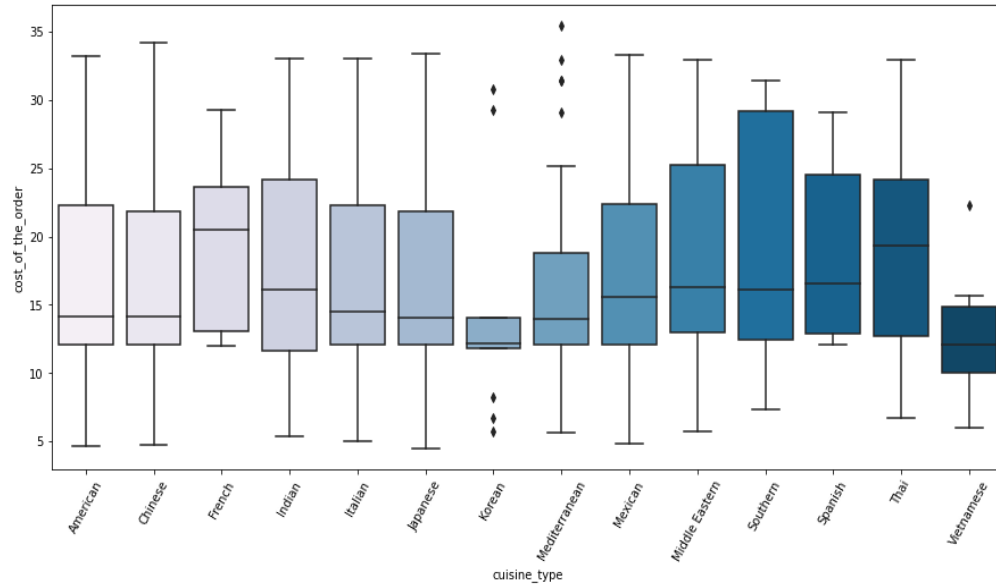
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Top 3 most frequent customers that will be given 20% discount based on the number of order placed are as listed:

CUSTOMER ID	# OF ORDERS
52832	13
47440	10
83287	9

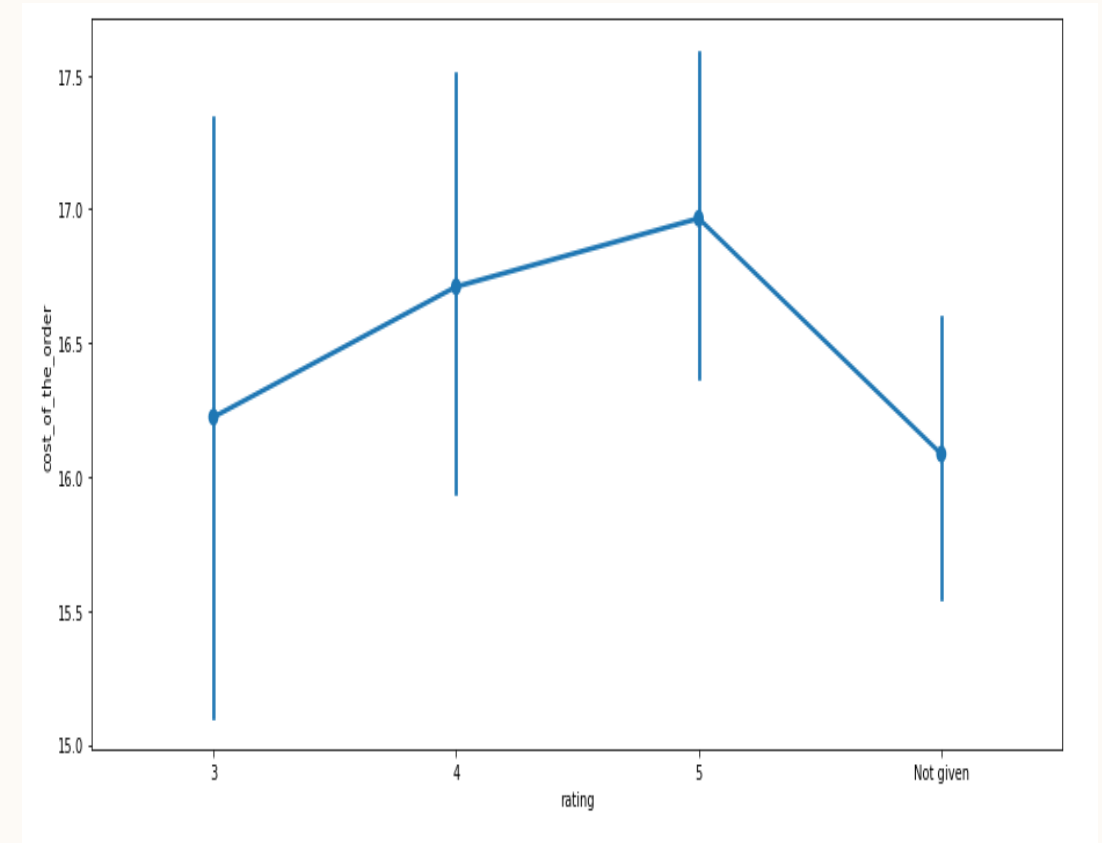
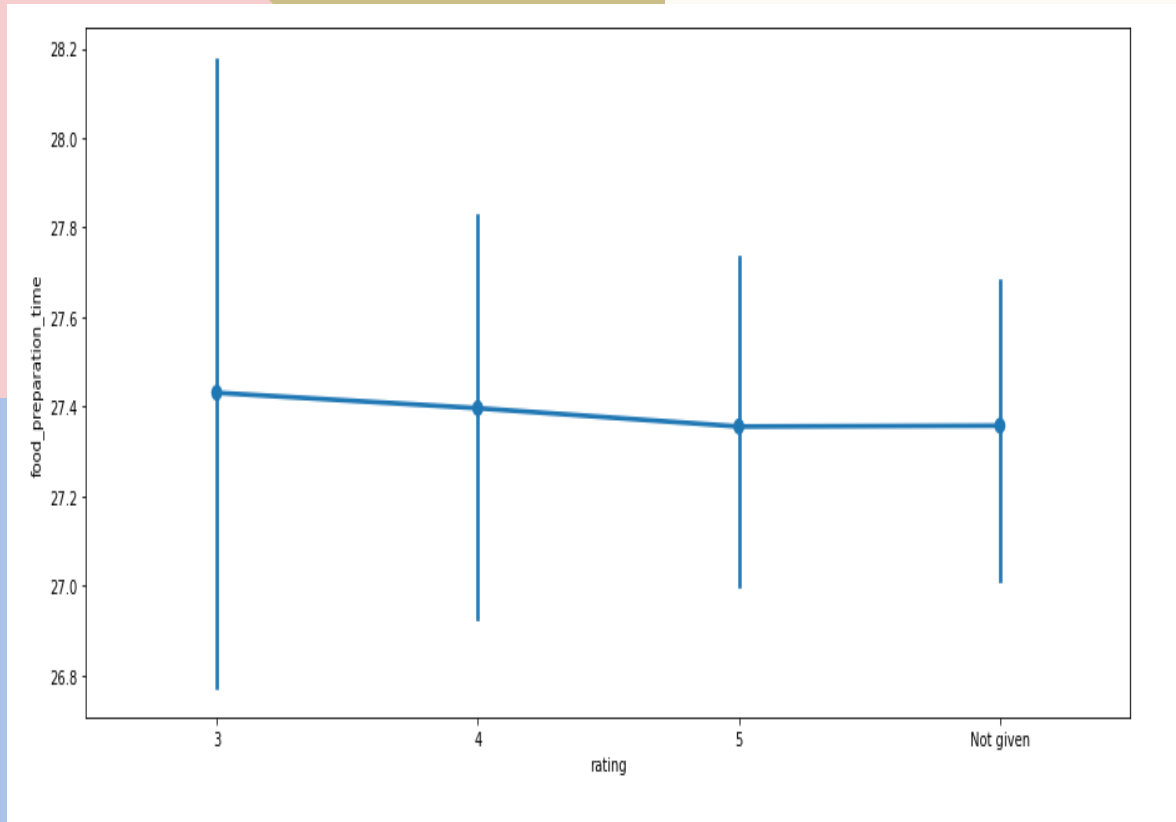
EDA: MULTIVARIATE ANALYSIS

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EDA: MULTIVARIATE ANALYSIS

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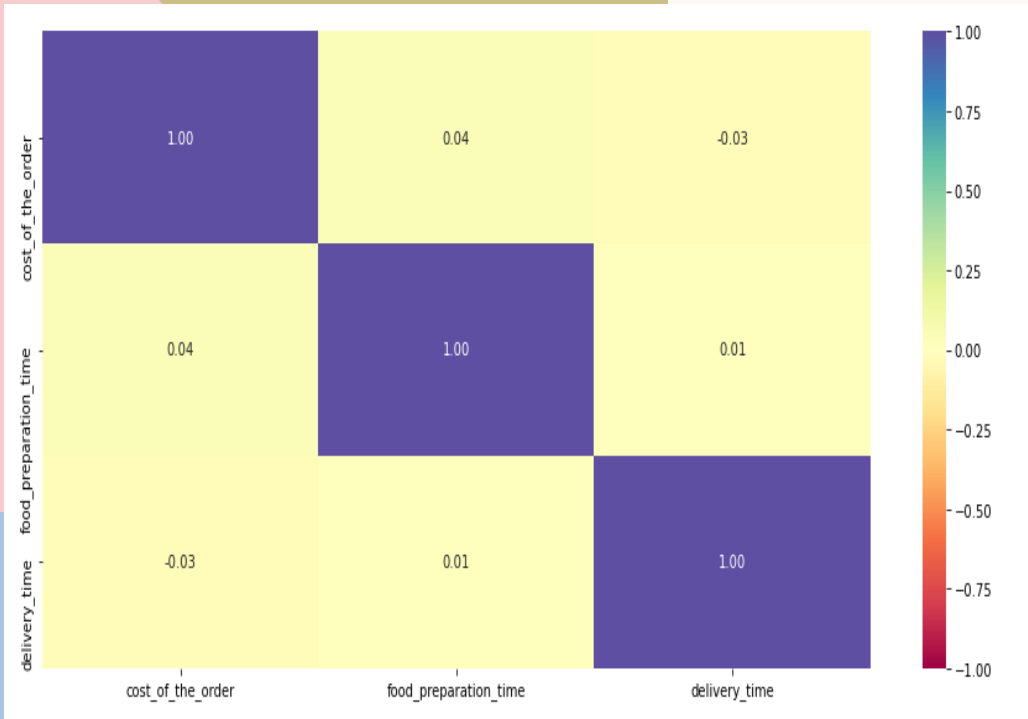
OBSERVATIONS

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- Cuisine Type
 - American, Japanese, and Italian cuisine were most popular during weekdays and weekends
 - Most cuisine cost between \$5 - \$35 while Korean and Vietnamese were much lower
- Restaurants Popularity
 - Top 5 restaurants: Shake Shack, Meatball shop, Blue Ribbon Sushi, Blue Ribbon Fried Chicken, and Parm
 - Accounts ~33% of all 1898 orders
- Food Prep Time
 - The time preparation is uniform among weekdays and weekend → No difference seen
 - Did not play a major role in low-rating of orders
 - The avg. prep time is 27mins
- Cost of Orders
 - There no difference within the average cost of orders during weekdays and weekend
 - The maximum order cost is seen to be greater during weekdays then weekend
- Delivery Time
 - Weekends delivery times is much lesser than the weekdays delivery times → weekdays delivery times are greater
 - Result of greater #of orders on weekends leading to greater variability
 - Also delivery during weekdays can occur during rush hours or when there is much traffic
 - Low rating of orders can result from delivery times
 - The min, max, and mean observed are much higher during weekdays than the weekend
 - ~11% (10.54) of orders have total delivery time greater than 1hr (60mins)
- Day of the Week
 - No impact on orders cost and food prep time
 - Impacted delivery times
 - Average weekdays delivery time ~28mins
 - Average weekends delivery time ~22mins
 - Average delivery times for all orders ~24mins

EDA: MULTIVARIATE ANALYSIS

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- There are no significant correlations seen among order cost, food prep time, and delivery time
- Cost of order seen to have slightly (+) correlation with food prep time
 - As food prep time increases so at the cost of order
- Order cost has a slightly (-) correlation with delivery time
 - As the cost of order increases, the delivery time decreases

ORDERS	PERCENTAGE
>\$20	60%
>\$5	40%

- The net revenue generated by company that charges restaurants 25% and 15% on orders having cost > \$20 and \$5 respectively is \$6,166.30
 - Thus, revenue would be greater than \$6000

RECOMMENDATIONS: FOODHUB

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- Should specialize on giving promotional offers to restaurants in order to lessen the waiting period of orders placed by customers
- Should recruit more delivery agents especially during weekdays rush hours or traffic times in order to optimize customers delivery times
- Should provide customers incentives such as promotional discounts for customers that purchase American, Japanese, and Italian food to enhance customer demand
- Should promote more American, Japanese, and Italian cuisine in the app
- Should also acknowledge customers that leaves honest customers reviews by providing incentives such discounts or gift cards
- Should offer promotional advertisement on the app to restaurants with rating count >50 and average rating >4
 - Blue Ribbon Fried Chicken
 - Blue Ribbon Shushi
 - Shake Shack
 - The Meatball Shop

CONCLUSIONS

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- Top 5 restaurants consist of Shake Shack, Meatball shop, Blue Ribbon Sushi, Blue Ribbon Fried Chicken, and Parm with most orders
- There is a (+) correlation between cost of order and food prep time
 - Can lead to positive outcome on rating
- There is a (-) correlation between cost of order and delivery time
- During weekdays, there is a longer delivery time compare to the weekends
- The total revenue established on all order is approx. \$6166.3
- The mean delivery time for weekdays is ~28mins whereas the weekends ~22mins
- Approx. 11% of the total order demonstrated a total delivery time >1hr



THANK YOU!!!

Dr. Cynthia Offoha