FoodHub Data Analysis [Low Code]

Executive Summary

This analysis investigates order data from FoodHub's New York operations to better understand restaurant demand and inform strategic improvements to our platform. Our study covers 1,898 orders and highlights trends in cuisine popularity, customer behavior, and operational efficiency. Key findings include a concentration of demand on weekends, significant variation in order ratings, and specific restaurant and cuisine performance insights. Based on these results, we recommend targeted actions such as:

- incentivizing customer ratings
- optimizing weekend operations (including reducing high delivery times)
- enhancing the experience for high-value orders and more.

These recommendations aim to enhance customer satisfaction, strengthen restaurant partnerships, and drive business growth for FoodHub.

Business Problem Overview

As Data Scientists at FoodHub, we've noticed that the rising number of restaurants in New York is driving more students and professionals to rely on online food delivery. Our FoodHub app connects customers with a variety of restaurants, streamlines the ordering and delivery process, and collects valuable feedback, generating revenue through a fixed margin from each order. To enhance the customer experience and support business growth, we are analyzing order data to identify demand trends and provide insights that will help improve our platform.

Solution Approach

The aim of this report is to gain a comprehensive understanding of the demand across different restaurants. By analyzing these demand patterns, we seek to identify opportunities to enhance customer experience and optimize restaurant operations.

Data Overview

1. **General**
    a. We have information about 1898 orders across 9 parameters (customer, what restaurant they order from, what cuisine, cost of the order, food preparation time, delivery time, etc.).

b. A noteworthy aspect of this dataset is the **absence of missing values; it is fully complete**. This completeness enhances the reliability of any analyses performed, allowing us to draw findings and make recommendations with a high degree of confidence.
c. The time for food preparation after an order is placed is:
    i. minimum time for food preparation is 20 minutes
    ii. **average time for food preparation is approximately 27 minutes** and
    iii. maximum times for food preparation after an order is placed is 35 minutes
d. **38.77% of orders do not have customer ratings**. That is 736 of the 1898 total orders.

2. **Analysis of Individual Data Points** (a.k.a. EDA - Univariate Analysis)
    a. This includes data about 1200 customers, 178 restaurants and 14 cuisines.
    b. Most popular cuisines are American, Japanese, Italian, Chinese and Mexican.
    c. Least popular cuisines are Vietnamese, Spanish, Korean, Southern, Thai and French.
    d. The median order cost is approximately $14–$16 (evidence). While most orders are concentrated in the lower price range, there are a few orders with significantly higher costs.
    e. More than 50% of the total orders (a.k.a. demand) are placed on weekends.
    f. Most restaurants fall under the rating of either 3, 4 or 5. However, more than 700 orders (almost 50%) from this dataset, did not result in a rating from the customer.
    g. 50% of the orders will take between 23 minutes and 31 minutes to prepare, with an average of 27 minutes.
    h. 50% of the orders will be delivered within 20 minutes and 27.5 minutes, with an average delivery time of 24.16 minutes.
    i. The most popular restaurants on our platform are Shake Shack, The Meatball Shop, Blue Ribbon Sushi, Blue Ribbon Fried Chicken and Parm which aligns with the high popularity of the American cuisine we have observed.
    j. A total of 555 orders cost above $20, accounting for 29.24% of all orders.
    k. These three customers should be considered for a potential 20% discount vouchers given their frequency on our platforms: 52832 with 13 orders, 47440 with 10 orders and 83287 with 9 orders.
3. **Exploring Relationships Among Multiple Data Points** (EDA a.k.a. Multivariate Analysis)
    a. Relationship between cost of the order and cuisine type:
        i. Korean, Vietnamese, or Mediterranean cuisines offer cheaper meals to customers
        ii. French and Thai cuisines set higher medians.

    b. Average food preparation time is lowest for Vietnamese, Korean and French cuisine, with highest variation in food prep time for Thai cuisine.
    c. Average Delivery times are longer on weekends at around 27.5 minutes, compared to 22 minutes on weekdays.
    d. As delivery time gets closer to 24.5 minutes, the ratings do seem to drop at a rating of 3, best ratings come when delivery times are under 24.25 minutes.
    e. Food prep time has no impact on the rating.
    f. Some higher cost orders will result in better ratings at 4 and 5.
    g. The cost of an order, the time it takes to prepare, and the time it takes to deliver appear to be independent of one another and have no significant impact on each other (evidence).
4. **Additional observations:**
    a. Restaurants that generate the maximum revenue for us are Shake Shack, The Meatball Shop, Blue Ribbon Sushi, Blue Ribbon Fried Chicken and Parm.
    b. Restaurants with average rating >4 who might qualify to offer promotions are The Meatball Shop(4.5), Blue Ribbon Fried Chicken(4.3), Shake Shack(4.27) and Blue Ribbon Sushi(4.2).
    c. Revenue generated via existing operations is 6166.3 dollars
    d. Percentage of orders with more than 60 minutes total delivery time: 10.54%
    e. The mean delivery time on weekdays is around 28 minutes. The mean delivery time on weekdays is around 22 minutes

Conclusions and Recommendations:

To improve customer experience and increase company business:

1. 👉 **Encourage More Customer Ratings**
   Observation: 38.77% of orders do not have customer ratings.
   Recommendation: Implement incentives like loyalty points to encourage customers to leave ratings after every order. More ratings will help other customers make informed choices and potentially increase the number of orders.
2. 👉 **Optimize Weekend Operations**
   Observation: Over 50% of demand is concentrated on weekends, and average delivery times rise from 22 minutes (weekdays) to 27.5 minutes (weekends).
   Recommendation:
   Increase delivery and kitchen staff on weekends to meet higher demand.
   Consider introducing surge pricing on weekends to improve revenue, if not already implemented.
3. 👉 **Strategic Promotions and Loyalty Programs**

Observation: Certain frequent customers (e.g., customers 52832, 47440, and 83287) have high order counts.
Recommendation: Reward loyal customers with targeted promotions.

4. 👉 **Address High Delivery Times**
   Observation: 10.54% of orders take more than 60 minutes in total, and longer delivery times (especially above 24.5 minutes) negatively impact customer ratings.
   Recommendation: Analyze logistics to reduce delivery bottlenecks during peak periods. Optimize delivery routing and notify customers promptly about delays. Set clear expectations for delivery time at order confirmation, possibly with live tracking and compensation offers when thresholds are exceeded.
5. 👉 **Focus on Quality and Speed for Better Ratings**
   Observation: Ratings drop when delivery times exceed 24.25 minutes, but food preparation time does not impact ratings. Higher costs are sometimes associated with better ratings.
   Recommendation: For high-cost orders, ensure a “white-glove” experience (e.g., live updates, special packaging), since these orders have the strongest impact on ratings.
6. 👉 **Support for Lower-Performing Cuisines**
   Observation: Vietnamese, Spanish, Korean, Southern, Thai, and French are the least ordered cuisines.
   Recommendation: Run promotional campaigns to boost visibility of these options.
7. 👉 **Spotlight low cost cuisines**
   Observation: Korean, Vietnamese, and Mediterranean cuisines offer lower-cost meals
   Recommendation: Market lower-cost cuisines to value-conscious customers

Appendix:

Data Description

The data contains the different data related to a food order. The detailed data dictionary is given below.

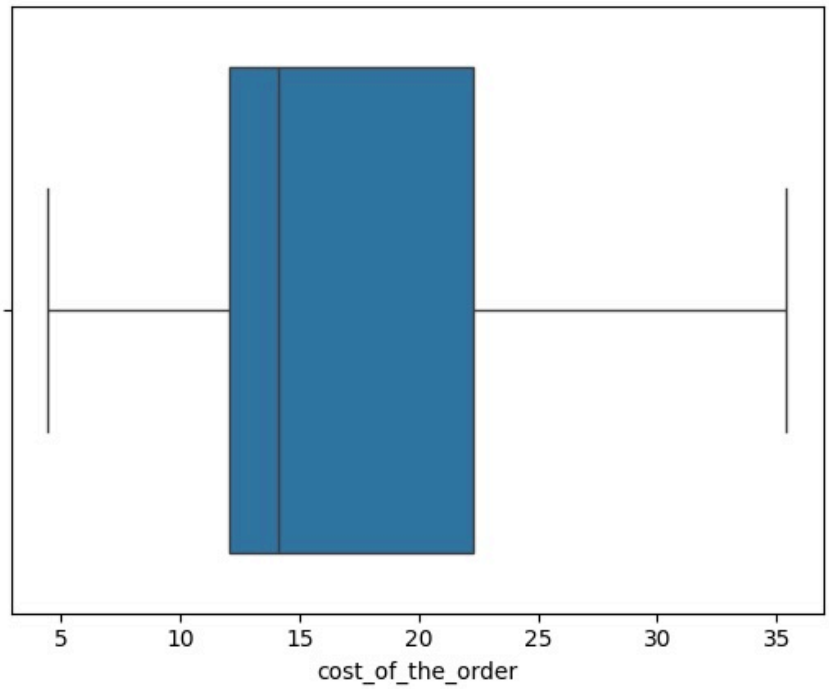
Data Dictionary

Column	Description
order_id	Unique ID of the order
customer_id	ID of the customer who ordered the food
restaurant_name	Name of the restaurant

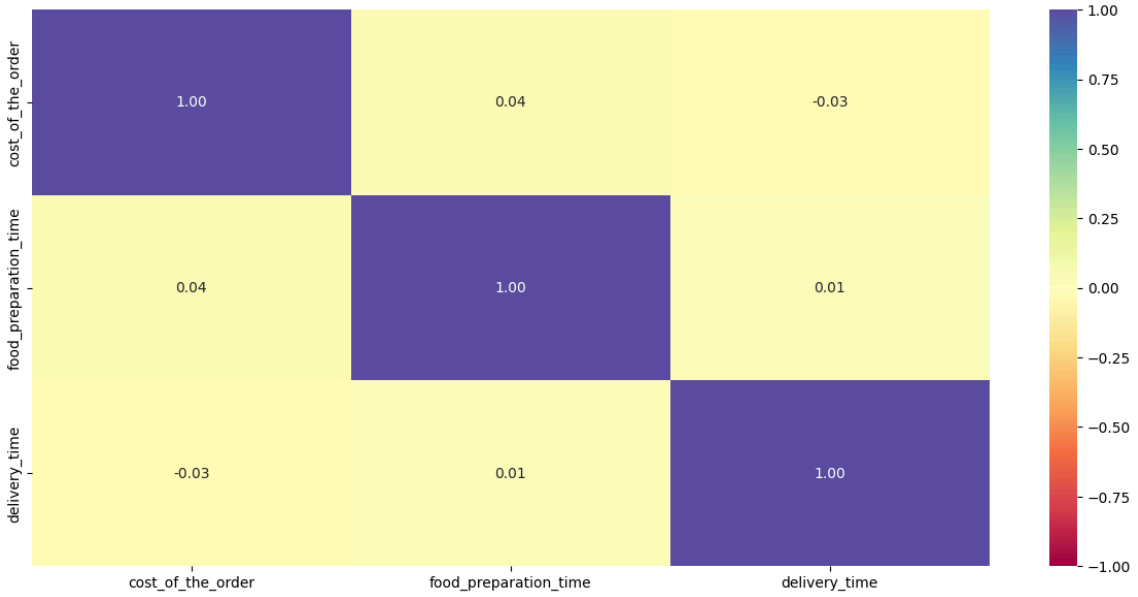
cuisine_type	Cuisine ordered by the customer
cost_of_the_order	Cost of the order
day_of_the_week	Indicates whether the order is placed on a weekday or weekend (The weekday is from Monday to Friday and the weekend is Saturday and Sunday)
rating	Rating given by the customer out of 5
food_preparation_time	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

Plots

1. Cost of order box plot



2. Heat Map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food_preparation_time
delivery_time
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0.04
-0.03
0.04
1.00
0.01
-0.03
0.01
1.00
cost_of_the_order
food_preparation_time
delivery_time
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00