FoodHub Data Analysis

Python Foundations: FoodHub

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Executive Summary: Conclusions

- Revenue Distribution:
  - Shake Shack is a clear outlier in revenue generation, earning significantly more than any other restaurant on FoodHub.
  - The bottom-performing restaurants have very few orders, suggesting low demand or visibility on the app.
- Delivery Time Insights:
  - Delivery times are significantly shorter on weekends (22 min avg.) than weekdays (28 min avg.).
  - Orders taking more than 60 minutes account for 10.54% of total orders, indicating a need for optimization in preparation and delivery efficiency.
- Customer Satisfaction & Ratings:
  - Lower ratings correlate with higher delivery times and longer food preparation times.
  - Higher ratings do not always have the lowest delivery times but have more consistency and lower variability.
  - Higher-cost orders are more likely to receive 5-star ratings, suggesting customers associate premium pricing with better quality.
- Cuisine-Specific Insights::
  - Certain cuisines have longer preparation times, which can contribute to higher delivery times and lower ratings.
  - The relationship between cuisine type and cost also influences order frequency and revenue generation.

Executive Summary: Conclusions

- Promotional Offer Eligibility:
    - Restaurants like Shake Shack, The Meatball Shop, Blue Ribbon Fried Chicken, and Blue Ribbon Sushi qualify for promotions due to high ratings and order counts.*
- Company Revenue Generation:
    - Orders over $20 contribute 25% revenue share, while those between $5 and $20 contribute 15% revenue share.

Executive Summary: Insights & Recommendations

- Optimize Delivery & Food Preparation Time:
  - Improve efficiency for longer weekday deliveries: Consider increasing the number of delivery personnel during peak weekday hours.
  - Support restaurants with high prep times: Encourage them to streamline processes.
- Enhance Customer Satisfaction & Ratings
  - Introduce a "Fast Delivery Badge" for restaurants consistently delivering within 25 minutes to incentivize quicker service.
  - Provide estimated delivery times upfront to set realistic customer expectations.
- Strengthen Promotions & Partnerships:
  - Prioritize high-rated restaurants with more than 50 reviews for marketing campaigns to boost engagement.
- Revenue & Pricing Strategy:
  - Introduce a tiered commission model: Offer reduced commission rates for restaurants that meet fast prep and high-rating criteria to incentivize quality service.
  - Encourage upselling & larger orders by providing combo discounts or incentives on orders above $20.

By implementing these strategies, we can **enhance operational efficiency, improve customer satisfaction, and drive revenue growth.**

Business Problem Overview

Our company, FoodHub, wants to analyze customer orders to understand restaurant demand and delivery efficiency. We aim to:

- Optimize restaurant promotions
- Improve customer experience
- Enhance revenue strategies
- Analyze operational efficiency

By addressing these challenges, we can refine our business model, improve service efficiency, and enhance customer satisfaction.

Solution Approach

Data Overview & Cleansing

- Handling Missing Values, Correcting Data Types, and Outlier Detection.

Univariate Analysis (Exploring individual variables)

- Identify most popular restaurants and order trends, understand distribution of revenue trends, and evaluate timing.

Multivariate Analysis (Exploring relationships between variables)

- Identify pricing and efficiency trends, compare delivery efficiency, assess factors affecting customer satisfaction, identify popular restaurants to optimize promotions, and check relationships between cost, prep time, and delivery time.

Data Overview

- Dataset Size: 1,898 rows, 9 columns
- Column Data Types:
  - float64: 1 column
  - int64: 4 columns
  - object: 4 columns
- Missing Values: No null values
- Food Preparation Time (in minutes):
  - Minimum: 20 min
  - Average: 27.37 min
  - Maximum: 35 min
- Unrated Orders: 736 orders have no rating

Univariate Analysis

- 1,898 Orders
- 1,200 Customers
- 178 Restaurants
- 14 Cuisine Types
- Most Popular Cuisines
  1. American
  2. Japanese
  3. Italian
  4. Chinese

- Cost of Order
  - 50% of orders range between $12 – $23
  - Mean: ~$40
  - Highest Order: ~$36
  - Distribution: Right-skewed
- Day of the Week:
  - 67%+ orders are on weekends
- Ratings:
  - Most customers do not leave ratings
  - When given, ratings are at least 3 stars
  - Most common: 5 ⭐ > 4 ⭐ > 3 ⭐

Univariate Analysis

- Food Preparation Time:
  - Symmetrical distribution
  - 50% of orders take 23 – 31 minutes
  - Min: 20 min | Max: 35 min
- Delivery Time:
  - Left-skewed distribution
  - 50% of orders take 20 – 28 minutes
  - Min: 15 min | Max: 33 min
- Total Time:
  - 50% of orders take 43 – 59 minutes
  - Min: 35 min | Max: 68 min

Univariate Analysis

- Top 5 Restaurants by Number of Orders:
  - Shake Shack – 219 orders
  - The Meatball Shop – 132 orders
  - Blue Ribbon Sushi – 119 orders
  - Blue Ribbon Fried Chicken – 96 orders
  - Parm – 68 orders

- Most Popular Weekend Cuisine:
  - American cuisine with 415 orders

- Order Cost Analysis:
  - 29.24% of orders cost more than $20 (555 orders)

- Mean Delivery Time:
  - 24.16 minutes

Univariate Analysis

- Top Customers for 20% Discount Vouchers:
  - There is a tie among 8 customers
  - Options for selection:
    - Top 4 customers only
    - Top 4 + the customer who spent the most
    - Include all 8 customers
- Top Customers by Order Count:
  - Customer 52832: 13 orders
  - Customer 47440: 10 orders
  - Customer 83287: 9 orders
  - Customer 250494: 8 orders
  - Tied (7 orders each): 259341, 82041, 65009, 276192

Multivariate Analysis

- Cuisine vs. Cost of the Order:
  - Different cuisines have varying average costs per order.
  - Certain cuisines might be associated with higher or lower costs.
- Cuisine vs. Food Preparation Time:
  - Fast food or simpler meals may have shorter preparation times, while complex dishes take longer.
  - This could influence customer satisfaction and delivery efficiency.
- Day of the Week vs. Delivery Time:
  - Weekends: Faster delivery times (15 min min, 30 min max, 75% of orders < 27 min).
  - Weekdays: Slower deliveries (25 min min, 33 min max, 75% of orders > 26 min).
  - The faster weekend deliveries may indicate higher restaurant efficiency or fewer traffic-related delays.

Multivariate Analysis

- Revenue Generated by Restaurants:
  - Top 5 restaurants: Shake Shack is a clear outlier, generating the most revenue, with the next highest earning just over half of Shake Shack's revenue.
  - Bottom 5 restaurants: Appear to have very few orders, possibly only one each in the dataset.
  - This highlights the disparity in restaurant performance on the platform.
- Rating vs. Delivery Time:
  - Worst rating (3 stars): Highest delivery time (~24.5 min).
  - Best rating (5 stars): Not necessarily the fastest but has the least variability in delivery time.
  - Suggests that consistency in delivery time may impact ratings more than absolute speed.

Multivariate Analysis

- Rating vs. Food Preparation Time:
  - Worst rating (3 stars): Highest average preparation time (~27.4 min).
  - Best rating (5 stars): Shows minimal variation, meaning preparation times are more consistent.
  - This suggests that reliability in food prep time is linked to higher ratings.
- Rating vs. Cost of the Order:
  - 5-star ratings: Orders with a central price tendency around $17.
  - Lower variability: Higher-rated orders tend to have less price uncertainty, as seen in the pinplot.
  - More expensive orders may be associated with higher satisfaction.
- Correlation Among Variables:
  - No strong correlations found between food delivery time, food preparation time, and cost of the order.

Multivariate Analysis

Restaurants Eligible for Promotional Offers

- To qualify for the promotional offer, restaurants must have:
    - More than 50 ratings
    - An average rating greater than 4.0

1. The Meatball Shop (84 ratings, 4.51 average rating)
2. Blue Ribbon Fried Chicken (64 ratings, 4.33 average rating)
3. Shake Shack (133 ratings, 4.28 average rating)
4. Blue Ribbon Sushi (73 ratings, 4.22 average rating)

Multivariate Analysis

Net Revenue Generated by the Company

- We charge a commission based on the order cost:
  - 25% for orders costing more than $20
  - 15% for orders costing more than $5

Multivariate Analysis

Percentage of Orders Taking More than 60 Minutes

- Total delivery time = Food preparation time + Delivery time
- From the analysis, 10.54% of orders take more than 60 minutes to be delivered from order placement.
- This suggests that a significant portion of deliveries experience long wait times, which could impact customer satisfaction.

Multivariate Analysis

Mean Delivery Time on Weekdays vs. Weekends

- Weekdays: ~28 minutes
- Weekends: ~22 minutes

Orders on weekends are delivered, on average, 6 minutes faster than on weekdays. This could be due to various factors such as:

- Lower traffic congestion on weekends
- Increased efficiency in restaurant operations during peak demand times
- A higher number of drivers available for delivery

APPENDIX

Great Learning

Happy Learning !