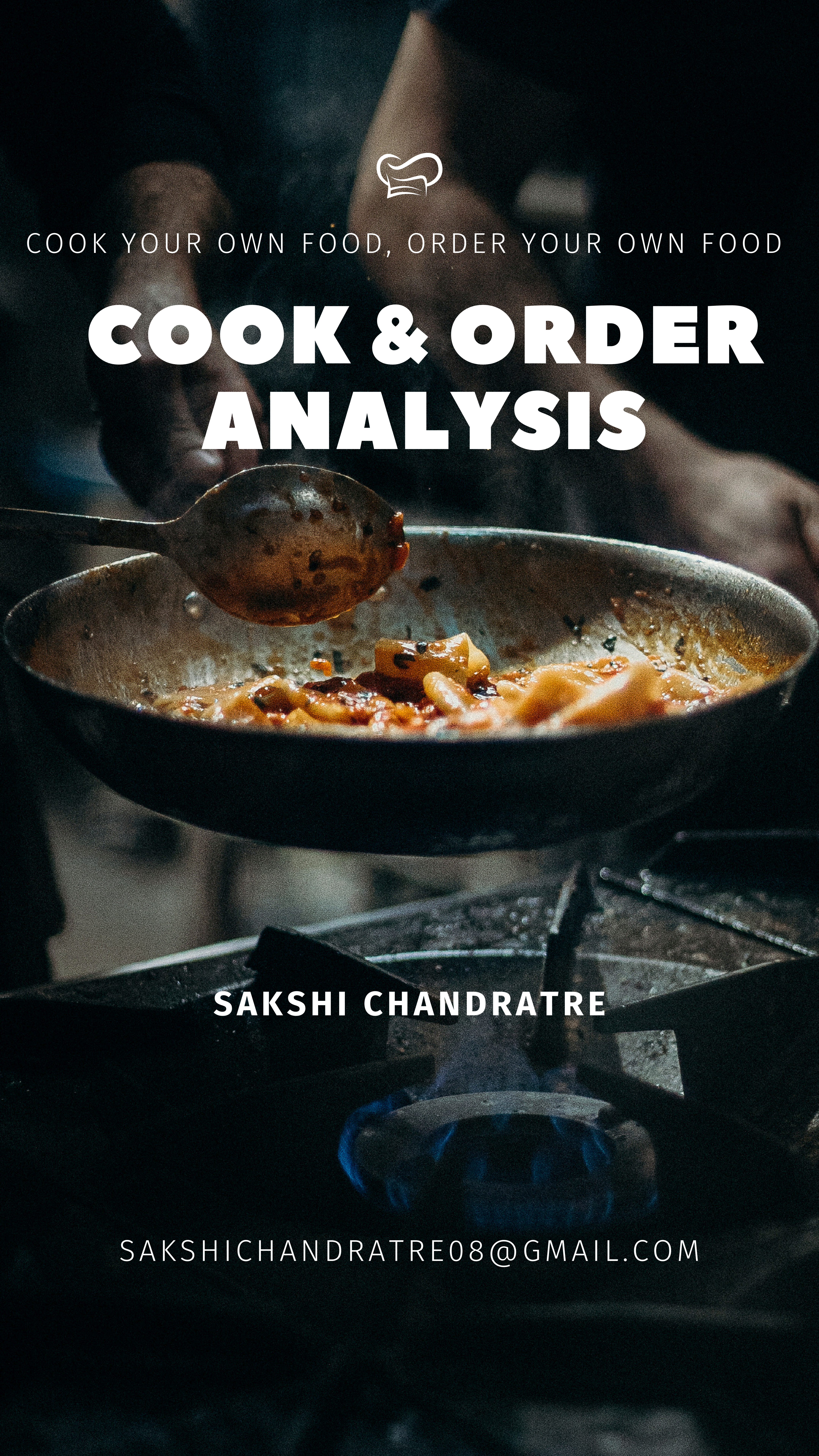

COOK YOUR OWN FOOD, ORDER YOUR OWN FOOD

COOK & ORDER ANALYSIS

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Introduction

This report focuses on understanding user behavior, cooking preferences, and order trends by analyzing three distinct datasets: **UserDetails**, **CookingSessions**, and **OrderDetails**. By integrating these datasets, the goal is to uncover valuable insights into user interactions, popular dishes, and demographic factors shaping preferences. The analysis will serve as a foundation for data-driven business decisions, enhancing customer satisfaction and operational efficiency.

Objectives

1. **Data Cleaning and Integration**
   - Ensure data consistency and quality by cleaning and merging the three datasets into a unified format.
2. **Relationship Analysis**
   - Examine the connections between user participation in cooking sessions and their order behaviour.
3. **Popular Dish Identification**
   - Determine the most frequently cooked and ordered dishes, highlighting key preferences.
4. **Demographic Behavior Exploration**
   - Investigate how demographic factors such as age, gender, and location influence cooking and ordering habits.
5. **Visualization Development**
   - Create clear, insightful visualizations to represent trends, patterns, and relationships effectively.
6. **Business Recommendations**
   - Provide actionable recommendations based on the findings to enhance user engagement and business outcomes.

Data Overview:

User Details

- **Age**: Average = 32 years (range 25–42), indicating a diverse age group.
- **Total Orders**: Average = 9 (range 5–15), showing moderate activity levels.

Order Details

- **Amount Spent**: Average = $11.25 (range $7–$15), reflecting affordable pricing.
- **Rating**: High satisfaction with average = 4.3/5.

Session Details

- **Duration**: Average session = 30 mins (range 10–45 mins), showing reasonable engagement.
- **Session Rating**: High user satisfaction, average = 4.5/5.

Data Flow

Data Preprocessing:

Missing Value Imputation:

Use: .isnull().sum() to identify missing values in each dataset.

Output:

Imputing Numerical Variables: For the Missing Values in Rating, i have used KNN Imputer to predict and fill missing values. It captures the underlying relationships between features for accurate imputation using the neighbor points.

Standardize Column Names:

Rename 'amount_(usd)' to 'amount' in order_details for uniformity.

Merge Datasets:

Merge user_details with cooking_sessions using user_id.

Combine the result with order_details using user_id

Standardization

1. Subtract the mean of each feature.
2. Divide each feature by its standard deviation.
3. Use StandardScaler

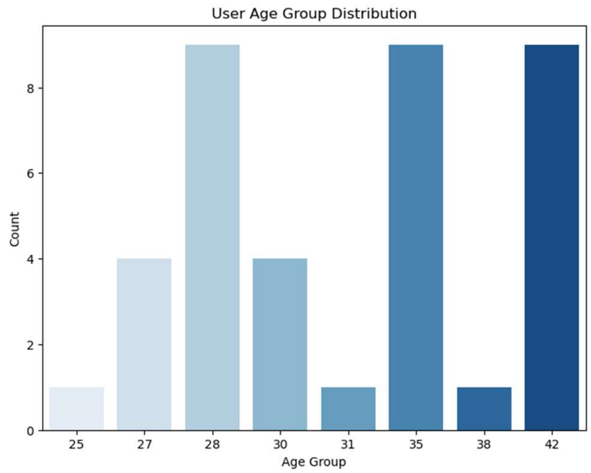
Normalization (if required)

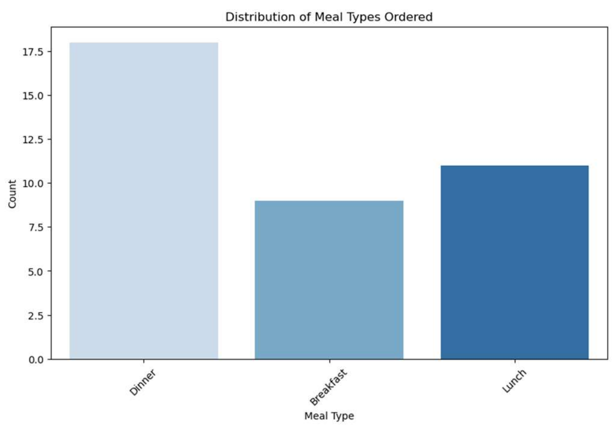
1. Subtract the minimum value of each feature.
2. Divide by the range (max - min).
3. Use MinMaxScaler

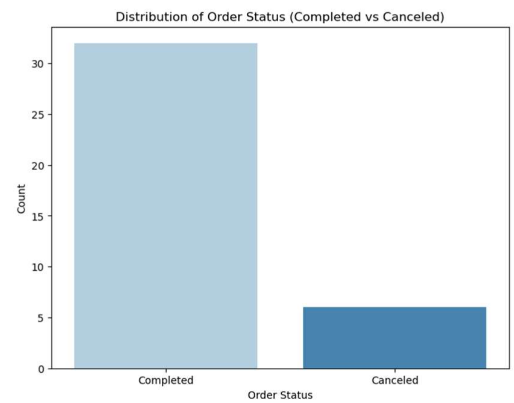
Encoding

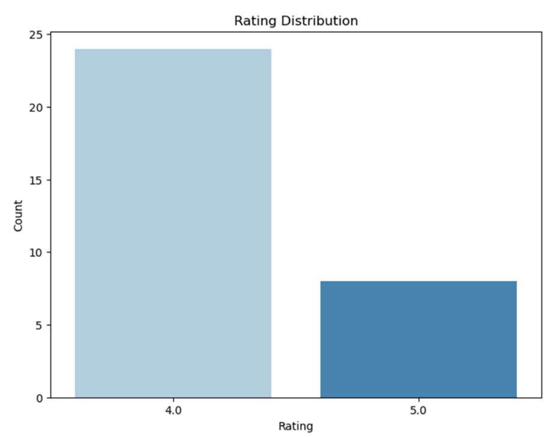
1. Apply one-hot encoding using pd.get_dummies() or OneHotEncoder to categorical columns
2. Add encoded columns back to the dataset and drop the original categorical columns

Data Distribution









Data Distribution and Business Insights

Interpretation:
📊 **Key Demographic**: Majority of users are aged **30-35**, a critical segment for targeting. Younger (25-27) and older (36-42) groups are less prevalent.

Introducing **age-specific features** and meal options for younger (25-27) and older (36-42) groups could broaden the customer base and boost inclusivity.

💰 **Order Amount Trends**: **Bimodal distribution** with peaks at **$9-10** and **$12-13**, hinting at two distinct customer types.

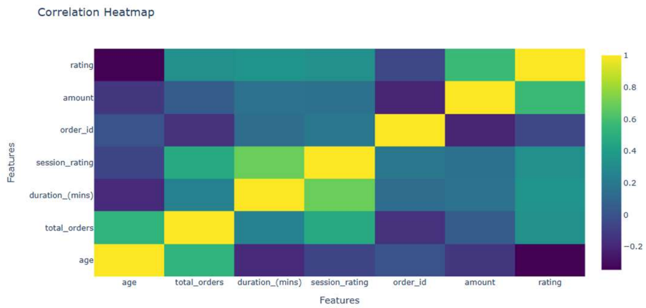
Budget-conscious: Attract with affordable pricing, combo deals, and value packs.

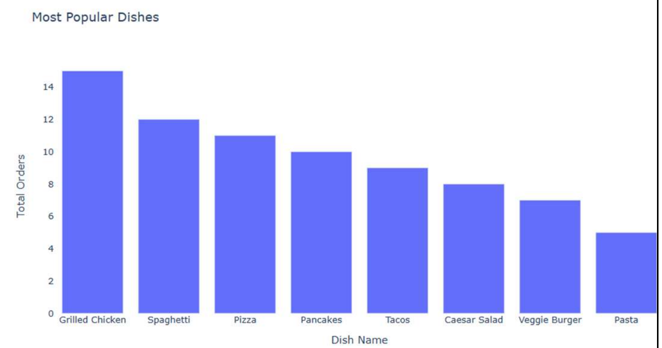
Premium spenders: Appeal with high-quality, exclusive dishes and loyalty programs.

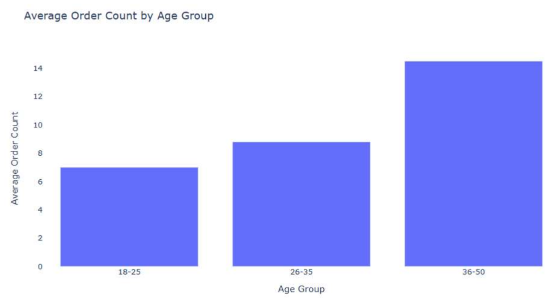
❌ **Order Cancellations**: While most orders are completed, cancellations are notable. Addressing this could enhance satisfaction and efficiency.

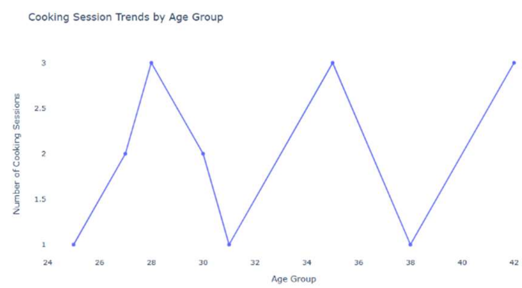
Implement **real-time updates, flexible options**, and **follow-up offers** to minimize cancellations and recover lost opportunities.

Exploratory Data Analysis









Interpretation:

Dish Correlations:

- **Positive correlations** (💚/💛): Certain dishes are often ordered together—great for bundling or combo deals.
- **Negative correlations** (❤️/💜): Some dish combinations are rare—useful for optimizing menu layout.

🌟 **Most Popular Dishes**:

- **Top Picks**: Grilled Chicken, Spaghetti, and Fries lead the charts!
- Focus inventory, marketing, and promotions around these high-demand items.

👥 **Order Count by Age**:

- **25-31 age group** places the most orders—key demographic for targeted campaigns.

Comparison Of Dish Made in session increases the Rating of dish order

```
Summary of order trends after session rating decrease:
  order_rating_category  dish_similarity  count
0             High (>4)            False      4
1             High (>4)             True      4
2             Low (<=4)            False     18
3             Low (<=4)             True     12
Records where a different dish was ordered:
  user_id       dish_name_x      dish_name_y  session_rating  rating
1    U001         Spaghetti         Pancakes             4.5     4.0
2    U001         Spaghetti  Grilled Chicken             4.5     5.0
3    U001          Pancakes        Spaghetti             4.2     5.0
5    U001          Pancakes  Grilled Chicken             4.2     5.0
6    U001   Grilled Chicken        Spaghetti             4.9     5.0
```


```
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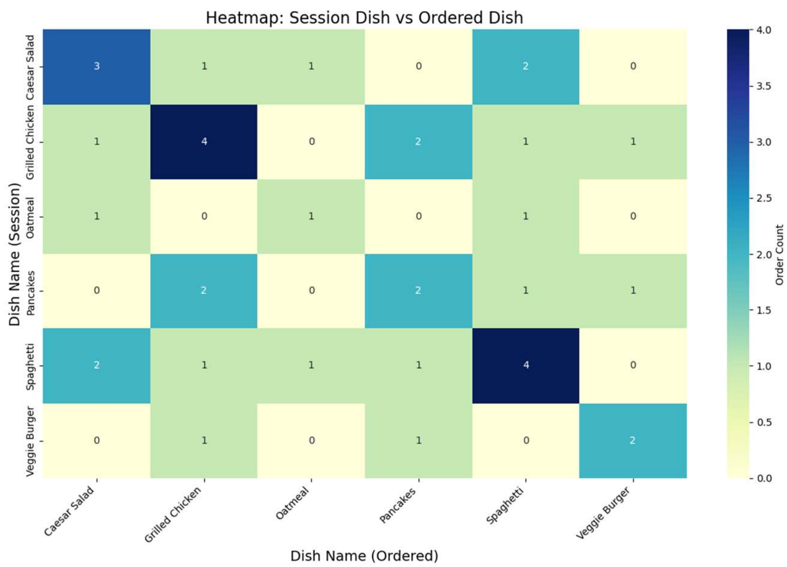


Interpretation:

🍴 **Dish Made vs. Dish Ordered**:

- **Higher Ratings** (🌟 4-5): When the dish cooked during the session matches the ordered dish.
- **Lower Ratings** (⬇️ 4 or less): When the session dish and ordered dish differ.
- Aligning session dishes with orders boosts satisfaction!

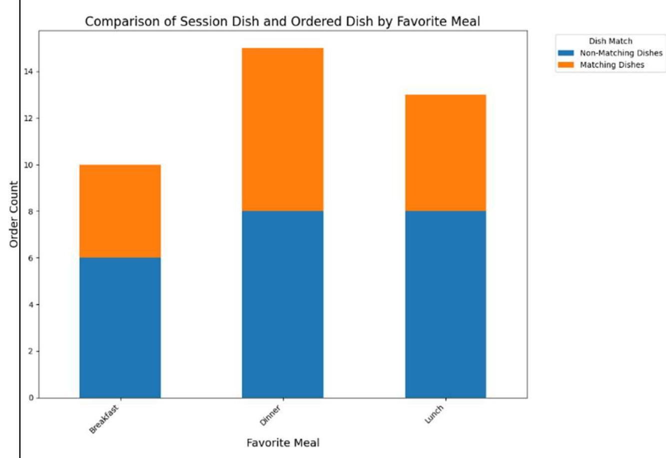
🌡️ **Heatmap: Session vs. Ordered Dish**:

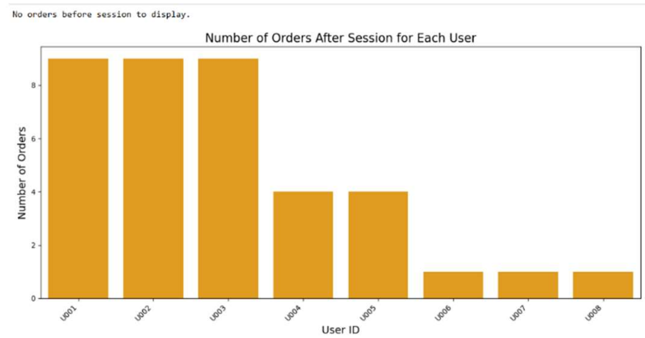
- **Diagonal Highlights** (e.g., Spaghetti-Spaghetti): Strong correlations with higher ratings.
- **Off-Diagonal Areas**: Lower correlations and ratings when dishes differ.
- Reinforces the importance of matching session dishes with orders.

📈 **Actionable Steps**:

- Add **session-to-order reminders** or a seamless way to order dishes cooked in sessions.

Session Dish Cooked Influence





Interpretation:

🍴 **Session Dish vs. Ordered Dish (Favorite Meal)**:

- Strong alignment between session dishes and ordered dishes for **favorite meals** and **usual meals**.
- Matching dishes = **higher satisfaction** and customer happiness!
- Ask Customers Favourite meals in database for future recommendations of sessions

📊 **Orders After Cooking Sessions**:

- Users cooking their **favorite meal** place **more orders** compared to those cooking usual dishes.
- Positive cooking experiences, especially for favorites, drive **higher engagement** and order frequency.

📈 **Actionable Steps**:

- Offer **personalized recommendations** for cooking sessions based on user favorites.
- Introduce **session-to-order workflows** to simplify the process of ordering cooked dishes.
- Leverage these insights to refine menus, features, and marketing campaigns to foster loyalty.

Recommendations

For the User: Personalized Meal Recommender

- Use **machine learning** to analyse the user's past orders, cooking sessions, and ratings **to predict their ideal menu choices**
- Seamlessly integrate this into the app's menu so users are guided towards their most satisfying options

Streamlined Session-to-Order Flow

- Optimize the transition from cooking session to placing an order
- Allow users **to easily convert the dish they just cooked into a completed order with one-click**
- Provide **visual cues and nudges** to encourage users to order the dish they just prepared

For the Restaurant: AI-Powered Churn Prediction

- As suggested, leverage machine learning techniques like logistic regression, decision trees, or random forests
- Train models to **predict which customers are at risk of stopping orders** from the restaurant
- Use these predictions to implement proactive retention strategies:
  - Offer **personalized discounts or loyalty rewards to high-risk customers**
  - Encourage users to **cook and order their favourite dishes to boost engagement**

Intelligent Dish Optimization

- Use this data to identify the **most profitable and popular dish** combinations like Grilled Chicken
- Optimize the menu by featuring these **high-performing dish pairings**
- Adjust pricing, promotions, and placement of these top-performing items

Sample Outputs After Recommendations

```
🍽️ Welcome to Culinary Upalaince! 🍽️

🌟 Specials of the Day 🌟
+-----------------+---------------+-------------+--------------+
| dish_name_x     |  session_time |  avg_rating |   num_orders |
+=================+===============+=============+==============+
| Grilled Chicken |       41.6667 |     4.78889 |            9 |
+-----------------+---------------+-------------+--------------+
| Spaghetti       |       33.3333 |     4.53333 |            9 |
+-----------------+---------------+-------------+--------------+
| Caesar Salad    |       21.4286 |     4.31429 |            7 |
+-----------------+---------------+-------------+--------------+
| Pancakes        |       30      |     4.4     |            6 |
+-----------------+---------------+-------------+--------------+
| Veggie Burger   |       20      |     4.375   |            4 |
+-----------------+---------------+-------------+--------------+

Please choose a dish from the Specials (enter the dish name) or type 'exit' to leave: Spaghetti

🔍 Dish Details for Spaghetti:
+---------------+---------------+-------------+--------------+
| dish_name_x   |  session_time |  avg_rating |   num_orders |
+===============+===============+=============+==============+
| Spaghetti     |       33.3333 |     4.53333 |            9 |
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Please choose a dish from the Specials (enter the dish name) or type 'exit' to leave: exit

Thank you for visiting Culinary Upalaince! Come back soon! 👋
```