

A/B Test Analysis for Foodtech Company

Introduction

Objective: Analyze whether increasing food image size on menu cards improves order conversion rates.

Experiment Design

Hypothesis: Increasing the size of food images on restaurant menu cards will improve conversion to orders.

- **Test Location:** London
- **Duration:** 25–30 November 2024
- **Control Group:** Variation 1- 65000 Users
- **Test Group:** Variation 2- 35000 Users
- **User Split:** Random selection
- **Key UI difference:** Control group saw the original small images and Test group saw the larger food images

- Image of Bar plot

Understanding the data

- **event_id**- Unique id for each events (Total events: 326921)
- **session_id**- Unique id for user's interaction with the app/website (Total unique sessions: 179294)
- **user_id**- Unique id for each individual users (Total users: 100000)
- **shop_id**- Unique id for each shops (Total known shops: 1000)
- **Platform**- User's platform iOS / Android
- **datetime_event**- The date and time event was conducted (25 Nov to 30 Nov in 2024)
- **event_type**- User interaction events with the app/website
- **final_order_status**- Order status
- **Variation**- Target Variable where User Variation

Assumptions of this experiment

1. Random Assignment of Users
2. Independence of Observations
3. No External Influences During the Experiment

Strength of the experiment

1. Controlled A/B Test Setup
2. Random User Assignment
3. Large & Diverse Sample Size
4. Clearly Defined Success Metrics
5. Real-World Test Environment

Limitation of the experiment

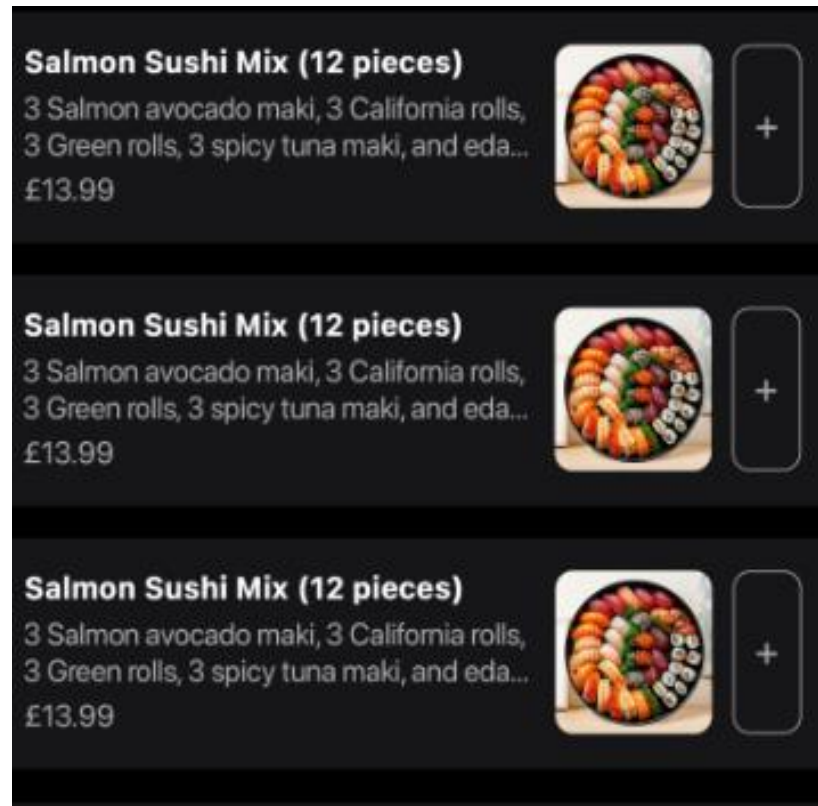
1. Unequal Sample Sizes
2. Short Test Duration
3. No Segmentation by User Type (New vs existing)
4. External Factors Not Controlled
5. Between-Group Design

Improvement on the experiment

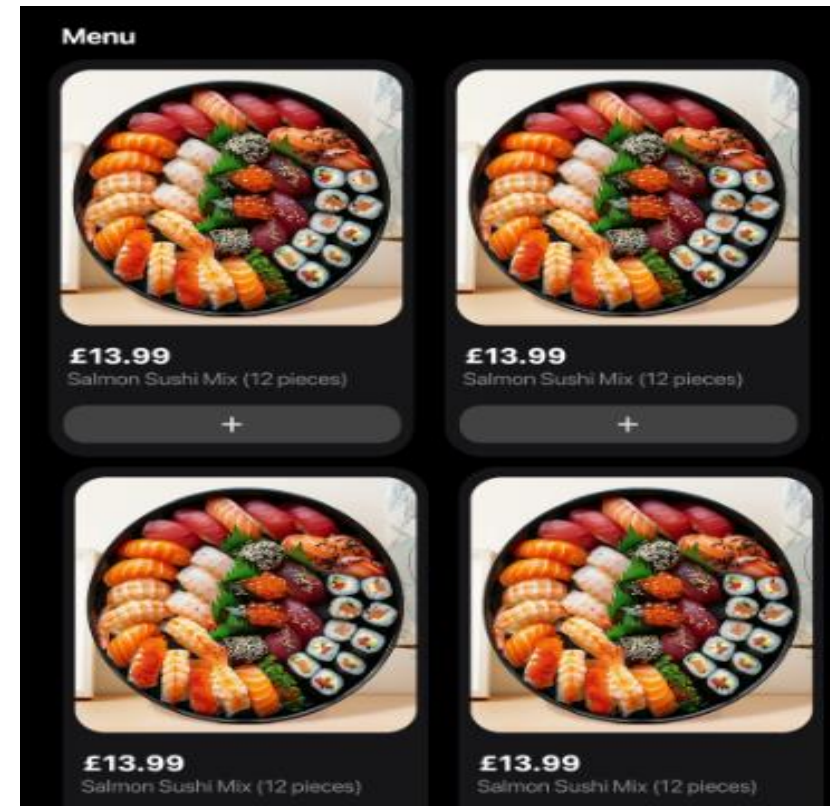
1. Address Unequal Sample Sizes
2. Extend Test Duration
3. Segment Users for More Precise Analysis
4. Control for External Factors
5. Within-Group Design (Alternative Approach)

Complete Data Analysis for this A/B Test Experiment

A

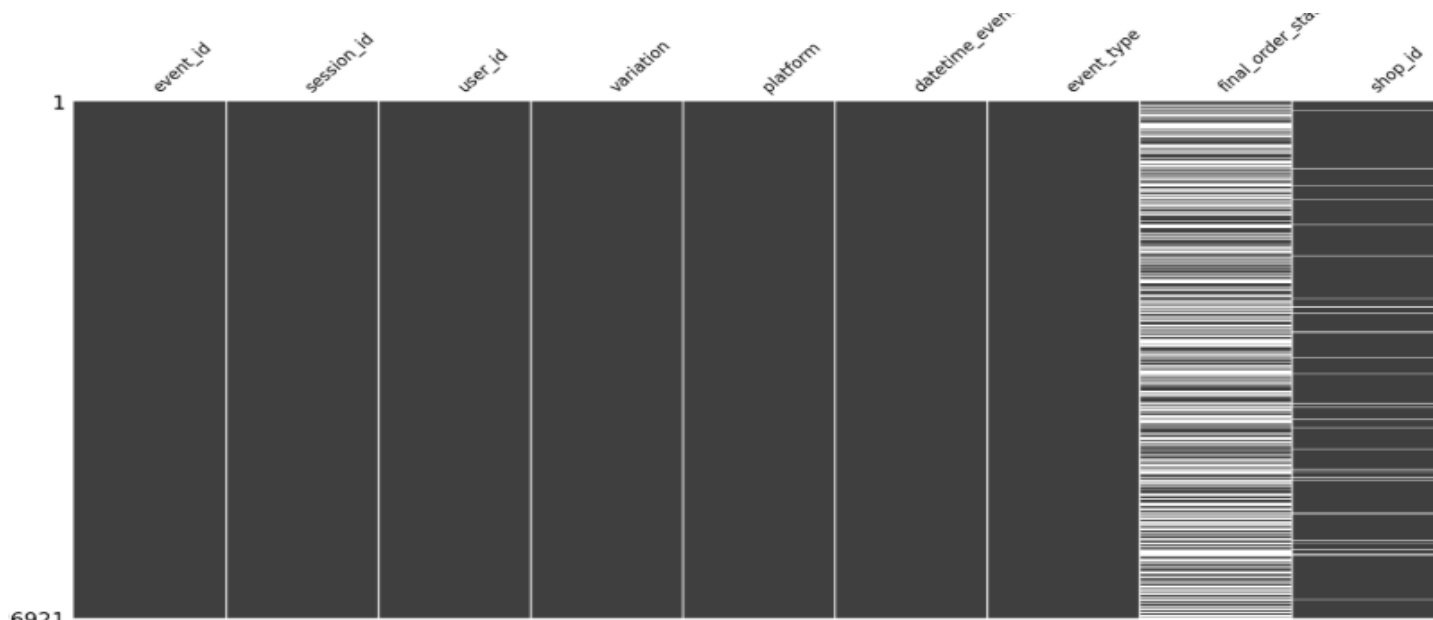


B



Data Cleaning & Preparation

- Converted datetime columns to standard format
- Converted categorical columns to string
- Converted categorical variables to lowercase
- Handled missing values in shop_id (# missing values: 11079)



Exploratory Data Analysis (EDA)

Overall Dataset Summary

- **Total Users:** 100000
- **Total Sessions:** 179294
- **Total Events:** 326921
- **Total Orders:** 52418
- **Conversion Rate:** 42.34%
- **Success Rate (Orders Completed Successfully):** 85.58%
- **Cancellation/Refund Rate:** 14.42%
- **Platform:**
 - Android: 225929 ~ 70%
 - iOS: 100229 ~ 30%

Distribution of Key Variables

- **Variation 1:** 65000 users (small images)
- **Variation 2:** 35000 users (large images)
- **Order Status Distribution:**
 - Successful: 44858 ~ 85.57%
 - Cancelled: 5301 ~ 10.11%
 - Refunded after delivery: 2259 ~ 4.3%
- **Event Type Distribution:**
 - reload_the_page: 53870
 - entry_to_shop: 168215
 - order_paid: 52418
 - order_finished: 52418

Conversion Rate Analysis

Conversion Rate = (Users who placed an order/ Total Unique Users) * 100

Original Data

- **Variation 1 (Control):** 42.41%
- **Variation 2 (Test):** 42.20%
- **Statistical Test:** Chi-Square Test
- **p-value:** 0.52

Stratified Data

- **Variation 1 (Control):** 37.51%
- **Variation 2 (Test):** 42.13%
- **Stratification Column:** “Platform” (7:3)
- **Statistical Test:** Chi-Square Test
- **p-value:** 3.17e-24 ~ 0.000

Order Success Rate Analysis

$$\text{Success Rate} = (\text{Successful Orders} / \text{Total Orders}) * 100$$

Original Data

- **Variation 1 (Control):** 86.73%
- **Variation 2 (Test):** 90.43%
- **Statistical Test:** Chi-Square Test
- **p-value:** 5.955736807347403e-29

Stratified Data

- **Variation 1 (Control):** 85.61%
- **Variation 2 (Test):** 90.41%
- **Stratification Column:** “Platform” (7:3)
- **Statistical Test:** Chi-Square Test
- **p-value:** 5.661217389603234e-38

Platform-Based Analysis with Original Data

iOS

- Conversation Rates:
 - Variation 1: 44.95%
 - Variation 2: 45.29%
- Success Rates:
 - Variation 1: 87.07%
 - Variation 2: 91.07%

Android

- Conversation Rates:
 - Variation 1: 41.32%
 - Variation 2: 40.88%
- Success Rates:
 - Variation 1: 86.57%
 - Variation 2: 90.13%

Platform-Based Analysis with Balanced Data

iOS

- Conversation Rates:
 - Variation 1: 40.29%
 - Variation 2: 45.20%
- Success Rates:
 - Variation 1: 85.91%
 - Variation 2: 91.01%

Android

- Conversation Rates:
 - Variation 1: 36.31%
 - Variation 2: 40.82%
- Success Rates:
 - Variation 1: 85.47%
 - Variation 2: 90.01%

Entry_to_Shop Analysis

original data

- Total Shop entries: 168215
- Unique users' entries: 96293
- Shop Entry Rate by Variation:
 - Variation 1: 96.27%
 - Variation 2: 96.32%

Balanced data

- Total Shop entries: 116291
- Unique users' entries: 74773
- Shop Entry Rate by Variation:
 - Variation 1: 95.57%
 - Variation 2: 96.30%

User Behavior Analysis

- **Platform-Specific Behavior:** iOS users had a slightly higher conversion rate in Variation 2 than Android users
- **Shop Entry Rate Differences:** Users in Variation 2 (Large Images) had a higher shop entry rate than Variation 1.
- **Conversion Patterns:** More users placed orders in Variation 2, and the increase was statistically significant.
- **Order Success & Cancellation:** Variation 2 had a lower refund/cancellation rate, meaning users felt more confident purchasing.

Conclusion:

- **Larger images significantly improve both conversion and success rates** when the dataset is properly balanced.
- Users exposed to larger images also have **higher order success rates**)
- User behavior varies by platform, so UI design should be optimized for different user segments.

Business Recommendations

- **Implement Larger Images:** Roll out larger images across platforms to **boost conversions** and **successful orders**.
- **Optimize for Each Platform:** UI design should be optimized for different user segments to get maximize impact.
- **Encourage Shop Visits:** Use **personalized promotions** to drive users to **enter shops**, increasing their likelihood of purchasing.
- Regularly **analyze** performance with **balanced** datasets for accurate insights