Data-Driven Campaign Optimization for iFood

OptiData Squad

1. Define The Problem

The main research question of our project is how iFood can improve the effectiveness of its marketing campaigns to maximize revenue and customer engagement. Specifically, our project aims to predict which customers are most likely to respond positively to a new marketing campaign for a gadget and spend the most money, allowing iFood to allocate resources more effectively and improve profit margins through targeted advertising.

In the bigger picture, our question is how firms can predict which customers will respond the greatest to a marketing campaign so they can be targeted in advertising efforts. This problem is essential to marketing in general because it addresses the practical need for targeted campaigns, a significant aspect of sustaining customer engagement in competitive markets and a question that if answered could lead to more optimal and efficient use of marketing resources. By optimizing resource allocation towards more responsive customer segments, marketing teams can drive better campaign performance and potentially reduce wasted expenditures.

2. Data Collection

Our data is from the simulated data of the iFood meta information on the customer and how they react to the iFood campaign. When one customer wants to enter the platform and use the iFood product, the platform will collect some data from the customer to build a basic profile. Some data was collected by user submission, and some may be collected based on the user behavior in the app, for example, buying and ordering behavior. We can divide the collected data to three categories

3. Data Preparation

Data preparation is crucial to gain accurate insights. First, assess for missing values, outliers, and inconsistencies to ensure data quality. Use transformations like scaling and one-hot encoding to make features more suitable for analysis. Categorical data should be encoded, and redundant or duplicate observations removed. Creating new features, such as customer buying percentage and campaign responsiveness, can enhance the analysis. Sampling or aggregating data may reduce complexity, allowing iFood to focus on trends that maximize customer engagement and campaign success.

4. Data Exploration

Our data exploration uses a range of metrics to understand customer behaviors and identify high-potential segments for targeted coupon distribution. We will analyze demographics like *Income* and *Age*, as well as household characteristics, such as *Kidhome* and *Teenhome*, to identify customers with higher purchasing

power and potential product preferences. Metrics for monthly spending on product categories (e.g., *MntWines*, *MntMeatProducts*, *MntFishProducts*, and *MntSweetProducts*) provide insights into purchasing patterns, helping us identify which segments are more likely to respond to product-specific promotions. Behavioral indicators, including *NumDealsPurchases* and *NumWebVisitsMonth*, allow us to identify customers who actively seek deals or frequently browse online. We will also assess past campaign response variables, such as *AcceptedCmp1* through *AcceptedCmp5* and *Response*, to segment customers based on prior engagement. Visualization techniques like scatter plots and heatmaps will help detect patterns and correlations among these metrics, supporting our goal of designing coupon strategies that maximize total campaign impact.

5. Model Building

Based on insights from our data exploration, we anticipate that certain demographic and behavioral factors, such as age, income, and past campaign engagement, will be key predictors of response to targeted discounts. We hypothesize that customers with higher spending in specific product categories (e.g., meat or wine) and those with a history of responding to campaigns are likely candidates for future offers. Additionally, we plan to explore potential relationships between deal-seeking behaviors, like *NumDealsPurchases* and *NumWebVisitsMonth*, and the likelihood of campaign engagement. As we move forward, our goal will be to validate these assumptions and refine the model to ensure it effectively identifies high-response customers, ultimately optimizing campaign targeting and maximizing overall revenue.

6. Risks and Timeline

Data quality and integrity risk

- Risk 1: Data may contain missing values, inconsistencies, or noise, such as incomplete information from users, duplicate records, or anomalous values. These issues can adversely affect data analysis and model construction, or even lead to model bias.

  Possible impact: If data quality is not effectively handled, the predictive accuracy and stability of the model will be affected, which in turn will affect the reliability of the marketing strategy.

- Risk 2: Since the data set is modelled and derived from a specific experimental campaign, sample bias may exist. For example, some customer segments may be over- or under-represented and not accurately reflect overall customer response.

  Possible Impact: Bias data may cause the model to be overly optimistic or pessimistic in its predictions for specific customer segments, affecting the effective allocation of advertising resources.

Effective allocation of advertising resources.

- Risk 3: Customer preferences and behaviors may change over time, such as changes in acceptance of certain products or marketing techniques, which may lead to inaccurate predictions by existing models.

  Possible Impact: Model effectiveness may be significantly reduced in future campaigns, failing to capture new patterns of customer behavior.
  Timeline

  Week 1: Project Initiation and Data Collection
  Defining project objectives, data collection and initial understanding.

  Week 2: Data Cleaning and Exploratory Analysis
  Perform data cleaning, feature engineering and exploratory analysis to mine key customer features.

  Week 3: Model Construction and Optimisation
  Select and train predictive models, optimise model parameters to ensure accuracy and robustness.

  Week 4: Presentation and Report Writing
  Collect analysis results, complete report and presentation materials, and prepare for project delivery.