

Project Report

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Marketing Campaign Data Analysis

In my project, I analyzed a marketing campaign dataset containing customer demographics, purchasing behavior, and responses to multiple campaigns. This analysis aims to derive actionable insights into customer characteristics and patterns that influence marketing success.

Objectives

- Described the dataset and its variables.
- Performed statistical analyses and visualizations to identify key characteristics.
- Explored relationships between variables, focusing on purchasing behavior and campaign responses.

Data Loading and Preparation

I Cleaned the dataset and prepared it for analysis. Key steps included:

1. Loading and Cleaning: Check for duplicated rows, ensuring each customer entry is unique.
2. Handling Missing Values: Missing values were removed.
3. Data Type Conversion: The customer registration date was converted to an appropriate date format, and unrealistic ages (customers older than 100 years) were filtered out.
4. Outlier Handling: Extreme values for income were capped at the 1st and 99th percentiles to minimize their impact on analysis.
5. Profit Calculation: Customer profit was estimated based on spending in various product categories.

Data Exploration

I generated the summary statistics to get an overview of the data:

Age Distribution: Customers mainly were middle-aged, with a significant portion in the 30-50 range.

Income Distribution: Income data showed skewness, handled by capping extreme values.

Customer Demographics were visualized:

Marital Status: Most customers were married or in relationships, with smaller segments being single or divorced.

Education Level: Customers varied in educational attainment, from essential to postgraduate degrees.

Data Engineering and Visualization

Customer Tenure was calculated to determine the number of days since each customer joined the campaign. The analysis showed that the customer base has a broad range of tenure, from new customers to those who have been with the company for years.

Key Visualizations included:

- Income Distribution: Displayed as a histogram after outlier treatment, showing most customers earn between 25,000 and 75,000.
- Tenure Analysis: The histogram shows how long customers have been with the company.
Data Analysis
- Spending Patterns were analyzed to understand customer behavior across different product categories.
- Wine Spending: The histogram revealed that wine was the most purchased category, with a large portion of customers spending between 0 and 500 units.

Campaign Response Analysis focused on understanding what drives customer response to campaigns.

Income and Campaign Response: The histogram showed how income levels influence customer responses to campaigns.

Higher-income groups seemed more likely to respond positively.

Correlation Analysis between income and profit was performed:

- Income vs Profit: A scatter plot showed a positive correlation between income and profit, with a trendline added to illustrate the relationship. The correlation coefficient was approximately 0.65, indicating a moderate positive relationship between income and profit.
- Income vs Profit by Marital Status: Additional analysis indicated that the correlation between income and profit can vary based on marital status, suggesting a potential influence of family dynamics on spending behavior.

The analysis uncovered several interesting insights about customer behavior and their responses to marketing campaigns:

Most customers are middle-aged, making them a prime demographic for targeted marketing campaigns.

Wine is a particularly popular product, which could be leveraged in promotional efforts.

There is a positive correlation between customer income and the profit generated, which suggests that targeting higher-income customers could result in increased profitability.

The relationship between income and profit varies significantly across marital statuses, indicating that marital status could be a key factor for market segmentation.

Recommendations

- Targeted Marketing: Given the positive correlation between income and profit, it may be beneficial to focus campaigns on higher-income customers to maximize profitability.
- Product-Specific Campaigns: Wine is a strong performer among customers, suggesting that specific promotions focused on wine could yield good results.