



MARKETING CAMPAIGN ANALYSIS USING PYTHON

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1. PROJECT INTRODUCTION



A retail food company launched an extensive marketing campaign featuring products like fish, meat, fruits, and sweets across five stages. The success of the campaign hinges on consumer acceptance of the offers in each round. The marketing department aims to analyze consumer responses to optimize future campaigns for maximum benefit.

The **dataset** comprises user demographics (education, marital status, family size, income), details of marketing activities (rounds, products purchased, channels used), and user behavior (purchase frequency, visits to the company's website).

The **goal** is to analyze this data to enhance the effectiveness of future marketing efforts.



2. BUSINESS ISSUE UNDERSTANDING

First, check the specific performance of the marketing activities, check the user portraits, user responses, marketing effects, etc. involved in the marketing activities.

ISSUE 1

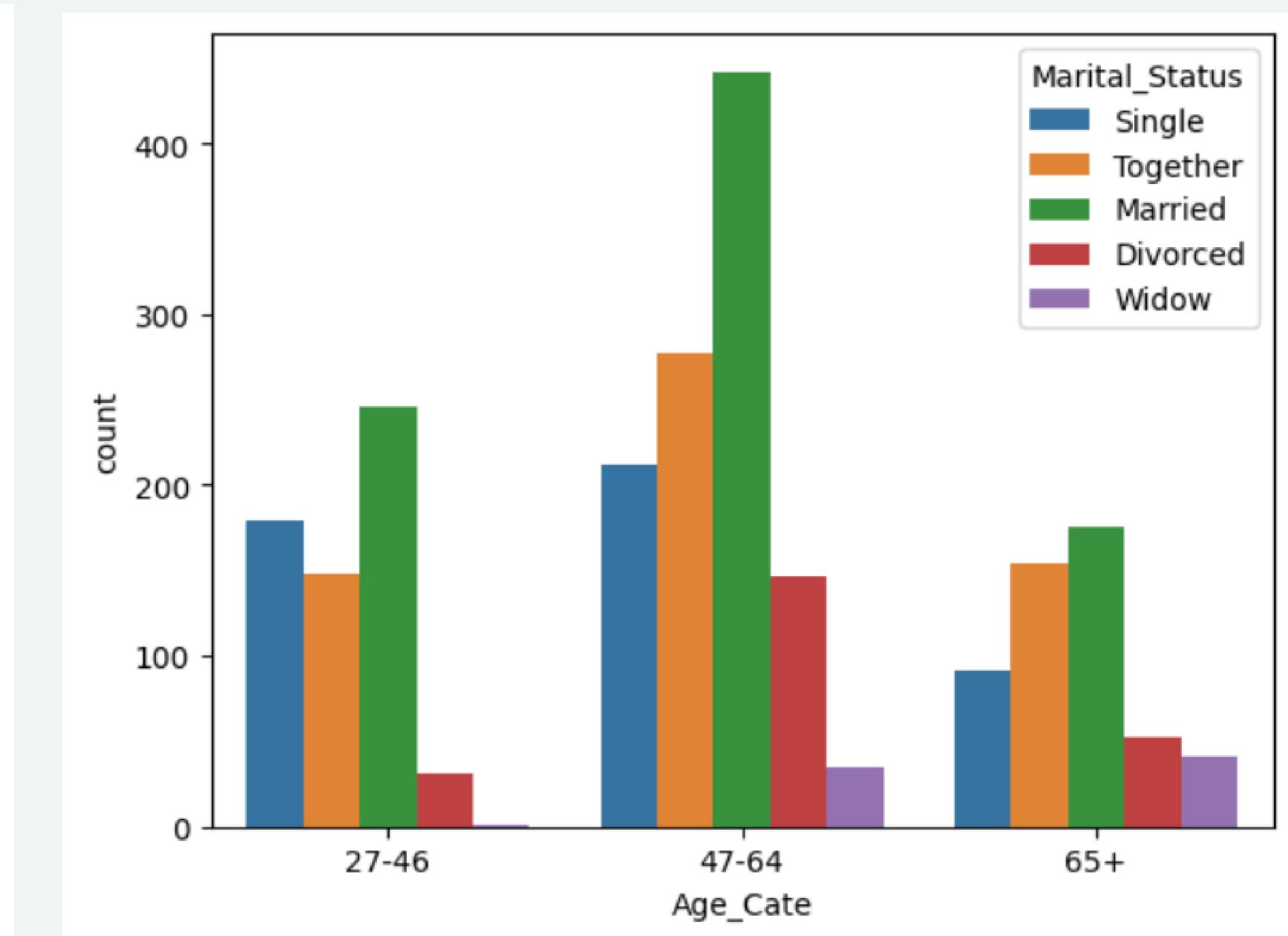
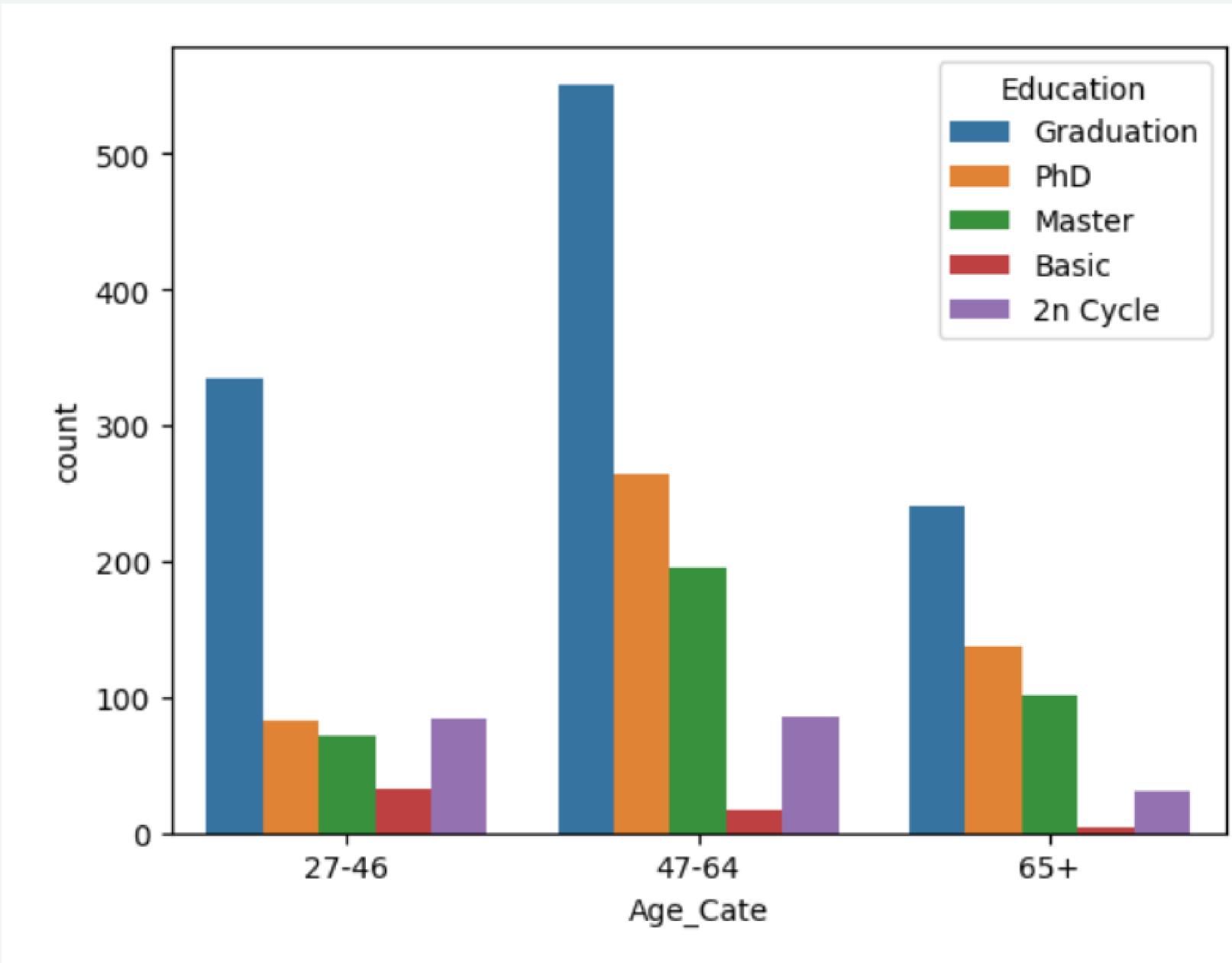
Then, conduct specific portrait analysis of the users involved in the marketing activities, including user division and user clustering.

ISSUE 2

Lastly, perform advanced analysis on the results of marketing campaigns, including predicting users' total purchases and predicting users' response behavior.

ISSUE 3

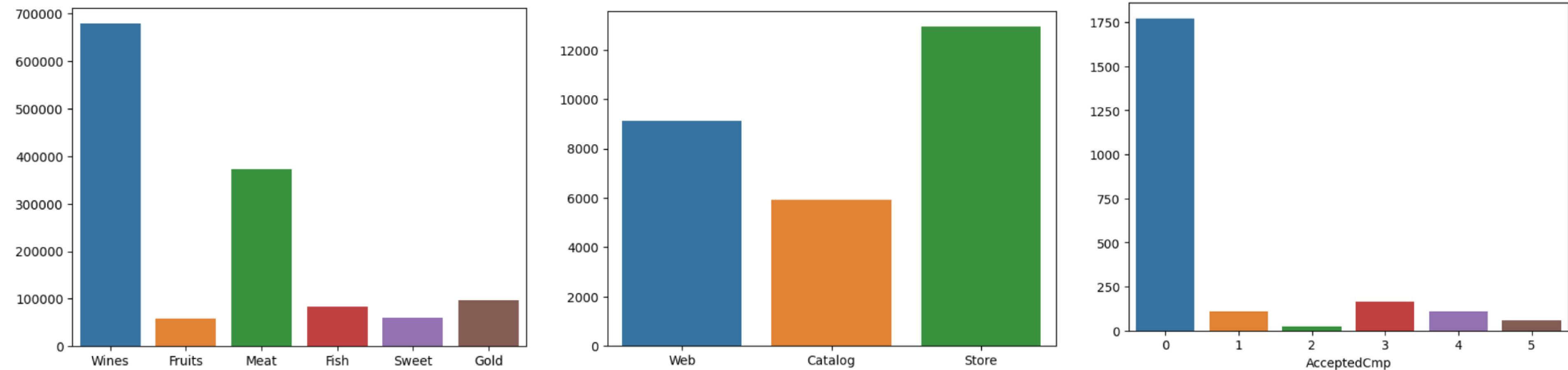
3. EXPLORATORY DATA ANALYSIS



The graph shows that the dominant age group among our customers falls within the **47-64** years range, and within this age group, **married** customers are the predominant category.

This demographic represents the most significant portion of our customer base, indicating a mature audience with potentially established family structures.

3. EXPLORATORY DATA ANALYSIS

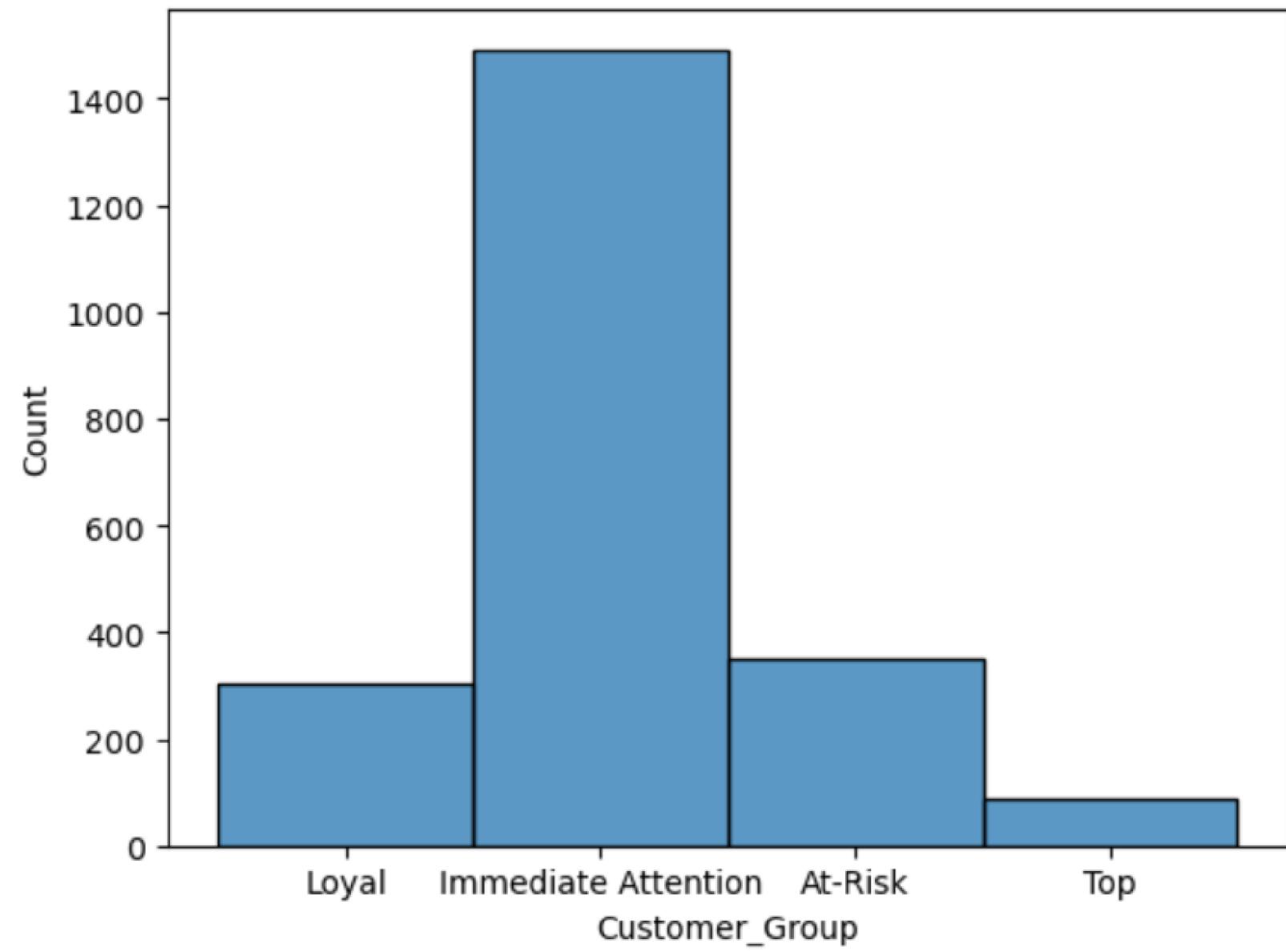


*In contrast, **wines** emerge as our best-selling product category; **fruits** represent the least popular category.*

*Data indicate a general lack of enthusiasm for most of our marketing campaigns, signaling a need for significant improvements. Notably, the **third** campaign is the most effective.*

Store sales lead as the most effective channel for revenue, highlighting the importance of the in-person shopping experience for our customers. **Catalog** sales rank last, which may reflect changing consumer behaviors towards more digital or immediate purchasing options.

4.1 RFM CUSTOMER SEGMENTATION



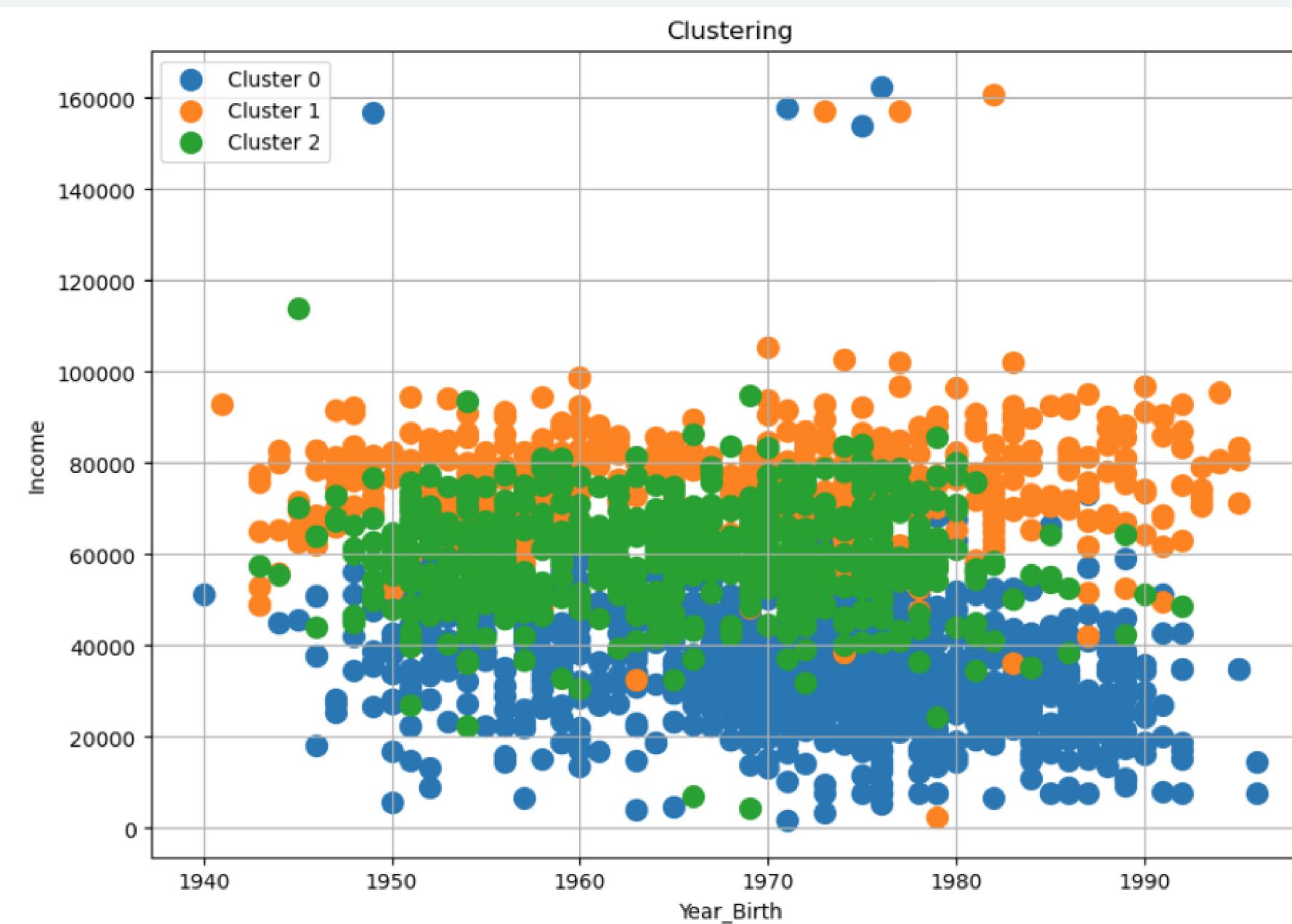
```
Customer_Group
Immediate Attention      0.668159
At-Risk                   0.156740
Loyal                     0.136140
Top                       0.038961
Name: proportion, dtype: float64
```

After leveraging **RFM (Recency, Frequency, Monetary)** analysis for customer segmentation, the results show that:

- 1) A substantial portion of the customer base, **66.8%**, falls into a category requiring **immediate attention**, and only **3.90%** are identified as top customers.
- 2) The immediate attention customer segment is **characterized** by an average age of 54.2 years, an average income of 48,781, and an average of 0.5 children per household.

	Age	Income	Kidhome
Customer_Group			
At-Risk	52.857143	41218.254700	0.622857
Immediate Attention	54.199062	48781.005959	0.506702
Loyal	54.825658	74564.321014	0.059211
Top	55.057471	77593.344828	0.022989

4.2 K-MEANS CUSTOMER CLUSTER



- **Group 0 (Largest: 1078 clients):** Characterized by the lowest annual income, one child on average, minimal purchases across categories, low offer acceptance, and a preference for web store purchases and discounts.
- **Group 1 (Smallest: 510 customers):** Notable for the highest annual income, no children, highest purchase volumes in all categories, high campaign engagement, and a preference for catalog and in-store purchases.
- **Group 2 (Mid-sized: 652 clients):** Marked by medium annual income, typically one teenager per family, moderate purchasing behavior, and a balanced tendency to buy on discount, in-store, and online, with moderate campaign participation.

5.1 TOTAL PURCHASE FORECAST

MACHINE LEARNING

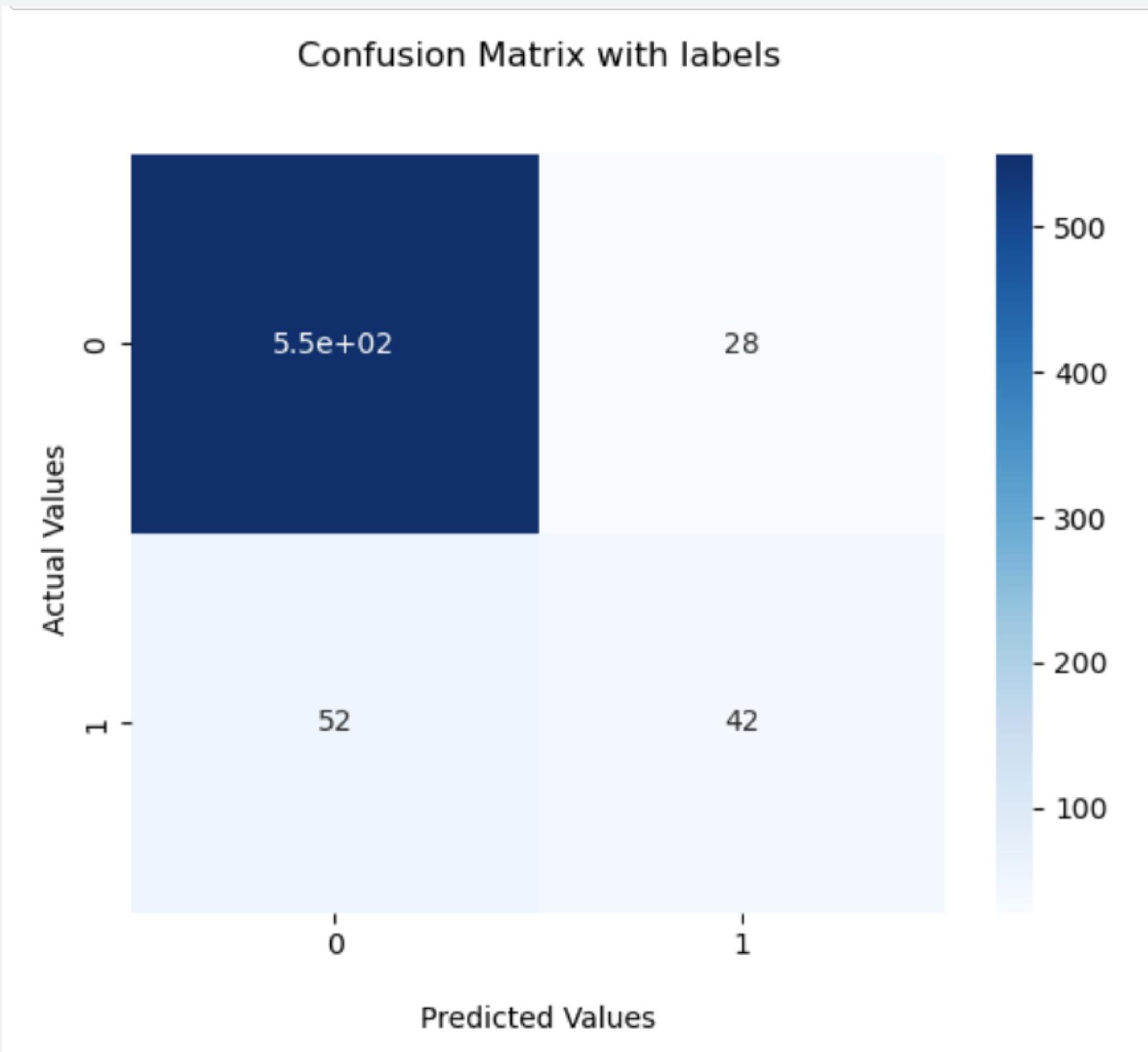
I choose two machine learning models to forecast total purchases:
LGBMRegressor and random forest.

Despite both models achieving an impressive R² score of **99.4%**, the **Random Forest** was favored for its insightful feature importance scores and general applicability to diverse datasets, making it a versatile and reliable option for accurately predicting sales volume.

99.4%

R² score

5.2 RESPONSE PREDICTION



I developed a predictive model for market campaign outcomes, leveraging both XGBoost and LightGBM algorithms for training and evaluation.

Overall, the use of **XGBoost** and **LightGBM** in a market campaign holds tremendous potential for organizations to gain a competitive edge, improve marketing effectiveness, and enhance customer experiences. And Evaluate the Accuracy of this model. Both accuracy score is almost same and **Accuracy is 88%**.

6. SUGGESTS AND RECOMMENDATION

Targeted Marketing Campaigns: For the "immediate attention" segment, consider personalized promotions that encourage repeat purchases and enhance loyalty. For top customers, develop exclusive offers or loyalty programs that recognize and reward their high engagement and spending.

STRATEGY N°1

Product and Service Diversification: Expand family-oriented products and services that appeal to the mature audience with potentially established family structures. Additionally, leverage the insights from feature importance scores to identify and prioritize the products or services most valued by customers

STRATEGY N°2

Optimize Inventory and Dynamic Pricing: Adjust prices in real-time based on demand predictions, inventory levels, and customer purchasing behavior. What's more, use the sales volume predictions to streamline inventory levels, ensuring that the stock levels of products align with their forecasted demand.

STRATEGY N°3

**THANK'S FOR
WATCHING**

