



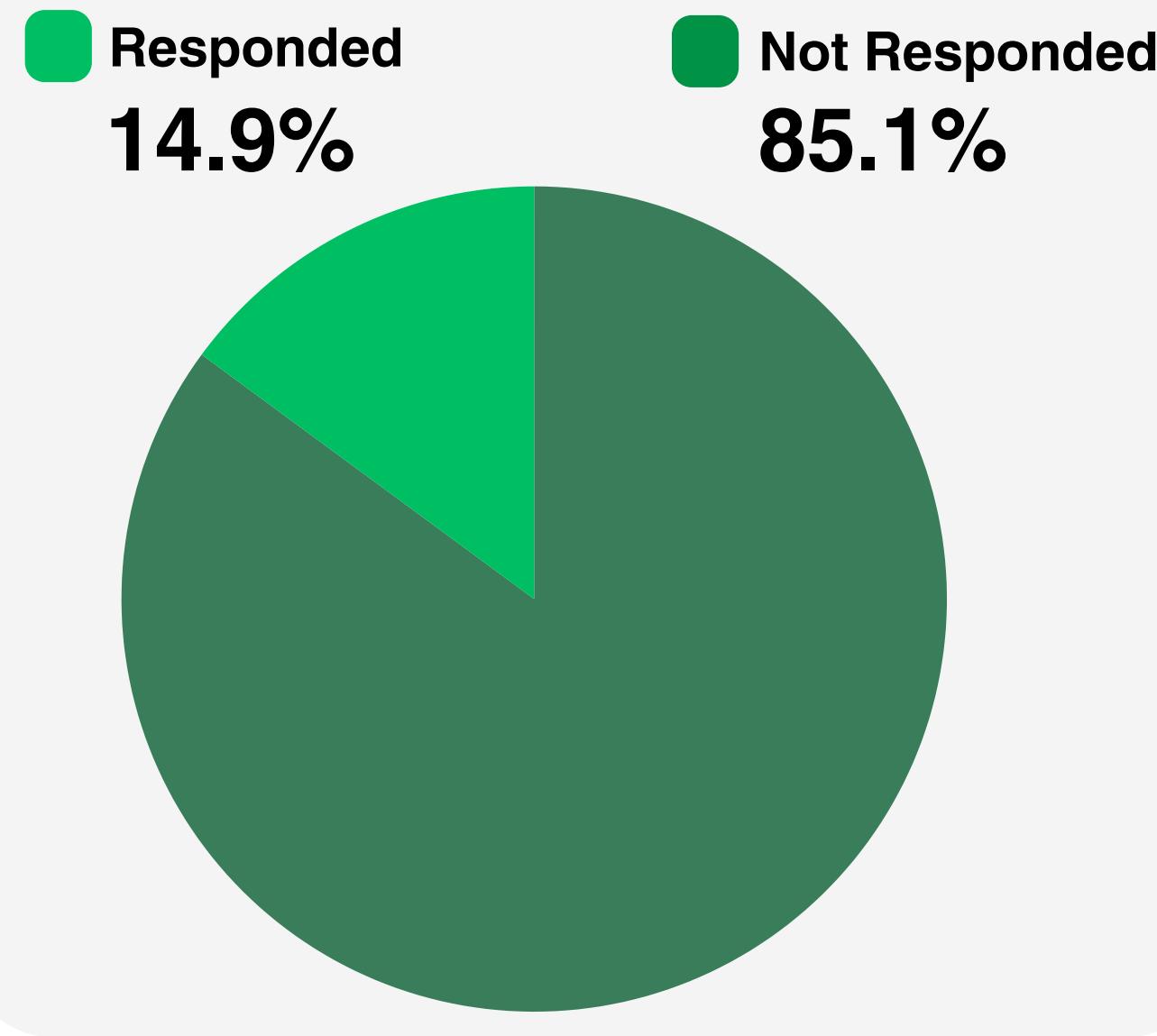
Mini Project Report:

Predict Customer Personality to Boost Marketing Campaign by Using Machine Learning

by Bhima Fairul Rifqi



Business Overview

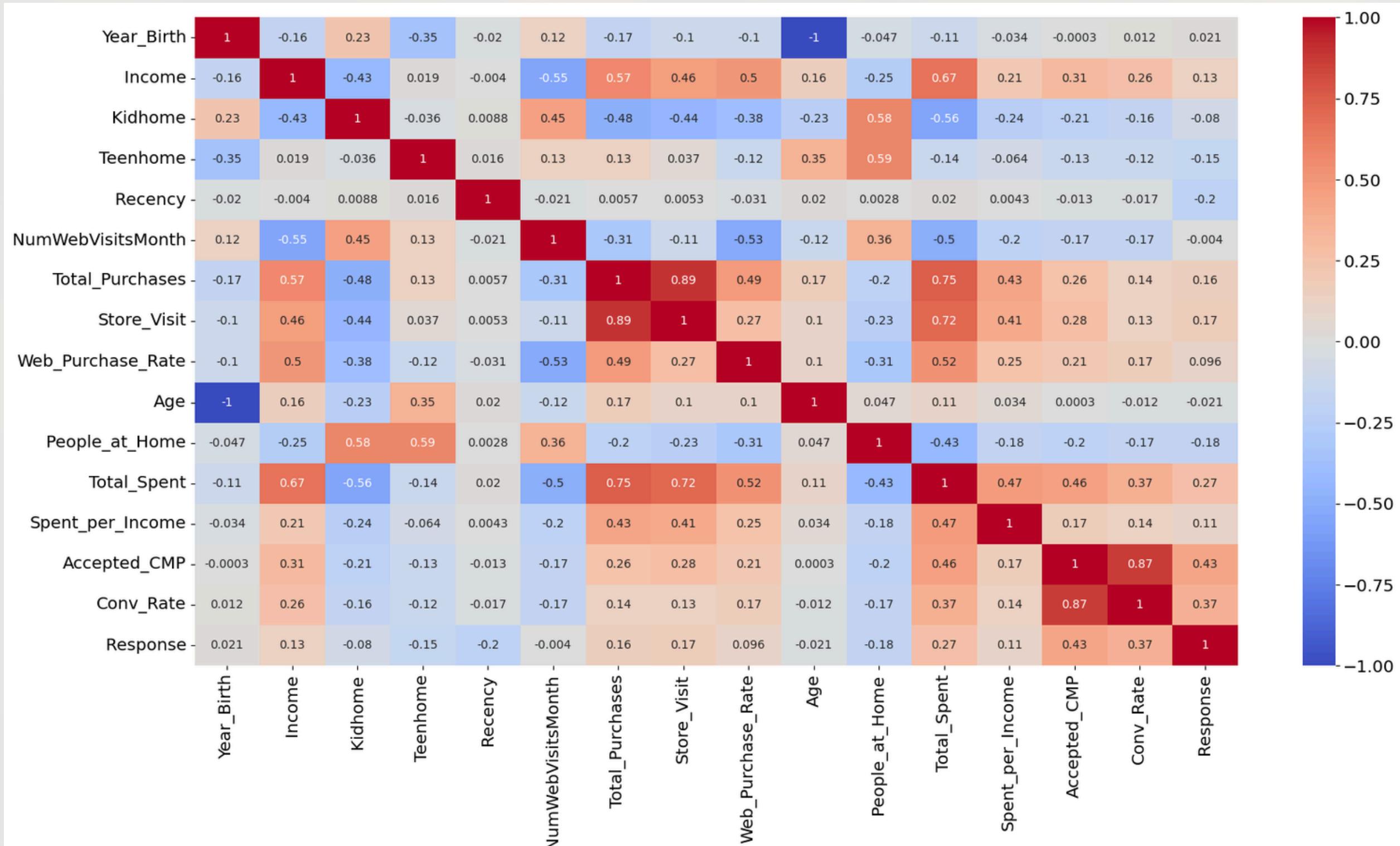


Facing a low 14.9% campaign response rate, KLMart is turning to machine learning to segment its clients more effectively and improve targeting, engagement, and retention.



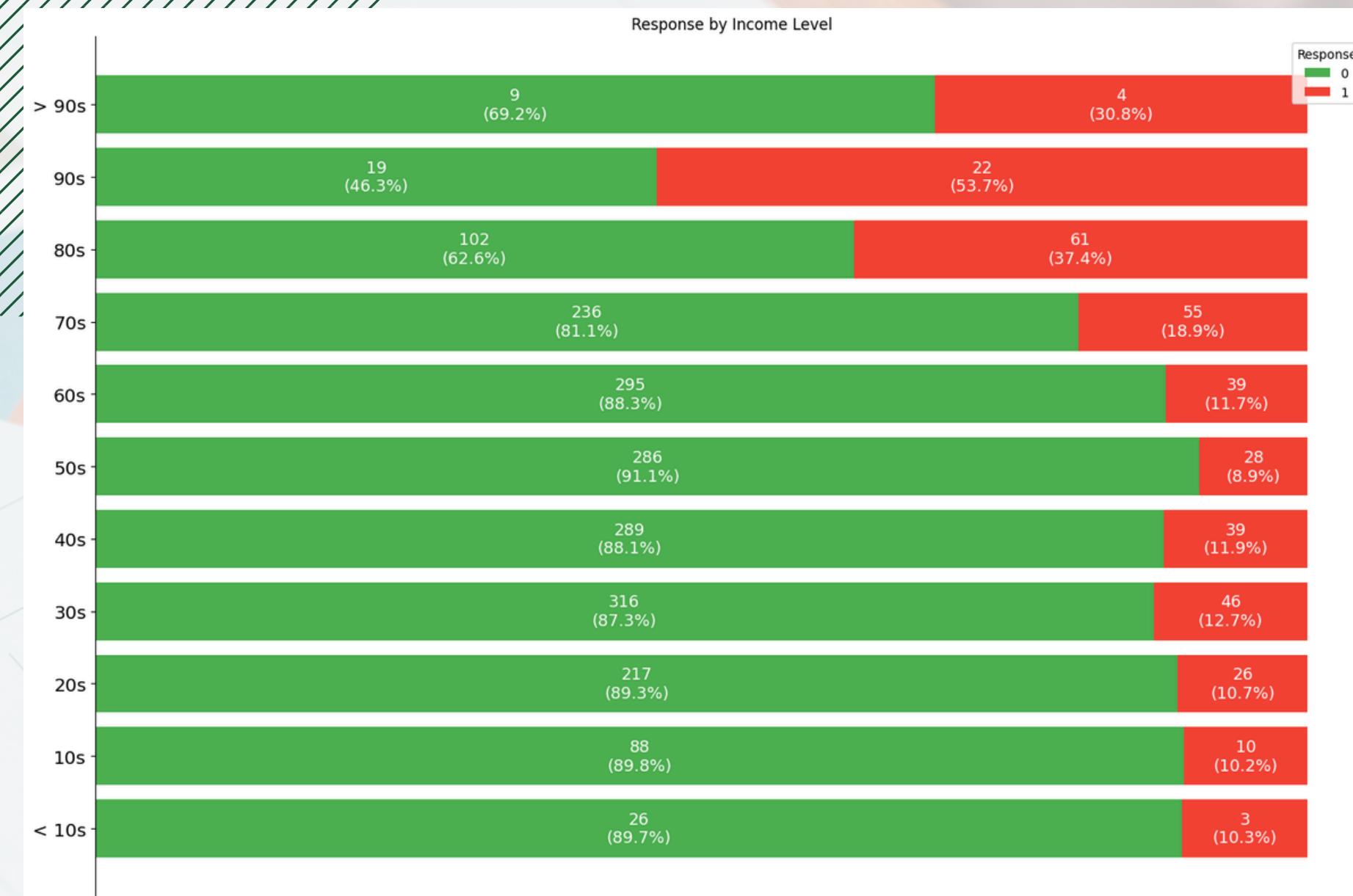
Insights

High-income customers spend and purchase more, making them ideal for premium targeting. Past campaign responders show higher future response rates, good for retention. Larger households spend less and engage less online. Behavioral and spending patterns are more useful for segmentation than demographics.



Insights:

Customers with higher income levels (80s and above) show lower response rates to the campaign, as low as 46.3% and 30.8%. In contrast, lower- to mid-income groups (10s to 70s) respond significantly better, with response rates consistently above 80%, peaking at 91.1% in the 50s income range.



Recommendation:

Shift marketing focus toward mid- and lower-income segments, which are clearly more responsive. For higher-income groups, reassess messaging and value propositions, consider more premium, exclusive, or personalized offers to better align with their expectations and purchasing behavior.

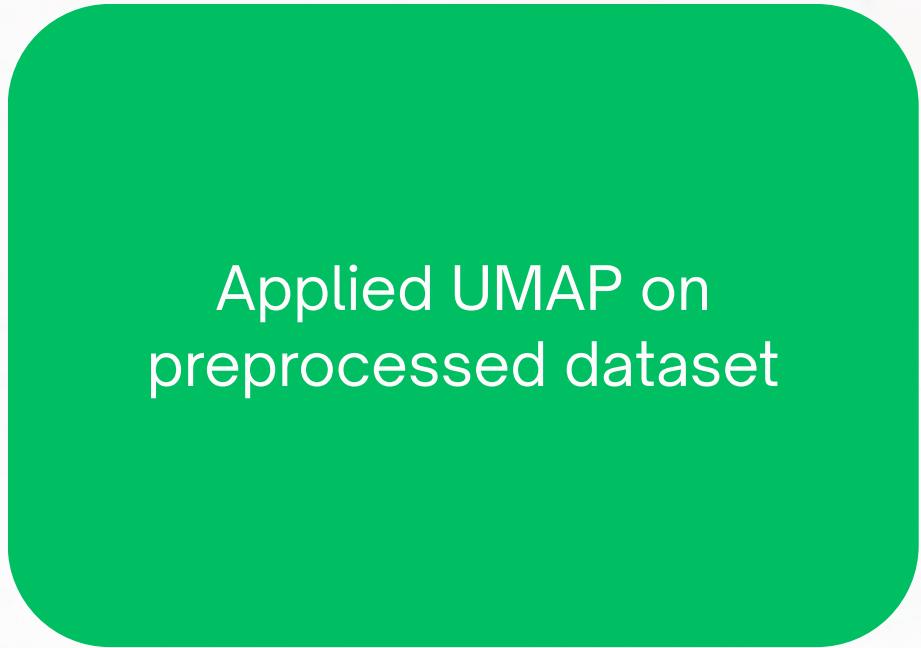
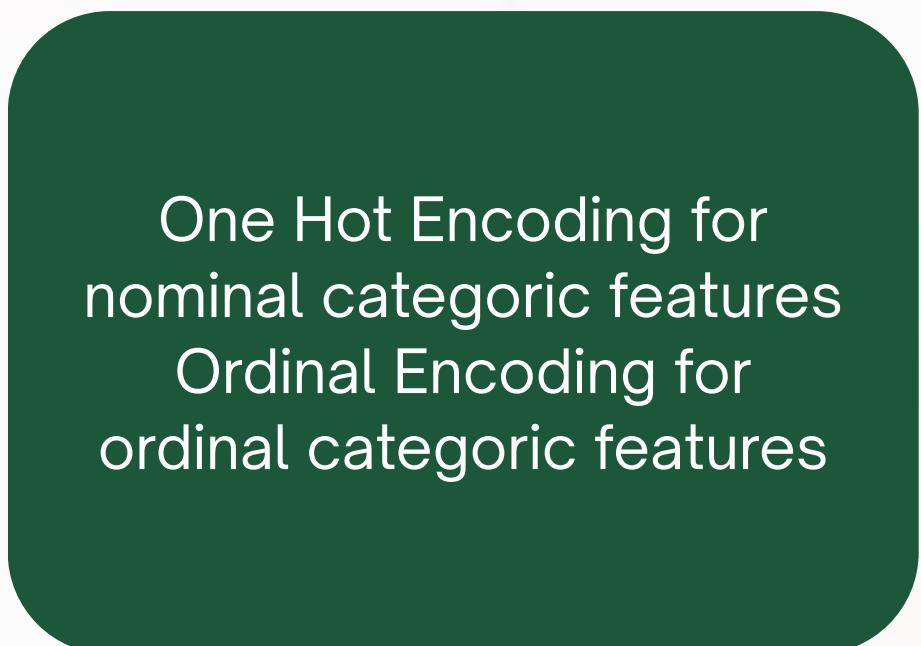
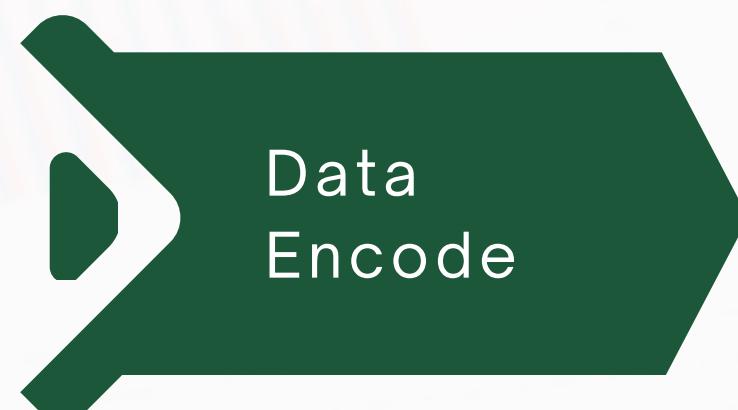
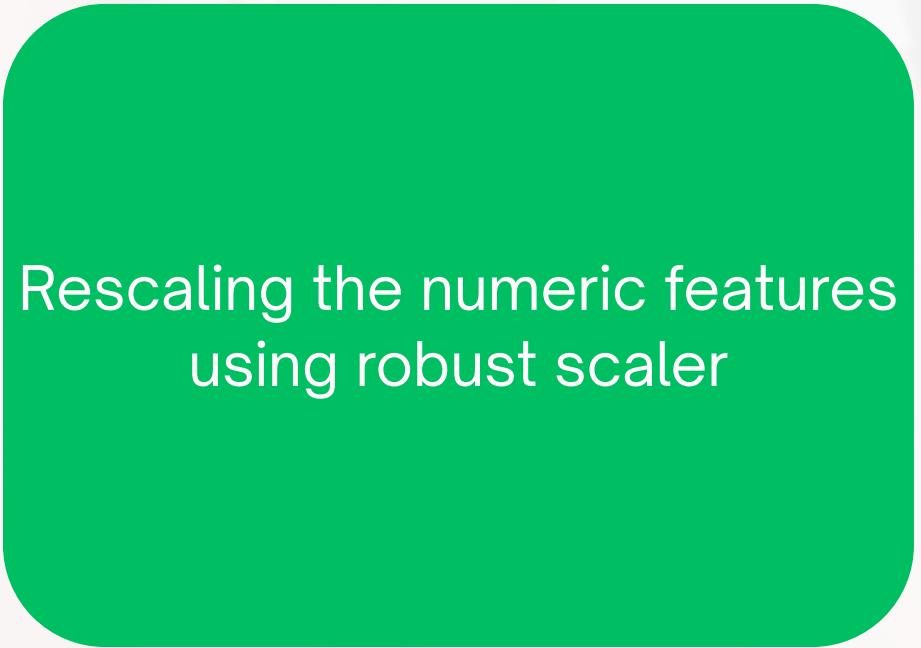
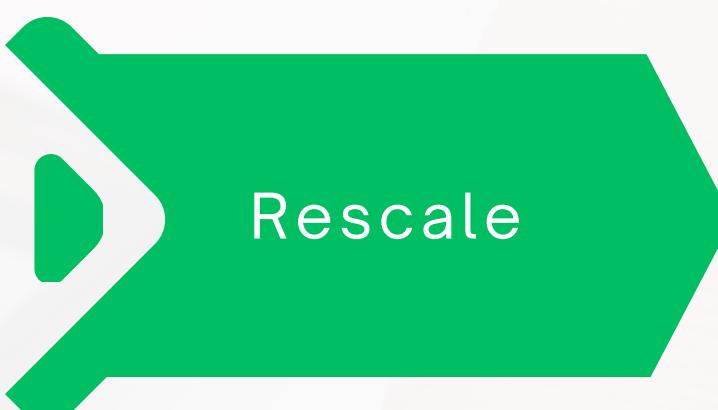
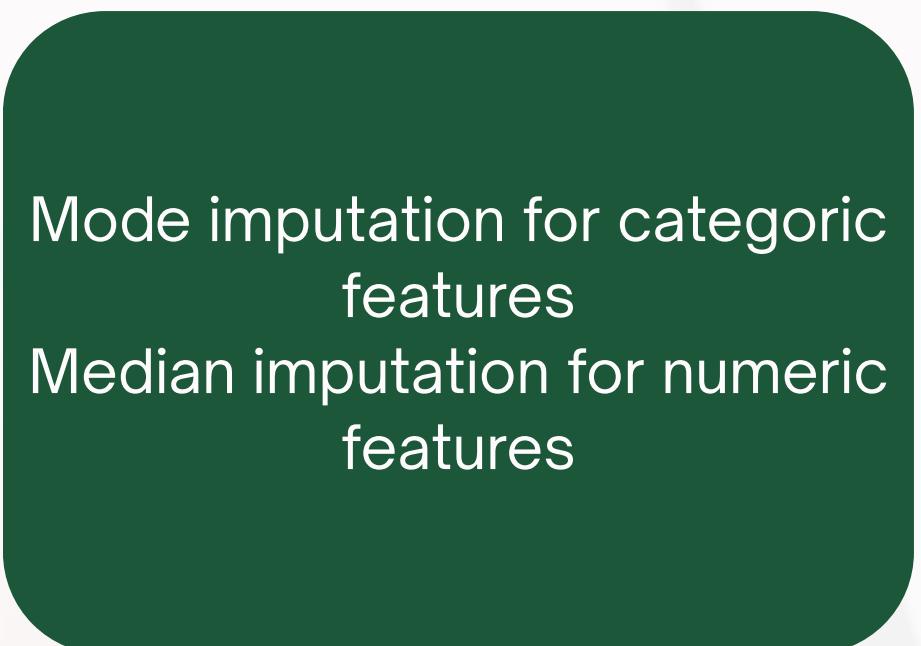
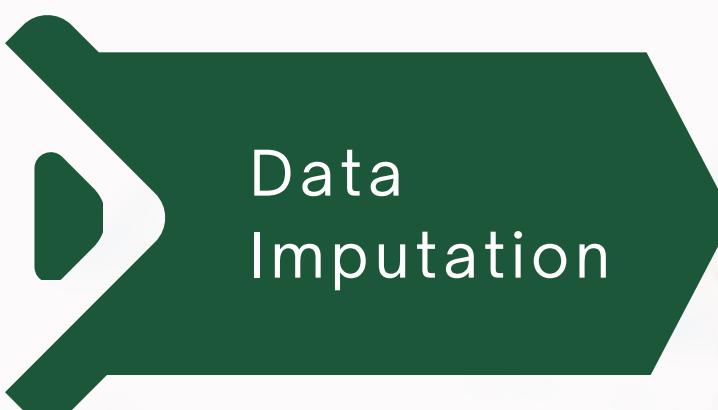
Selected Features

Feature	Type
Income	float64
Recency	float64
NumWebVisitsMonth	float64
Total_Purchases	float64
Web_Purchase_Rate	float64
Age	float64
People_at_Home	float64
Spent_per_Income	float64
Accepted_CMP	float64
Conv_Rate	float64
Education	float64
Complain	int64

Number of Observations: 2240

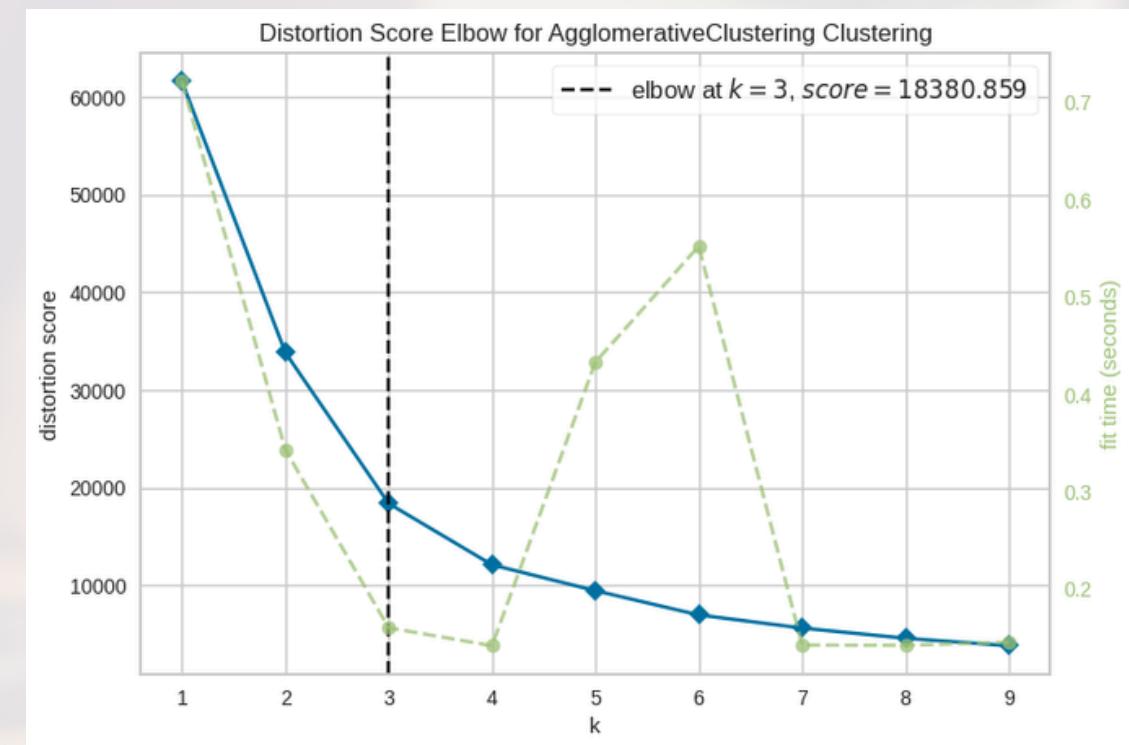
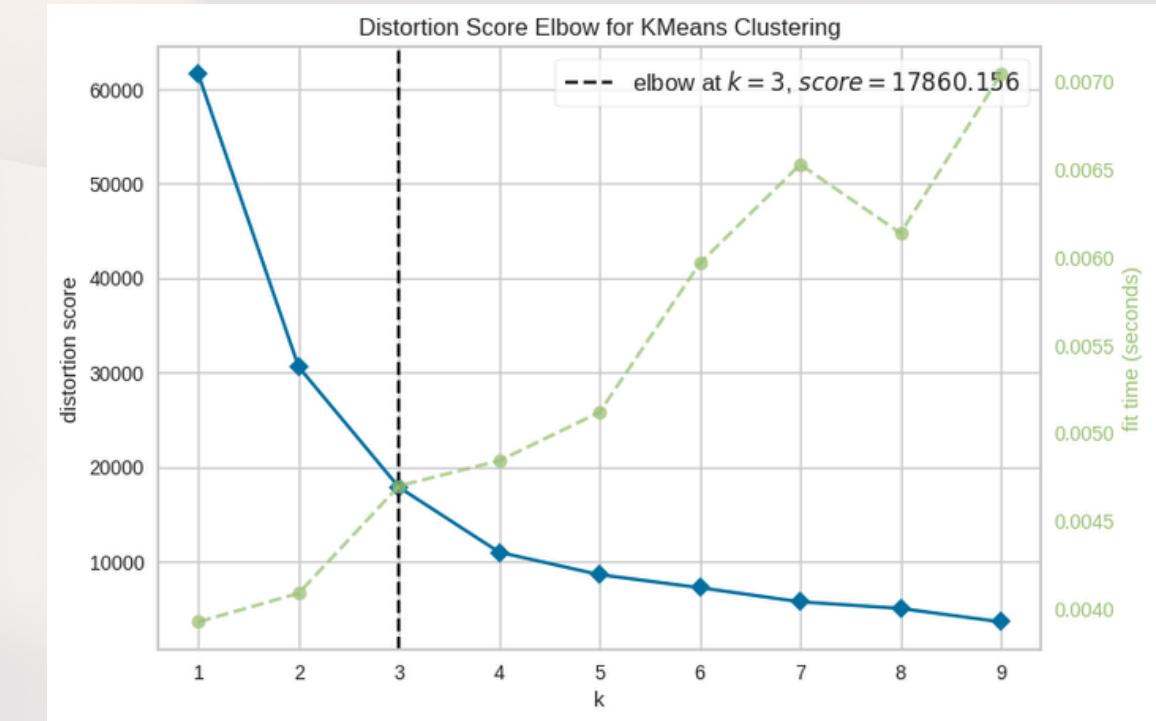
Data Preprocessing

The data are splitted into train and test set on 80:20 ratio respectively.

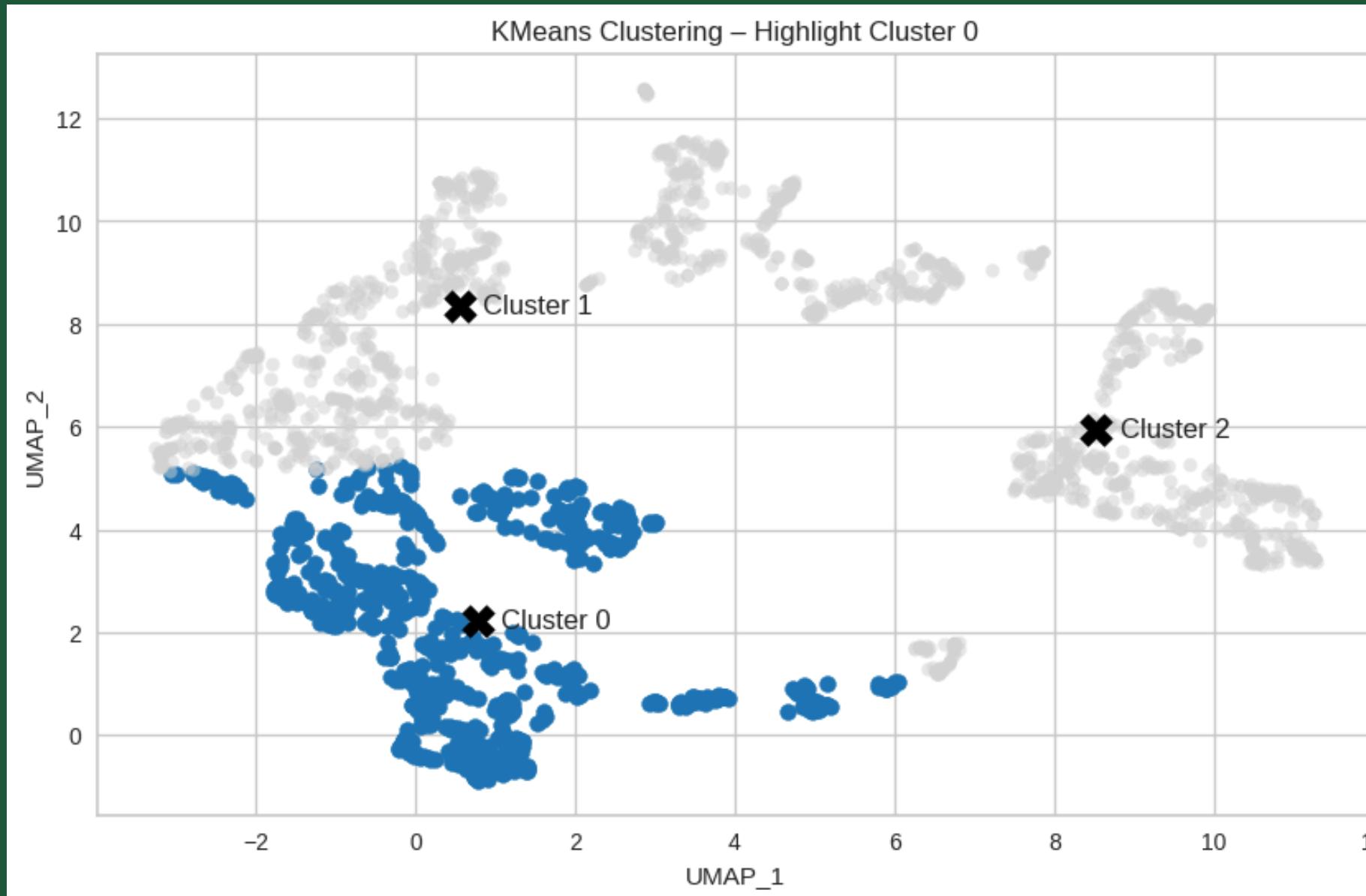


Clustering Models

K	Silhouette Score	
	Agglomerative	KMeans
2	0,45	0,48
3	0,46	0,47
4	0,46	0,48
5	0,45	0,47
6	0,46	0,44
7	0,47	0,45
8	0,47	0,47
9	0,5	0,5
10	0,5	0,53



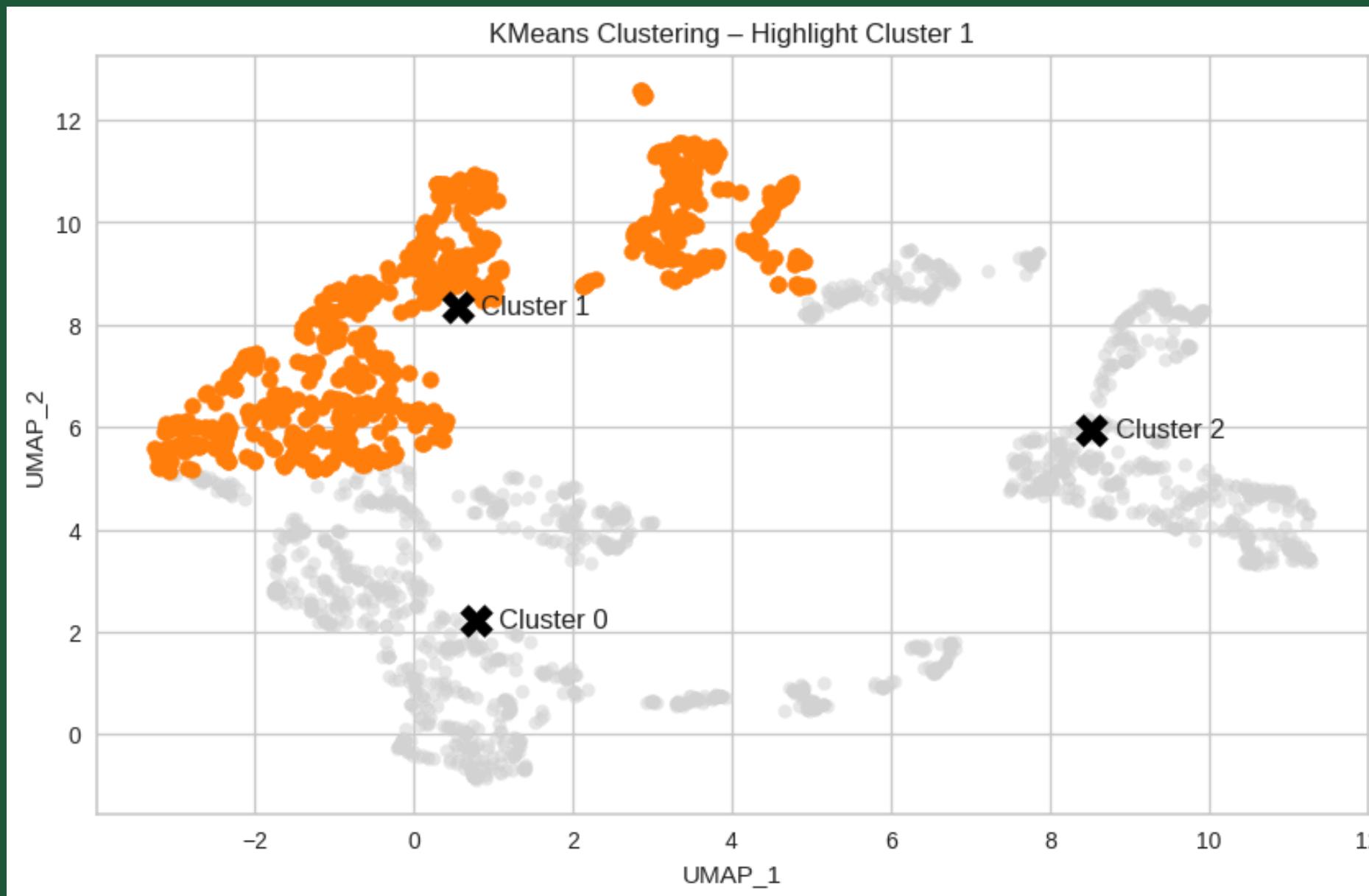
Cluster 0: Active Online Shoppers



This cluster consists of moderately affluent customers with a strong online presence. They have high web visit rates and a good number of total purchases, but their conversion rate remains low, suggesting a gap between interest and action. The group is largely composed of S1-educated individuals, possibly younger or early-career professionals who are digitally native and actively browse. However, they may be price-sensitive or indecisive when it comes to completing transactions.

Recommendation: To improve performance from this segment, use targeted digital campaigns with retargeting ads, cart abandonment emails, and limited-time offers to push conversions. Educational content, product comparisons, and user reviews can also help build trust and nudge them toward purchase decisions. Gamification elements like points or reward systems could further incentivize engagement.

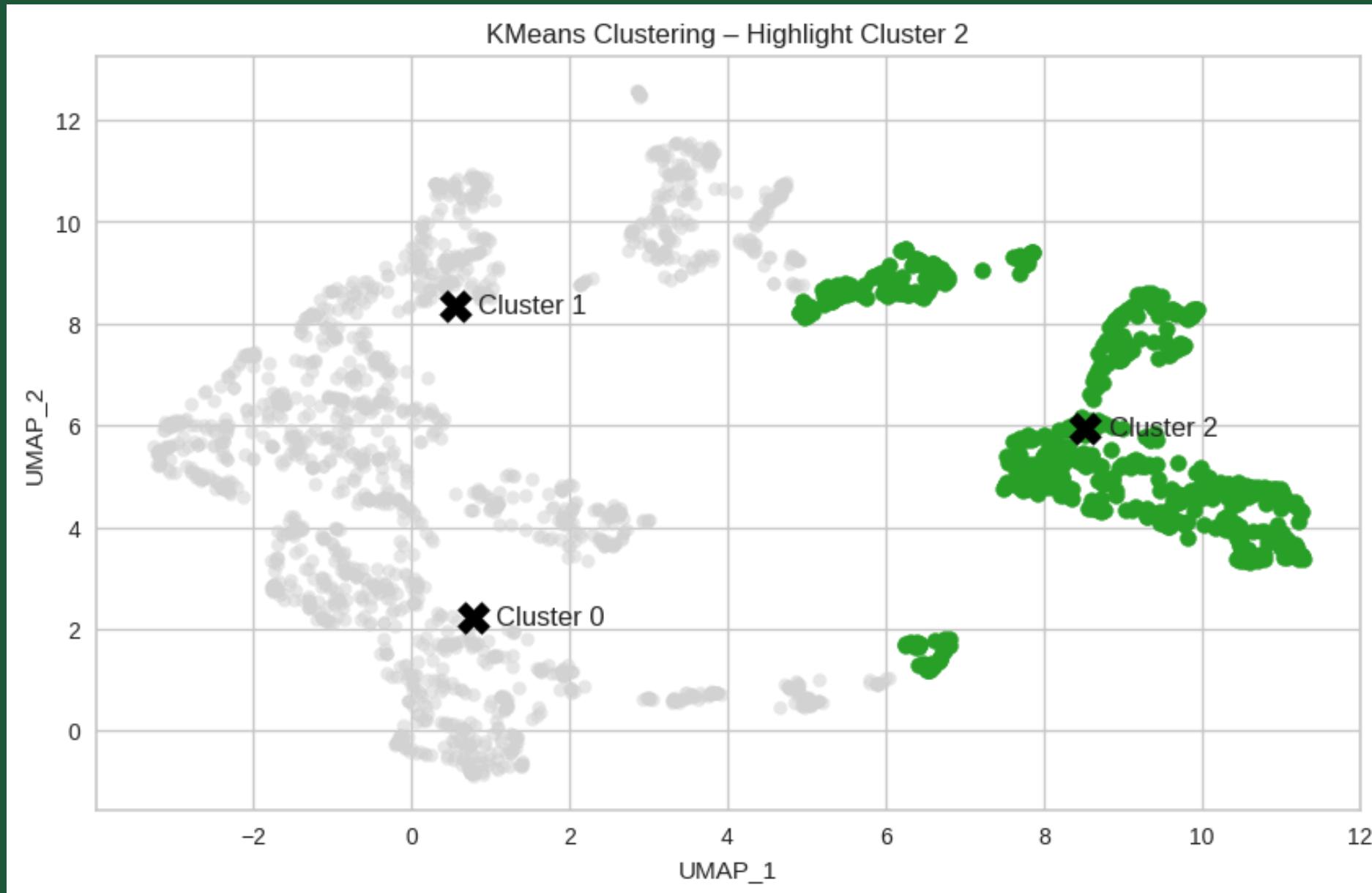
Cluster 1: Wealthy & Highly Engaged



This is company's most valuable and responsive customer segment. With the highest income, greatest number of purchases, and the best conversion and campaign acceptance rates, these customers are clearly engaged and loyal. They are mostly highly educated (S3), suggesting professionals or executives who appreciate quality, personalization, and efficiency. Their high web purchase rate and spending behavior make them ideal for high-margin or premium product targeting.

Recommendation: Focus on personalized experiences, exclusive VIP deals, and early access to new products to maintain their loyalty. Use advanced segmentation in email campaigns, offer tailored recommendations, and consider launching premium membership or referral programs. This group should be prioritized for retention and upselling strategies.

Cluster 2: Family-Oriented Low Spenders



This group shows low income, minimal engagement, and the lowest conversion and campaign acceptance rates. They have the highest number of people at home, indicating a family-oriented lifestyle, and consist mainly of S1 and S2 education levels, which could reflect lower access to resources or digital literacy. Their online activity and web purchasing behavior are minimal, suggesting a preference for traditional or offline shopping or a lack of digital confidence.

Recommendation: Marketing to this group should focus on value, affordability, and practicality. Promote budget-friendly bundles, family-oriented products, and seasonal deals through accessible channels like SMS, WhatsApp, or community-based campaigns. Keep messaging simple, relatable, and focused on needs over wants, emphasizing savings and convenience for the whole family.

THANK YOU

Project Resource:

 [GitHub / Repo](#)

