

Customer Segmentation

Phase 4 Project: Flatiron School

Presented by

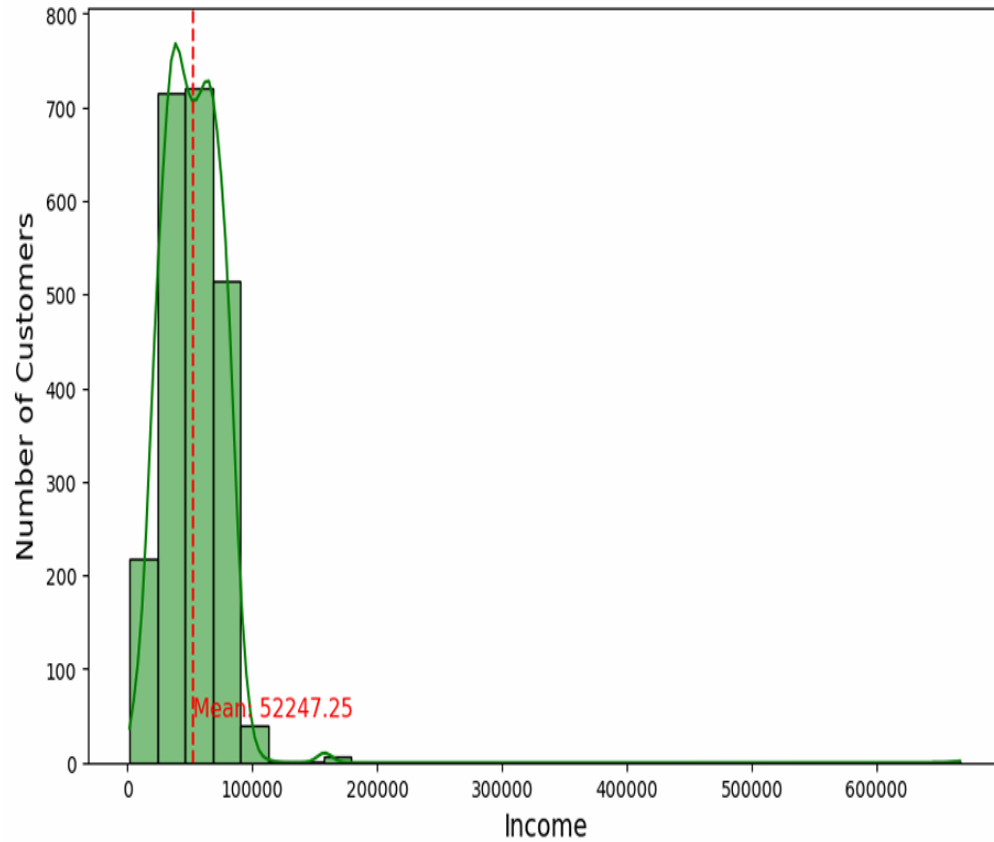
Rashmi Chauhan

Objective

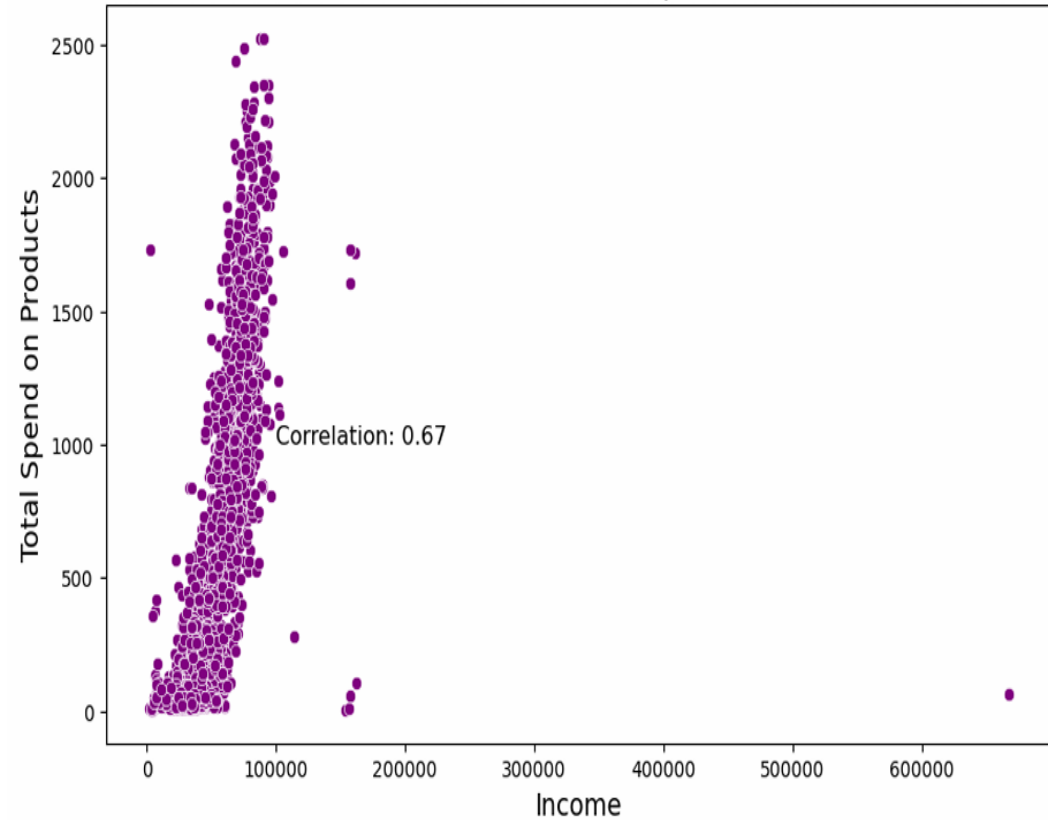
- This project aims to develop a customer segmentation model using a marketing campaign dataset.
- By leveraging demographic information (such as age, income, and family size), purchase history (amount spent on different product categories), and engagement with marketing campaigns, it aims to identify distinct customer groups.
- The Dataset consists of:
 1. Customer's information
 2. Products (Amount spent on diff. products)
 3. Promotion (Response to campaign and campaign acceptance information)

Income vs Total Spend

Income Distribution of Customers

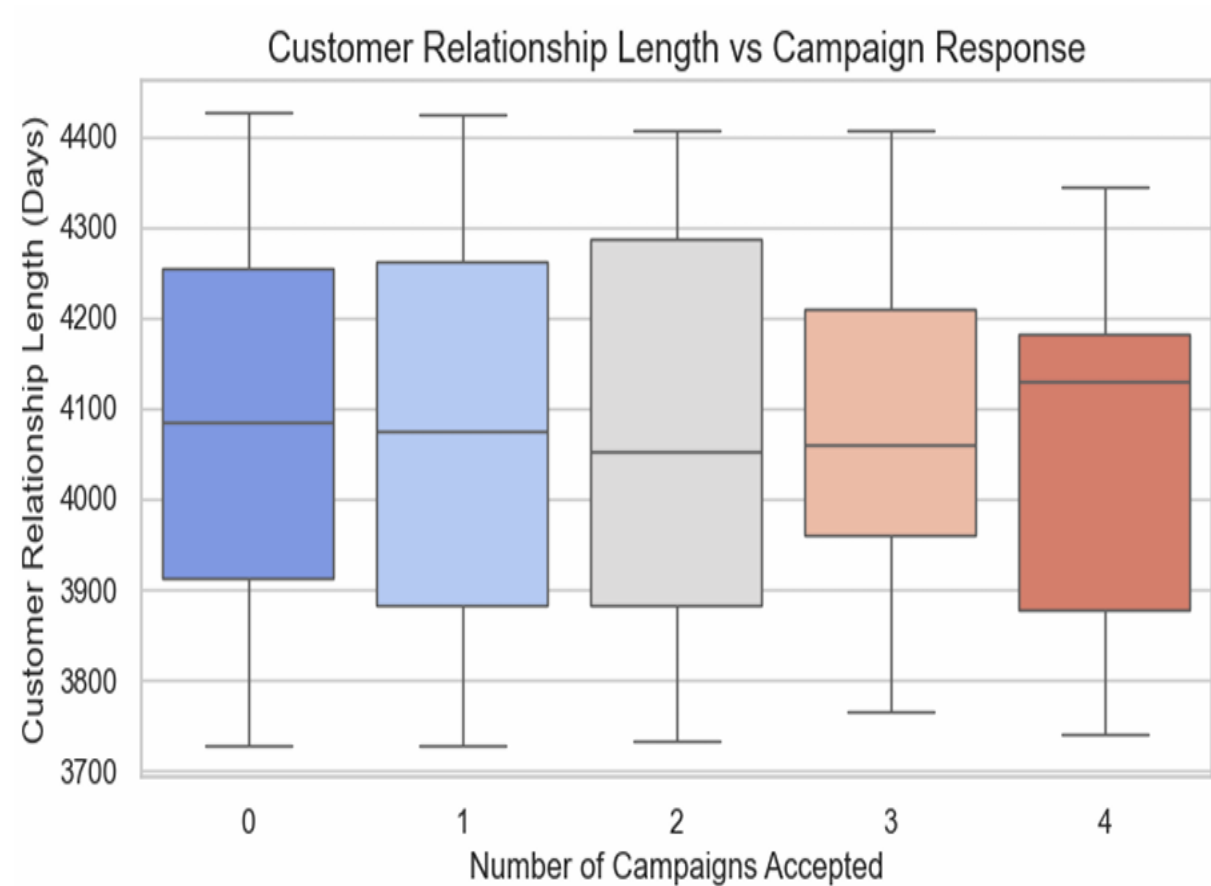
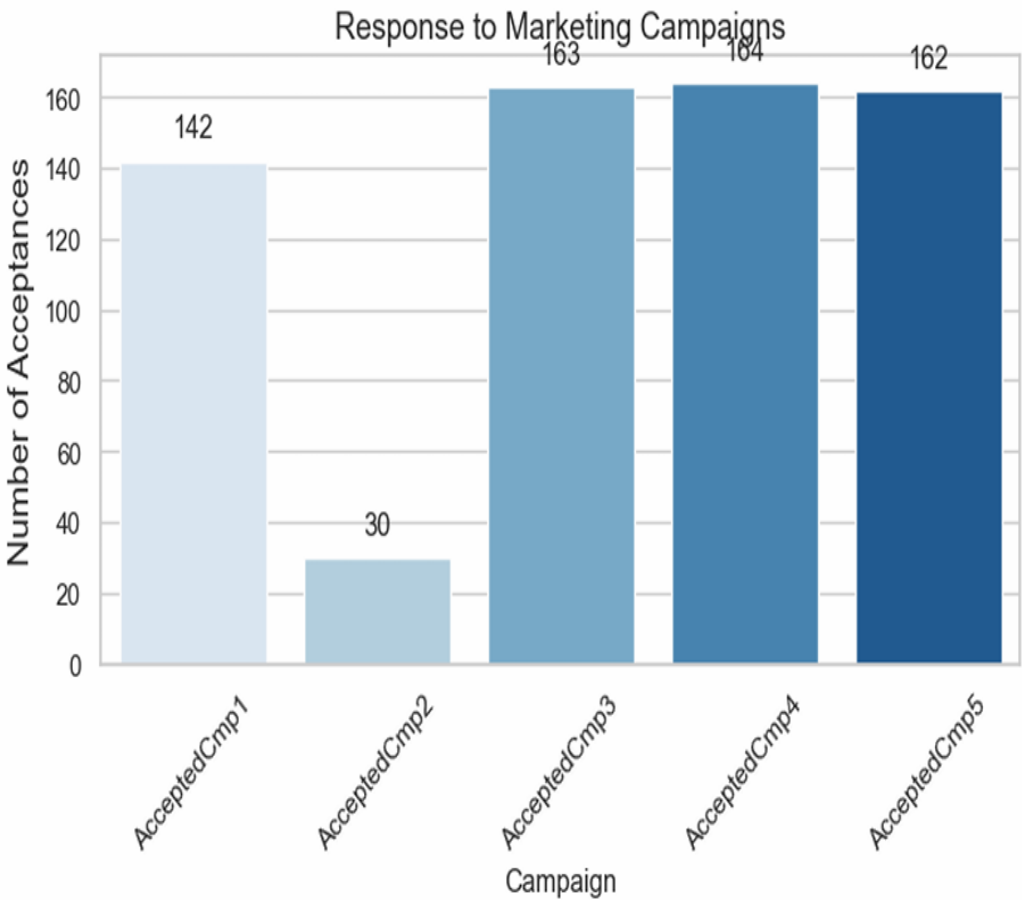


Income vs Total Spend



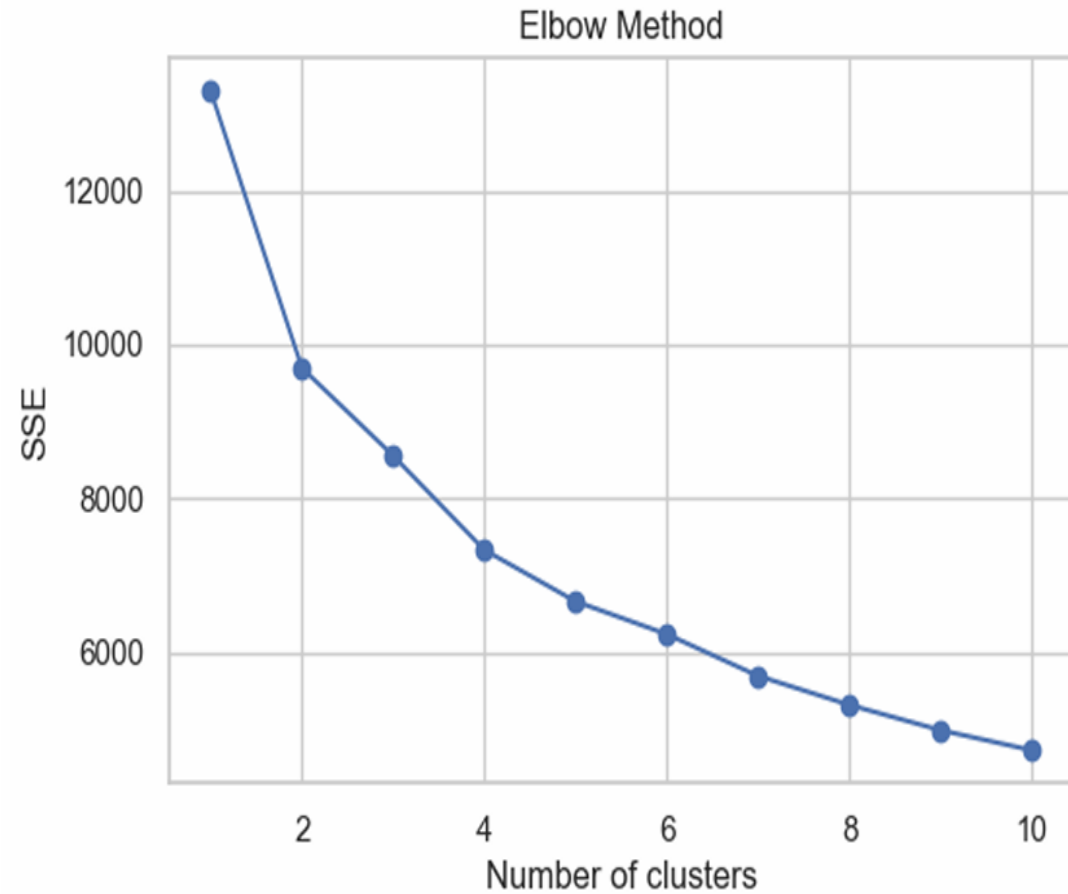
*Income data is rightly skewed

Length of Customer relationship influence on response to Campaigns?

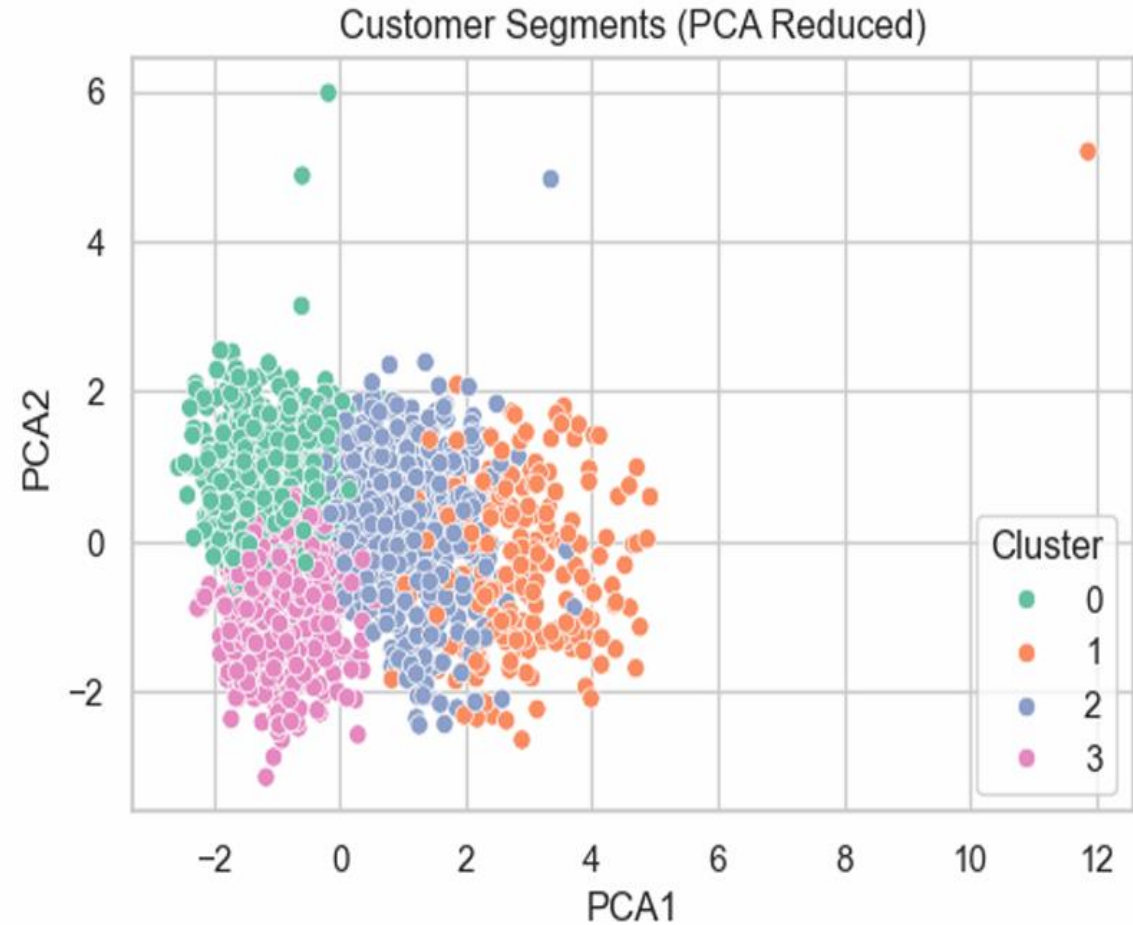


Visualization of Clusters

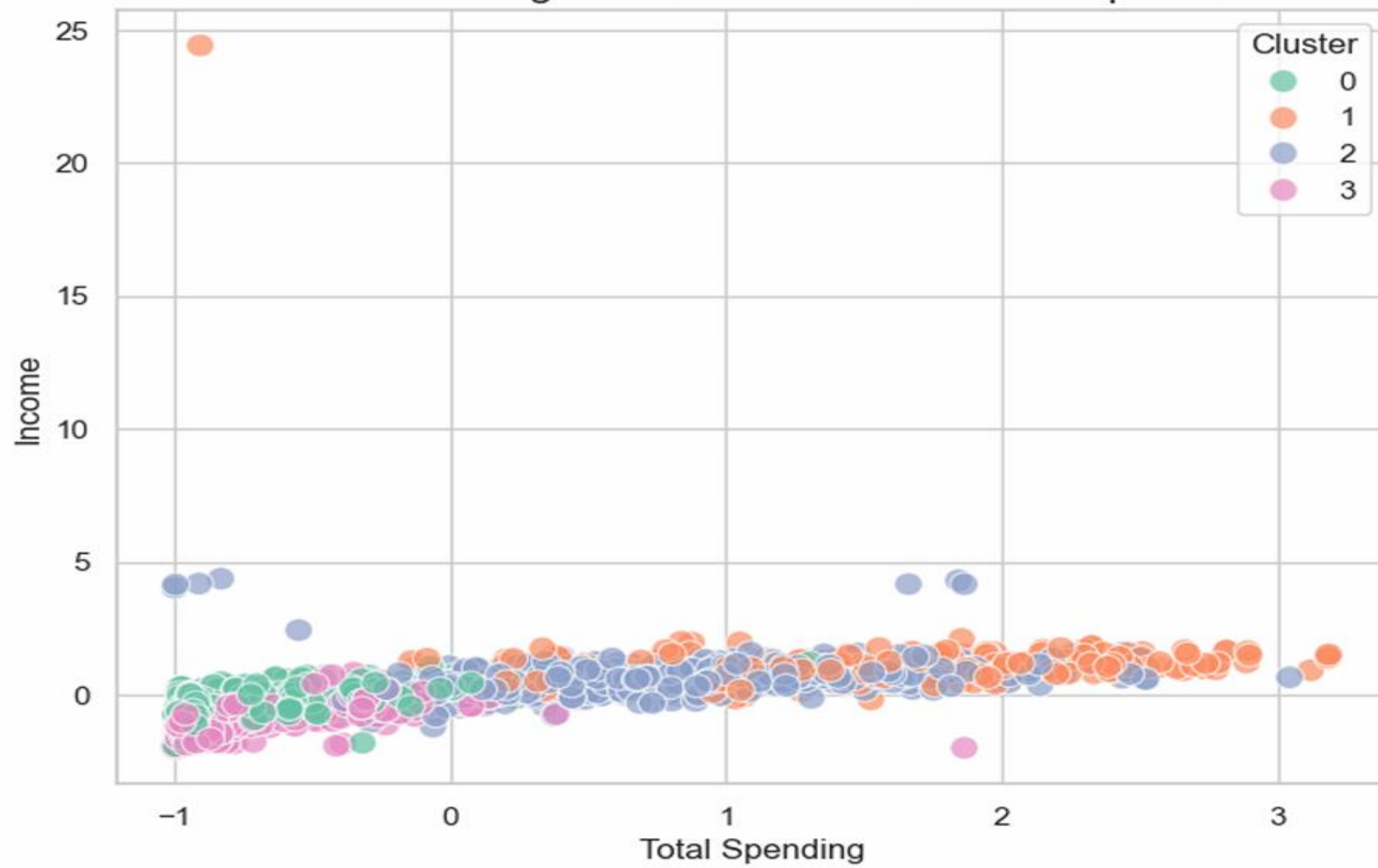
K means clustering algorithm is used to group customers based on optimal clusters from Elbow method.



Silhouette score: 0.211



Customer Segmentation with Cluster Descriptions

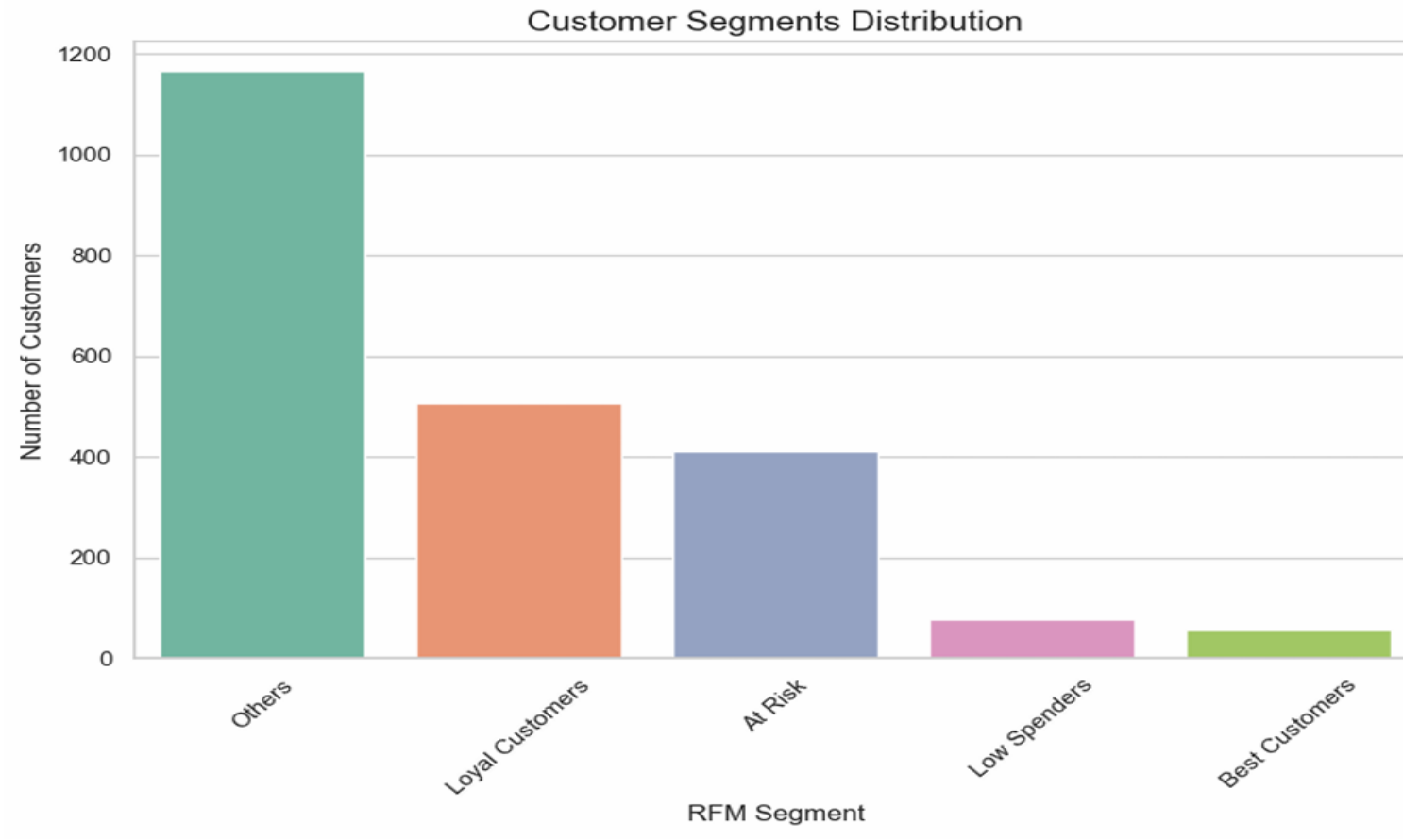


Customer Profiling based on Clusters

- Cluster 0: Customers here are older, have moderate income, more children, but spend less and engage less in marketing campaigns. (Low Income, Low Spending)
- Cluster 1: These are the most valuable customers, as they have high incomes, spend the most, and are highly engaged with marketing campaigns. (High Income, High Spending)
- Cluster 2: These are middle-aged, middle-income customers who spend moderately and have moderate engagement with campaigns.
- Cluster 3: This group consists of younger, low-income customers who spend very little and are not highly engaged in campaigns.

New Features = ['Income', 'Age', 'Customer Tenure', 'Total Spending', 'Total Accepted Campaigns']

RFM Analysis



Segmenting customers based on how recently they made a purchase (Recency), how often they purchase (Frequency), and how much they spend (Monetary)

Multilayer Perceptron, (a type of Artificial Neural Network) using Keras

Objective: Predict whether a customer will respond to a marketing campaign

Model: "sequential"

Layer (type)	Output Shape	Param #
dense (Dense)	(None, 64)	1,856
batch_normalization (BatchNormalization)	(None, 64)	256
dense_1 (Dense)	(None, 32)	2,080
batch_normalization_1 (BatchNormalization)	(None, 32)	128
dense_2 (Dense)	(None, 1)	33

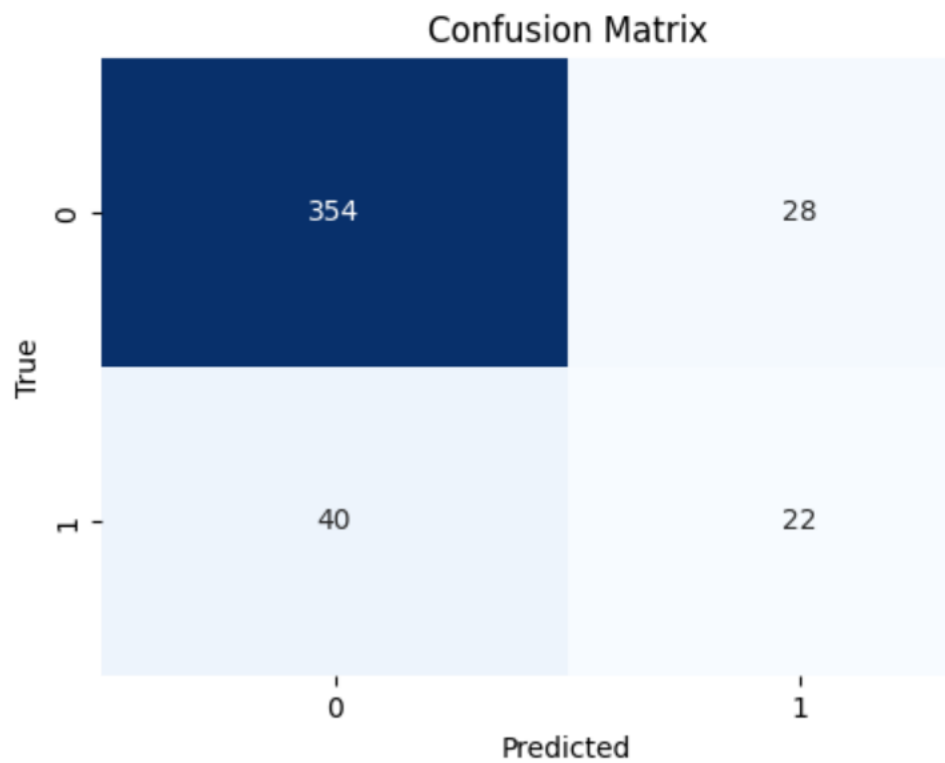
Total params: 12,677
(49.52 KB)

Trainable params:
4,161 (16.25 KB)

Non-trainable params:
192 (768.00 B)

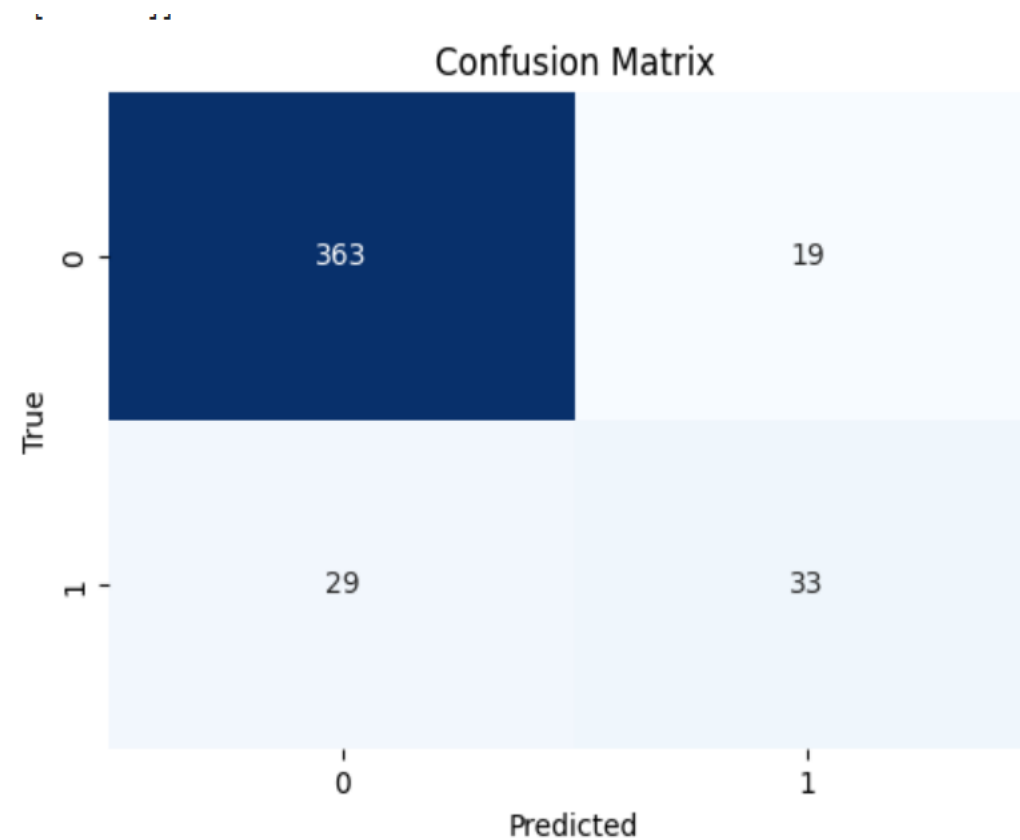
Optimizer params:
8,324 (32.52 KB)

Before Hyperparameter tuning



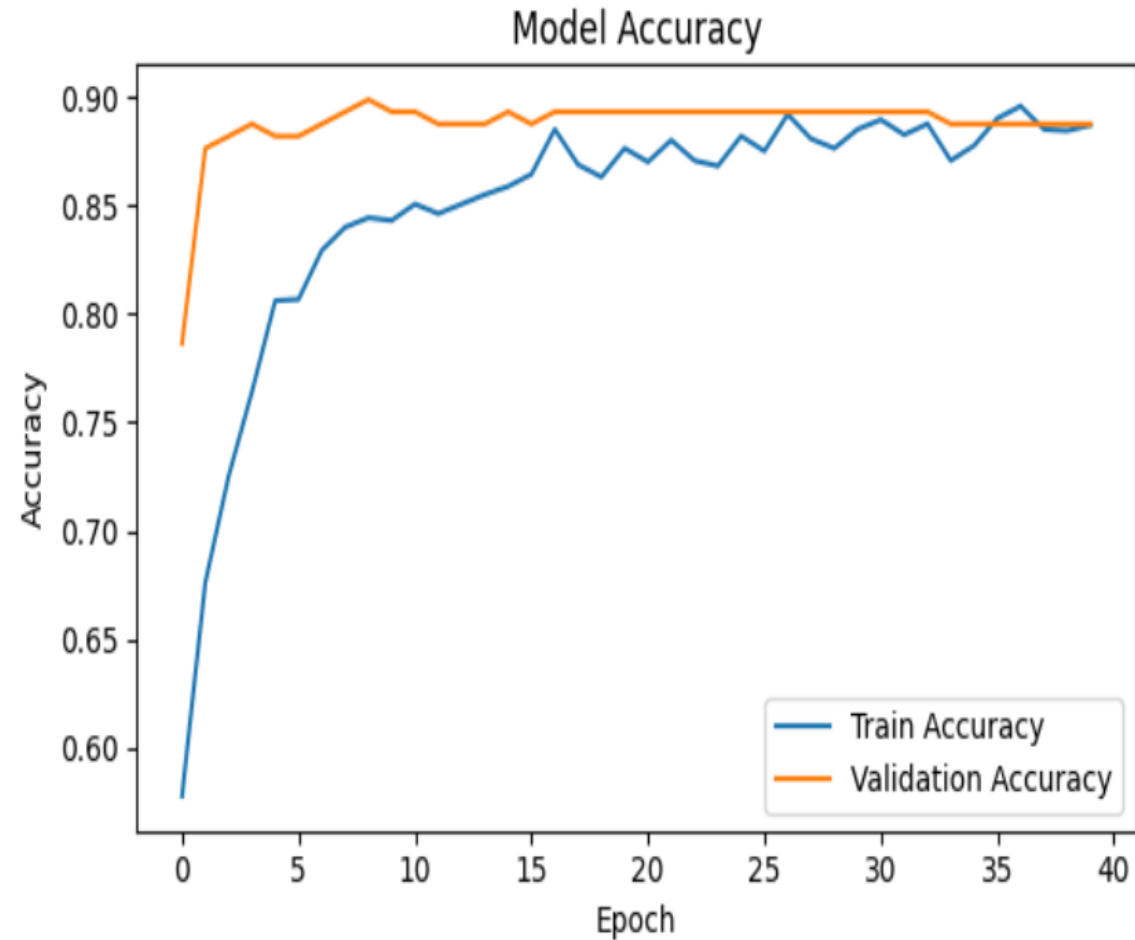
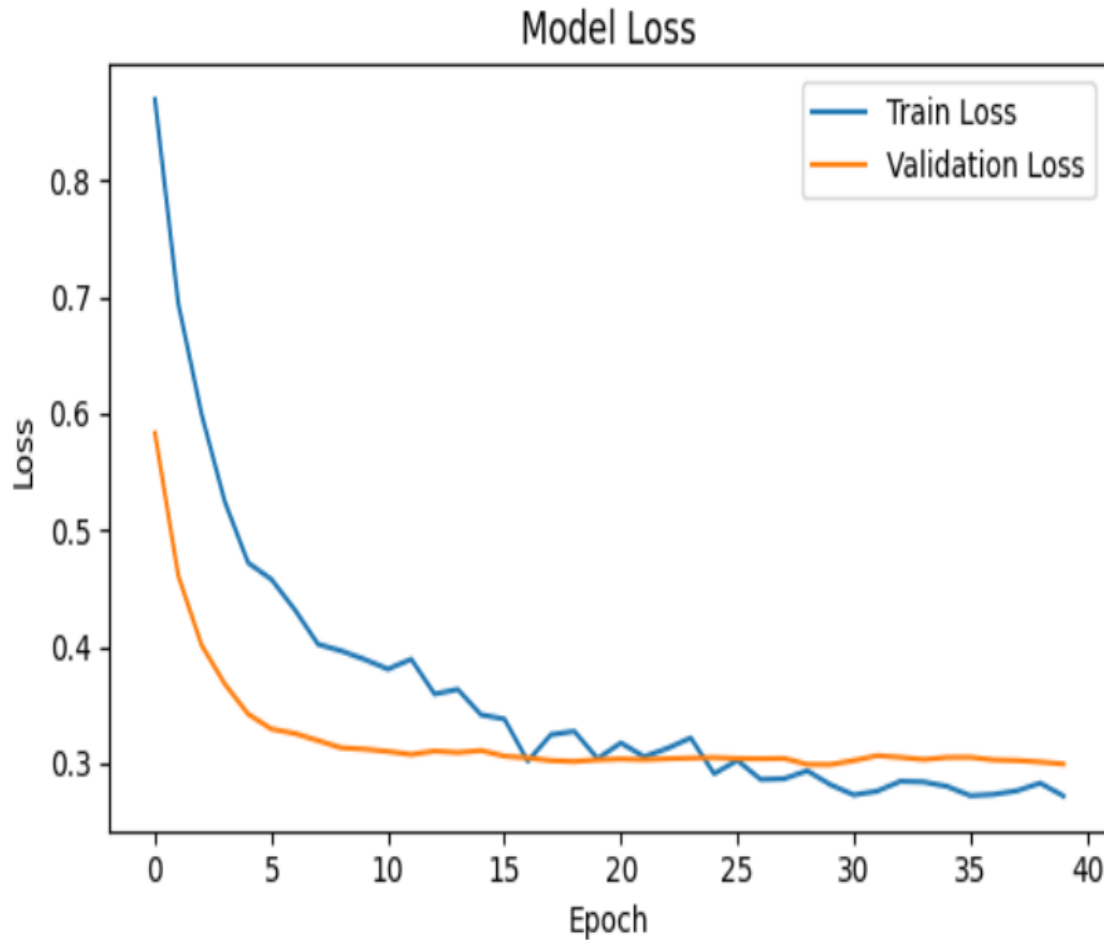
Model Accuracy: 84 %

After Hyperparameter tuning



Model Accuracy: 88.9 %

- The model has generalized well on both the training and validation sets
- No significant overfitting observed.



Dropout: Added dropout layers with a rate of 0.5 after each batch normalization. This randomly sets input units to 0 during training, which helps prevent neurons from co-adapting too much.

Early Stopping: Monitors the validation loss and will stop the training if the validation loss does not improve for 10 consecutive epochs. It also restores the weights from the best epoch.

Recommendations

1. Prioritize customers who are predicted to respond positively (output "1") to the campaign. Focusing marketing efforts on these customers will likely result in higher conversion rates.
2. The model can help identify segments that may require different incentives or messaging, allowing for a tailored approach that could improve engagement.
3. For customers predicted to respond, consider examining their long-term value. Customers who respond positively but don't convert into loyal, repeat buyers might require different engagement strategies post-campaign to maximize customer lifetime value (CLV).
4. Continuously gather feedback from actual campaign responses and feed this new data back into the model for retraining. Over time, this will improve the model's accuracy and make future campaigns even more targeted and effective.
5. Personalize marketing efforts for different customer groups.
6. Optimize promotional strategies for higher customer engagement and revenue.
7. Improve customer retention by addressing specific needs and preferences of different segments

Thank You!