# ex2_23_09
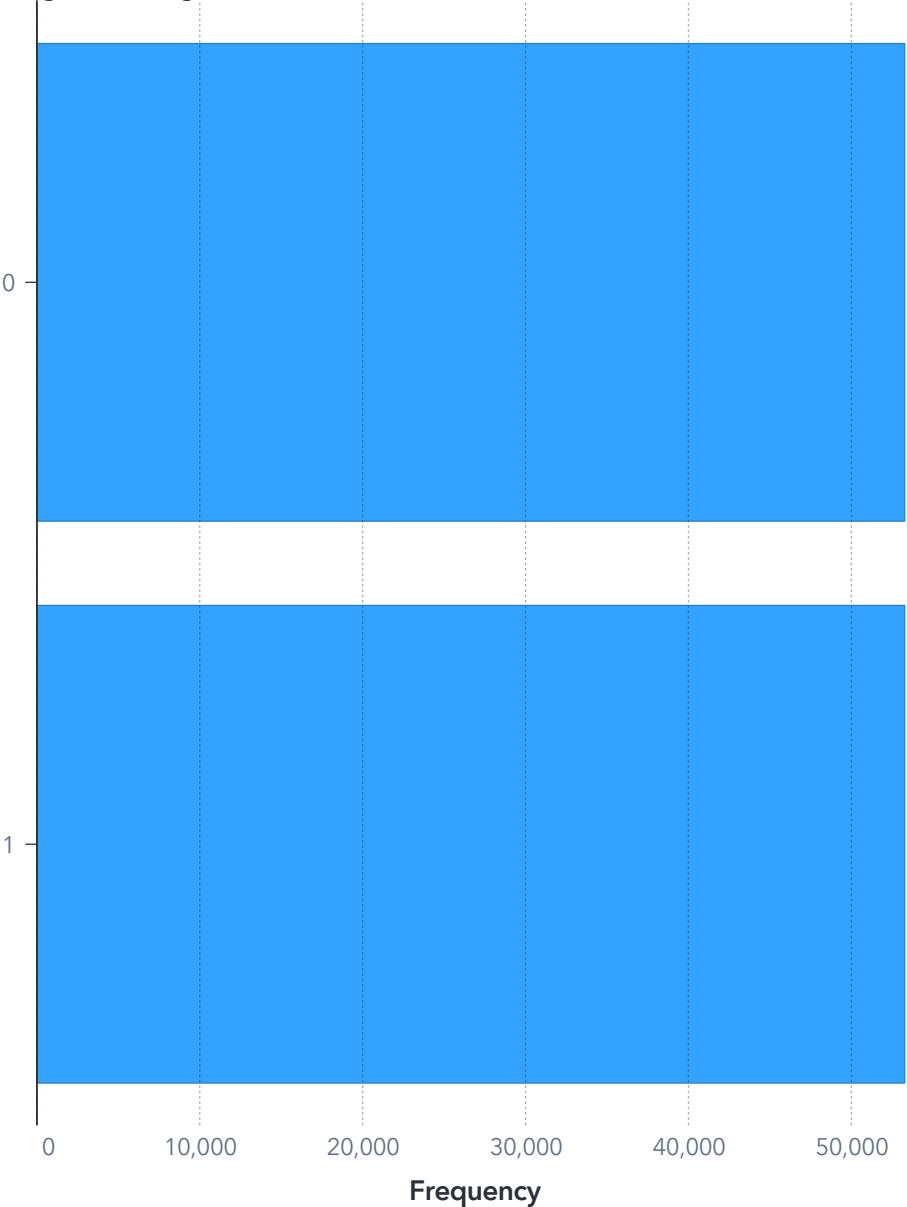
Creation Date: Friday, September 30, 2022 09:04:34 AM
Author: abdelmounaim.bouzerira@edu.univ-paris13.fr
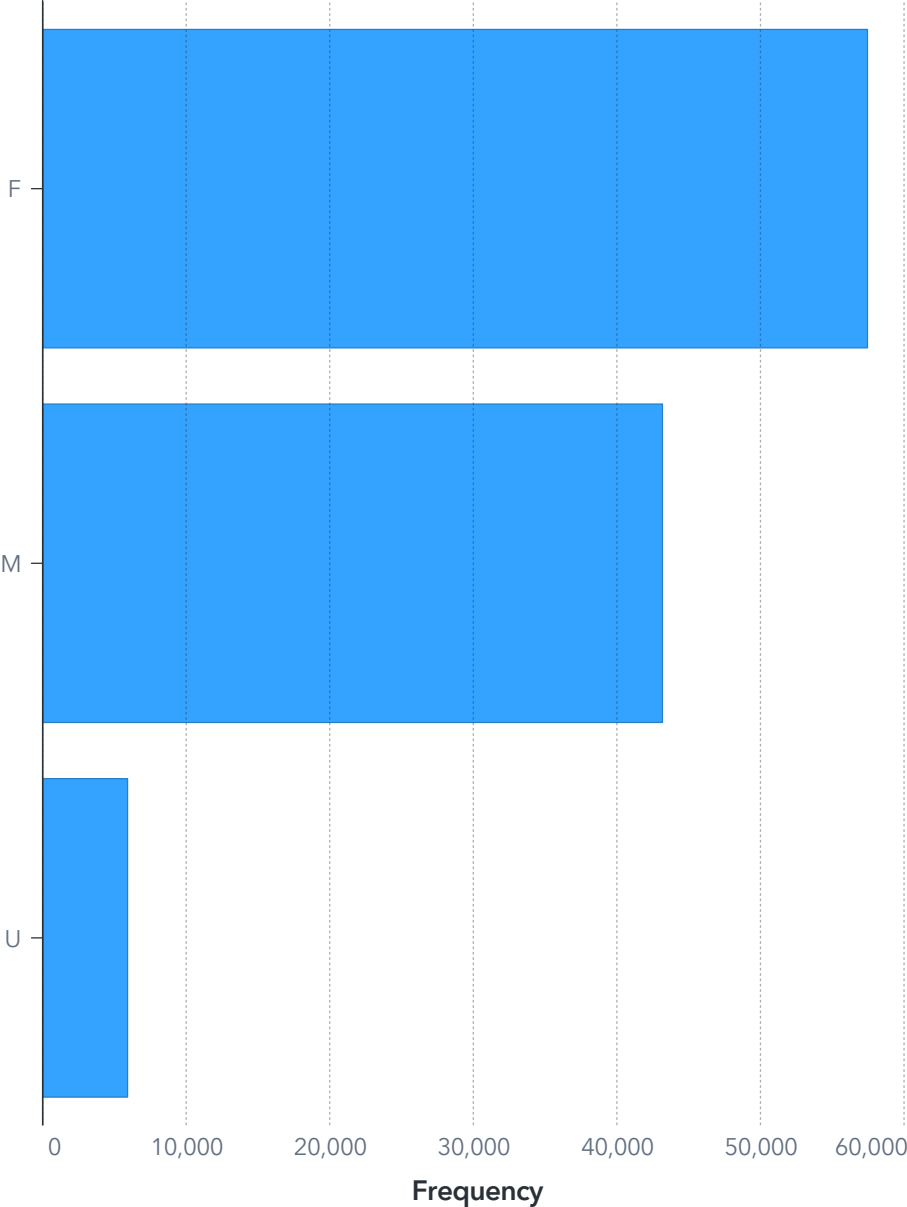
## Frequency of Target Gift Flag
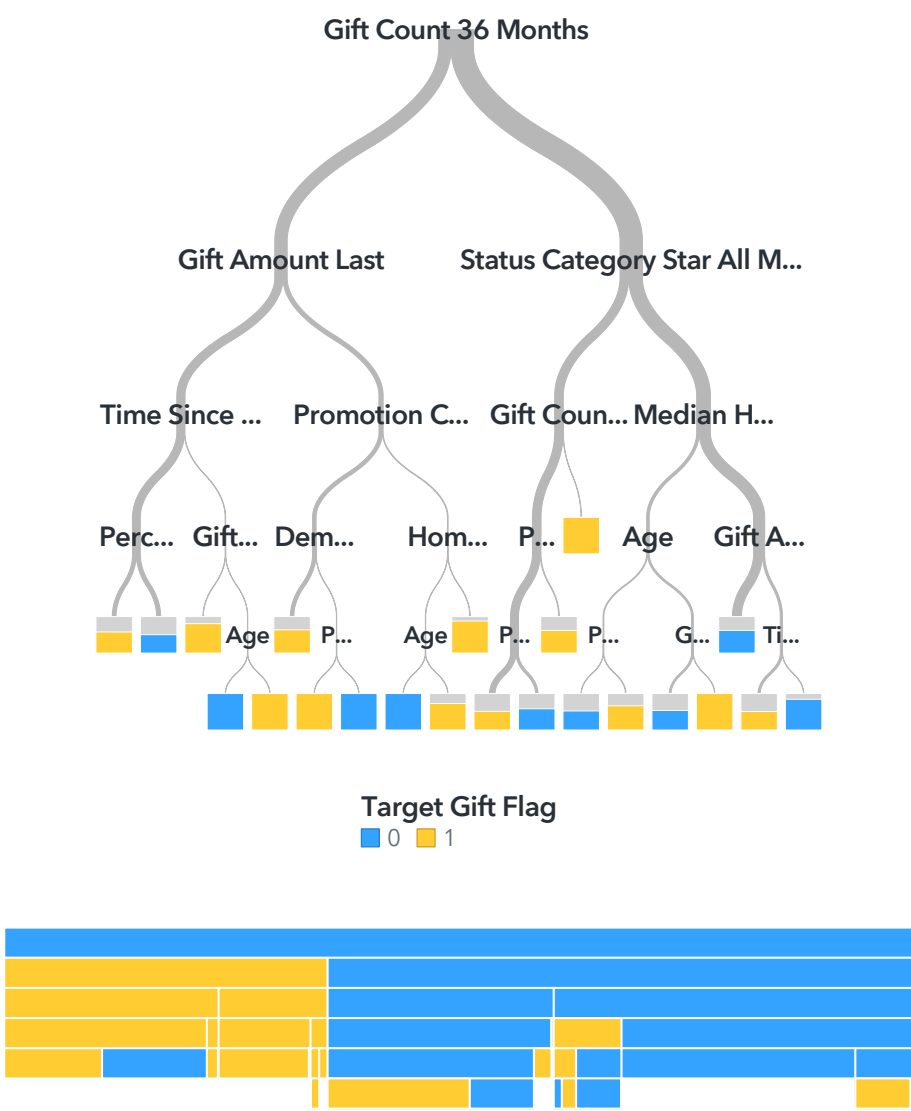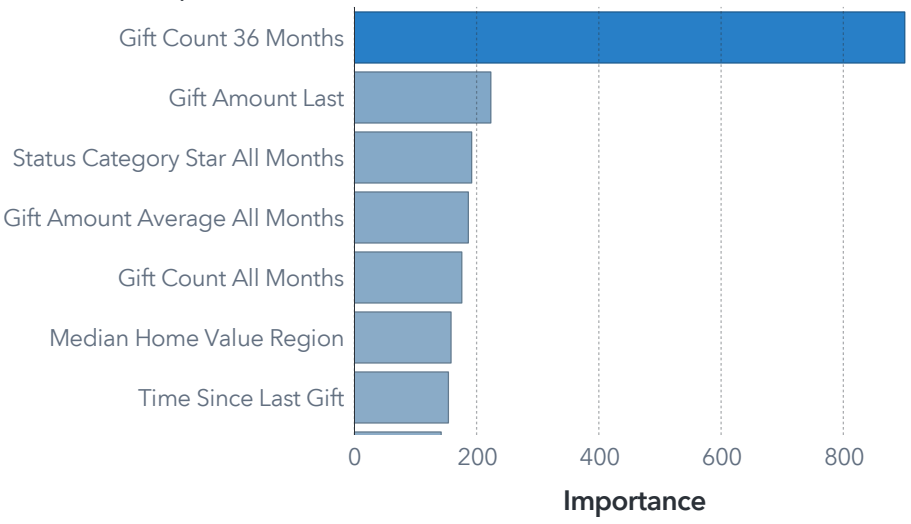
**Target Gift Flag**



Frequency

## Frequency of Gender

**Gender**



Frequency

*Decision Tree* **Target Gift Flag** (event=1) KS (Youden) **0.1639** Observations Used **106,546**

## Tree



Target Gift Flag
■ 0 ■ 1

## Variable Importance



## Confusion Matrix

**Observed**

| | Predicted | |
|---|---|---|
| | 0 | 1 |
| 0 | 31,262 | 22,011 |
| 1 | 22,528 | 30,745 |

**Predicted**
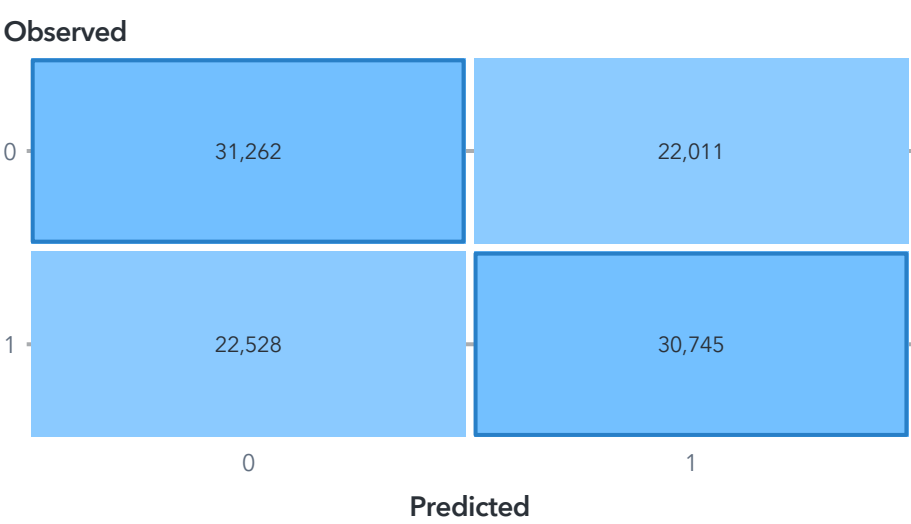
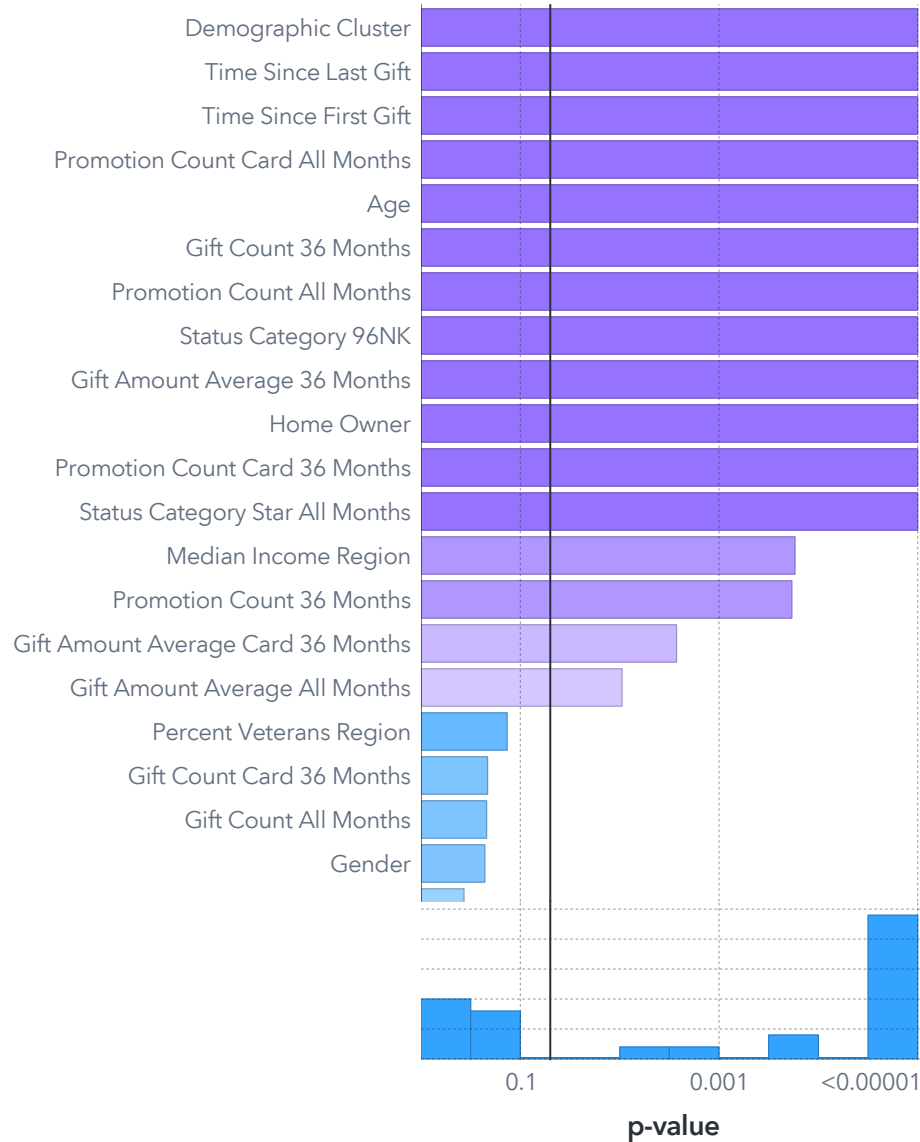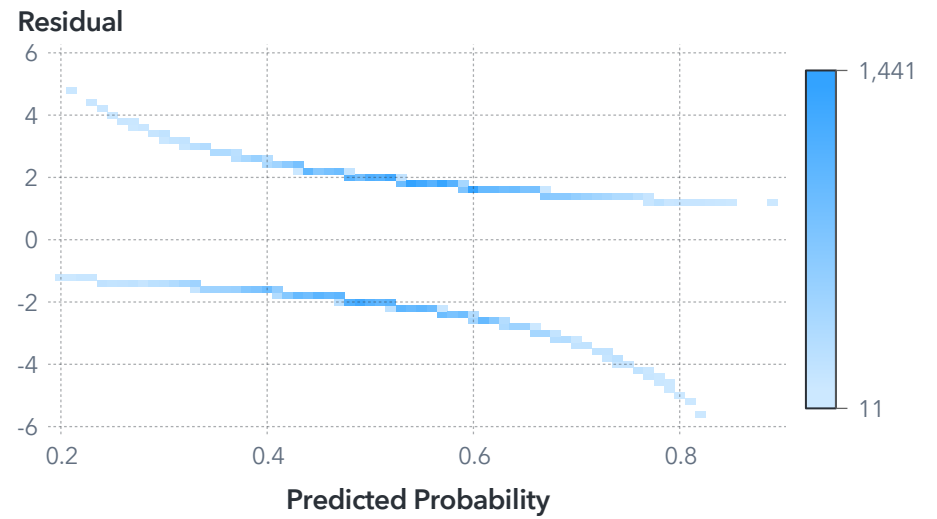*Logistic Regression*  **Target Gift Flag**  (event=1)  KS (Youden)  **0.1863**  Observations Used  **64,988**  Unused  **41,558**

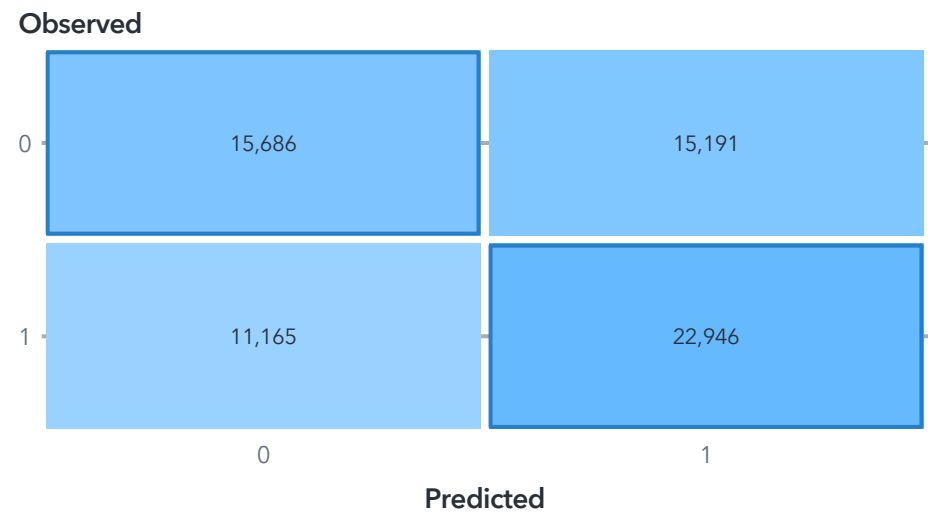## Fit Summary

Demographic Cluster
Time Since Last Gift
Time Since First Gift
Promotion Count Card All Months
Age
Gift Count 36 Months
Promotion Count All Months
Status Category 96NK
Gift Amount Average 36 Months
Home Owner
Promotion Count Card 36 Months
Status Category Star All Months
Median Income Region
Promotion Count 36 Months
Gift Amount Average Card 36 Months
Gift Amount Average All Months
Percent Veterans Region
Gift Count Card 36 Months
Gift Count All Months
Gender

p-value

## Residual Plot

**Residual**



1,441

11

**Predicted Probability**

## Confusion Matrix

**Observed**

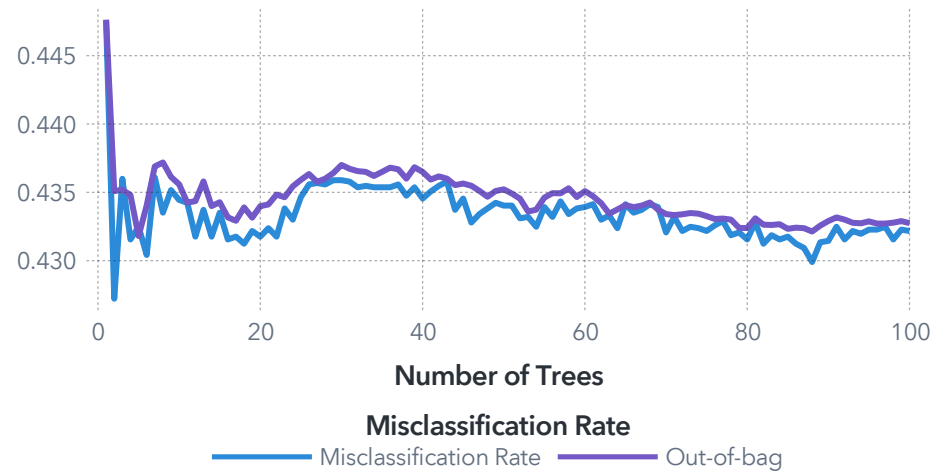| | Predicted 0 | Predicted 1 |
|---|---|---|
| 0 | 15,686 | 15,191 |
| 1 | 11,165 | 22,946 |

**Predicted**

*Forest*  **Target Gift Flag**  (event=1)  KS (Youden)  **0.1569**  Observations Used  **106,546**

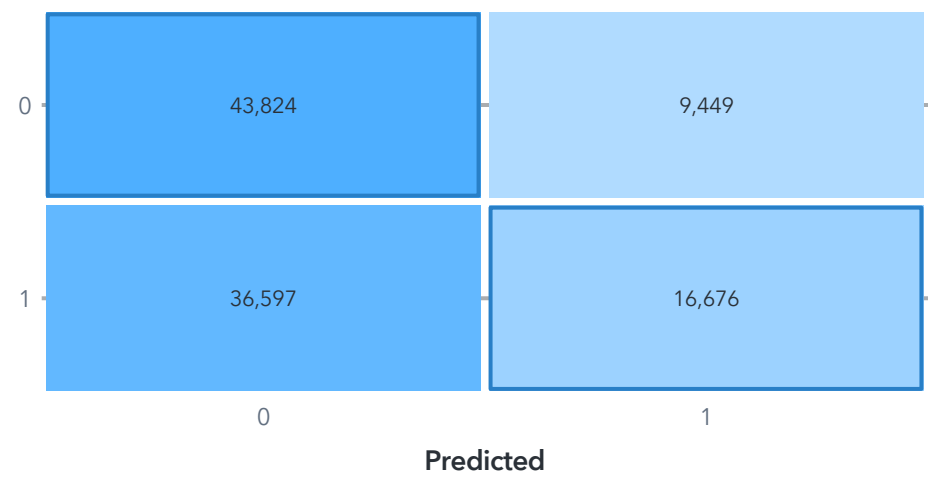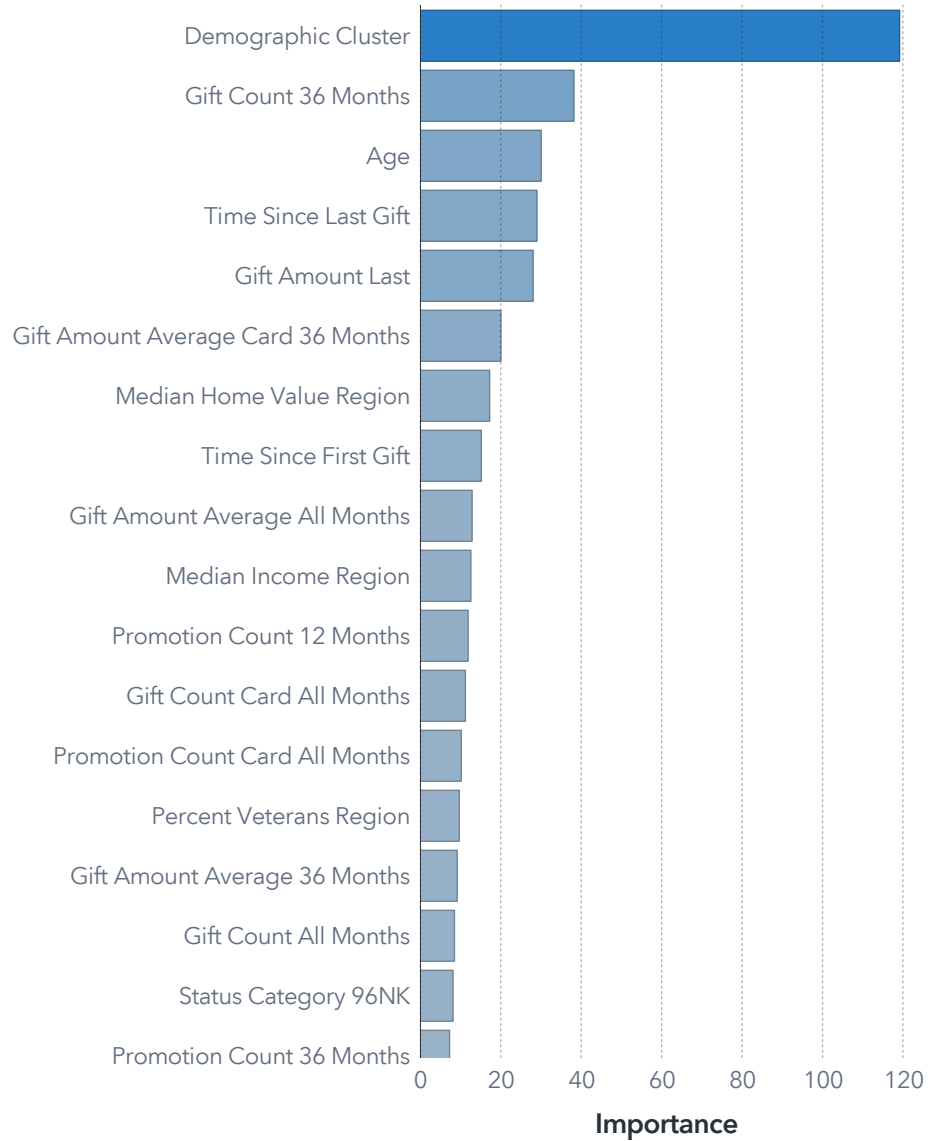## Variable Importance
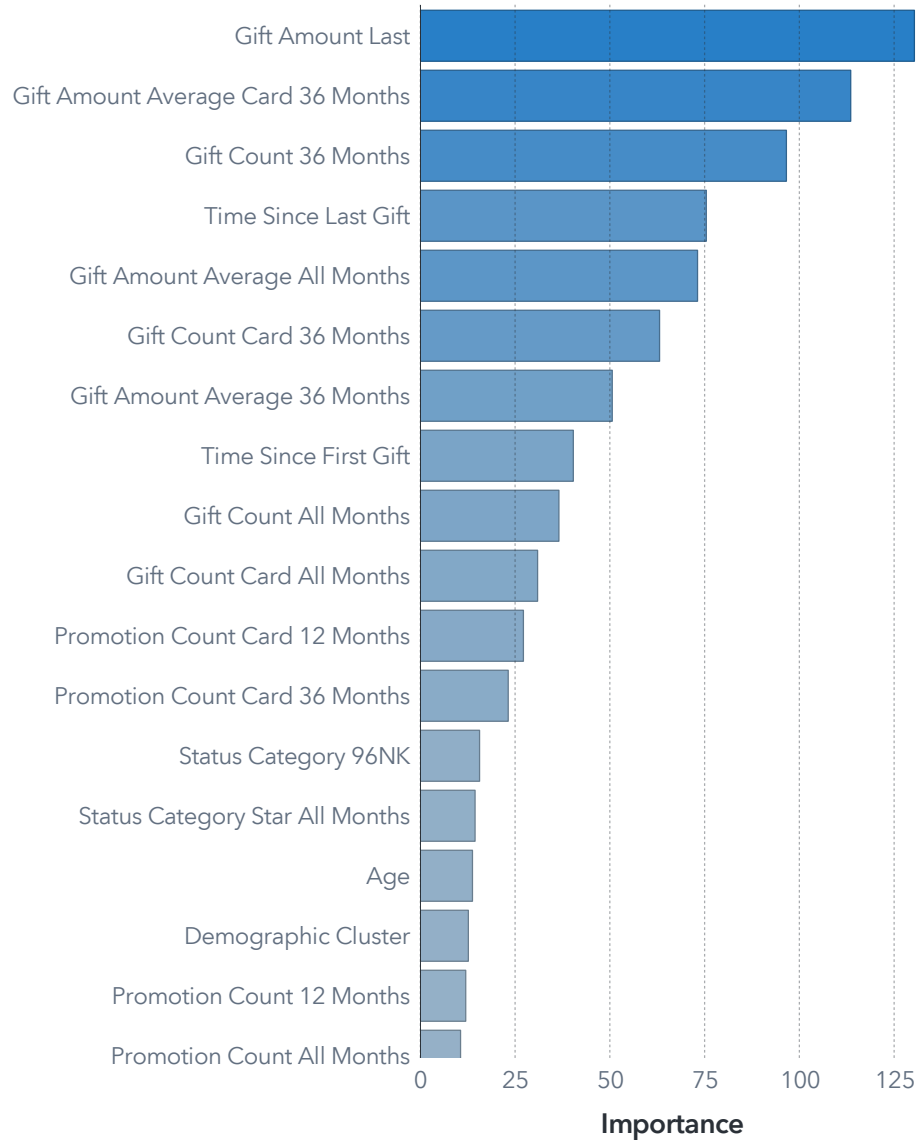


## Error Plot
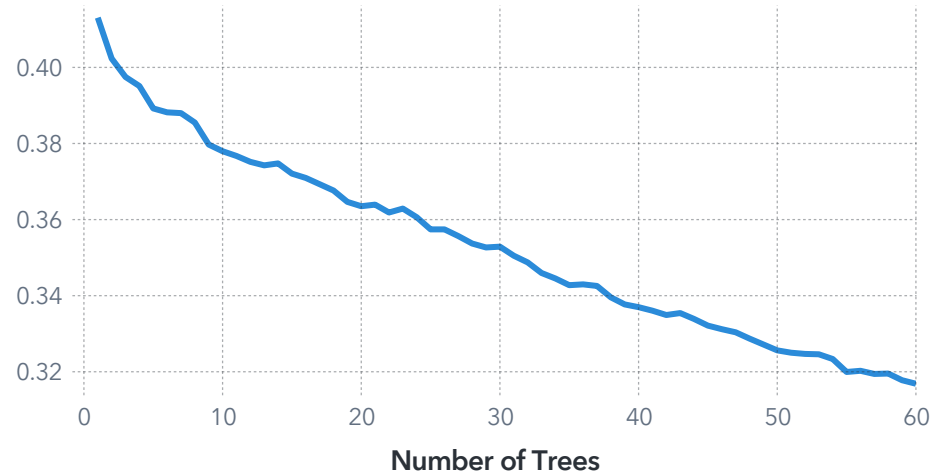
**Misclassification Rate**



## Confusion Matrix

**Observed**

*Gradient Boosting*  **Target Gift Flag**  (event=1)  KS (Youden)  **0.3663**  Observations Used  **106,546**
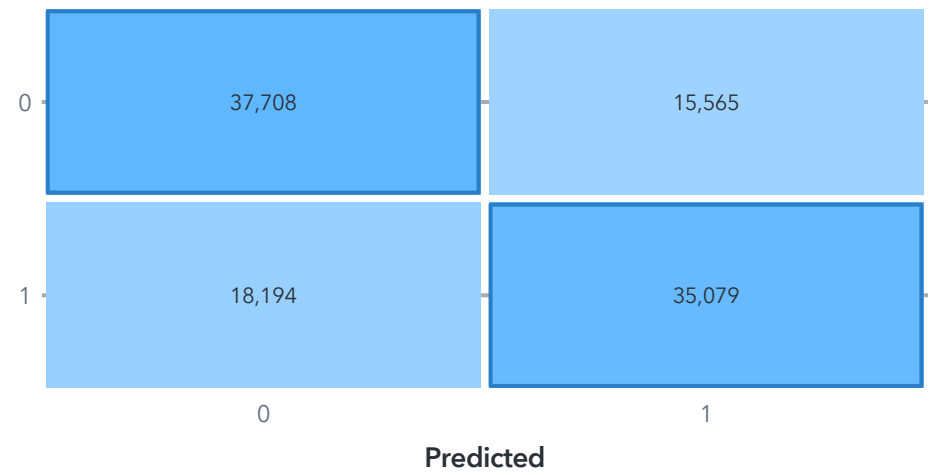
## Variable Importance

| Variable | Importance |
|---|---|
| Demographic Cluster | 120 |
| Gift Count 36 Months | 38 |
| Age | 30 |
| Time Since Last Gift | 29 |
| Gift Amount Last | 28 |
| Gift Amount Average Card 36 Months | 20 |
| Median Home Value Region | 18 |
| Time Since First Gift | 16 |
| Gift Amount Average All Months | 13 |
| Median Income Region | 13 |
| Promotion Count 12 Months | 12 |
| Gift Count Card All Months | 11 |
| Promotion Count Card All Months | 10 |
| Percent Veterans Region | 10 |
| Gift Amount Average 36 Months | 9 |
| Gift Count All Months | 9 |
| Status Category 96NK | 8 |
| Promotion Count 36 Months | 7 |

## Iteration Plot

**Misclassification Rate**



Number of Trees

## Confusion Matrix

**Observed**

| Predicted | 0 | 1 |
|---|---|---|
| 0 | 37,708 | 15,565 |
| 1 | 18,194 | 35,079 |

*Neural Network* **Target Gift Flag** (event=1) KS (Youden) **0.0000** Observations Used **64,988** Unused **41,558**
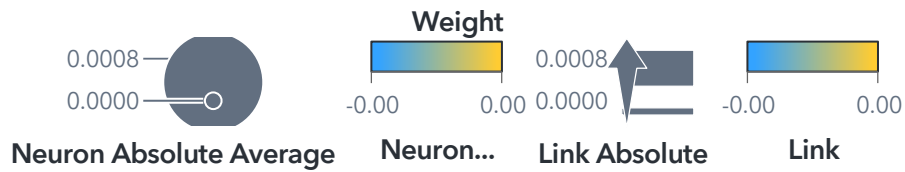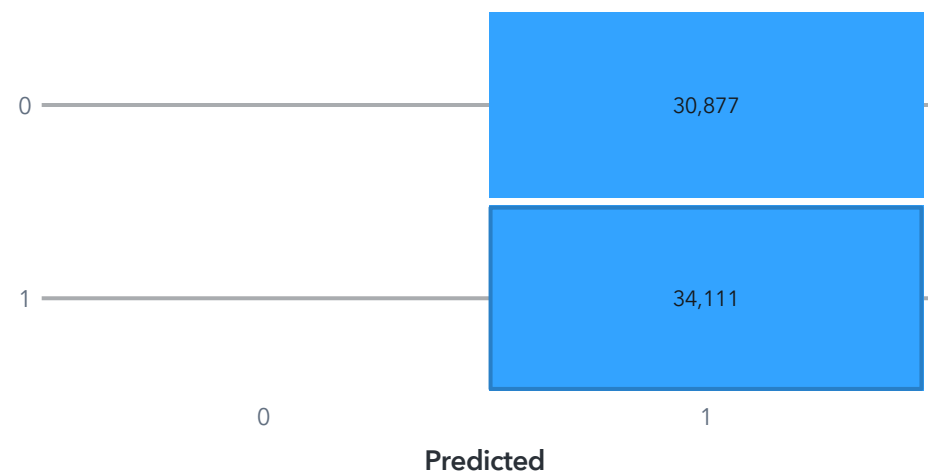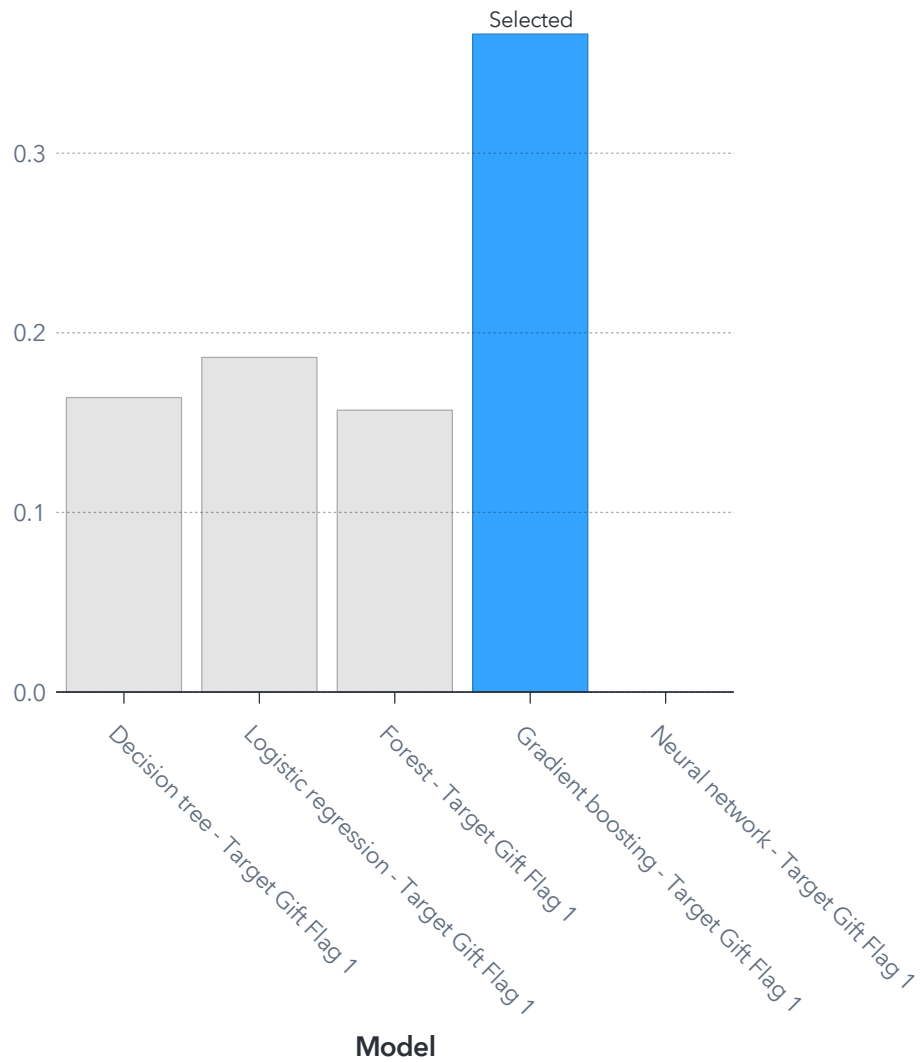
## Network
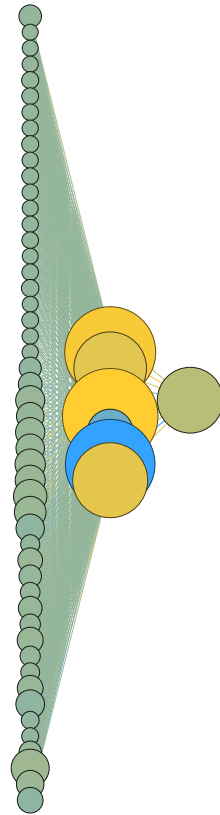


Iteration Plot
**Objective / Loss**
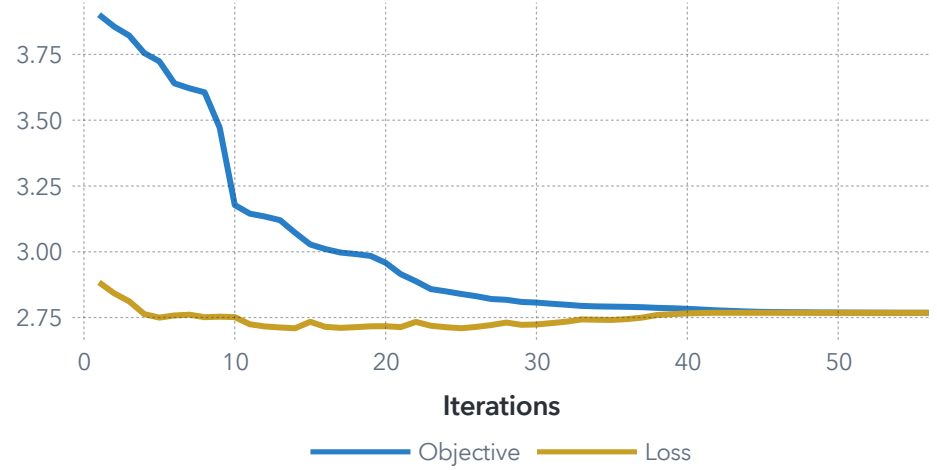


Confusion Matrix
**Observed**

*Model Comparison*   **Target Gift Flag**   (event=1)

## Fit Statistic
**KS (Youden)**



Model

⚠ A1.1

## Lift
**Cumulative Lift**



Percentile

AUTO
— Decision tree - Target Gift Flag 1
— Logistic regression - Target Gift Flag 1
— Forest - Target Gift Flag 1
— Gradient boosting - Target Gift Flag 1
— Neural network - Target Gift Flag 1
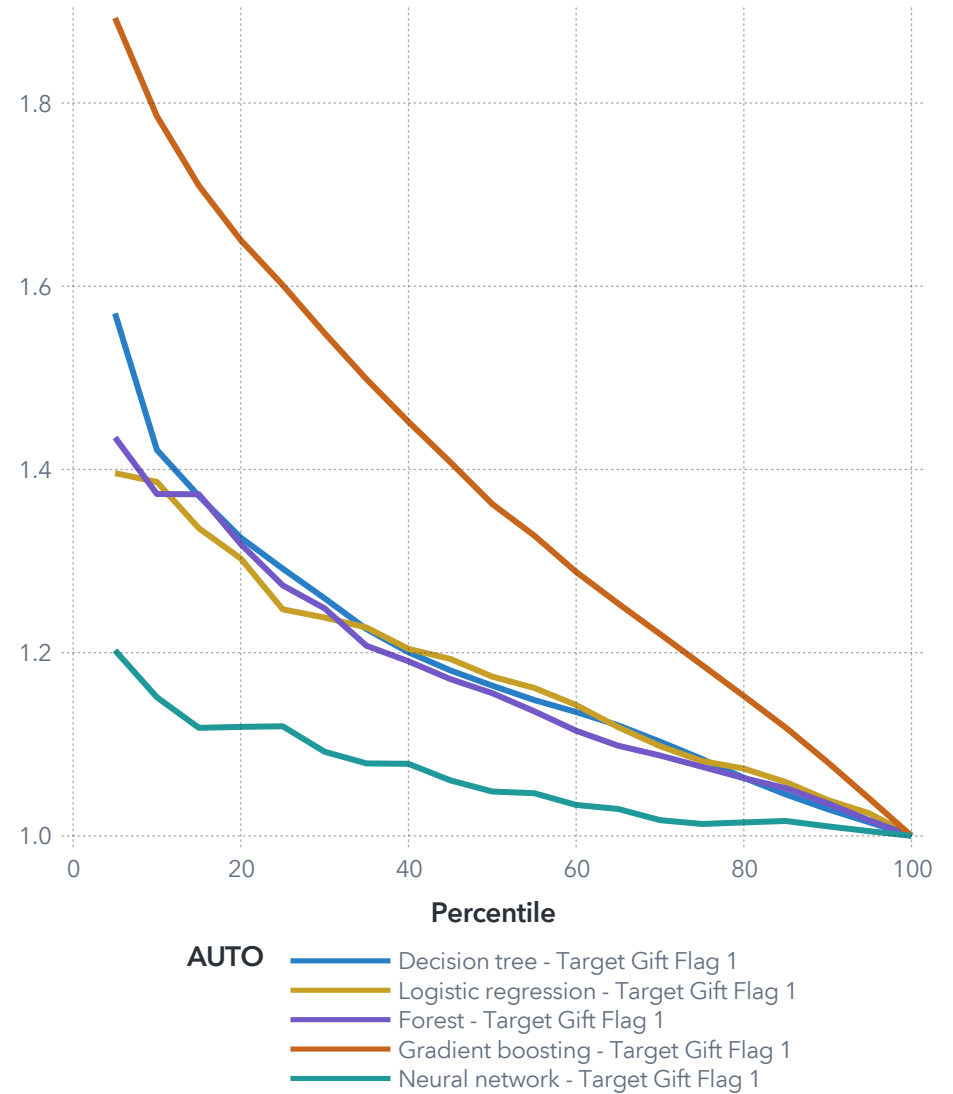
# Appendix

## A1.1 Fit Statistic