# Machine Learning Analytic

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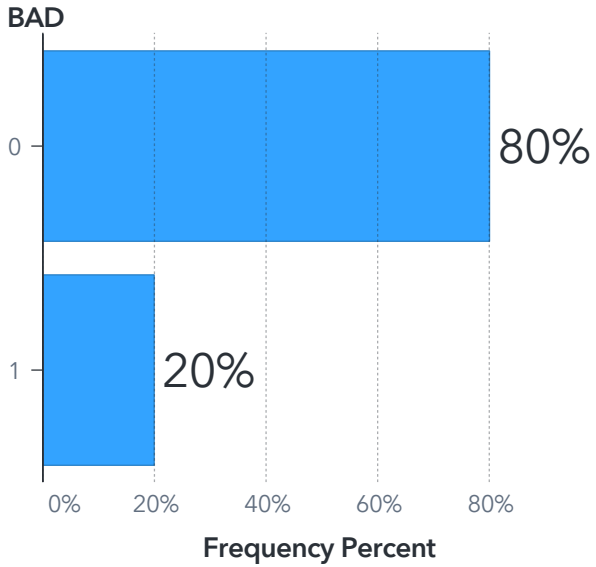
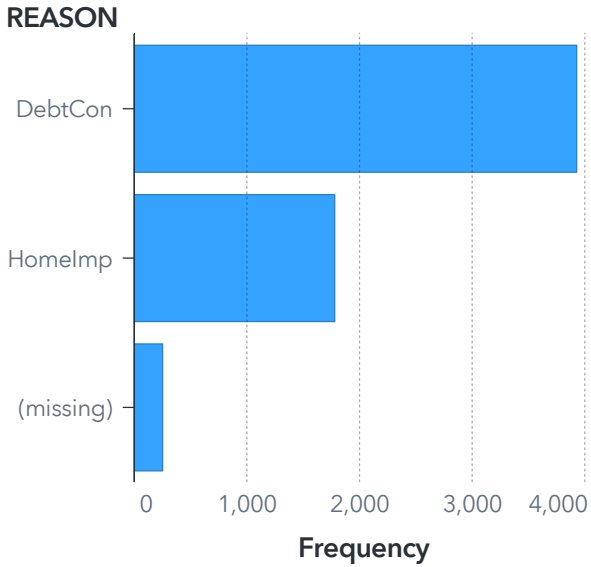
# Descriptive Statistics

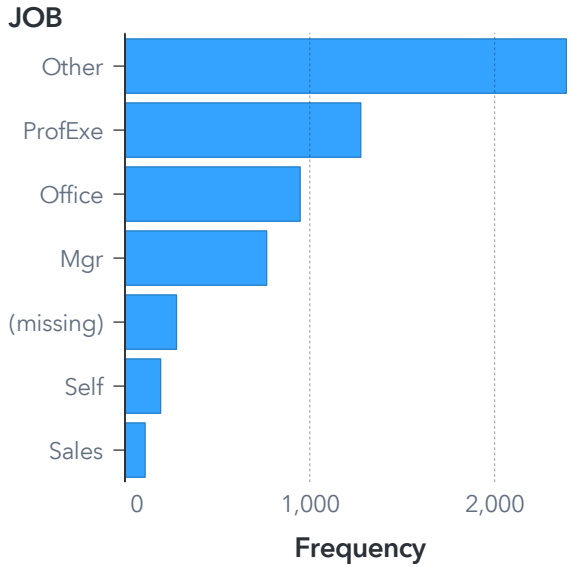
## Frequency Percent of BAD



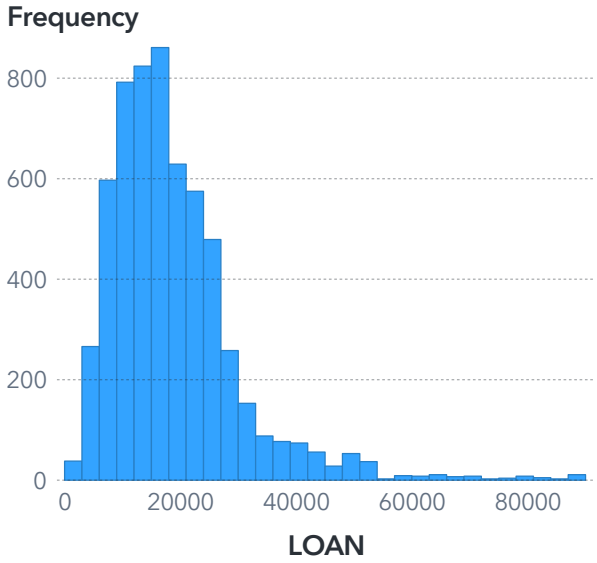

## Frequency of REASON



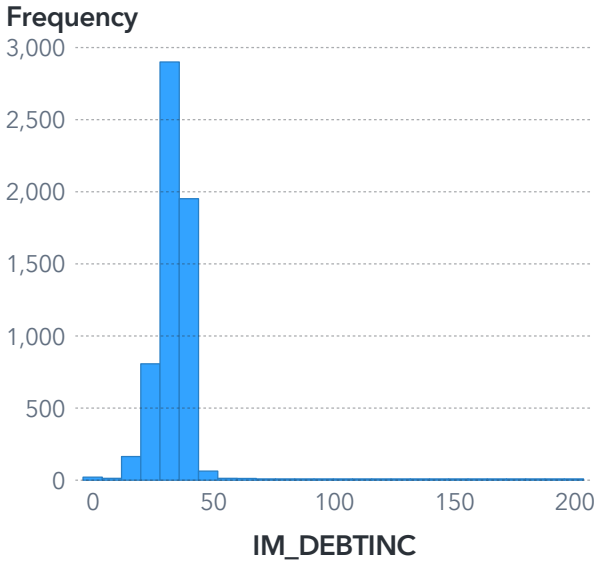

## Frequency of JOB



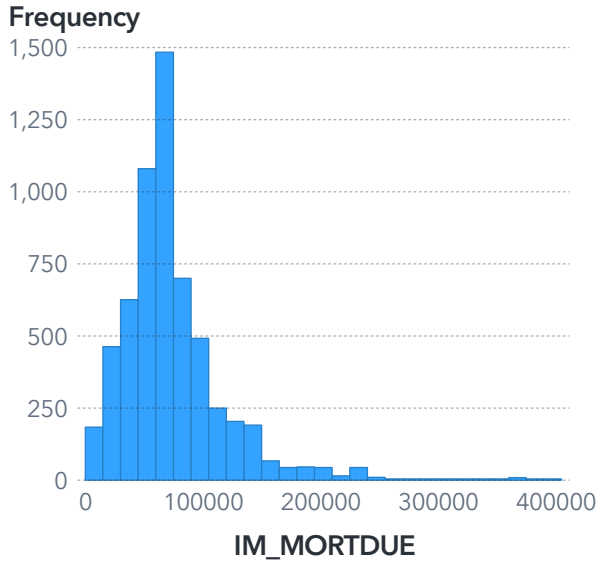

## Frequency of LOAN




## Frequency of IM_DEBTINC



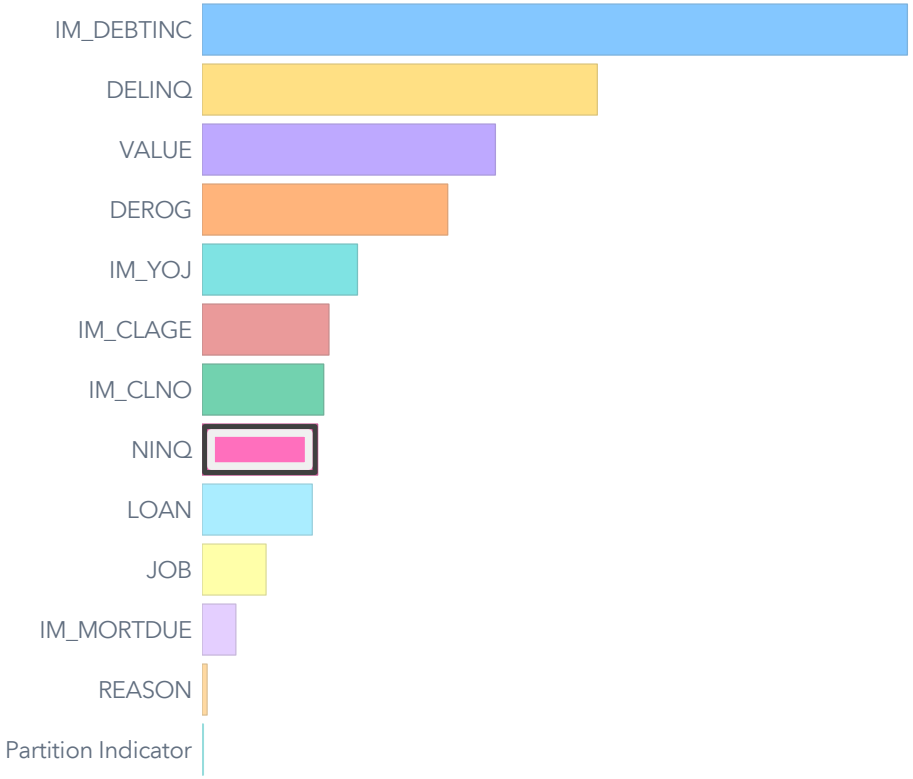

## Frequency of IM_MORTDUE



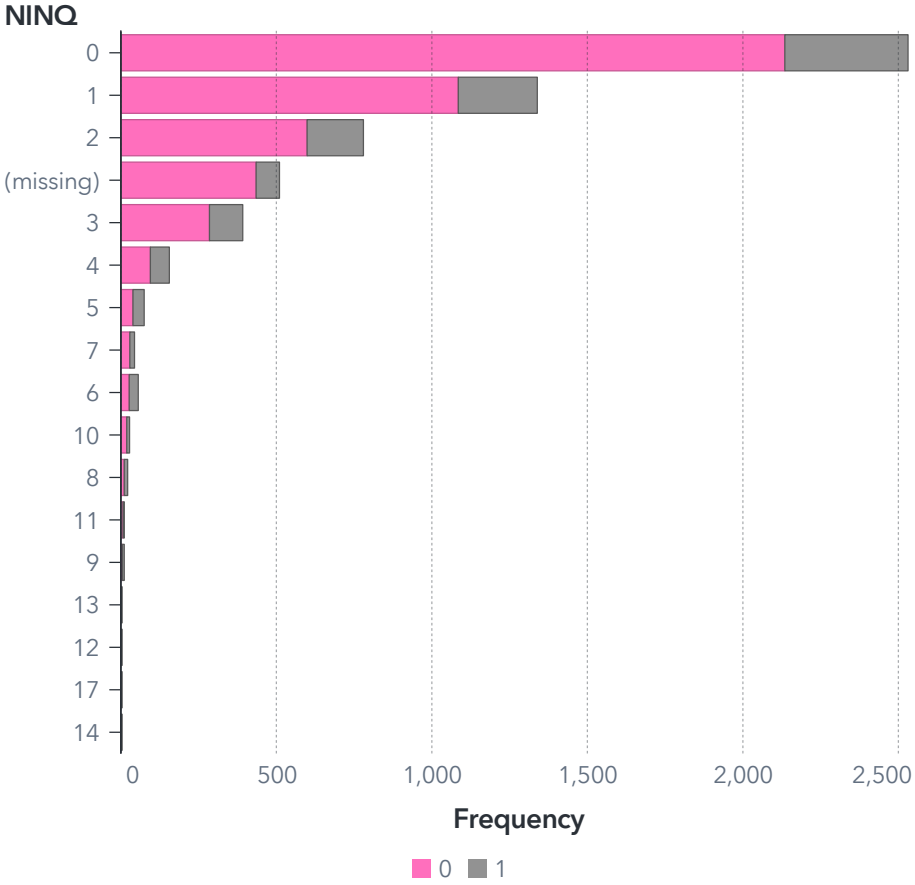
## What are the characteristics of BAD?


0 is more common at 80.05% (4.8K of 6K). 1 is less common at 19.95%. The three most related factors are IM_DEBTINC, DELINQ, and VALUE.

## What factors are most related to BAD?




## What is the relationship between BAD and NINQ?

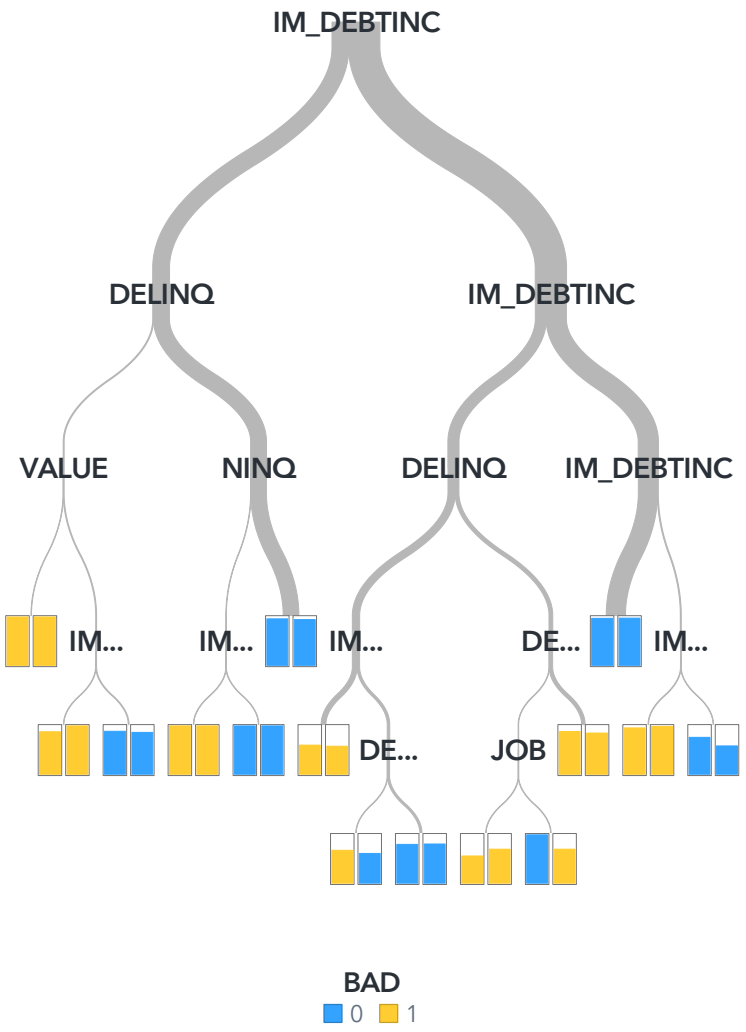



When NINQ is 0, the total count of 0 is a high value; when NINQ is 2, (missing), 3, 4, 5, 7, 6, 10, 8, 11 or 9, the total count of 0 is a low value. The most common NINQ value is 0.

## Decision Tree of BAD

Event: **1** Fit: **Validation Misclassification Rate 0.1292** Observations: **6K of 6K**

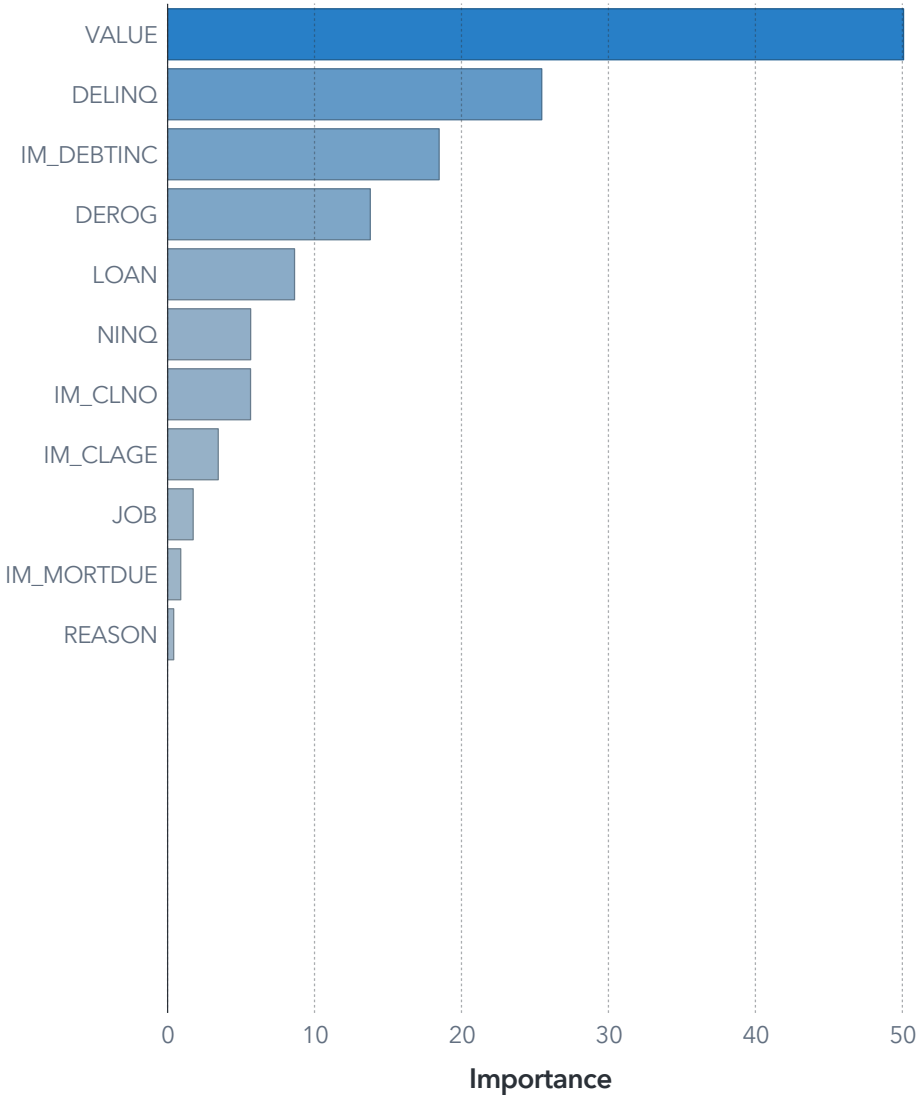
## Tree



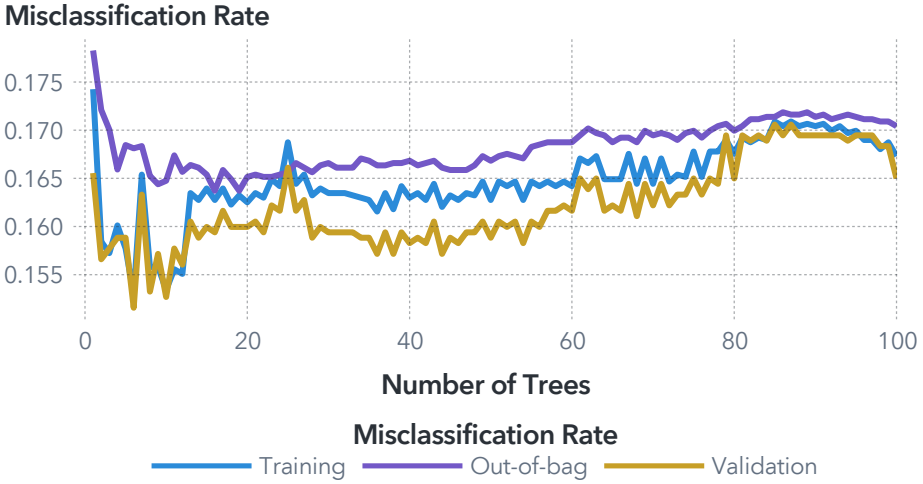
## Forest of BAD

Event: **1** Fit: **Validation Misclassification Rate 0.1650** Observations: **6K of 6K**

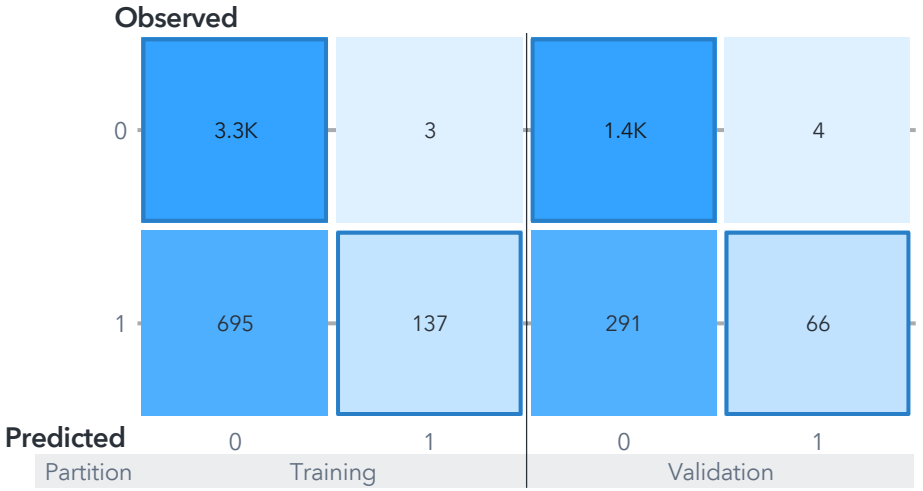
### Variable Importance




### Error Plot



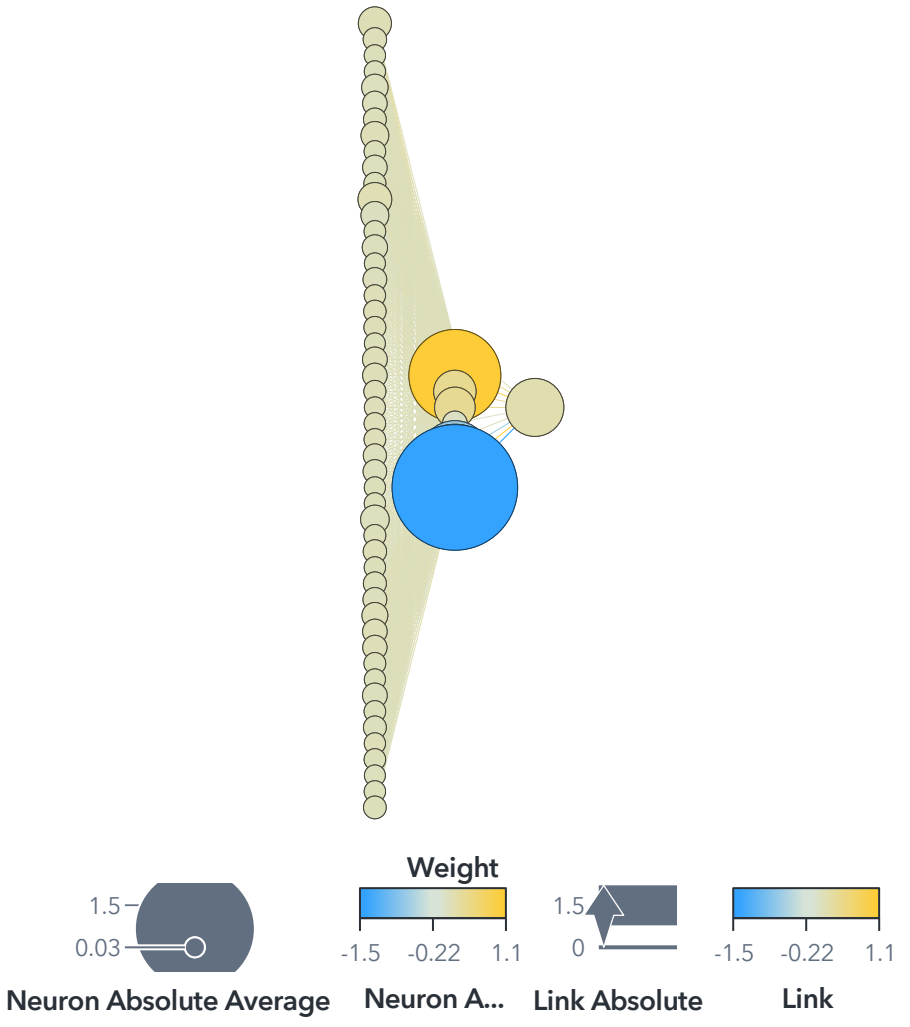

### Confusion Matrix



## Neural Network of BAD

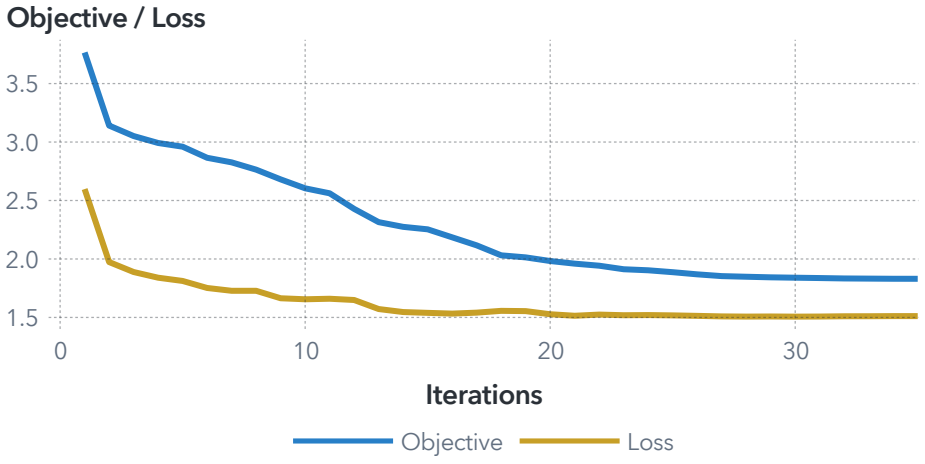
Event: **1** Fit: **Validation Misclassification Rate 0.1588** Observations: **4.8K of 6K**

### Network



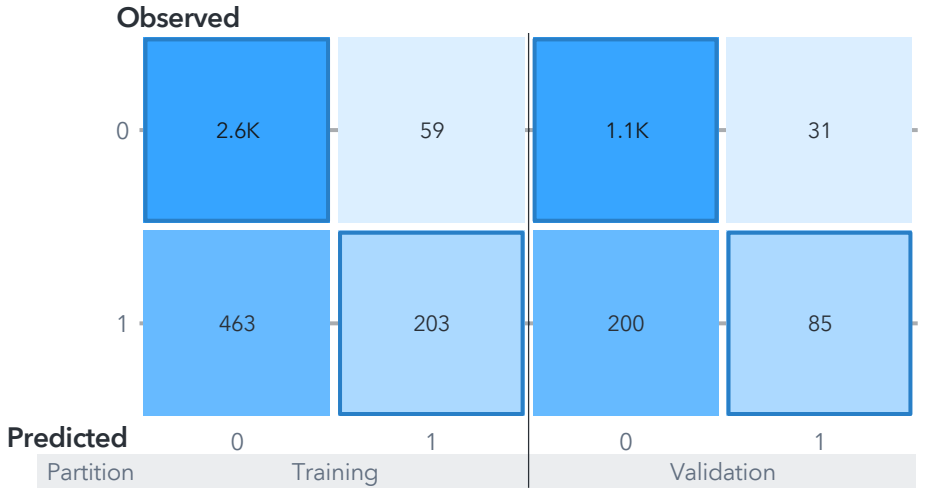

A1.1

### Iteration Plot




A1.2

### Confusion Matrix

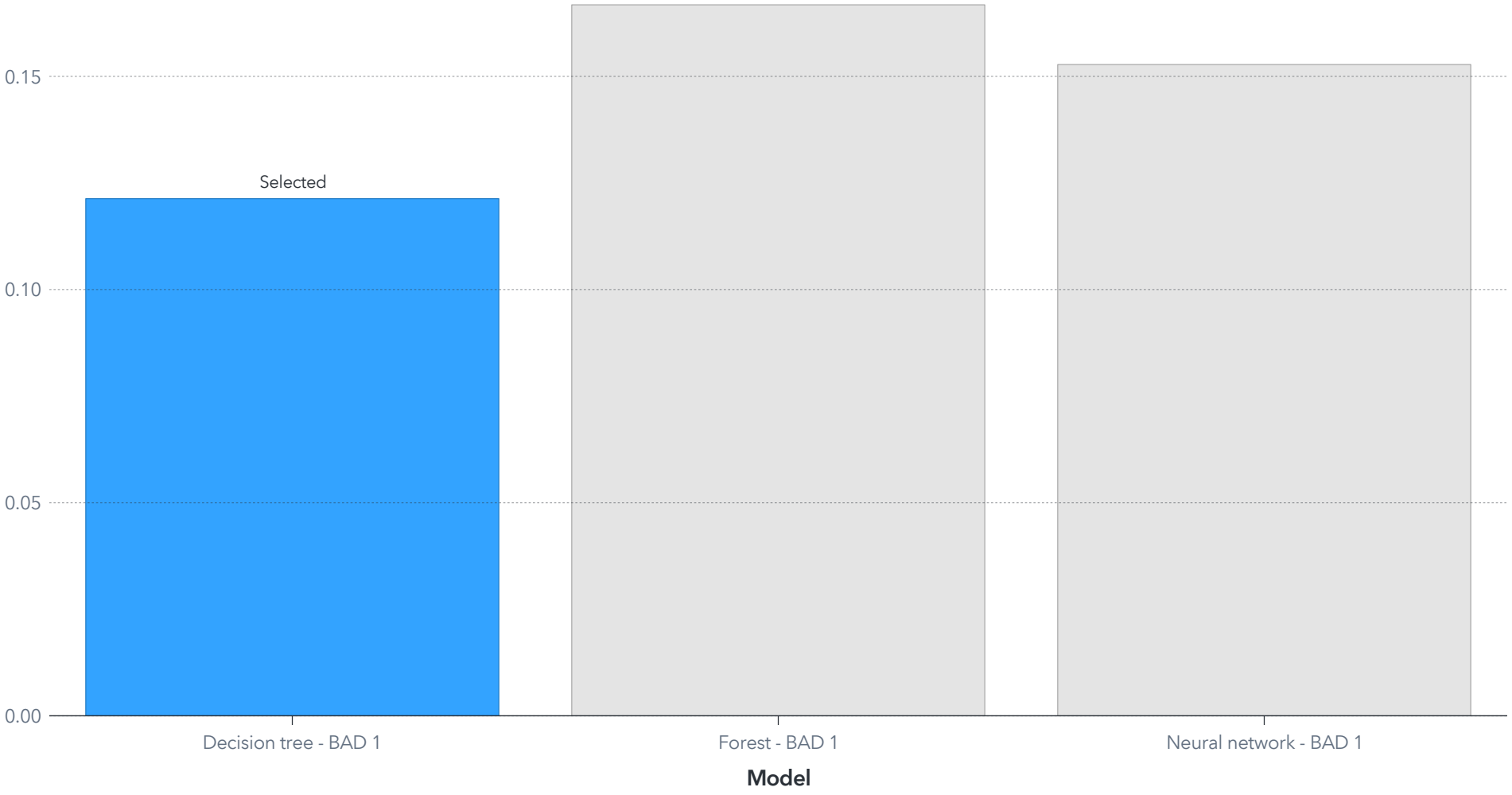


## Model Comparison of BAD

Event: **1**

### Fit Statistic

**Misclassification Rate**




A2.1

# Appendix

## A1.1 Network

Warnings: One or more of the neuron layers has too many neurons to display and has been truncated. The independent variable layer is truncated from 116 to 50 neurons.

## A1.2 Iteration Plot

Warnings: One or more of the neuron layers has too many neurons to display and has been truncated. The independent variable layer is truncated from 116 to 50 neurons.

## A2.1 Fit Statistic

Warnings: Neural network - BAD 1: One or more of the neuron layers has too many neurons to display and has been truncated. The independent variable layer is truncated from 116 to 50 neurons.
Number of observations for all models do not match.