

Cross-Sell Early Account Monitoring Report 4

This report presents a Random Forest model to assess customer performance and associated risk within the Cross-Sell Program. The program aims to monitor customers who have transitioned from the Fuel-Only Card to the Universal Card, helping the company make informed decisions regarding credit tightening or treatment based on customer behavior and financial health.

The model evaluates three questions asked by company:

- ✓ Customer Performance Evaluation: Financial indicators and transaction behavior to gauge customer creditworthiness.
- ✓ Transaction Patterns: Analysis of key transactional variables linked to financial performance.
- ✓ Risk Assessment: Identification of high-risk accounts and recommended treatments.

Random Forest Model Output:

Confusion Matrix and Statistics

	Reference	
Prediction	High	Low
High	73	0
Low	2	75

Accuracy : 0.9867
95% CI : (0.9527, 0.9984)
No Information Rate : 0.5
P-Value [Acc > NIR] : <2e-16

Kappa : 0.9733

Mcnemar's Test P-Value : 0.4795

Sensitivity : 0.9733
Specificity : 1.0000
Pos Pred Value : 1.0000
Neg Pred Value : 0.9740
Prevalence : 0.5000
Detection Rate : 0.4867
Detection Prevalence : 0.4867
Balanced Accuracy : 0.9867

'Positive' Class : High

Model Evaluation and Results

Confusion Matrix:

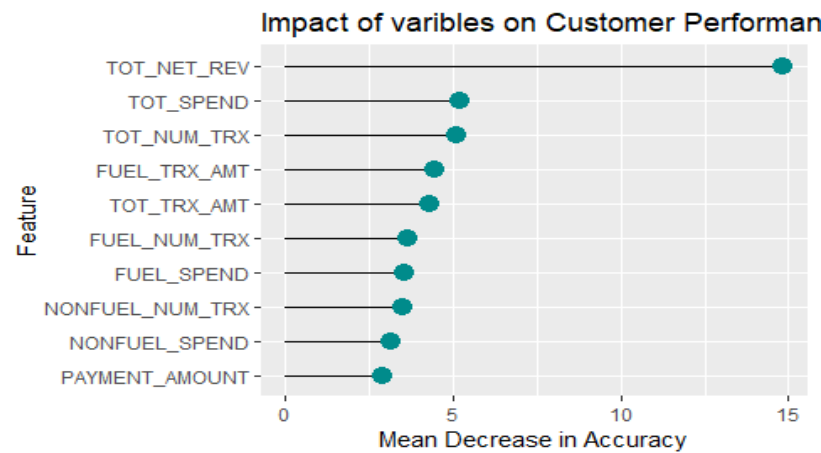
- True Positives (High predicted as High): 73
 - True Negatives (Low predicted as Low): 75
 - False Positives (Low predicted as High): 0
 - False Negatives (High predicted as Low): 2
- The model achieved an overall accuracy of 98.67%, demonstrating strong performance in distinguishing high- and low-performing customers.

Performance Metrics:

- Sensitivity (Recall for High): 97.33% - Reflecting the model's ability to identify high-performance customers.
- Specificity (Recall for Low): 100% - Perfect classification of low-performance customers.
- Kappa Statistic: 0.9733 - Indicative of near-perfect agreement beyond chance.
- Balanced Accuracy: 98.67%

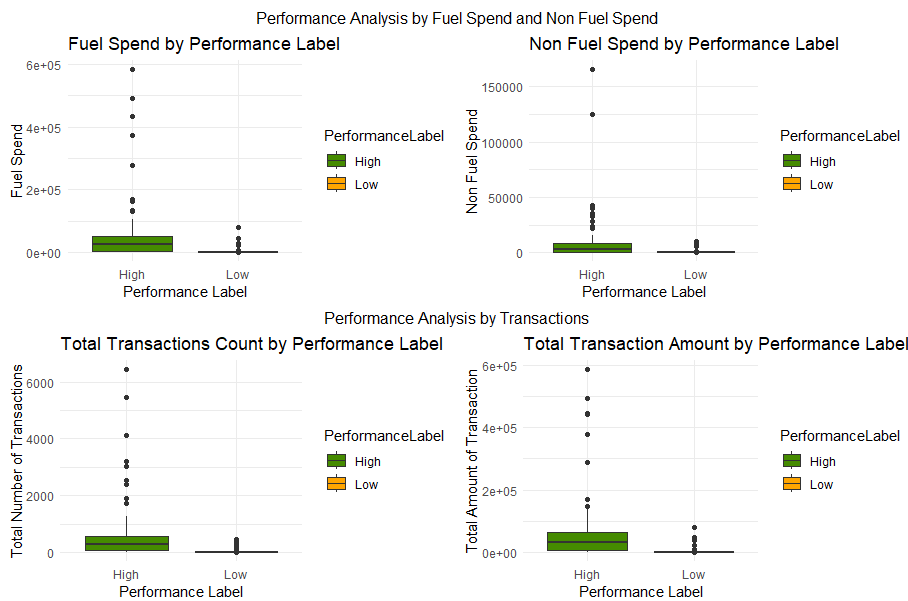
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a) Customer Performance Evaluation through Random Forest Model Insights:



1. Purpose of this plot is to Evaluate the financial performance of customers who have transitioned to the Universal Card in the Cross-Sell Program.
2. "Impact of variables on Customer Performance," displays the most influential variables on customer performance as per the Random Forest model. The higher the mean decrease in accuracy, the more critical the feature is for predicting performance. Key variables like TOT_NET_REV, TOT_SPEND, and transaction counts are particularly significant.

b) Transaction Evaluation through Random Forest Model Insights:



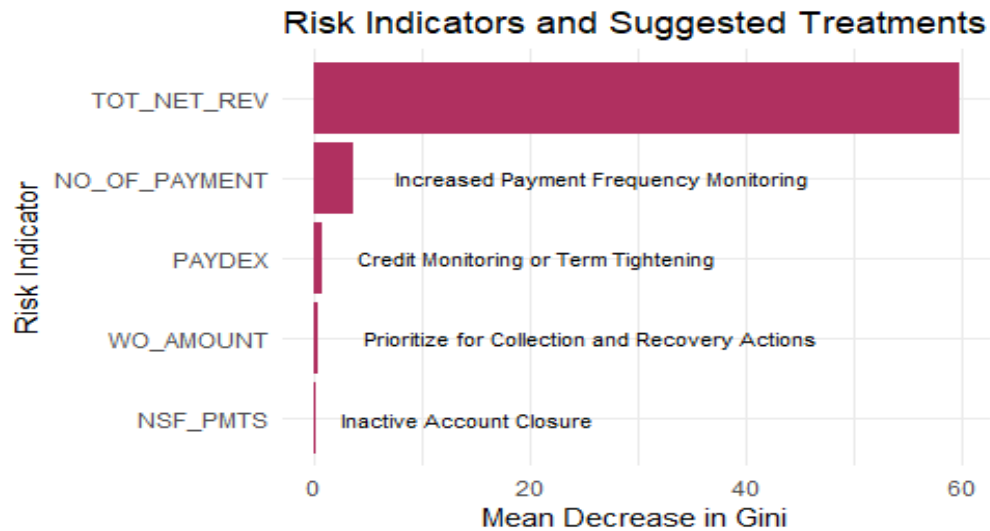
1. Purpose of Box plots is to identify patterns in transaction data that are predictive of future performance. **Boxplots of Fuel and Non-Fuel Spend by Performance Label:** These show the spending patterns for both fuel and non-fuel categories among high and low performers. Significant differences in spending behavior are highlighted, showing that high performers generally have higher spending.

Boxplots of Transaction Counts and Amounts: These plots reveal the frequency and volume of transactions across performance labels. The charts show that high performers typically have higher transaction volumes and amounts, which might be indicative of consistent card usage.

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c) Risk Assessment from Random Forest Model Insights:

Bar chart illustrates the features most related to risk, such as TOT_NET_REV and PAYDEX, based on the Mean Decrease in Gini. Suggested treatments are annotated alongside each risk indicator, providing actionable strategies, such as monitoring payment frequency or credit adjustments



Accounts associated with high risk:

- Attached the Excel of Accounts which require tightening treatments and cause potential financial impact which is generated based on insights of Random Forest Model.

[High Risk Customers \(1\).xlsx](#)