

# PROVIDENCE FINANCIAL SERVICES

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*Making ownership dreams come true.*

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# Problem Statement:

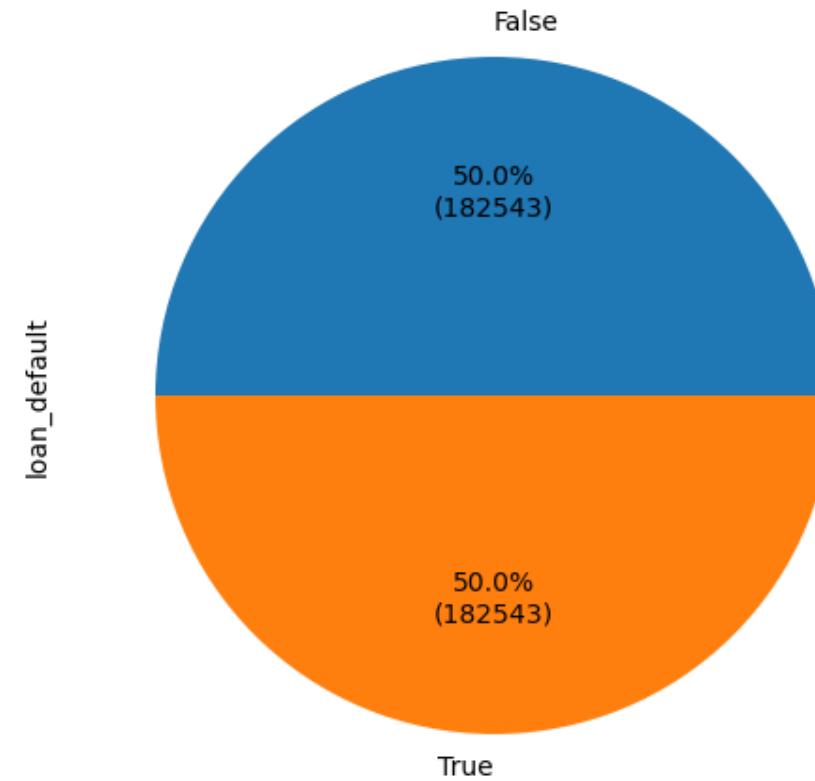
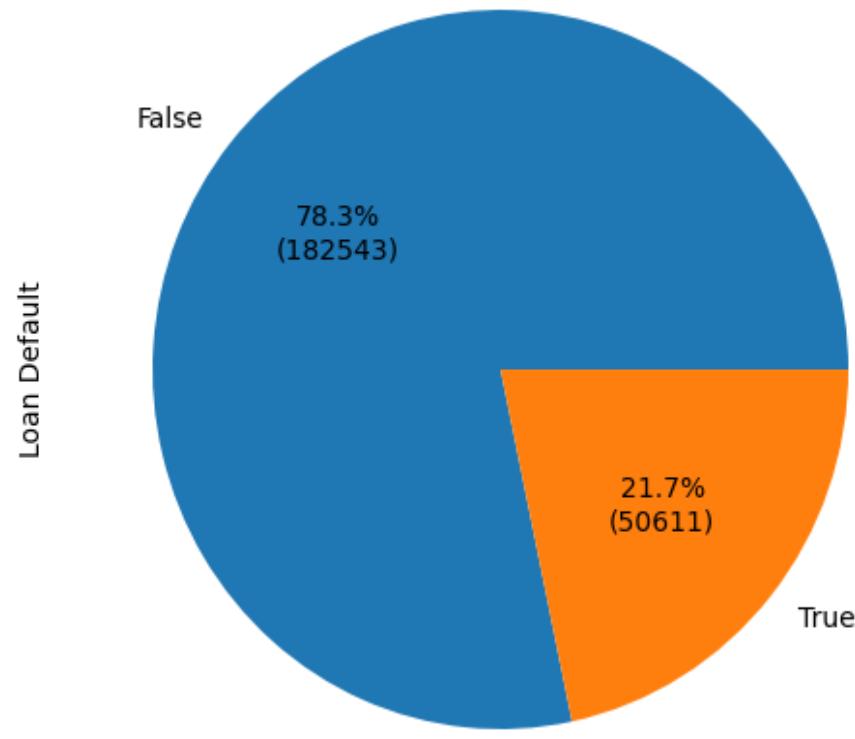
We were given the task of building a model to help the company increase the ability to predict those who would be most at risk of defaulting on a car loan.

The company has the goal of giving back by identifying those on the line of qualifying for, or at risk of defaulting on a car loan.

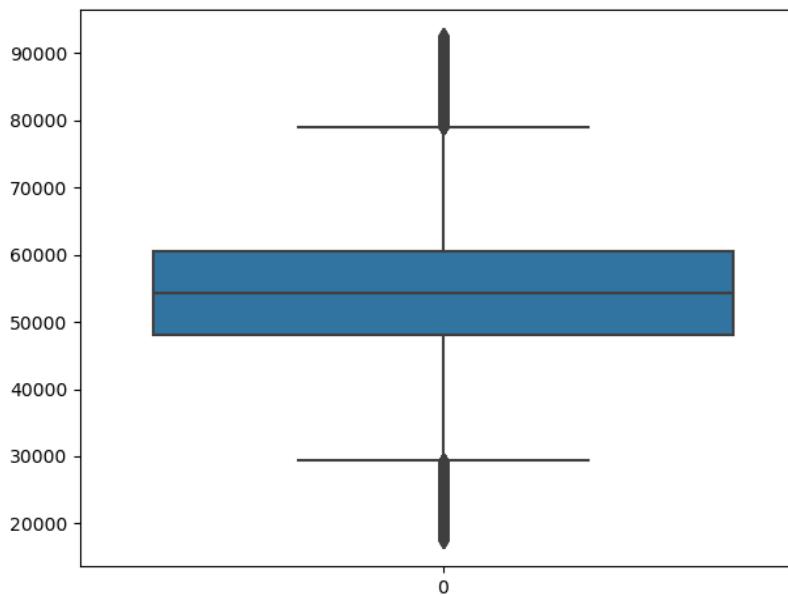
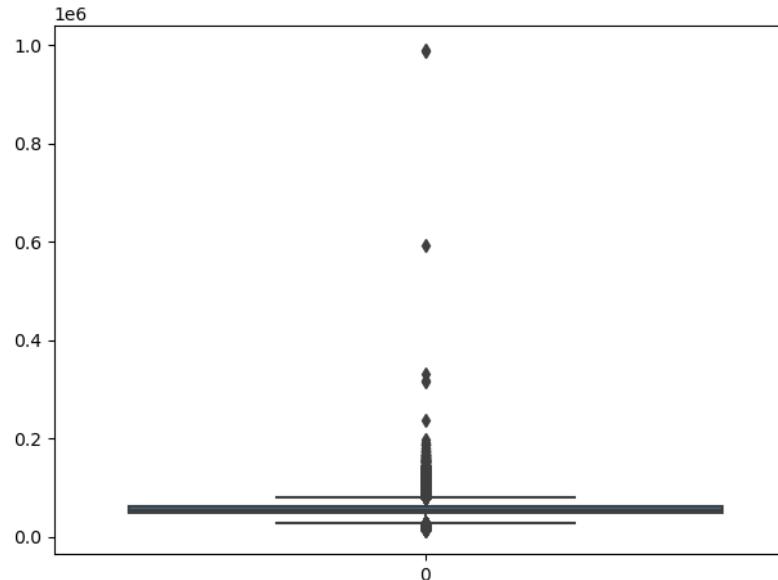
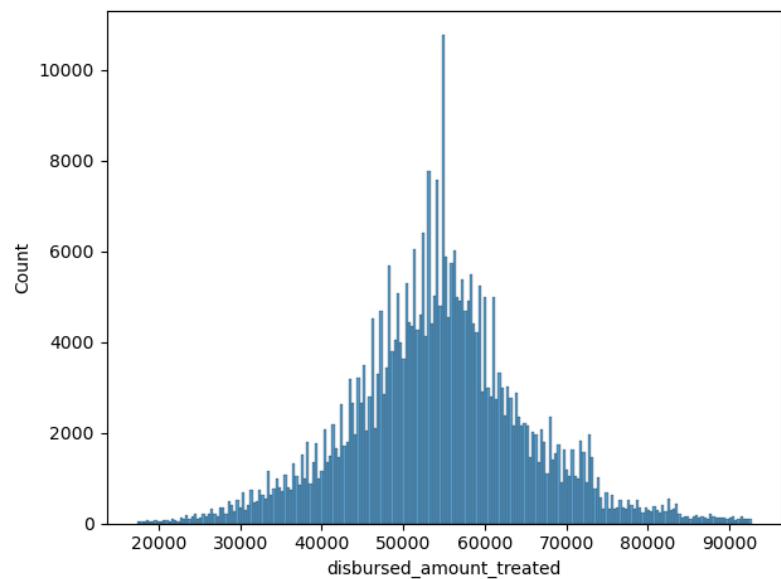
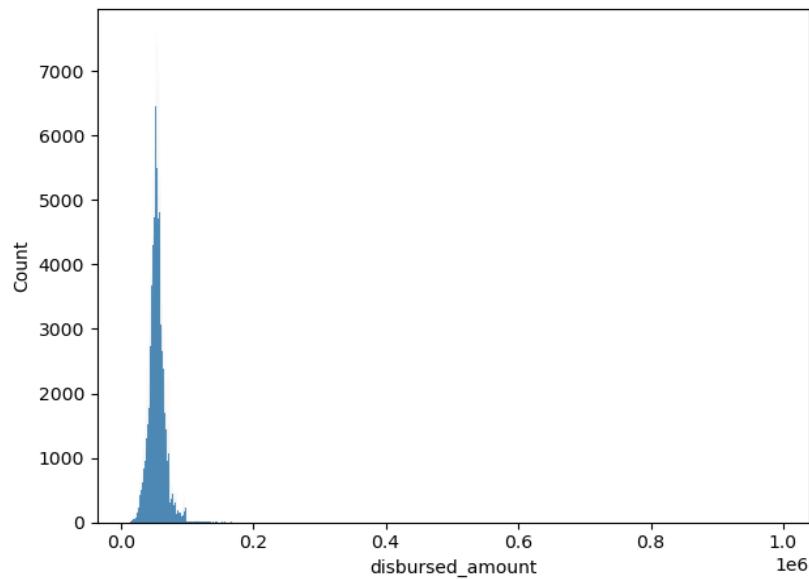
From there the company will assist them by enrolling them in a personal finance program designed to increase likelihood of approval and reduce likelihood of default.



# SmoteNC for imbalanced classes...

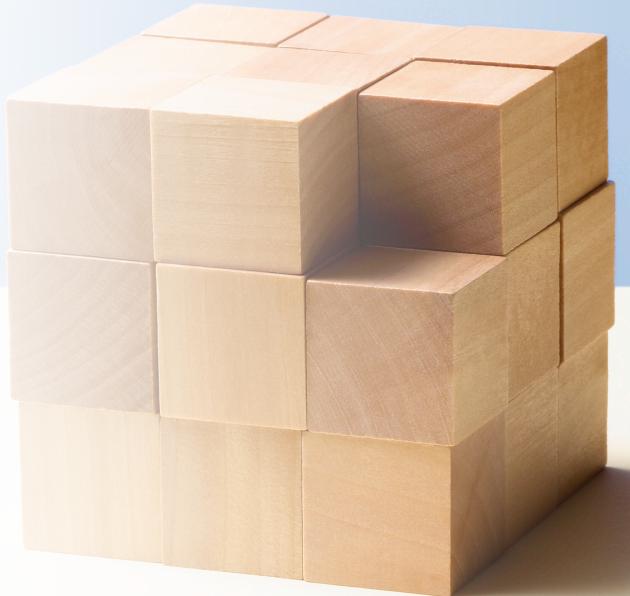


# Effect of imputing Outliers...



# Feature Selection...

1. Identifying and managing outliers
2. Identifying and removing unnecessary features
3. Utilizing line assumptions
4. Identifying uncorrelated features
5. Maximizing feature selection without overfitting to increase accuracy



# Model Results:

- Baseline accuracy of 50 % after managing imbalanced classes.
- Initial Model performance was just slightly above baseline.
- Accuracy was consistently between 54 % & 61% , regardless of model.
- Logistic Regression, Decision Tree, KNN, Naïve Bayes, AdaBoost, Stacked Models

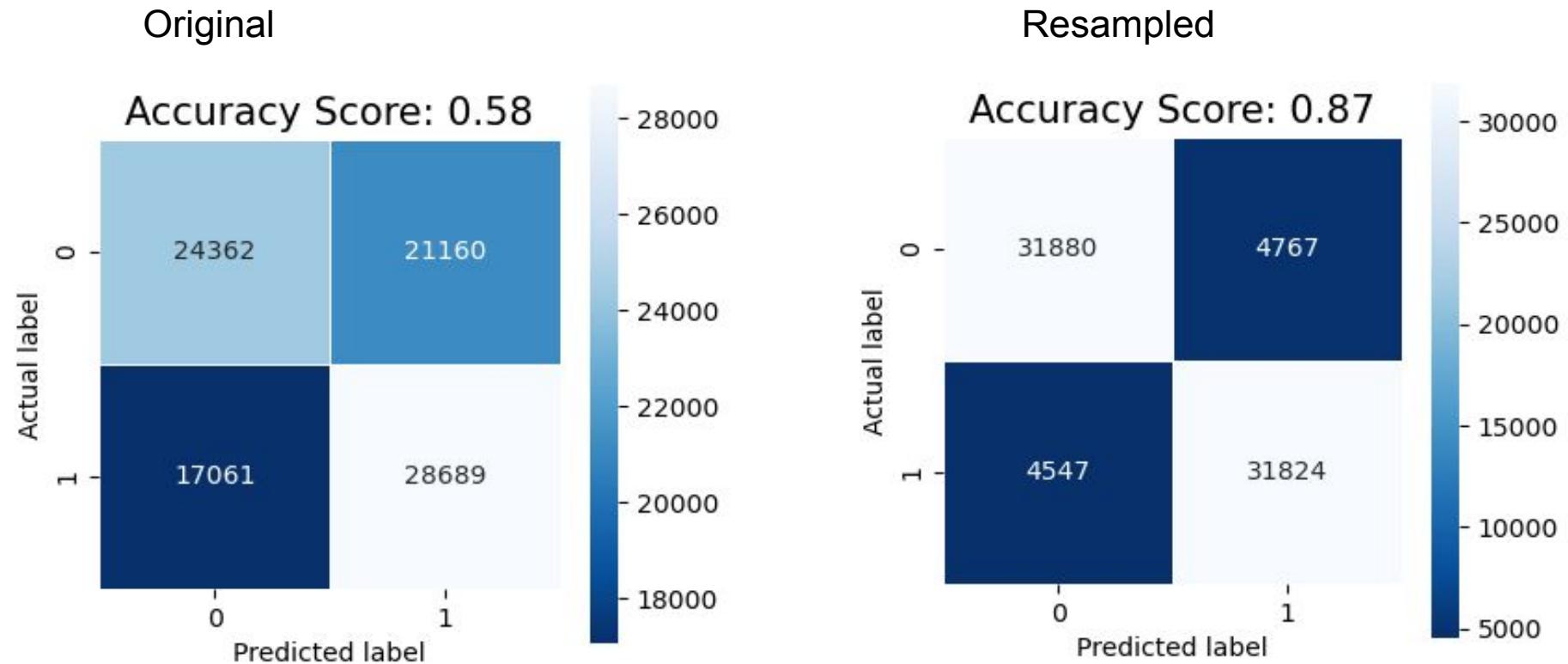


# Best performing models (TEST SCORES)

	Logistic Regression	Decision Tree	KNN	Naïve Bayes
Accuracy	87 %	98 %	98 %	83 %
Precision	87 %	98 %	99 %	80 %
Recall	87 %	98 %	98 %	89 %
F1	87 %	98 %	98 %	84%

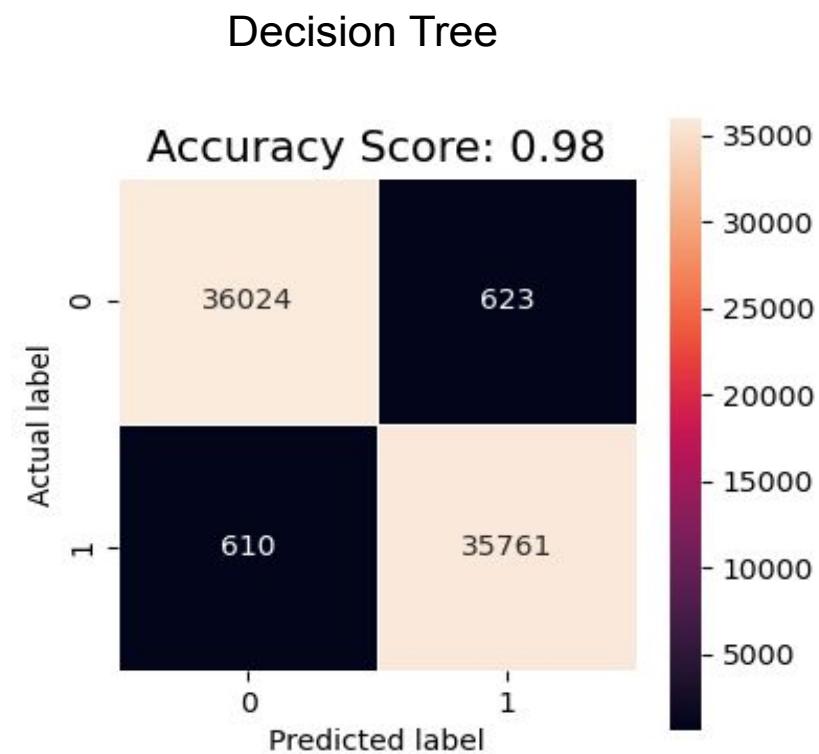
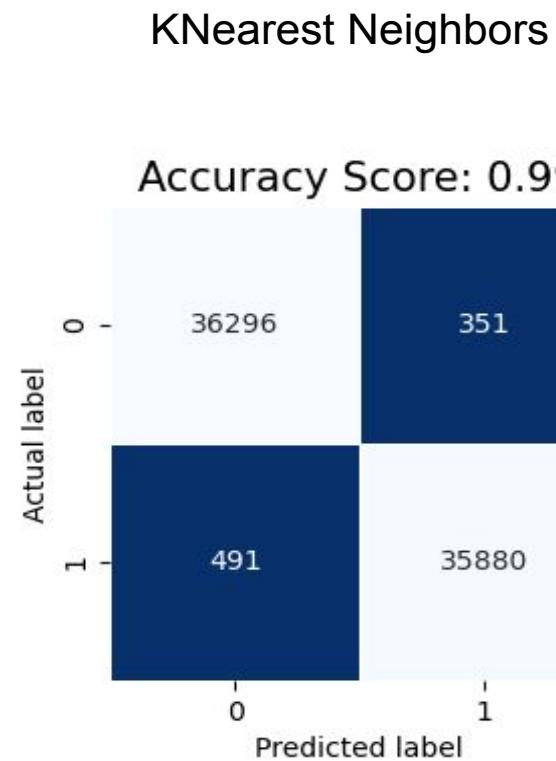
# Data Visualization...

## Confusion Matrices Logistic Regression



# Data Visualization (cont'd)...

## Confusion Matrices Cont'd



# Conclusions & Recommendations...

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- Feature selection matters
- Exploring stacked model performance and neural network performance with more time
- Recommend the bank feed prospective clients through the model prior to approval
- Those deemed high risk should be resubmitted through the model again after program completion and prior to secondary loan application

