# AI DRIVEN COLLECTIONS STRATEGY FOR UNSECURED LENDING

ABSTRACT

Unsecured Lending primarily includes credit card, personal loan and student loan which does not involve any collateral. Financial organizations have been facing major challenges to minimize losses in unsecured lending portfolio as they struggle to build an effective and efficient collection strategy. Personal loan delinquency rates in United States have gone up over the last year. From the second quarter of 2021 to the first quarter of 2022, the percentage of borrowers with an account 60 days or more past due increased from 2.28% to 3.25%.

U.S. credit card debt as a whole reached an all-time high in 2019, peaking at $930 billion in the fourth quarter of that year. It has fluctuated throughout the pandemic, but appears to be on the rise again. It increased by 9.2% from 2021 to 2022.

Figure 1: CREDIT CARD DEBT IN USA
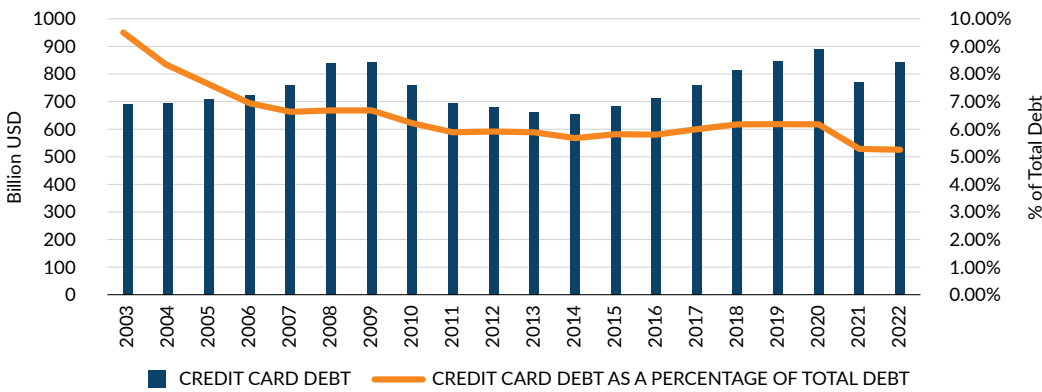
Data source: Federal Reserve Bank of New York (2022). Debt statistics are from the first quarter of each year.

A robust collection strategy can help the business to collect more money with cost constraints. It also helps in capacity planning, driving strategic decisions and business planning. Benefits from AI/ML driven collections strategy implemented by the financial services organizations are as follows

01 — 2 to 5% Increase in Loss Savings

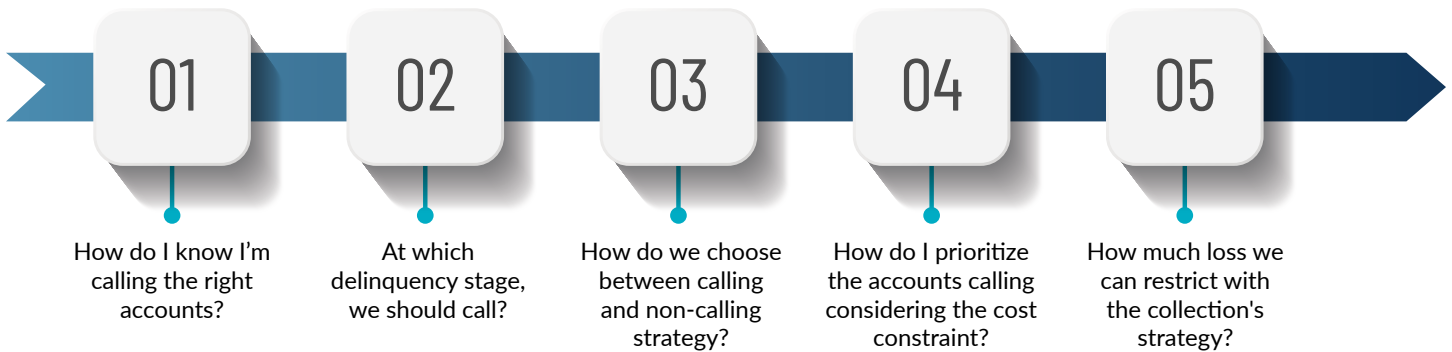**02** — 1 to 3% Decrease in Net Flow

03 — 5 to 7% Increase in Productivity

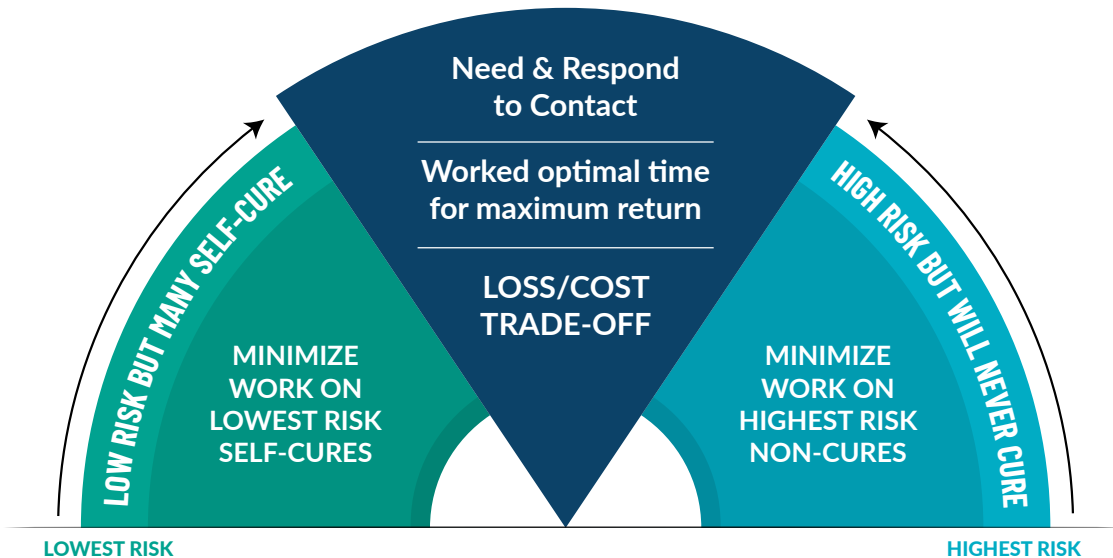**04** — 5 to 10% Decrease in Cost of Collections

WHAT DOES COLLECTIONS STRATEGY SOLVE FOR?

Building a collections strategy would address some significant challenges faced by the financial organizations. The challenges primarily include whom to call, when to call, who should call etc. However, it can also entail the other strategies into account – No call, letter, mail, digital call, live call etc. Calling or non–calling strategy would depend on portfolio economics, risk appetite of the organization, cost constraints, and infrastructure to implement strategy

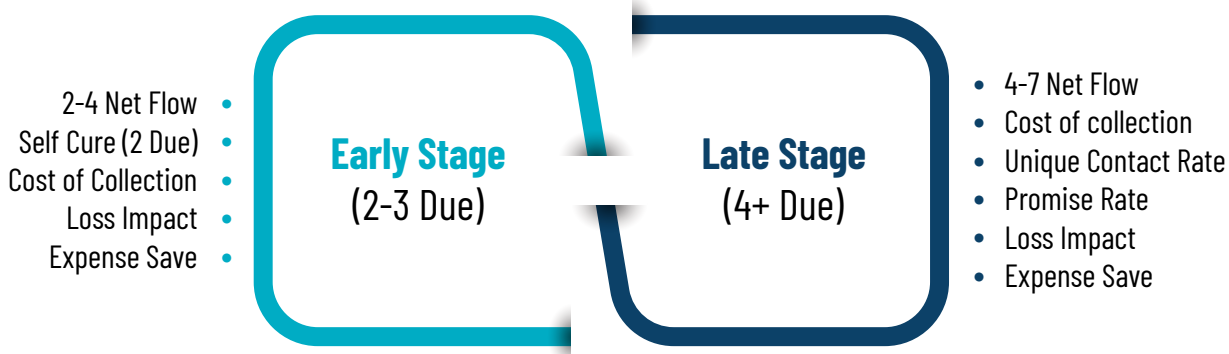| 01	02	03	04	05
How do I know I'm calling the right accounts?	At which delinquency stage, we should call?	How do we choose between calling and non-calling strategy?	How do I prioritize the accounts calling considering the cost constraint?	How much loss we can restrict with the collection's strategy?

HOW COLLECTIONS VIEWS THE PORTFOLIO

Collection strategy primarily considers risk segments of the customers by analysing the past customer behaviour and accordingly calling/non–calling strategy to be applied. Loss /Cost trade–off must be defined for each of the risk segments and define strategy optimally for maximum return. There are multiple metrics or strategy measures.

Need & Respond to Contact

Worked optimal time for maximum return

LOSS/COST TRADE-OFF

LOW RISK BUT MANY SELF-CURE

HIGH RISK BUT WILL NEVER CURE

MINIMIZE WORK ON LOWEST RISK SELF-CURES

MINIMIZE WORK ON HIGHEST RISK NON-CURES

LOWEST RISK

HIGHEST RISK

COLLECTIONS STRATEGY MEASURES

2-4 Net Flow •
Self Cure (2 Due) •
Cost of Collection •
Loss Impact •
Expense Save •

Early Stage
(2-3 Due)

Late Stage
(4+ Due)

• 4-7 Net Flow
• Cost of collection
• Unique Contact Rate
• Promise Rate
• Loss Impact
• Expense Save

APPROACH – COLLECTIONS STRATEGY

Data Engineering & Diagnostic   Model Development and Validation   Deployment and Scale Up

Identification of objective function

• Review the existing collections measures for the portfolio
• Identify the most important measure to be considered for the strategy

Understanding of Collections Strategy

• Understand the existing collections strategy
• Understand the current approach of building collections strategy

Data Preparation and Diagnostic

• Understand the data sources and available data elements
• Understand the detailed solution architecture
• Understand the current collections strategy implementation platform
• Perform exploratory data analysis which includes Bivariate analysis, Missing value and outlier analysis, portfolio insights
• Consolidate and create cleansed data for building the strategy

Optimization

• Apply optimization techniques on each of the risk segments and align different treatments (calling and non- calling) to customers leading to minimize losses subject to cost constraint

Risk Segmentation using ML Algorithm

• Create risk segmentation of the customers using Machine Learning algorithms such as Random Forests, Gradient boosting ANN etc. and identify the best fit model
• Perform in-sample and out-sample validation to ensure model robustness

Strategy Implementation (Pilot)

• Implement the strategy based on the advanced analytics solution and generate the list of customers aligned to each treatment daily
• Primarily set the strategy as challenger on 50% population

Tracking and Scale Up

• Track the challenger performance and fine tune accordingly
• Scale up the solution when challenger outperforms champion for 6 months continuously

Data Engineering & Diagnostics

As mentioned in the collection strategy measures, the major KPIs in collections are different in early due i.e., 2 & 3 due and late due i.e., 4 to 7 due. While cost of collection, loss impact and cost saves are common in all due stages, 2 – 4 net flow and self-cure rates are more pertinent in early due and 4 – 7 net flow is very important for late due stages. Identify the best metric to be considered as objective function is not only the very first step but also the most critical business decision as the whole strategy would depend on that. Some analysts and business owners may justify with 60-day net flow for each due stage as the objective function.

Understanding of Collections Strategy

Existing collections strategy would be considered as a champion strategy to set the benchmark. It has been observed that most of the collections strategy is rule based where account balance, due stage plays a very important role on rule-driven strategies. It is pertinent to understand the existing strategy and the relevant parameters used to build the strategy with details on the thresholds applied in the rules. Performance of the existing strategy would throw some insights.

Data Preparation and Diagnostics

Data preparation is the first step to build the analytical model which is primarily the risk segmentation in this context. Monthly billing data at the customer level, customer risk scores – internal and external bureau scores, customer demographics, customer transaction data and payment data are the data points to be considered. Also, we need to consider the existing response on calling and non- calling strategy. Analysts should perform all standard data preparation steps & tests to build the data, which includes missing value treatment, outlier treatment, bivariate analysis, variable standardization/normalization etc. Finally, an exploratory data analysis report needs to be created for better understanding of the variables.

## Risk Segmentation using ML Algorithm

Based on the objective function defined at the discovery phase and agreed with all stakeholders, and data preparation done at the previous steps, the analysts should first check the target variable leakage. Target variable leakage is to check if any independent variable which is highly correlated with the objective function or derived from dependent variable. It is recommended to decide on the number of risk segmentation models to be created. As per the industry standards, the number of risk segmentation models can be based on due stage & balance (high and low based on a threshold). It is recommended to try multiple machine learning algorithm such as Random Forest, Gradient Boosting Decision tree to find the risk segments and split them primarily to four – High Risk, Medium High Risk, Medium

Risk and Low risk based on the risk scores generated by the model. Number of risk segments ideally should be based on the portfolio dynamics and economics. Finally calculate the objective function e.g., 60-day net flow for each of the risk segments in each of the models.normalization etc. Finally, an exploratory data analysis report needs to be created for better understanding of the variables.
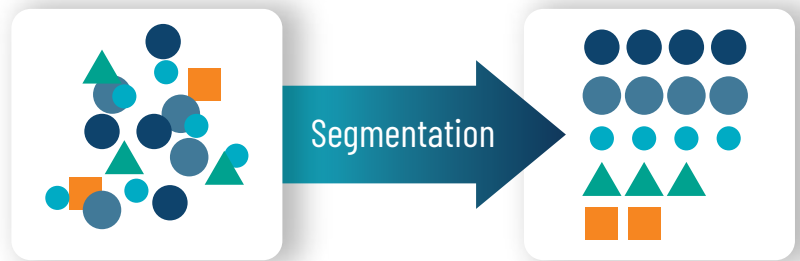
Optimization

One should identify the number of accounts in each of the risk segments daily and based on the previous strategy, map the different strategy used so far e.g., 2-day interval calling, 5-day interval calling, 10-day interval calling etc. Analysts typically apply multiple optimization techniques to identify the best calling strategy for each of the risk segments subject to capacity constraints to minimize the net flow or to optimize the objective function. All the calling and non-calling strategy are considered for optimizing the overall strategy.
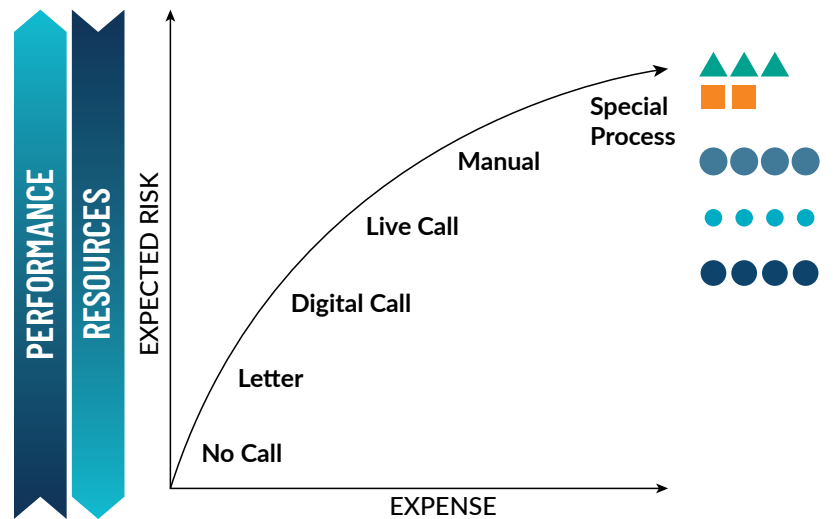
Deployment and scale up

The implementation team generally deploys the strategy in a challenger mode with 50% population and track the performance of the strategy in terms of model performance and other portfolio KPIs such as net flow, cost of collections, expense save, loss save. The strategy is required to be monitored on a monthly basis on the performance metrics such as KS, Gini, PSI, CSI etc. Fine tuning is suggested if there are changes in the model performance after performing a deep dive analysis to identify the root cause. After observing consistent and robust performance of the strategy for 3 months, , the challenger strategy can be scaled up to 80%. It is always recommended to keep 2 strategies at the same time to understand the performance improvements better.

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