# Report

To minimize financial losses, the bank aims to be better able to identify customers at risk of cancelling their accounts. Customers have closed their credit accounts in record numbers over the past couple of years, leading to declining revenue. The banks must maintain profits by maximizing the number of credit lines they provide to their customers. It is also in their best interest to encourage their customers to carry large credit card balances from month to month to maximize interest earnings. We are trying to determine what contributes to customers cancelling their credit card accounts and whether the bank can predict whether a customer will do the same in the future.

I have identified below questions for analysis: -

a) Does last year transactions effect the customer status.
b) Does last year spendings make any difference in account.
c) Does number of dependents effect the people who have closed the account.
d) Is credit limit affecting the closure status?
e) Is there a particular section of people who are majority in closed status category?

These questions are important to identify what the causes for are closing the account and predict based on some condition whether a person will be closing the account or not.

Key findings from exploratory analysis are: -

a) The average transactions made last year is higher for active status class than closed status class. This means people who made more transactions are more likely to maintain active status.
b) The average spendings made last year is higher for active status class than closed status class. This means people who made more spendings are more likely to maintain active status.
c) We can see there are most people having 3 dependents in the closed account category followed by people having 2 dependents. This means that having more dependents might not be the reason for a person to close the account.
d) we can see that credit limit is high for active accounts when compared to closed accounts. Similarly, active accounts have higher median value when compared to closed accounts. We can infer that higher credit limits will impact closure status of a person.
e) The concentration of people who closed their accounts is more where they have 3 dependents, doing a part time job and having credit limit below 10,000. The least people are present in self-employed category. The credit limit, employment status effect the account status of the person.

Based on these findings, we can identify the factors causing people to close accounts. Knowing the causes helps us discover ways to reduce the closures.

The three models which I used are Logistic regression, LDA (Linear Discriminate Analysis), and Decision trees. Out of the three models, Decision tree gave te most optimal results while predicting on Test data. The statement is based on the 3-performance metrics b) Sensitivity c) Specificity.

a) Accuracy: - It gives us the proportion of correctly classified rows in the data.
b) Sensitivity: - Proportion of all positive classes that were correctly classified
c) Specificity: - Proportion of all negative cases that were correctly classified.

Now all these are highest for Decision tree model with an accuracy = 90.492, Sensitivity = 88.336, Specificity = 92.27. What its states is this model (Decision tree) most efficiently identifies or predicts whether the person is going to close the account or keep it. This is because, the decision tree model identifies positive classes and negative most efficiently (as given from sensitivity and specificity values).

My recommendations would be

a) To keep increasing the transactions done by an individual, increasing different modes of transactions helps as the user has many things to choose from.
b) Similarly, to increase the amount of money spent by person, offering discounts and perks like cashbacks will help in increasing the spendings of a person.
c) Majority of closed accounts are happening in the case of part time employees. So, to sustain them, they need to be special perks like low interest rates on credit amount, increasing the length of repayment period etc.
d) Increasing the credit limit without any background analysis of individual will lead to errors in assessing a credit payment capability of a person. So, while increasing credit limit, background details like utilization ratio, spent ratio, age, martial etc. need to be considered so that it gives better understanding of social, personal and economic conditions.