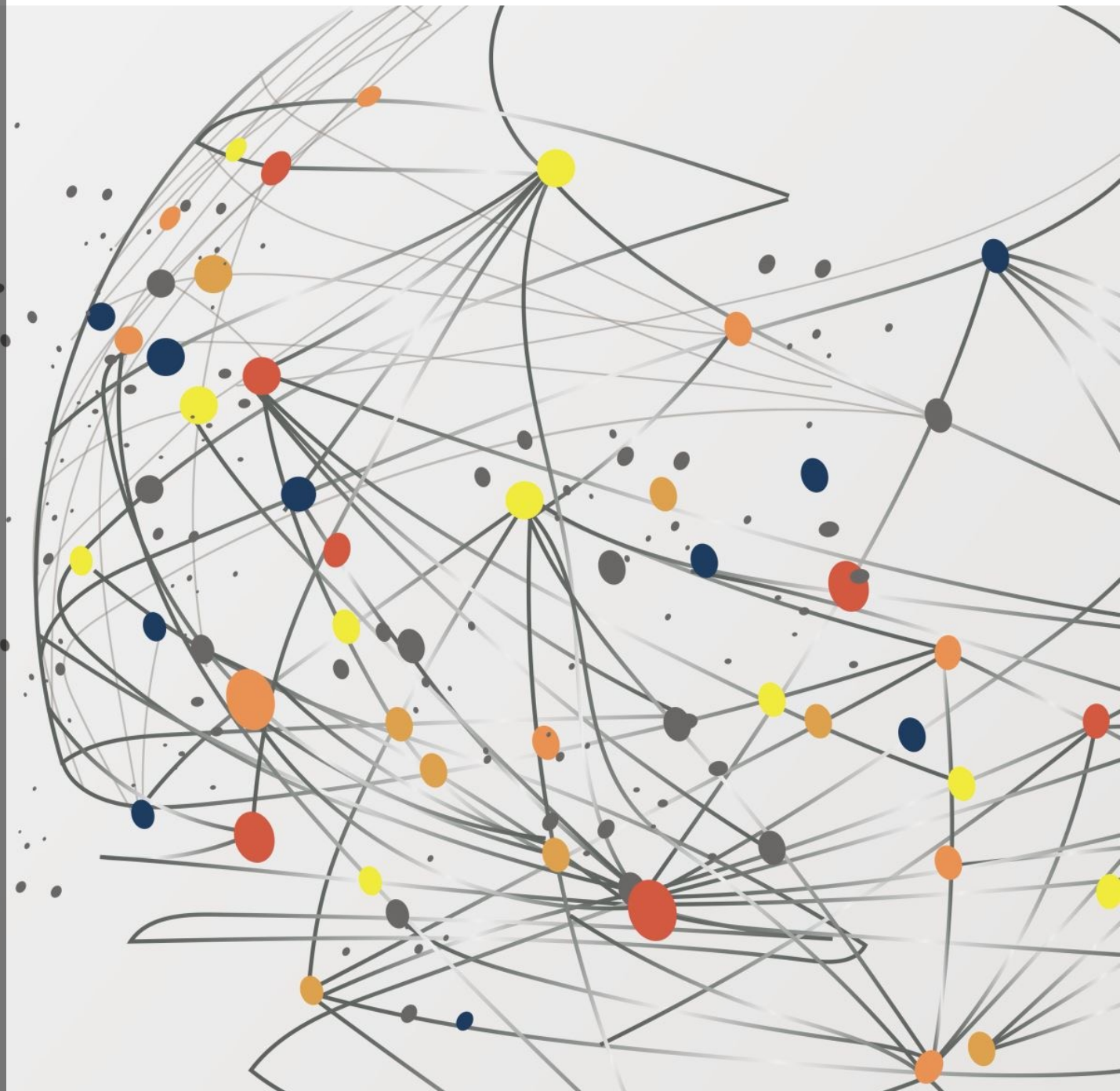
Prediction System – Customer Credit Card Churn

-Jyothi H



Business Questions

How do we accurately build a prediction system to help bank improve their services so that customers do not renounce their credit cards?

Key Questions To Address

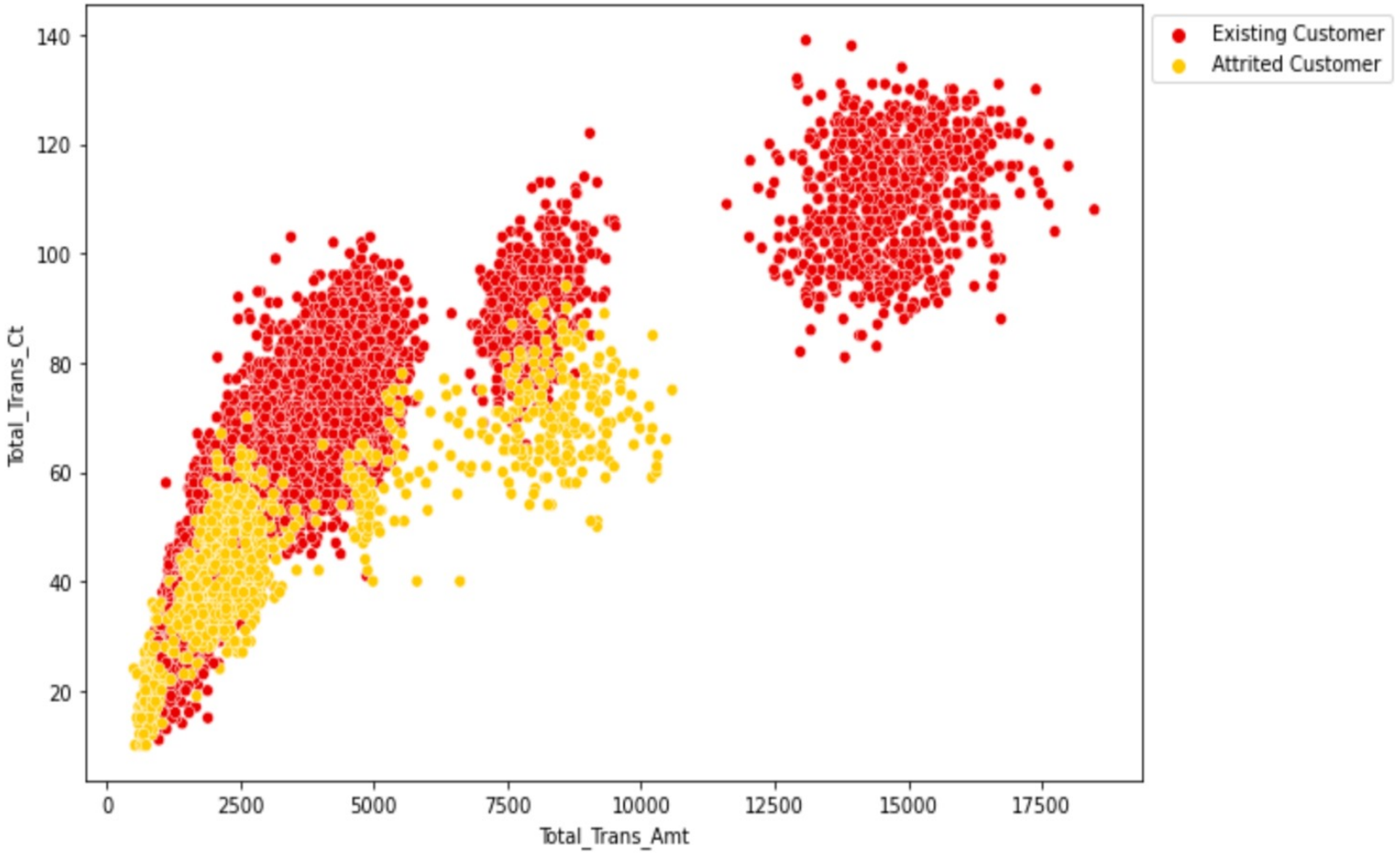
The following questions need to be answered to effectively predict if a customer will renounce the credit card

- Does various predicting factors really affect the likelihood of customer churning their credit card?
- What are the important variables affecting the likelihood of a customer churning their credit card?
- Does the income of the customer really effect the likelihood of a customer churning their credit card?
- Does the total credit card transaction count and transaction amount provide an insight into credit card churn ?
- Does the credit limit on the card provide any indication of the credit card renunciation?
- Does the average card utilization ratio provide any indication of a customer churning their credit card?

Classification Techniques & Models Evaluated

- Logistic Regression
- Decision Tree
- Bagging with Decision Tree
- Random Forest Estimator
- AdaBoost Classifier
- Gradient Boost Classifier

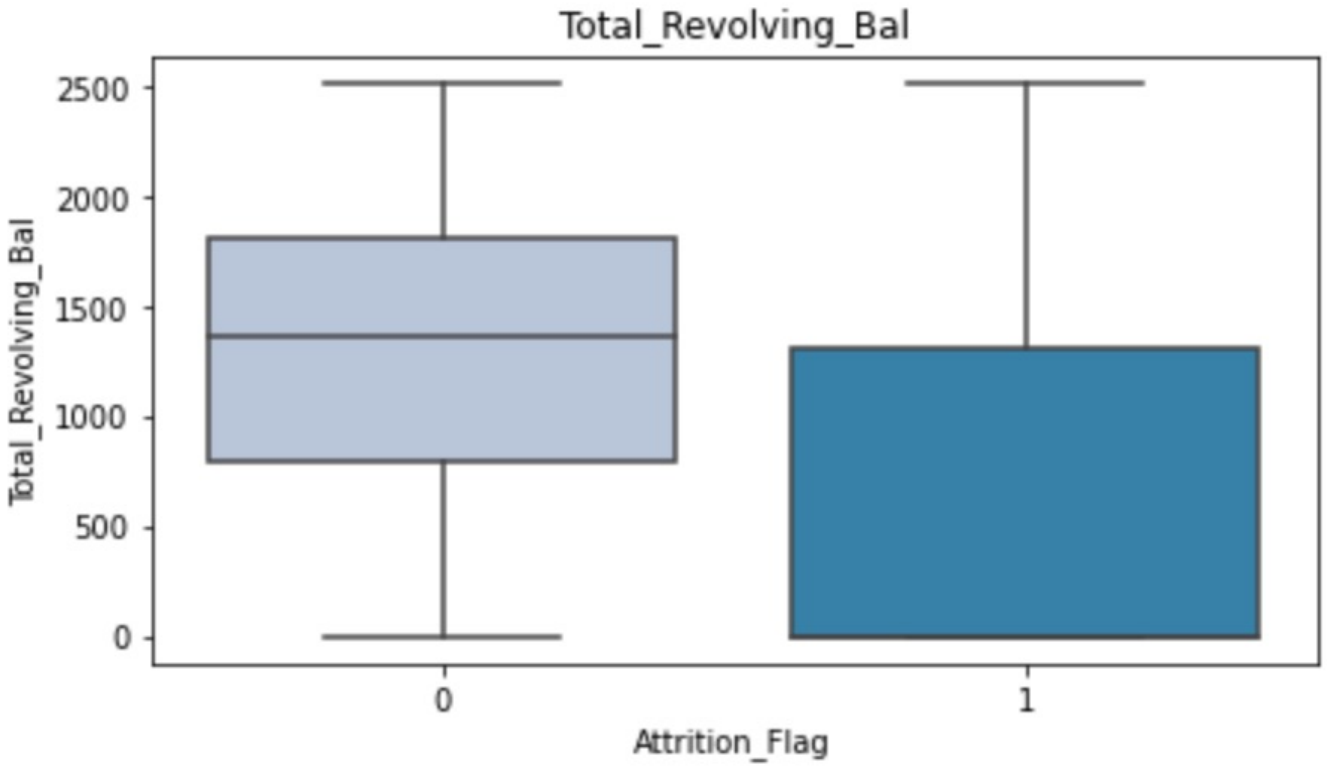
Correlation – Customer Attrition Vs Total Transaction Count Vs Transaction Amount



As depicted in the graph, the likelihood of a customer churning is correlated with the total transaction count and total transaction amount.

Therefore, we would expect to see these as important features in our model prediction.

Correlation – Customer Attrition Vs Total Revolving Balance

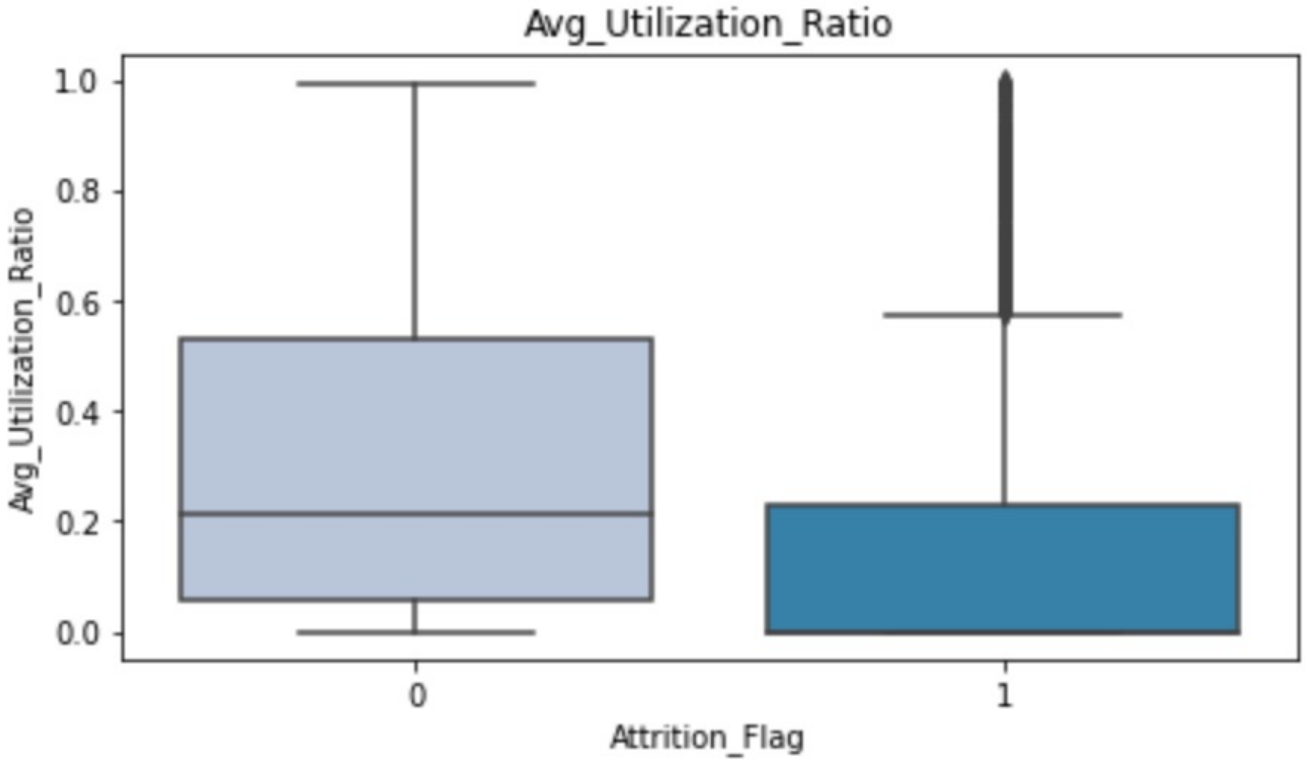


0 = Existing Customer
1 = Churned Customer

As depicted in the graph, the likelihood of a customer churning is correlated with the total revolving balance.

Therefore, we would expect to see this as an important feature in our model prediction.

Correlation – Customer Attrition Vs Average Utilization Ratio

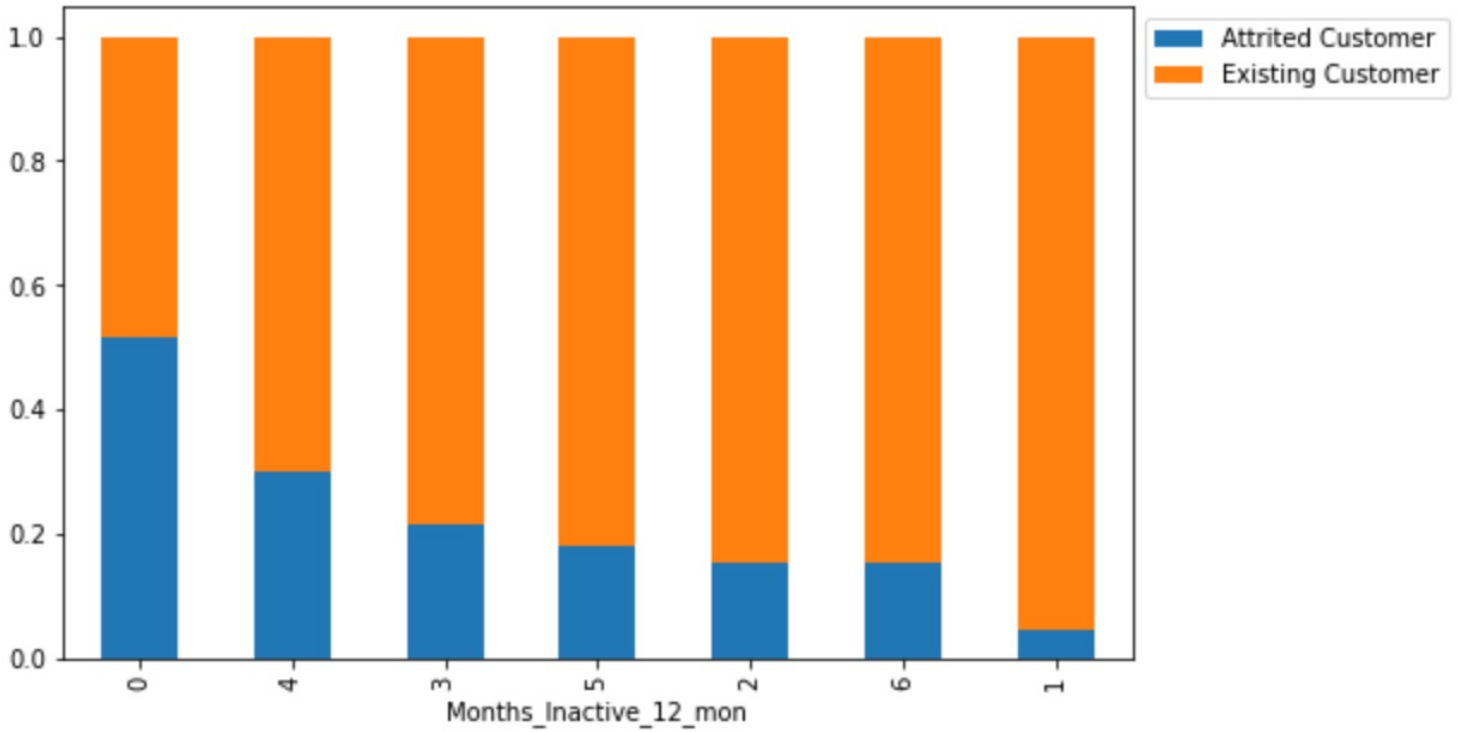


0 = Existing Customer
1 = Churned Customer

As depicted in the graph, the likelihood of a customer churning is correlated with average credit card utilization ratio.

Therefore, we would expect to see this as an important feature in our model prediction.

Correlation – Customer Attrition Vs Customer Credit Card Activity



Churned customers tend to have a higher level of inactivity in the last 12 month compared to existing customers.

Therefore, we should expect to see passport attribute as an important feature in our model prediction.

Model Evaluation Criteria

Possible Errors in Prediction:

1. Error 1 - Predicting a customer will renounce the credit card but in reality, does not.
    - Leads to misuse of marketing expenditure and resources
2. Error 2 - Predicting a customer will not renounce the credit card but in reality, he will –
    - Results in potential lost opportunity

Which Case Holds More Weight ?

- Error 1 results in misuse of capital which can be critical for small cash strapped companies
- Error 2 results in lost opportunity, which is important for stable companies with healthy balance sheet, looking to grow.

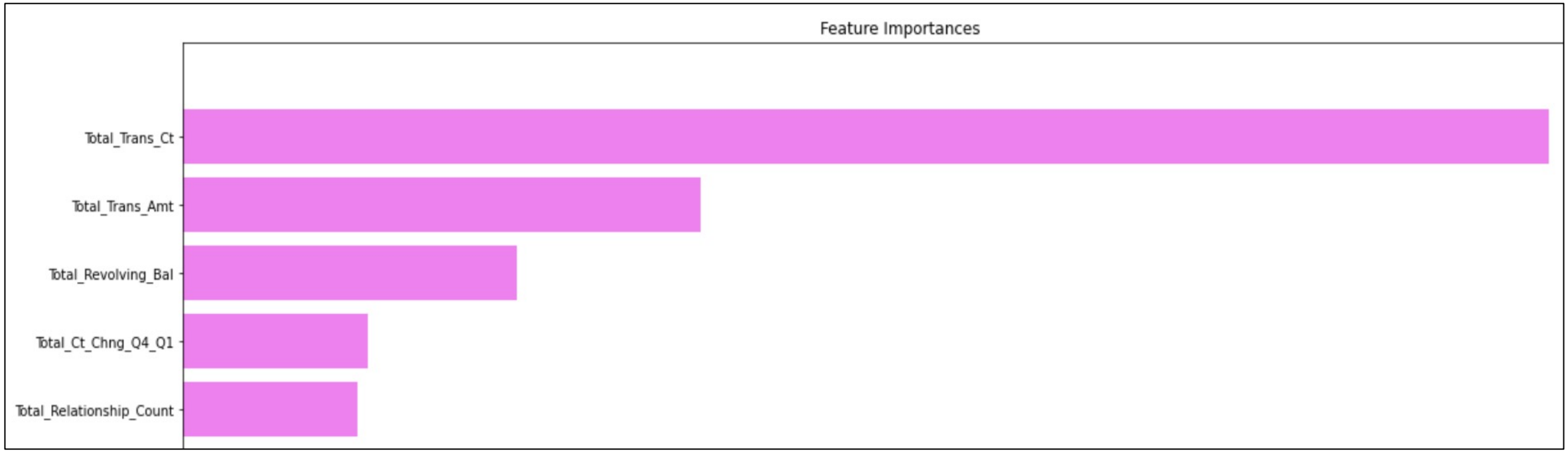
We will assume Error 1 to be important and therefore will try to maximize the Recall Score to get an optimal model

Model Prediction – 3 Best Models

	Model (Tuned)	Accuracy	Recall	Precision	F1 Score
Training Data	Gradient Boost (Without Sampling)	0.958325	0.919592	0.996811	0.956646
	AdaBoost Classifier (With Sampling)	0.988037	0.990783	0.985372	0.988070
	Gradient Boost (Up Sampling)	**0.988429**	**0.992155**	**0.984816**	**0.988472**
Testing Data	Gradient Boost (Without Sampling)	0.977789	0.920000	0.940252	0.930016
	AdaBoost Classifier (With Sampling)	0.966436	0.950769	0.855956	0.900875
	Gradient Boost (Up Sampling)	**0.969398**	**0.953846**	**0.868347**	**0.909091**

Best Model Recommendation : Gradient Boost Classifier Tuned, since it gives a better balance of a generalized model and performance

Model Prediction – Top Relative Feature Importance



Potential Benefits Of Accurate Prediction Model

- Increased Marketing ROI – By accurately targeting the right segment of customers, the marketing team can maximize its ROI on marketing spend.

- Increased Conversion Rate – Accurate prediction model allows the company to target the right customers , thereby increasing the operational KPI's of the bank , mainly retention metrics.

- Improved Profit Margin – Optimal use of resource and capital that is targeted towards intended customers helps bank in improving the profit margin.

Insights

Important features that determine customer card churn -

- Transaction Count
- Total Revolving Balance
- Total Products Held
- Transaction Amount
- Transaction Count Change from Q4 to Q1

Recommendations

- Create outreach programs to target the customers with transaction amount lesser than $10,000 on their credit card.
- Provide promotional offers to increase customer engagement for those customers with fewer than 80 transactions in the last 12 months.
- Target the customers with total revolving balance of lesser than $500, since they are more likelihood to churn their card