
THERA BANK
CARDHOLDER TURNOVER MODEL
by JAKE EIDE

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OVERVIEW & SOLUTION APPROACH

• The Thera bank recently saw a steep decline in their number of credit card users, leading to a loss of income.

• The bank wants to identify the customers who will leave their credit card services in order to prevent potential losses.

• The solution to this problem is to leverage customer data to target those cardholders who are more likely to close their credit card account.

• I will develop classification models using ensemble techniques by analyzing data from Thera bank customers. These models will help the bank by predicting the types of customers more likely to close their accounts, allowing the bank to take measures to prevent customer loss.

• In exploring the Thera bank data, I will generate a set of insights and recommendations to help the bank improve their services.

DATA OVERVIEW

• The data contains information about 10127 Thera Bank credit card customers.

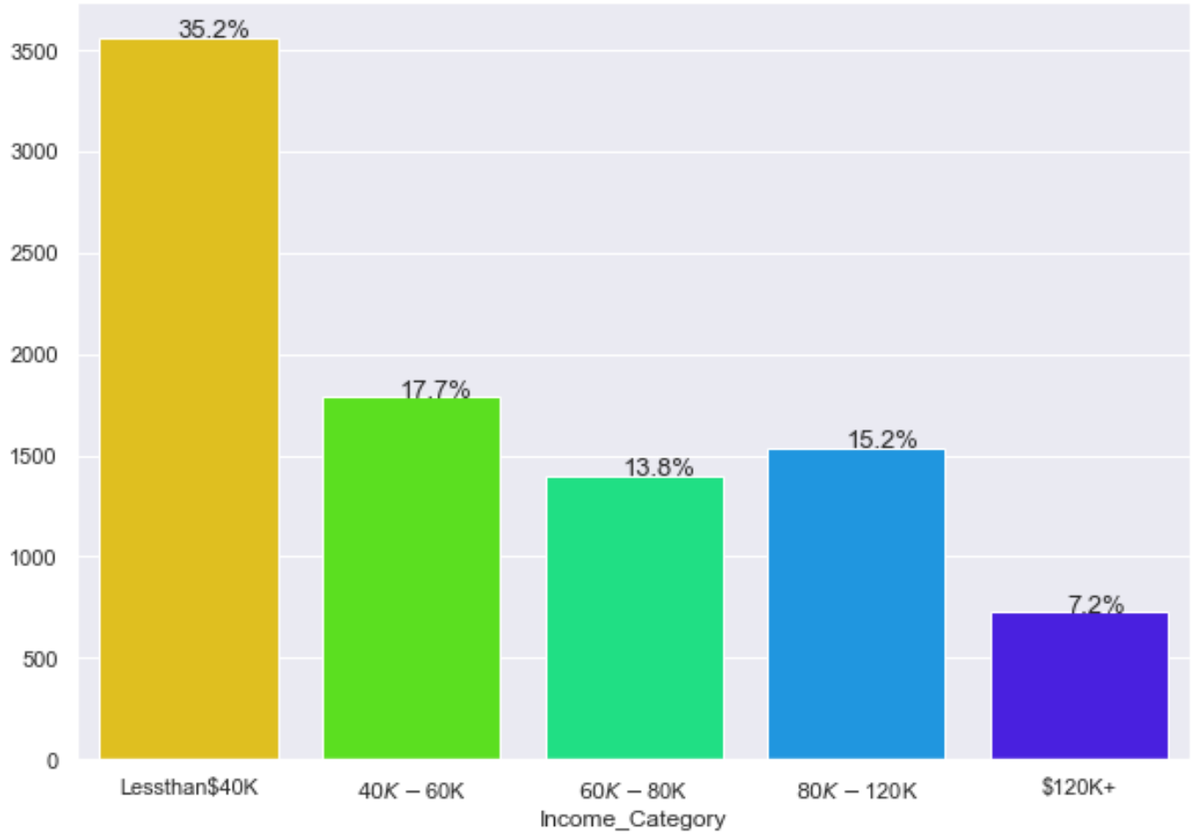
• This data set includes both active and closed credit card accounts.

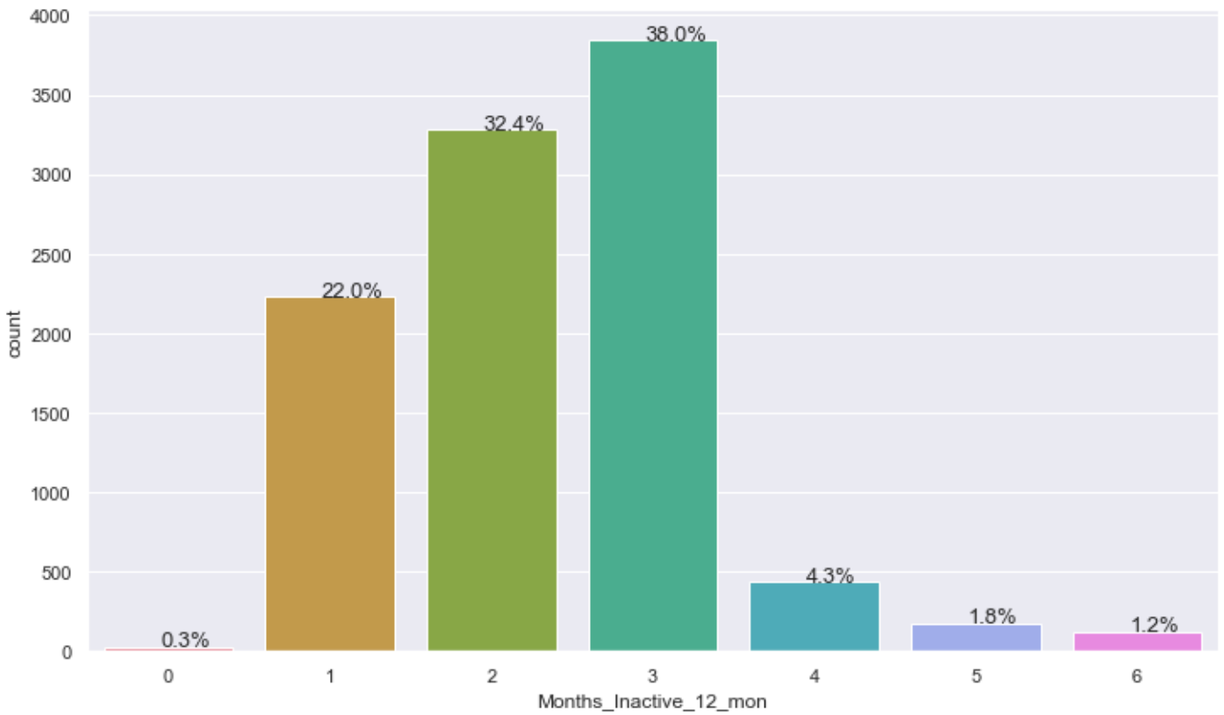
• The information includes customers' personal details such as age, gender, educational level, and marital status.

• There is also data about the customers' credit card usage and account, including type of card, credit limit, and revolving balance.

• Some values were listed as 'Unknown', which were filled in using a data imputation technique.

EXPLORATORY DATA ANALYSIS

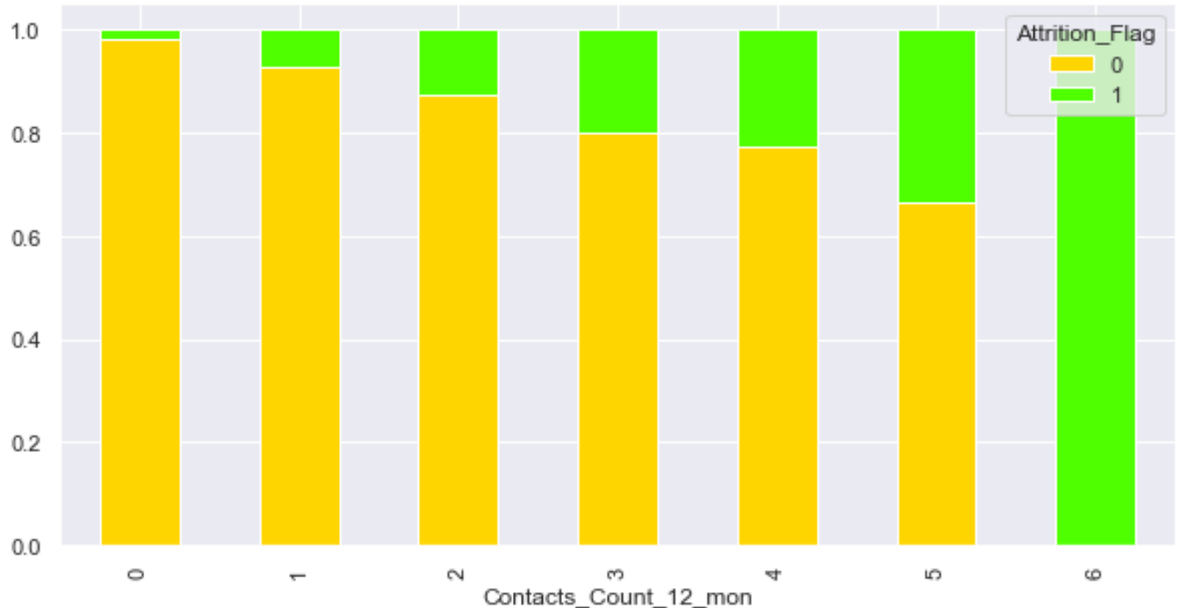


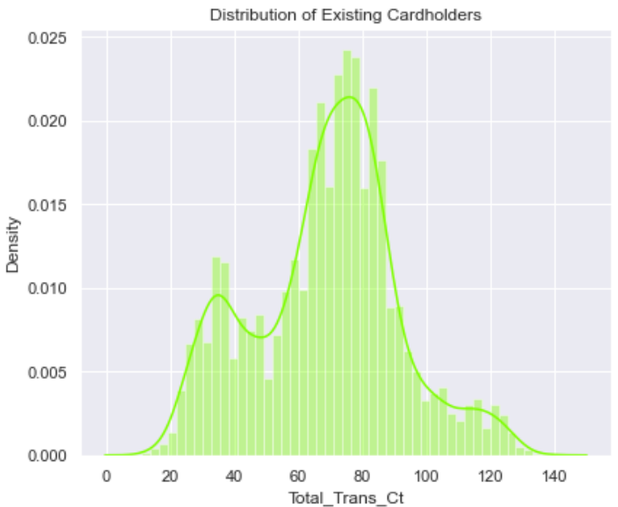


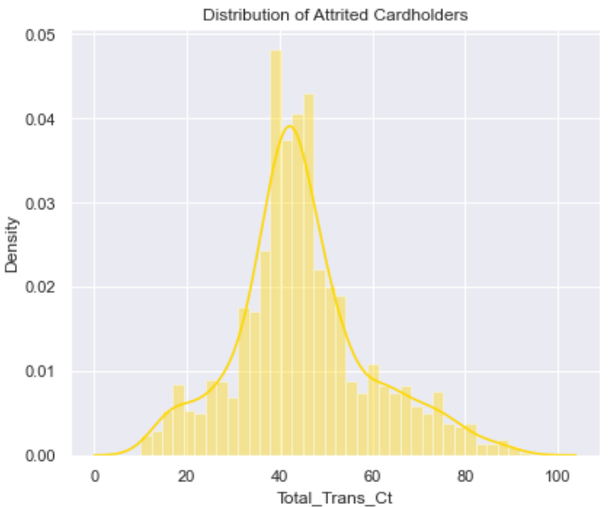
• The largest group of Thera Bank cardholders have incomes less that $40K per year.

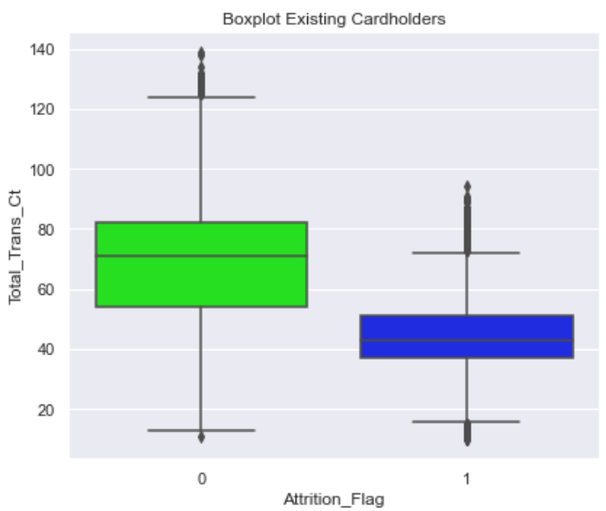
• More than 90% of customers were inactive between 1 and 3 months within a one year period.

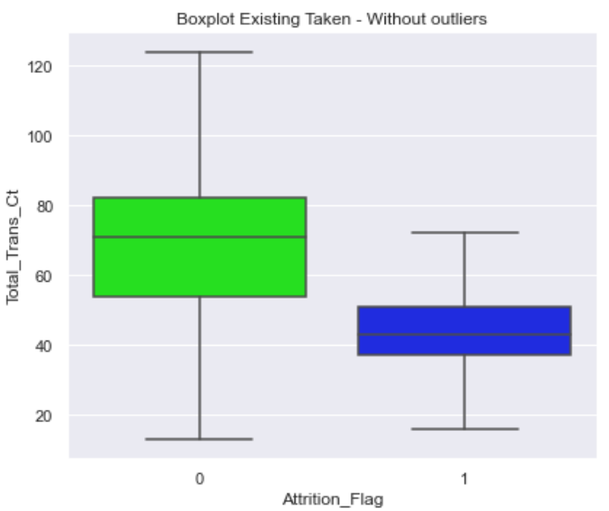
EXPLORATORY DATA ANALYSIS





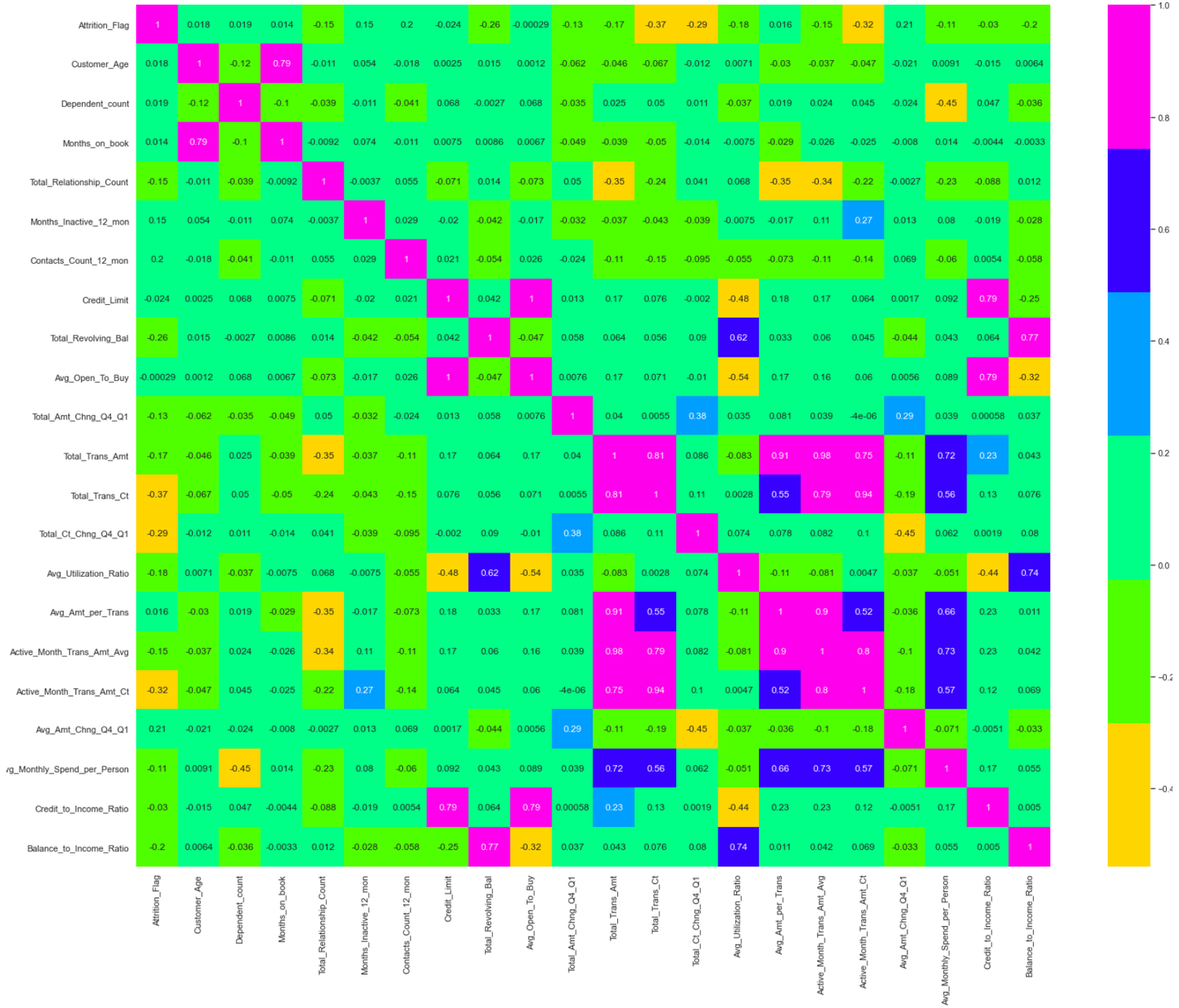






• The more contacts a customer has with the bank in a given year, the more likely they are to close their account.

• The graph to the right shows that customers who keep their account open tend to use their card more often. How can we encourage cardholders to perform more transactions every month?



EXPLORATORY DATA ANALYSIS: BIVARIATE CORRELATION

- Key takeaway is that Total_Trans_Ct has the highest correlation with Attrition_Flag; it is negatively correlated, indicating that the higher the Total Transaction Count a cardholder has, the less likely they are to close their account

- Months_on_Book and Customer_Age also have a higher correlation; neither of these correlate with Attrition_Flag

MODEL PERFORMANCE SUMMARY

- The objective is to predict which customer is most likely to close their credit card account.
- Recall will be the primary performance metric used to evaluate our model.
- This metric was chosen to satisfy the goal of the project – identify customers the bank is at risk of losing. The goal is to minimize false negatives.
- Insights from our model:
    - Total Transaction Count is the most important feature used to predict which customer is more likely to close their account
    - Average Amount Per Transaction and Total Revolving Balance are also important features
    - In general, financial activity is a better predictor than personal data

MODEL PERFORMANCE SUMMARY

Model	Train_Recall	Test_Recall	Train_F1	Test_F1	Train_Accuracy	Test_Accuracy	Train_Precision	Test_Precision
XGBoost tuned with RandomizedSearchCV	0.998431	0.996923	0.712726	0.321110	0.597568	0.323791	0.554153	0.191376
XGBoost tuned with GridSearchCV	0.999804	0.993846	0.911171	0.632713	0.902530	0.814906	0.836973	0.464080
Gradient Boosting tuned with RandomizedSearchCV	1.000000	0.935385	1.000000	0.892805	1.000000	0.963968	1.000000	0.853933
Gradient Boosting tuned with GridSearchCV	1.000000	0.926154	1.000000	0.885294	1.000000	0.961500	1.000000	0.847887
Random Forest tuned with RandomizedSearchCV	0.998039	0.920000	0.989982	0.850640	0.989900	0.948174	0.982053	0.791005
Random Forest tuned with GridSearchCV	0.976270	0.913846	0.966227	0.810368	0.965876	0.931392	0.956388	0.727941

BUSINESS INSIGHTS AND RECOMMENDATIONS

To maximize profits and prevent cardholder churn, I recommend the following:

• We should target customers who have lower transaction counts.

• Consider ways to encourage cardholders to use their card more often, even if the purchase is small. This encouragement could come in the form of perks or rewards for certain types of purchases.

• There should be a red flag for customers that contact the bank 4 or 5 times, as these are customers that are at high risk of closing their accounts. Every time a customer has contact with the bank, the bank should take the opportunity to remind the customer of the benefits using their card.

• Customers who have a revolving balance are not as much at risk of closing their account.


THANK YOU
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