Analysis and Prediction of Credit Card Default.

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Introduction

When cardholders fail to pay their credit card bills on time, it leads to credit card defaults, posing financial risks to issuers (Altman, 2013). From the perspective of the cardholder, non-payment can result in severe repercussions including penalties, increased interest rates, deteriorating credit ratings, and possible legal proceedings by the credit issuer or collection agencies. On the other hand, credit issuers face substantial financial threats when defaults occur, as they lead to losses on the unpaid balances, thereby affecting their financial health. Given the global surge in credit card usage, it has become critical for financial institutions to comprehend the dynamics behind defaults and to enhance the accuracy of predictive models. These models, leveraging machine learning techniques like logistic regression, decision trees, random forests, and neural networks, are crucial in estimating the likelihood of default among individual cardholders.

What is Credit Card

A credit card, typically a slender, rectangular piece of plastic or metal provided by banks or financial entities, facilitates the borrowing of funds for purchasing goods and services from vendors that accept such card transactions. With a credit card, individuals can access a line of credit, allowing for transactions beyond immediate financial means.

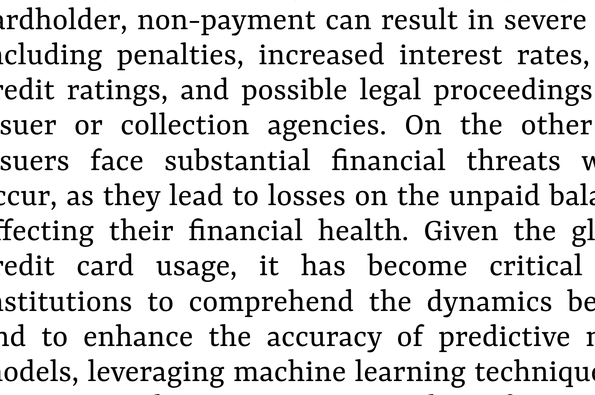


Image 1. Credit Card (Visa, 2024)

Types of Credit Card

- Rewards
- Store
- Secured

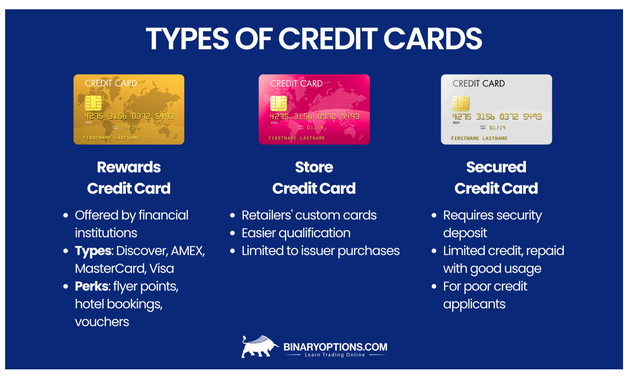


Image 2. Types of Credit Card (Percival, K., 2024)

Things To Consider Before Applying

- Annual Percentage Rate (APR): This is the average annual cost of using your card compared to what you spend on it over a whole year. It includes both interest payments and fees.
- Credit limits: Credit limits are the maximum amount of credit that card issuers will extend to you.
- Fees and charges: It's important to know the extra charges that will apply in different scenarios.
- Introductory offers – and what happens when they end: Thoroughly check the terms following the conclusion of any introductory promotions associated with your card.

How To Obtain Credit Card

Image 3. Credit Card Approval Requirement (Makeda, J., 2021)

Credit Card vs Debit Card

The following statistic illustrates the preferred methods of payment chosen by consumers for transactions:

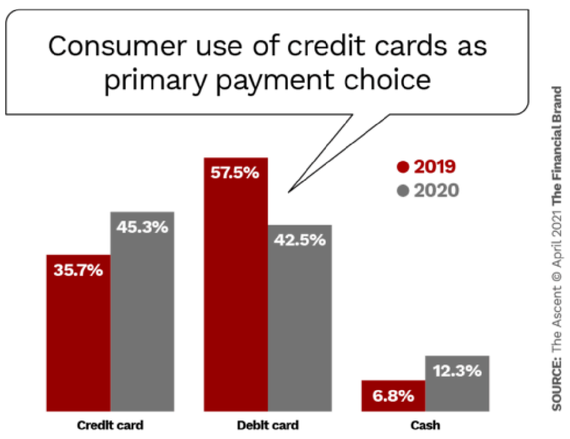


Image 4. Credit Card vs Debt Card (Bryan Yurcan, 2021)

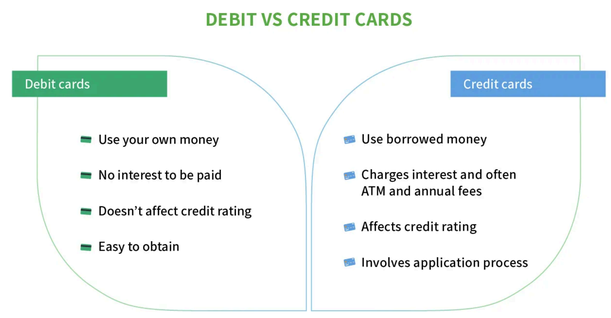


Image 5. Difference between Credit Card and Debt Card (Mozo, 2024)

Data Collection

The dataset used for this analysis was gotten from an independent researcher (Sandeep Bansode) on kaggle. This dataset contains 3000 rows and 25 columns.

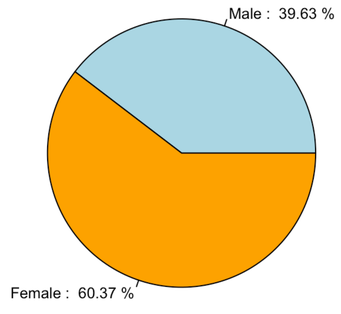
Machine Learning Algorithm

The emerging field of computational algorithms is designed to emulate human intelligence through the analysis of patterns and the utilization of data for decision-making (El Naqa, I., & Murphy, M.J., 2015).

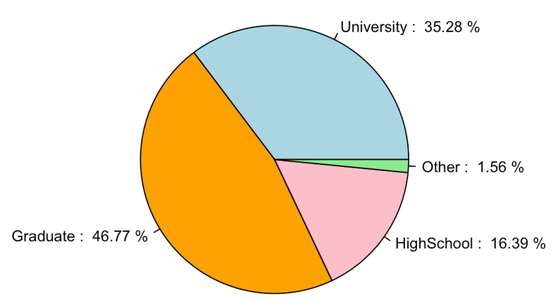
A decision tree represent a non-parametric supervised learning technique engaged for classification and regression function (IBM, 2024)

Random forests is a scheme designed to forecast by assembling a set of decision trees that develop within randomly selected subset of data space (Biau, G., 2012)

Pie Chart of Defaulter by Gender



Pie Chart of Defaulter by Education



Model Type	Model	Accuracy
Piecewise Linear	Decision Tree	0.8201111
Series Emsembling	Random Forest	0.8150000

Result and Conclusion

- There is a higher proportion of female defaulters compared to male defaulters.
- A significant proportion of defaulters are well-educated individuals, including those with university and graduate school backgrounds.
- According to the results of our prediction algorithm, the decision tree method demonstrates superior performance in identifying defaulters.

As demonstrated in the poster, leveraging advanced machine learning techniques provides a robust framework for predicting credit card defaults.

References

- Altman, E.I., 2013. *Predicting financial distress of companies: revisiting the Z-score and ZETA® models.* Handbook of research methods and applications in empirical finance. Edward Elgar Publishing. pp. 428-456.
- Biau, G., 2012. *Analysis of a random forests model.* The Journal of Machine Learning Research, 13(1), pp. 1063-1095.
- Bryan Y., 2021. *Millennials and Credit Cards: Separating Fact from Myth.* https://thefinancialbrand.com/news/millennial-banking/millennials-credit-cards-rewards-points-myth-113048/
- El Naqa, I. and Murphy, M.J., 2015. *What is machine learning?* Springer International Publishing, pp. 3-11.
- IBM, 2024. *What is Decision Tree.* https://www.ibm.com/topics/decision-trees
- Makeda, J., 2021. *Credit card requirements: what you need before you apply.* https://www.creditrepair.com/blog/credit-101/card-requirements/
- Mozo, 2024. *Visa debit card comparisons on Mozo.* https://mozo.com.au/debit-cards/visa
- Percival, K., 2024. *What is a Credit Card? – Definition and Examples.* https://www.binaryoptions.com/glossary/credit-card/
- Visa, 2024. *Visa credit card.* https://www.visa.com.my/pay-with-visa/find-a-card/credit-cards.html