

A stylized illustration in the background features various financial symbols: a house, a person with a smartphone, a large smartphone displaying a pie chart, a shopping cart, a car, a credit card, a stack of coins, and a person interacting with a large screen. The entire scene is set against a dark blue background with a vertical line down the center.

Personal Financial Literacy Optimizer

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Motivation

- Credit Score: score used by creditors to determine credit behavior
- Factors that generally affect credit score
 - Payment History
 - Amount Owed / Credit Utilization Ratio
- Some aspects of our lives can indirectly affect credit score
 - Lifestyle Choices
- Hard Inquiries will lower one's credit scores



CREDIT SCORE



Data Overview

Credit Score Classification:

<https://www.kaggle.com/datasets/paarisrohan/credit-score-classification?select=train.csv>

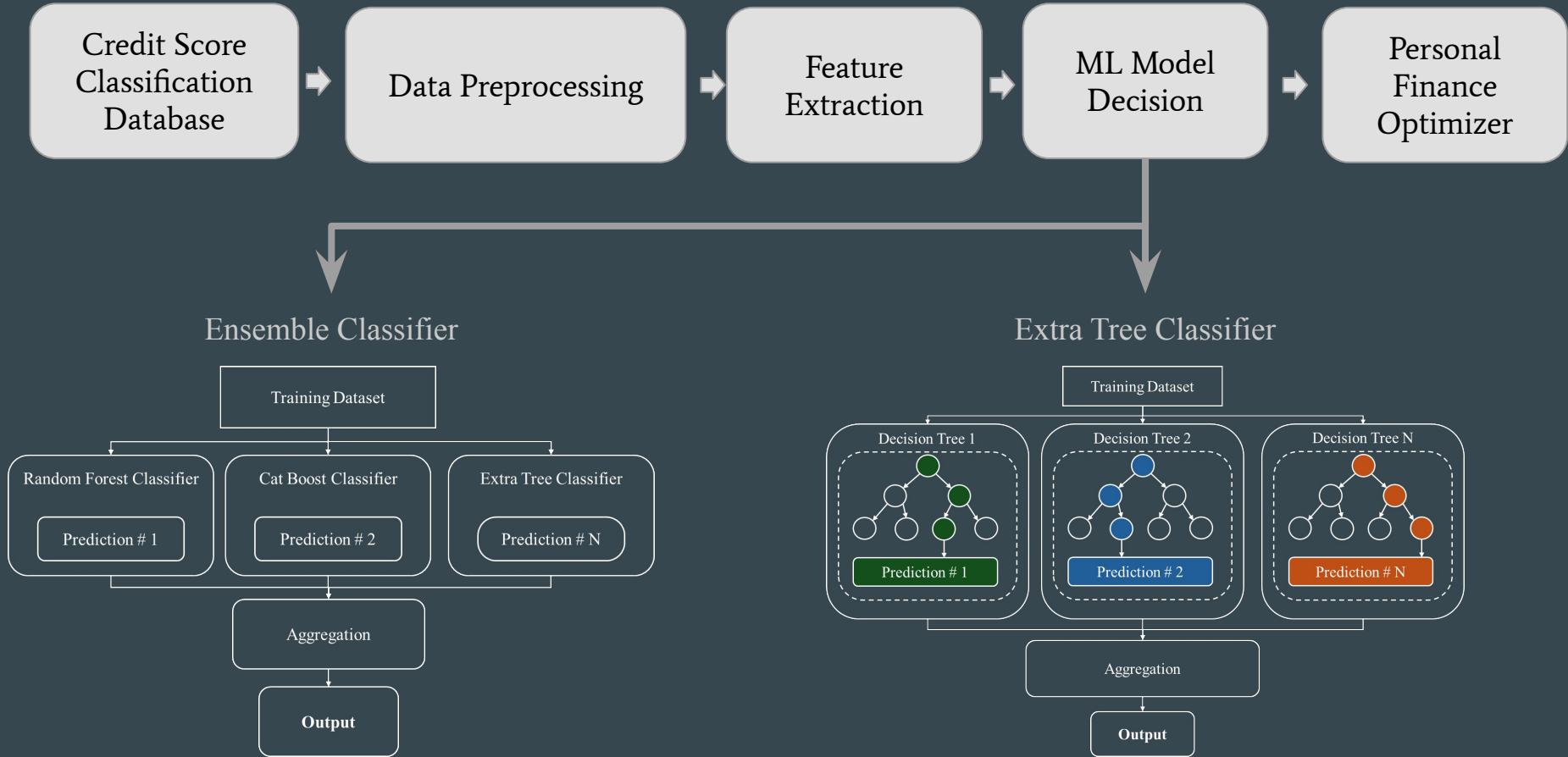
- 100,000 data points
- 28 features
- Basic bank details and credit-related information



Dataset Features:

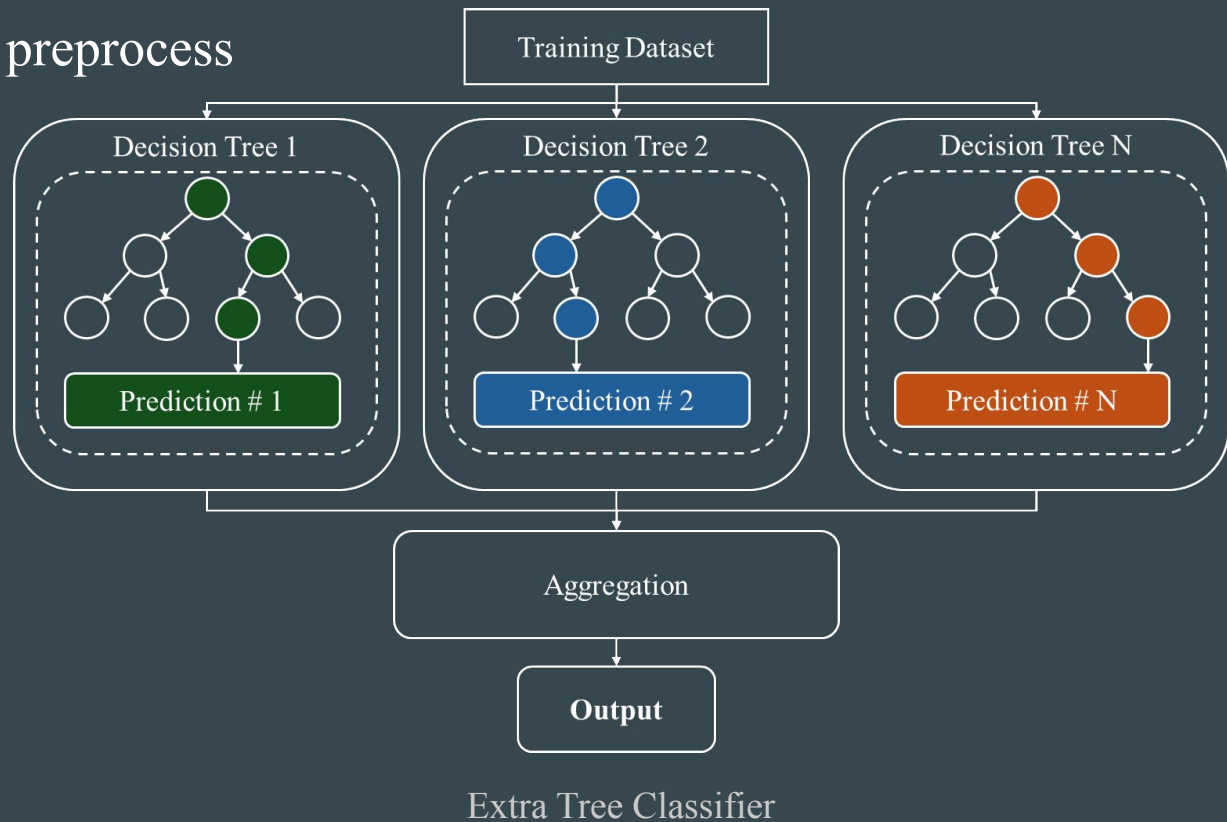
- Name, Age, Occupation
- Annual Income, Monthly In-Hand Salary
- Number of Bank Accounts, Credit Mix
- Outstanding Debt, Credit Utilization Ratio
- Credit History Age, Payment of Min Amount
- EMI per Month, Amount Invested Monthly
- Payment Behavior, Monthly Balance
- Credit Score

The Project Pipeline



Methodology

- Data cleaning and data preprocess
- Modeling
- Reverse optimization



What Can't People Change?

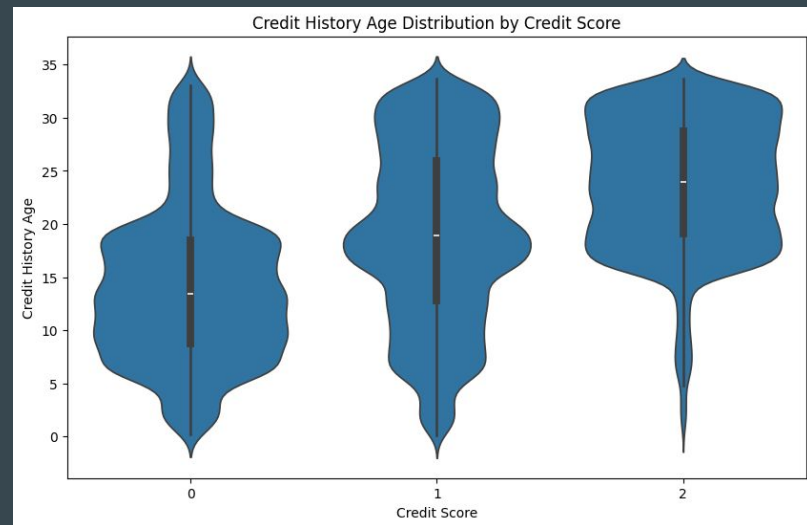
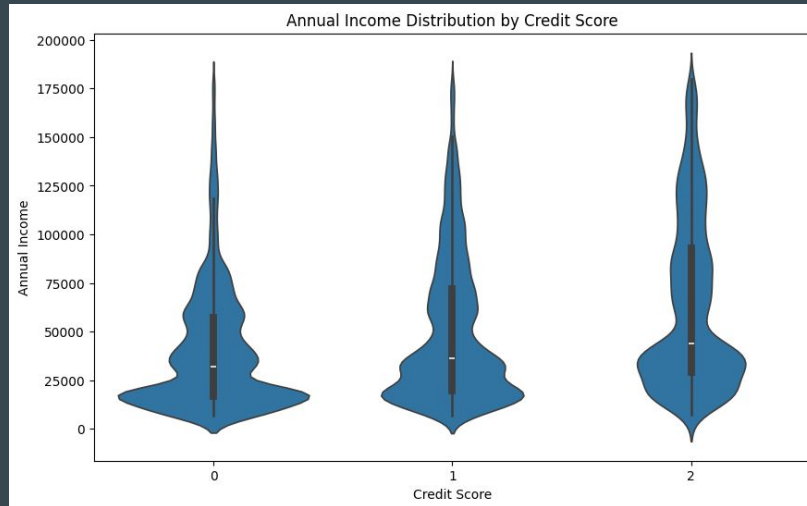
- Name, Age, Occupation
- Annual/Monthly Income

Data Analysis (1): Feature Selection

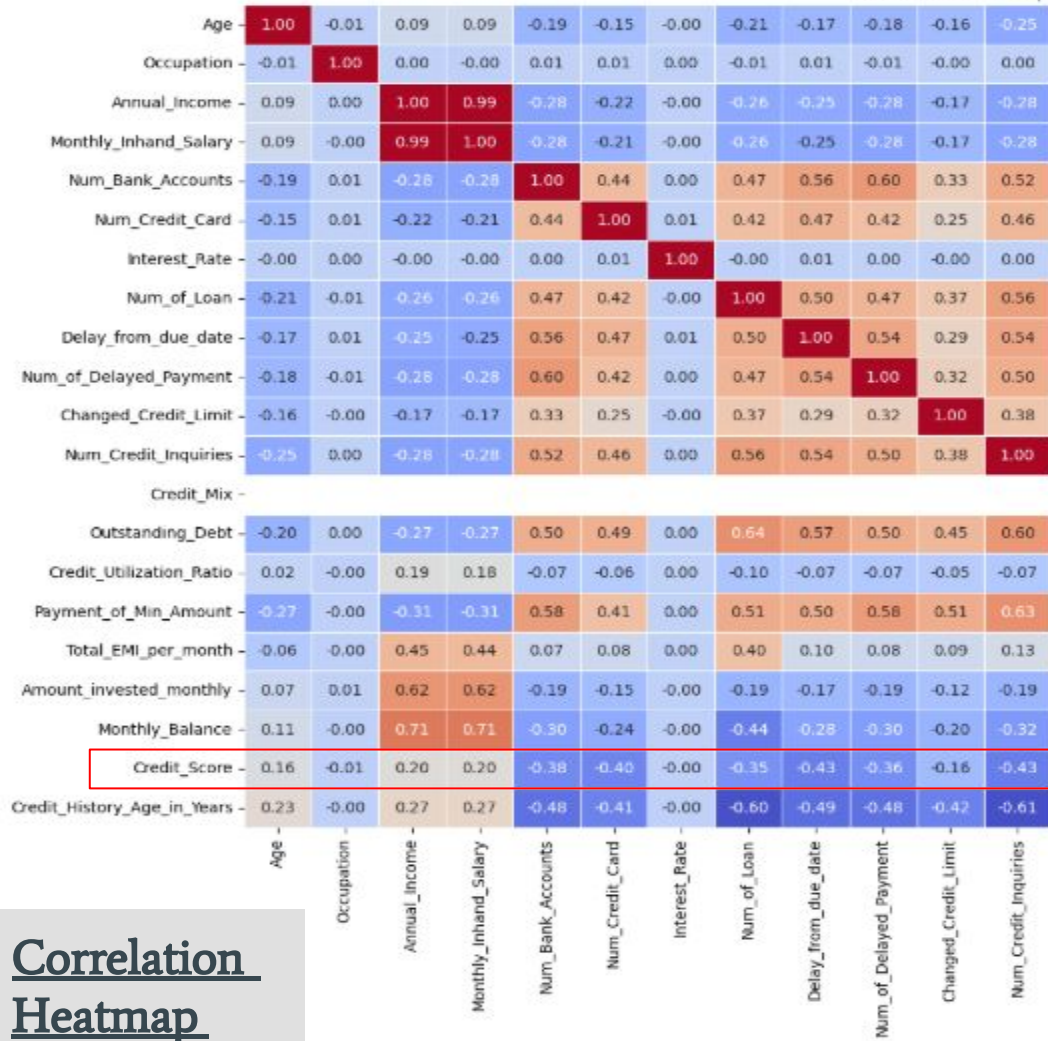
What are the some of the most important features?

- Payment of Min Amount
- Number of Credit Card Inquiries
- Delay from Due Date
- Number of Credit Cards

Note: Some features like Annual Income cannot be easily changed



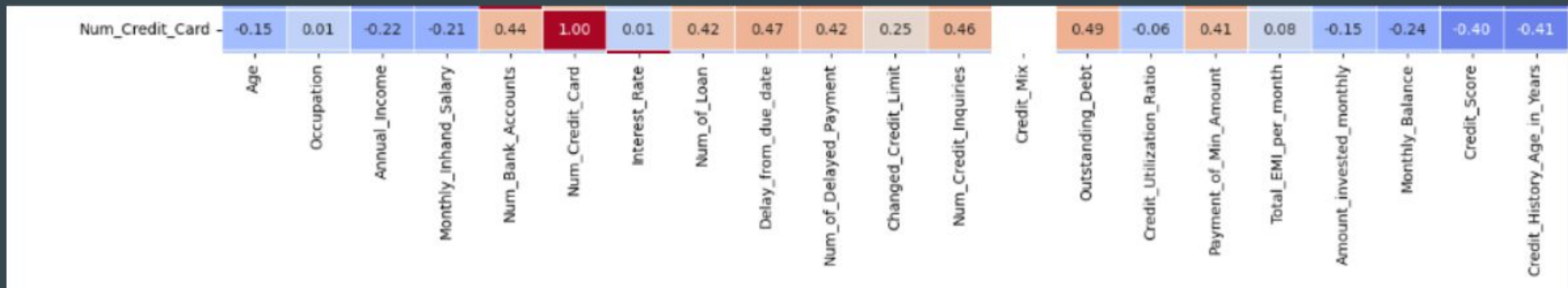
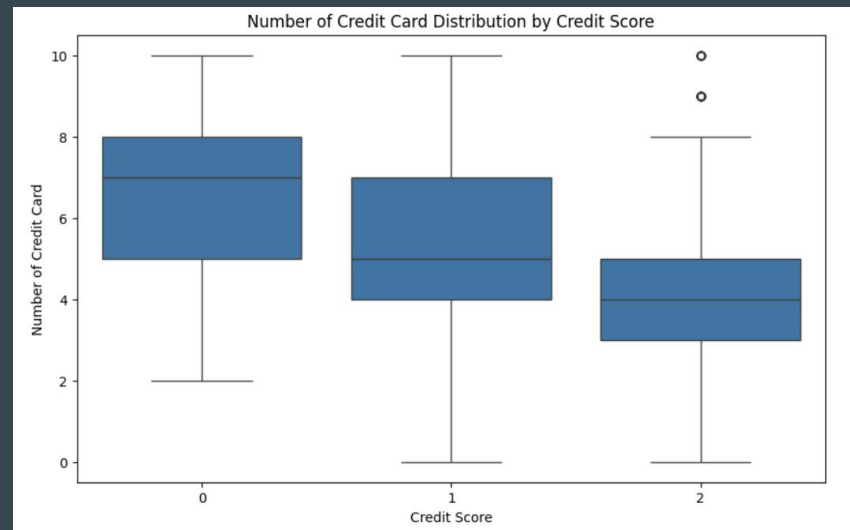
Correlation heatmap



**Correlation
Heatmap**

How do number of credit cards indicate financial behavior?

- Bad Behaviors have positive correlation
- People with more credit cards tend to have bad credit scores



Data Analysis (4): Choosing the Best Model

How accurate is the best model?

ExtraTreeClassifier performed the best


Accuracy and F1 score of over 85%



| | Model | Accuracy | AUC | Recall | Prec. | F1 | Kappa | MCC | TT (Sec) |
|----|-------------------------------|----------|--------|--------|--------|--------|--------|--------|----------|
| et | <i>Extra Trees Classifier</i> | 0.8527 | 0.9504 | 0.8527 | 0.8516 | 0.8514 | 0.7790 | 0.7797 | 8.2790 |

The Financial Optimizer Website for Users

| | |
|----------------------------|---------|
| Outstanding Debt | 3598.39 |
| Credit Utilization Ratio | 0.25 |
| Credit History Age (years) | 5 |
| Payment of Minimum Amount | 1 |
| Total EMI per Month | 64.5 |
| Amount Invested Monthly | 195.11 |
| Payment Behaviour | Low |
| Spent Amount: | Small |
| Monthly Balance | 100000 |
| Submit | |




Results

Credit Level: Poor

Some Suggestions:

- We suggest that you change Num Bank Accounts from 6 to 2. This change aligns better with your financial goals. - [More details](#)
- We suggest that you change Num Credit Card from 8 to 1. This change aligns better with your financial goals. - [More details](#)
- We suggest that you change Delay from due date from 24.00 to 0.95 to optimize your financial health. If possible, keep Delay from due date within the range of (0.00, 30.00). - [More details](#)
- We suggest that you change Num Credit Inquiries from 10 to 3. This change aligns better with your financial goals. - [More details](#)
- We suggest that you change Outstanding Debt from 3598.39 to 2515.88 to optimize your financial health. If possible, keep Outstanding Debt within the range of (359.84, 1547.31). - [More details](#)
- You can find more data about Age here: - [More details](#)
- You can find more data about Occupation here: - [More details](#)
- You can find more data about Annual Income here: - [More details](#)
- You can find more data about Monthly Inhand Salary here: - [More details](#)
- You can find more data about Interest Rate here: - [More details](#)
- You can find more data about Num of Loan here: - [More details](#)
- You can find more data about Type of Loan here: - [More details](#)
- You can find more data about Num of Delayed Payment here: - [More details](#)
- You can find more data about Changed Credit Limit here: - [More details](#)
- You can find more data about Credit Mix here: - [More details](#)
- You can find more data about Credit Utilization Ratio here: - [More details](#)
- You can find more data about Credit History Age here: - [More details](#)
- You can find more data about Payment of Min Amount here: - [More details](#)
- You can find more data about Total EMI per month here: - [More details](#)
- You can find more data about Amount Invested monthly here: - [More details](#)
- You can find more data about Payment Behaviour here: - [More details](#)
- You can find more data about Monthly Balance here: - [More details](#)

[Check another case](#)



Conclusions

- Many different features can negatively impact or positively affect one's credit score despite not having a direct relationship.
 - For example, number of credit cards does not always negatively impact credit score if one pays off all their credit card debt in time
 - Encourages bad practices (Increased credit inquiries, outstanding debt)
- Our goal is to use the data analysis on the features and give positive feedback on how to change different features to improve credit score
 - Decreasing Number of Credit Cards, Decreasing Outstanding Debt

Thank You!
Any Questions?