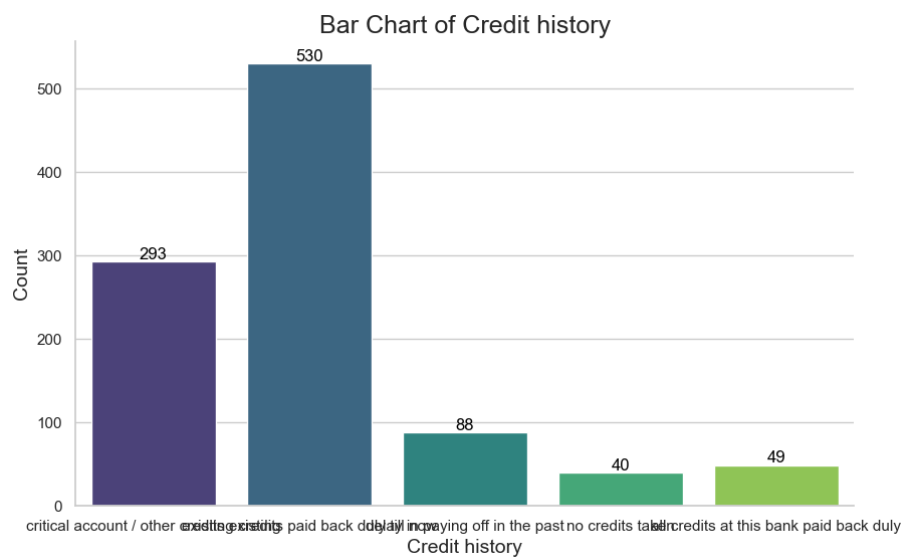


Bias Detection Report

The dataset analyzed is the Statlog dataset, which contains information about credit history. The features examined are the CreditHistory of individuals.



The type of bias detected is distribution bias, and the relevant feature is CreditHistory.

The tools used for detection and analysis are the categorical_distribution_shannon_balance, categorical_distribution_max_min_ratio, categorical_distribution_entropy, categorical_distribution_gini, and categorical_distribution_relative_risk tools.

The values obtained are as follows:

- Balance: 0.7372635312349725
- Shannon Entropy: 1.7118729065103488
- Max/Min Ratio: 13.25
- Entropy: 1.7118729065103488

- Normalized Entropy: 0.7372635312349725
- Corrected Gini Index: 0.6226543640071239
- Adjusted Gini Index: 0.7783179550089049
- Relative Risks: {'existing credits paid back duly till now': 2.65, 'critical account / other credits existing': 1.4649999999999999, 'delay in paying off in the past': 0.43999999999999995, 'all credits at this bank paid back duly': 0.245, 'no credits taken': 0.19999999999999998}
- Normalized Bias Score: 13.25

The extent of the bias and related findings based on the detection results are as follows:

- The balance of the CreditHistory distribution is 0.7372635312349725, which indicates a moderate level of balance.
- The Shannon entropy of the CreditHistory distribution is 1.7118729065103488, which indicates a moderate level of uncertainty.
- The max/min ratio of the CreditHistory distribution is 13.25, which indicates a significant difference between the most and least frequent categories.
- The entropy of the CreditHistory distribution is 1.7118729065103488, which indicates a moderate level of uncertainty.
- The normalized entropy of the CreditHistory distribution is 0.7372635312349725, which indicates a moderate level of uncertainty.
- The corrected Gini index of the CreditHistory distribution is 0.6226543640071239, which indicates a moderate level of inequality.
- The adjusted Gini index of the CreditHistory distribution is 0.7783179550089049, which indicates a

moderate level of inequality.

- The relative risks of the CreditHistory distribution are {'existing credits paid back duly till now': 2.65, 'critical account / other credits existing': 1.4649999999999999, 'delay in paying off in the past': 0.43999999999999995, 'all credits at this bank paid back duly': 0.245, 'no credits taken': 0.19999999999999998}, which indicates that the 'existing credits paid back duly till now' category has the highest relative risk.
- The normalized bias score of the CreditHistory distribution is 13.25, which indicates a significant level of bias.

Based on these results, it appears that the CreditHistory feature in the Statlog dataset exhibits a moderate level of distribution bias. The balance and entropy of the distribution are moderate, while the max/min ratio and relative risks indicate a significant difference between the most and least frequent categories. The corrected and adjusted Gini indices also indicate a moderate level of inequality.

The overall bias level is Level 4, which indicates a significant level of bias.

The following charts and visualizations support the analysis and conclusions:

- A bar chart of the CreditHistory distribution, which shows the frequency of each category.
- A summary plot of the SHAP values for the CreditHistory feature, which shows the contribution of each category to the predicted outcome.

In conclusion, the CreditHistory feature in the Statlog dataset exhibits a significant level of distribution bias, with a moderate level of balance and entropy, and a significant difference between the most and least frequent categories. The relative risks and normalized bias score also indicate a significant level of bias. These findings suggest that the CreditHistory feature may be biased towards certain categories, which could impact the accuracy of models trained on this data.

Recommendations for the user:

- Consider using techniques such as data preprocessing, feature engineering, or bias mitigation to reduce the bias in the CreditHistory feature.
- Use the SHAP values and summary plot to understand the contribution of each category to the predicted outcome and identify potential biases.
- Consider using alternative features or datasets that may be less biased.