

Fairness Analysis Report Credit Risk Modeling System

Objective

This report evaluates the credit risk model for potential bias across demographic groups and assesses compliance with fair lending principles.

FAIRNESS DEFINITIONS:

Protected Attribute:

Sex (Male / Female)

Fairness Metrics Used:

- Disparate Impact – compares approval rates across groups
- Equal Opportunity – compares true positive rates across groups

FAIRNESS RESULTS

Disparate Impact

Approval rates across demographic groups were found to be comparable. The calculated disparate impact ratio was close to 1, indicating no significant approval bias.

Equal Opportunity

True positive rates were similar across demographic groups, suggesting that qualified applicants are treated fairly regardless of gender.

INTERPRETABILITY & ADVERSE ACTIONS

Model Interpretability

SHAP-style feature contribution analysis was used to understand model decisions at both global and individual levels. Key risk drivers include credit amount, loan duration, and employment stability.

Adverse Action Reason Codes

For declined applications, the following compliant reasons are generated:

- High credit amount relative to applicant profile
- Long loan duration increasing repayment risk
- Limited income or employment stability

FINAL CONCLUSION

The fairness analysis indicates that the model complies with fair lending principles. Interpretability mechanisms ensure transparency, accountability, and regulatory readiness.