Credit Default Prediction Using XAI (SHAP + LIME)

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This document compiles all analysis, visualizations, and XAI interpretations performed so far.

1. Introduction

This project focuses on predicting credit default using a machine learning model and interpreting predictions using Explainable AI (XAI) methods such as SHAP and LIME. The goal is to create transparent and interpretable models that support fair and reliable lending decisions.

2. Model Performance Metrics

The following model metrics were obtained during evaluation: • Accuracy: 0.89 • Precision: 0.87 • Recall: 0.84 • F1-score: 0.85 • AUC-ROC: 0.92 These metrics indicate a stable and well-performing classifier.

3. SHAP Global Feature Importance

The SHAP Summary Bar Plot highlights the average impact of each feature on the model predictions.

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4. SHAP Dependence Plot – Credit Score

This plot visualizes how credit score values influence default probability across customers.

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5. LIME Explanation – High-Risk Customer

This LIME explanation breaks down the factors contributing to a high-probability default prediction. Orange bars increase default risk, and blue bars reduce it.

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6. LIME Explanation – Low-Risk Customer

This visualization highlights the protective features leading to a low default prediction. High income, strong credit score, and low DTI are influential.

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7. Conclusion

Using SHAP and LIME, we achieved both global and local interpretability for the credit risk model. This ensures transparency, fairness, and regulatory compliance, helping financial institutions make responsible lending decisions.