A novel regularization method PB - Positive Beta

Abstract

This study addresses the challenge of credit risk assessment by exploring credit scoring techniques and introducing an innovative regularization method. While AI and machine learning (ML) models, such as XGBoost, often achieve higher predictive performance, their lack of interpretability (black-box nature) poses a significant issue in the banking industry, where regulatory expectations demand fully transparent and explainable models. Traditional scorecards, on the other hand, offer complete interpretability but may lack predictive power.

To bridge this gap, we introduce the Positive Beta (PB) regularization method, which combines the interpretability of classical scorecards with the strong predictive power of ML. Unlike traditional regularization techniques that primarily focus on shrinking coefficients in large datasets, the PB method explicitly enforces positive beta values. This approach helps mitigate multicollinearity issues, improves score distribution, and reduces concentration risk—key factors in practical credit scoring—ultimately leading to more reliable decision-making.

The study evaluates the PB method against classical logistic regression, demonstrating its potential as an alternative that balances accuracy with full interpretability. By addressing both regulatory compliance and predictive accuracy, the PB method enables financial institutions to build robust, compliant, and high-performing credit scoring systems.

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