

From Credit Invisible to Credit Visible: Interpretable Scoring Models with Alternative Data in India

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Abstract: Access to formal credit remains a substantial barrier to financial inclusion in India, particularly for individuals lacking a traditional credit history. Existing credit evaluation systems, such as those employed by CIBIL, predominantly rely on historical borrowing and repayment patterns, thereby excluding millions of unbanked and underbanked individuals. This study introduces a novel and explainable machine learning (ML) framework for credit scoring that leverages alternative data sources—including mobile recharge behaviour, utility payment records, and patterns in UPI transactions—that are highly representative of the Indian financial environment.

The proposed framework integrates interpretable algorithms such as Decision Trees and Logistic Regression and evaluates their performance against more complex models like Random Forest and XGBoost. We further introduce a tailored interpretability metric—Alternative Score Fit (ASF)—designed to assess both transparency and fairness alongside conventional evaluation metrics. Experiments conducted on a synthetically generated dataset, modelled to reflect realistic Indian financial behaviors, reveal that interpretable models can achieve performance metrics comparable to opaque “black-box” systems while offering significant ethical and regulatory advantages.

This paper presents an extensive review of existing literature, justifies the selected modeling approaches, and details the system’s design, implementation, and empirical findings. Ultimately, we aim to contribute a scalable, fair, and context-sensitive solution that expands credit access to underserved Indian populations

Keywords: Credit Scoring, Financial Inclusion, Explainable Machine Learning, Decision Trees, India, Alternative Data, Transparency, UPI, Utility Payments

