AI-Based Risk Scoring for Credit Card Transaction to Prevent Fraud

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Abstract

The annual cost of credit card fraud is billions of dollars. This study provides an AI-based risk assessment method that assigns a risk rating to transactions to identify potential fraud. Using a publicly available European card transaction dataset [10], the machine learning system achieves approximately 99.9% accuracy, 80% precision, 90% recall, F1-score ≈0.85, and AUC-ROC ≈0.98 despite a high class imbalance (fraudulent instances <0.2%). By accurately detecting most fraudulent transactions with few false alarms, the risk score system enhances financial security and transparency. Future studies will examine the model's interpretability and adaptability to evolving fraud trends.

Keywords

Credit Card Fraud, Risk Scoring, Machine Learning, Imbalanced Classification, XGBoost, SMOTE.