

Chapter 4

SMOTE vs. ADASYN: An Analysis of Data Balancing Techniques to Enhance Machine Learning- Based Bank Loans Standard Hazard Forecasts

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ABSTRACT

Significant technical progress has led to an expansion in human requirements. As a result, the banking sector has seen a rise in the quantity of loan approval requests. When choosing a candidate for loan approval, a number of factors are taken into account to determine the loan's status. Evaluating loan applications and reducing the risks associated with potential borrower defaults provide significant problems for banks. The need for banks to carefully evaluate each borrower's loan eligibility makes this procedure very onerous. The dataset balancing will be done first. Given the importance of the job, the current research used two oversampling techniques—SMOTE and ADASYN—for comparative analysis and balanced the datasets as a first step. The goal of the study was to use algorithms like support vector machines (SVM) and logistic regression to analyse loan approval data and determine the best balancing approach.

1. OVERVIEW

In an age of unparalleled technological advancement, the banking sector is undergoing a radical metamorphosis to cater to the wide range of demands from its customer base. Requirements for housing, education, and business are driving an increase in loan approval requests; thus, advanced credit risk assessment techniques are desperately needed. Due to the inadequacies of traditional human underwriting techniques, financial institutions are turning to machine learning (ML) algorithms to improve loan approval accuracy and speed. This study examines the use of machine learning (ML) in the banking industry, with a particular emphasis on comparing and assessing the efficacy of support vector machines (SVM) and logistic regression in loan approval procedures. Since ML approaches have greatly improved the accuracy of loan eligibility predictions, which were previously relied on human evaluation, they have become more important. A significant issue is the class imbalance in datasets, where there are considerably fewer loan defaults than approvals, prediction algorithms may be skewed, which might result in discriminatory outcomes.

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