

## **ABSTRACT**

*Creditworthiness assessment is a crucial process for savings and loan cooperatives and sharia financing institutions to ensure targeted credit allocation and minimize the risk of non-performing loans that can disrupt the financial stability of the institution. The traditional process, which relies heavily on observation and subjective judgment, often leads to errors in identifying high-risk prospective members. This study develops a machine learning-based credit assessment system using the ensemble learning Voting method that combines Random Forest and XGBoost algorithms, further optimized with the SMOTE technique to address data imbalance. Unlike other studies that often use open-source datasets, this research utilizes eligibility and collectability data that are more relevant to the conditions of cooperatives in Indonesia, providing a significant advantage in model accuracy. The results show that the Voting model with SMOTE significantly improves performance, achieving an accuracy of 83.14%, precision of 83.03%, recall of 83.14%, and an f1-score of 83.04%, outperforming Random Forest and XGBoost without SMOTE, which achieved accuracies of 81.82% and 82.18%, respectively. The system is implemented as a web-based application that supports the credit committee in making more objective and accurate decisions without completely replacing traditional assessments. This system is expected to reduce the risk of non-performing loans, increase member trust, and strengthen the financial stability of cooperatives, thus supporting the achievement of the cooperative's socio-economic goals in empowering low-income households.*

**Keywords:** *credit scoring, ensemble learning, random forest, XGBoost*