

ABSTRACT

The loan approval process is a critical component in financial systems that demands high levels of accuracy and efficiency. However, many small to medium-sized financial institutions still rely on manual procedures that are prone to bias and inefficiency. This project aims to develop a loan approval prediction system using Machine Learning, specifically the Random Forest Classifier algorithm, and to implement the model into a web-based application using the Flask framework. The training dataset was processed through comprehensive stages, including data cleaning, encoding, data splitting (70:30), normalization, model training, and hyperparameter optimization using GridSearchCV. The final model achieved an accuracy of 78.91%, a recall of 0.98, and an F1-score of 0.86 for the approved loan class. Evaluation was conducted using a confusion matrix, classification report, and manual user testing through form-based input. The results show that the system is capable of delivering accurate and stable predictions in real-time. The website was developed using HTML, CSS, and Flask, featuring a simple interface and input validation to ensure data quality. Overall, the system successfully meets the objectives of this Final Project and has potential to be applied in financial institutions as an initial solution for automating loan eligibility assessment.

Keywords: Machine Learning, Random Forest, Loan Prediction, Flask, Web Application, Automated Credit Evaluation