**Bank Loan Status Prediction using Machine Learning**

**Abstract:**

Loan approval is a crucial process for financial institutions, requiring a thorough assessment of applicants' financial history, creditworthiness, and risk factors. This project presents a machine learning-based loan approval prediction system, designed to automate and improve the accuracy of loan approval decisions.

The system utilizes supervised learning algorithms to classify loan applications as approved or rejected based on various parameters such as applicant income, credit score, loan amount, employment status, debt-to-income ratio, and past loan history. The dataset undergoes data preprocessing techniques such as handling missing values, feature scaling, and categorical encoding to ensure optimal model performance.

Several classification algorithms, including Logistic Regression, Decision Trees, Random Forest, Support Vector Machines (SVM), and Gradient Boosting models (XGBoost, LightGBM), are implemented and evaluated using performance metrics such as accuracy, precision, recall, F1-score, and ROC-AUC score.

The final model is deployed through a user-friendly web-based interface or API, enabling financial institutions to automate loan approval processes, minimize manual errors, and enhance decision-making efficiency.