

Financial lending outcome predictor

Business Problem Description

The objective of this project is to build a predictive model that can determine whether a loan application should be approved based on personal, demographic, occupational, and financial indicators of the applicant. This model aids financial institutions in minimizing risk and improving decision-making in loan processing.

Methodology

Data Loading:

- Loading the dataset(financial_lending.csv) using read_csv() method

Data Preprocessing:

- Missing Value Imputation: Mode for categorical, Median for numerical (except 'term_duration_months' - Mode)

- Outlier Detection: IQR method for numerical columns

- Outlier Handling and Feature Scaling: Robust Scaler applied to numerical columns

- Handling Categorical Variables: One-hot encoding, Label encoding

(Label Encoding is used for binary categorical features, while One-Hot Encoding is preferred for categorical features with more than two classes (multiclass features))

Visualization:

- The data was visualized in different formats to make it easier to interpret using Matplotlib and seaborn.
- Also visualized the ROC-AUC curve to evaluate the model's prediction performance.

Feature Engineering:

- Created the features named total_income and income_loan_ratio using existing features like primary_income and secondary_income

Data Splitting:

- The dataset was split into training and testing sets using train_test_split

Model Building:

- Logistic Regression
- Random Forest Classifier
- XGBoost Classifier

Hyper parameter Tuning:

- In this step, I tuned the hyperparameters using GridSearchCV to gain better control over the model and enhance its performance.

Model Evaluation:

- Accuracy, Precision, Recall, F1-Score, ROC-AUC
- Confusion Matrix, Feature Importance, ROC Curves
- Also made the classification report to evaluate overall model performance.
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Insights & Recommendations

Regular model updates with fresh data are recommended to ensure continued accuracy and relevance.

Income-related variables play a significant role in determining the likelihood of loan approval.

Applicants with a strong credit history and stable employment are more likely to receive loan approval.

These represent my main findings regarding this problem.