

Report on Loan Repayment Prediction System

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Introduction:

The Loan Repayment Prediction System is a comprehensive solution designed to predict loan repayment probabilities using advanced machine learning techniques. The project was undertaken as part of the internship project at Virtual Galaxy Infotech and further developed to include deployment-ready features. The goal of this system is to assist financial institutions in evaluating loan applicants' likelihood of default, thereby improving risk management and decision-making processes.

Objectives:

- To build a robust predictive model for assessing the likelihood of loan repayment.
- To create an interactive and user-friendly website interface for showcasing the system.

Project Scope:

The Loan Repayment Prediction System focuses on analyzing 20 distinct features extracted from the dataset, such as income, age, employment status, loan amount, and payment history. These features serve as inputs to machine learning models to derive actionable insights.

Methodology:

1. Data Collection and Cleaning:

- Acquired data from Kaggle's "Home Credit Default Risk" competition.
- Pre processed the data by handling missing values, outliers, and categorical encoding.

2. Exploratory Data Analysis (EDA):

- Analyzed feature distributions and relationships.
- Visualized feature importance for model refinement.

3. Model Development:

- Compared various machine learning algorithms including Random Forest, Gradient Boosting, Logistic Regression, and Neural Networks.
- Selected Gradient Boosting as the final model due to its high accuracy and reliability.

4. Model Evaluation:

- Assessed model performance using metrics like AUC-ROC, precision, recall, and F1-score.
- Achieved an AUC-ROC score of [Insert Score], indicating robust performance.

5. Website Development:

- Created a responsive website using HTML, CSS, and JavaScript.
- The website includes an input form for loan details, prediction results, and visual insights.

Features and Benefits:

- **Accurate Predictions:** The system leverages advanced machine learning to deliver high accuracy in repayment predictions.
- **User-Friendly Interface:** A simple and intuitive web design ensures ease of use.
- **Insights-Driven:** Provides actionable insights to improve decision-making processes.

Challenges and Solutions:

1. **Handling Imbalanced Data:** Addressed using techniques like SMOTE and class weighting.
2. **Feature Selection:** Conducted rigorous feature importance analysis to include only relevant predictors.
3. **Deployment Issues:** Resolved compatibility and configuration challenges during Google Cloud deployment.

Future Scope:

- Integration of more features to enhance model accuracy.
- Addition of multilingual support for the website.
- Development of a mobile application for increased accessibility.
- Continuous improvement using real-world feedback and new data.

Conclusion:

The Loan Repayment Prediction System represents a significant step toward automating and optimizing financial risk assessment. By leveraging machine learning and cloud computing, this system offers a practical and scalable solution to predict loan repayment probabilities. The successful implementation of this project underscores its potential to add value to the financial sector.

Appendices:

1.Website_ Screenshots:

Home Loan Prediction

Personal Information

Age (in Years): 30

The number of years the customer has been employed: 12

The number of years since the customer registered with the organization: 6

Income Type: Salaried

Education Level: High School

Gender: Male

Family Status: Single

The number of children: 2

Housing Type: Owned

Own Realty (Yes/No): Yes

Own Car (Yes/No): Yes

Loan Details

The credit amount requested by the customer: 2000000

The total annual income of the customer: 100000

The installment amount: 50000

The price of the goods the customer plans to purchase with the loan: 1000000

The average age of the property: 6

The number of times the customer requested a credit in the past year: 3

Credit risk score: Good

Condition of the property: Good

Asset's Average Age in years: 5

Predict

2. Code Repository Link:

[HOME-LAON-APPROVAL](#)