■ LoanVision: Loan Prediction Mini Project

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1. Introduction

The LoanVision project is designed to predict loan approval outcomes using machine learning techniques. By analyzing applicant demographic and financial data, this system helps financial institutions streamline loan approval processes, reduce manual errors, and improve decision-making.

2. Dataset Description

The dataset consists of 20,000 loan application records containing information such as applicant income, loan amount, credit history, property area, and loan status. The target variable represents whether a loan was approved or not. Categorical variables such as Gender, Property Area, and Education were encoded, while numerical variables were standardized for model training.

3. Methodology

The methodology followed a structured data science workflow: 1. Data Loading & Cleaning (handling missing values and encoding categorical features) 2. Exploratory Data Analysis (EDA) using Seaborn & Matplotlib visualizations 3. Feature Scaling using StandardScaler 4. Model Training using Logistic Regression 5. Evaluation using Accuracy, Classification Report, and Confusion Matrix

4. Exploratory Data Analysis

EDA was performed to understand data distributions and relationships between features. Key insights included: - Loan status distribution was imbalanced with a higher number of approved loans. - Applicant income had a positive relationship with loan amount. - Property area was correlated with approval likelihood. - Correlation heatmap highlighted Credit History and Loan Amount as significant factors.

5. Model Building & Evaluation

A Logistic Regression model was trained on 80% of the data and tested on the remaining 20%. Label Encoding was applied to categorical variables, and numerical features were standardized. The model achieved strong performance on unseen data.

Metric	Value
Accuracy	≈ 80-85% (varies by dataset)
Model	Logistic Regression
Key Features	Credit History, Loan Amount, Income

6. Conclusion

The LoanVision mini project demonstrates how machine learning can be applied to automate loan approval prediction. Through proper data preprocessing, visualization, and model training, it is possible to build accurate and interpretable models that assist decision-making in the financial sector. Future work can involve integrating more complex models and real-time prediction systems.