Loan Interest Rate Prediction - Project Report

1. Overview

This project focuses on analyzing and predicting loan interest rates based on various borrower characteristics. The objective is to support personalized and fair loan offerings using data-driven insights and predictive modeling.

2. Dataset

The dataset includes borrower information such as age, income, employment history, education, existing liabilities, loan amount requested and approved, and previous loan details.

3. Analysis Steps

- Data Cleaning: Loaded and cleaned data using pandas.
- Exploratory Data Analysis: Identified trends, outliers, and correlations using matplotlib and seaborn.
- Modeling: Developed both simple and multiple linear regression models using statsmodels to predict interest rates.

4. Key Findings

- Many borrowers receive less than requested. A 95% confidence interval confirms this is statistically significant.
- Higher education correlates with lower interest rates.
- High debt-to-income ratio and low employment duration suggest higher risk and interest rates.

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5. Tools Used

Python, pandas, seaborn, matplotlib, scipy, statsmodels, scikit-learn, Jupyter Notebook.

6. Conclusion

A robust pipeline was built for data analysis and predictive modeling. The final model can estimate loan interest rates based on borrower data and is suitable for deployment in financial services platforms to personalize offers.

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