MAJOR PROJECT–3

MODEL ACCURACY IMPROVEMENT USING OPTIMIZATION TECHNIQUES

1. INTRODUCTION

In predictive modeling, building a model is not the final step. Improving the accuracy of an existing model is equally important to obtain better and more reliable results. Small improvements in accuracy can lead to better decision-making, especially in real-world applications such as finance and risk analysis.

This project focuses on improving the accuracy of a previously built classification model by applying feature engineering and parameter tuning techniques.

2. OBJECTIVE

The objectives of this project are:

- To evaluate the performance of a baseline model
- To improve model accuracy using optimization techniques
- To compare baseline and improved model performance

3. DATASET USED

- The same **Loan Approval Dataset** used in Project-2 was reused for this project. Using the same dataset allows a clear comparison between baseline and improved models.
- The target variable is **loan_status**, which represents whether a loan is approved or rejected.

4. BASELINE MODEL

- A Random Forest Classifier was selected as the baseline model. The dataset was preprocessed and split into training and testing sets. The baseline accuracy of the model was recorded and used as a reference for comparison.

5. ACCURACY IMPROVEMENT METHODS

To improve model performance, the following steps were applied:

- **Feature Engineering:**
  A new feature called **total_assets** was created by combining different asset-related attributes. This provided additional useful information to the model.
- **Hyperparameter Tuning:**
  Model parameters were optimized using GridSearchCV to find the best parameter combination.

6. PERFORMANCE COMPARISON

- After applying feature engineering and hyperparameter tuning, the improved model achieved higher accuracy compared to the baseline model. This demonstrates that optimization techniques can significantly enhance model performance.

7. CONCLUSION

- This project successfully improved the accuracy of the loan approval prediction model. Feature engineering and parameter tuning played a key role in enhancing predictive performance. The improved model produced more accurate and reliable results than the baseline model.