**Loan Approval Prediction Project Documentation**

1. Project Title :

**Loan Approval Prediction**

2. Objective :

The objective of this project is to build a machine learning model that predicts loan approval status based on applicants' data. This prediction aims to assist financial institutions in making quick and data-driven decisions on loan applications.

3. Database Description :

Dataset: The dataset contains information on loan applicants, laon id,s, gender, maritial status, education,income, loan status etc.

Data Overview: The dataset has more than 10 row records and 10 columns features, including both numerical and categorical data.

Missing Values: there are so many missing values in age, loan id etc

4. Preprocessing :

Data Cleaning: Handling missing values, removing duplicates, and correcting data types.

Encoding: Encoding categorical features using appropriate techniques.

Normalization/Scaling: Scaling numerical features to improve model performance.

5. Model Selection :

The models considered for this task, such as **Logistic Regression, Random Forest, and Decision Tree**

6. Training and Validation :

Data Split: Training and testing split ratio.

Cross-validation: Cross-validation is used to assess model stability.

Hyperparameter Tuning: Parameters tuned to optimize the model performance.

7. Results :

Metrics:

LogisticRegression

Accuracy: 0.8617886178861789

RandomForest

Accuracy: 0.8455284552845529

Decision tree Classifier

Accuracy : 0.8536585365853658

Confusion Matrix: Overview of true positives, false positives, true negatives, and false negatives.

8. Conclusion :

Logistic Regression Confusion matrix is very similar to Decision Tree and Random Forest Classifier. In this analysis, we did extensive analysis of input data and were able to achieve Test Accuracy of 86 %.