**💼 Loan Prediction App.**

A machine learning model that predicts whether a loan application should be **Approved** or **Rejected** based on applicant details. This project simulates how financial institutions can use data science to streamline decision-making and reduce loan default risks.

**🔍 Problem Statement**

Financial institutions receive numerous loan applications every day. Manually reviewing each one is time-consuming and prone to human error. The goal is to build a reliable model that can assist in **predicting loan approval** based on historical data.

**📊 Dataset**

* Source: [Kaggle - Loan Prediction Dataset](https://www.kaggle.com/)
* Features include:
  + Applicant Income
  + Coapplicant Income
  + Loan Amount & Term
  + Credit History
  + Education, Gender, Marital Status
  + Property Area, Self-Employment status

**🛠 Features & Workflow**

* ✅ Data Cleaning (handling missing values)
* ✅ Exploratory Data Analysis (EDA)
* ✅ Feature Engineering
* ✅ One-hot Encoding & Scaling
* ✅ Model Training (Logistic Regression & Random Forest)
* ✅ Hyperparameter Tuning (GridSearchCV)
* ✅ Imbalanced Data Handling (SMOTE)
* ✅ Model Evaluation (Accuracy, Precision, Recall)
* ✅ Model & Scaler Serialization with Pickle

**📈 Model Performance**

* **Best Model**: Random Forest Classifier (with SMOTE)
* **Validation Accuracy**: ~81%
* **Balanced performance** across both approved and rejected classes

**🧠 Skills Demonstrated**

* Supervised Machine Learning
* Imbalanced Classification Techniques
* Feature Importance Interpretation
* Model Deployment Preparation

**📁 Files Included**

| **File** | **Description** |
| --- | --- |
| loan\_prediction.ipynb | Main Jupyter Notebook |
| loan\_model.pkl | Trained model file |
| scaler.pkl | Scaler used for preprocessing |
| feature\_columns.pkl | List of input features |
| train.csv | Original dataset |

**🤝 Connect With Me**

Feel free to reach out if you'd like to collaborate or ask questions about the project!