# Bankruptcy Prediction Dashboard — Detailed Manual

This application is a **web-based dashboard** that helps financial professionals evaluate the bankruptcy risk of companies based on their risk factors and make informed loan decisions.
It is built using Python, Streamlit, machine learning, and visualization libraries.

## What is the Purpose of this Dashboard?

- Many companies apply for loans. Banks need to decide whether the company is financially stable or likely to fail (go bankrupt).
- This dashboard uses a trained **machine learning model** that has learned patterns from past data to predict the probability of bankruptcy for a company.
- The user can:
    - Upload company data (for multiple companies at once) or enter manually (for a single company).
    - See predictions about bankruptcy likelihood.
    - Understand what factors contribute most to bankruptcy risk.
    - See visual summaries of uploaded data.

## Login to Access

### Why Login?

- To make the tool secure and allow only authorized personnel to access it.

### How to Login?

- When you open the dashboard, you will see a **login screen**.
- You need to enter a valid **username** and **password**.

### Available Users:

| Username | Password |
|---|---|
| admin | password123 |
| Banker1 | sbi123@ |

| | |
|---|---|
| Banker2 | icici456! |
| Manager | manager789 |

You can use any of the above combinations.

After a successful login, the full dashboard becomes visible.

# Structure of the Dashboard

Once logged in, the dashboard is divided into **five main tabs**, which you can switch between using the menu at the top.

## Tab 1: Overview

### What you see here:

- A description of what this dashboard does:
  - Predict bankruptcy risk.
  - Suggest actions based on risk.
  - Provide insights into the data.
- A short explanation of the decision rules:
  - If probability of bankruptcy ≥ 70%, the suggestion is to *Decline Loan*.
  - If probability is between 50% and 70%, the suggestion is to *Approve with Collateral*.
  - If probability < 50%, the suggestion is to *Approve*.
- A button to **download an example CSV file** that shows the expected format for uploading company data.

## Tab 2: Prediction

### What happens here?

This is where you predict bankruptcy risk for companies.

### How to Use:

You have **two options** to enter data:

**Option 1: Upload CSV**

- Use this if you want to check the risk for **many companies at once**.
- The CSV file must have the following **6 columns**:
  - industrial_risk
  - management_risk
  - financial_flexibility
  - credibility
  - competitiveness
  - operating_risk
- Each row in the file represents one company, and each column is a risk factor rated as:
  - 0 → Low Risk
  - 0.5 → Medium Risk
  - 1 → High Risk
- After uploading:
  - The model predicts whether each company is likely to go bankrupt or not.
  - Displays the **Probability of Bankruptcy (%)**.
  - Gives a **Loan Suggestion** (Approve, Approve with Collateral, Decline Loan).
  - Results are displayed in a table and can be downloaded.

**Option 2: Manual Entry**

- Use this if you want to check the risk for **one company at a time**.
- For each of the 6 risk factors, select the level (0, 0.5, or 1).
- The dashboard then shows:
  - Prediction: Bankruptcy or Non-Bankruptcy.
  - Probability of Bankruptcy (%).
  - Suggested action.
  - A table summarizing the risk levels you selected.

# Tab 3: EDA (Exploratory Data Analysis)

## What happens here?

- This tab helps you **understand patterns in the uploaded data**.
- It provides interactive charts showing how risk factors relate to bankruptcy.

## You can choose one of three insights:

### 1. Industrial Risk vs Bankruptcy

- Shows how bankruptcy rate changes as industrial risk increases.
- A **bar chart** displays the percentage of bankrupt and non-bankrupt companies for each level of industrial risk.
- Colors:
    - Red = Bankruptcy
    - Green = Non-Bankruptcy

### 2. Financial Flexibility vs Bankruptcy

- Similar to the above but focuses on financial flexibility.
- Shows how lack of financial flexibility correlates with higher bankruptcy rates.

### 3. Key Highlights

- Summarizes important observations from the data:
    - Overall bankruptcy rate (%).
    - Number of companies that have high industrial risk and went bankrupt.
    - Number of companies with low financial flexibility and went bankrupt.
    - Number of companies with high operating risk and went bankrupt.
- These are shown as **metric cards** for easy reading.

# Tab 4: Feature Importance

## What happens here?

- This tab explains which risk factors have the **strongest influence** on bankruptcy probability in your data.
- For example:
    - If *competitiveness* has the highest correlation with bankruptcy probability, then it is the most influential factor.
- It calculates the absolute correlation between each risk factor and bankruptcy probability.
- Displays:
    - A **bar chart** ranking all factors by importance.
    - Highlights the most impactful feature.
    - Optionally, you can expand a table to see all the correlation values.

## Tab 5: Summary Metrics

### What happens here?

- This is a **summary of the predictions** for the uploaded data.
- It shows:
    - Total number of companies analyzed.
    - How many are in **high risk** category (≥ 70% probability).
    - How many are in **medium risk** (50–70%).
    - How many are in **low risk** (< 50%).
    - Average bankruptcy risk across all companies.
- Displays a **pie chart** of the risk distribution.

# Sample Risk Factors (values)

Here are some example combinations of risk factors you can try in **manual entry**:

| industrial_risk | management_risk | financial_flexibility | credibility | competitiveness | operating_risk |
|---|---|---|---|---|---|
| 1 | 1 | 0 | 0.5 | 1 | 1 |
| 0 | 0 | 1 | 1 | 0 | 0 |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| 1 | 0.5 | 0 | 0 | 1 | 0.5 |

These represent different combinations of company risk profiles and will result in different predictions and suggestions.

# Decision Rules Summary

| Probability of Bankruptcy | Suggested Action |
|---|---|
| ≥ 70% | Decline Loan |
| 50–70% | Approve with Collateral |
| < 50% | Approve |

# Notes for Team

- The dashboard is interactive and works best when used on a wide screen.
- Charts and tables can be hovered over for more details.
- All charts are updated based on the uploaded data; if no data is uploaded, default data is used.
- Data privacy: Uploaded files are processed temporarily and not saved permanently.
- The model is trained on historical company data and is not perfect — predictions should be combined with professional judgment.