Bank of America – Loan Default Risk Monitoring & Strategy

- End-to-End Predictive Analysis using Excel, Python, and Power BI

- By Aayush Tiwari

- June 2025

Problem Statement

- **Goal:** To identify high-risk loan applicants using data analytics and predictive modeling, and to recommend personalized lending strategies.

- Why it matters:

- Reducing default risk protects the bank's capital

- Helps in credit policy optimization

- Supports ethical and responsible lending

Data & Tools Used

- **Data Source:** Simulated dataset of 20 customer records

- Tools Used:

- 🧾 Excel: Cleaning, Feature Engineering, Pivot Insights

- 🐍 Python: ML Models (Logistic Regression, XGBoost), SHAP

- 📊 Power BI: Interactive Dashboard

- Target Variable: Defaulted (1=Yes, 0=No)

Feature Engineering (Excel)

- Created columns like:
- Loan-to-Income Ratio
- Income Category, Credit Score Label
- Loan Term Category Is High Risk
- Built 4 Pivot Sheets for business analysis:
- Income vs Default
- Loan Purpose vs Default
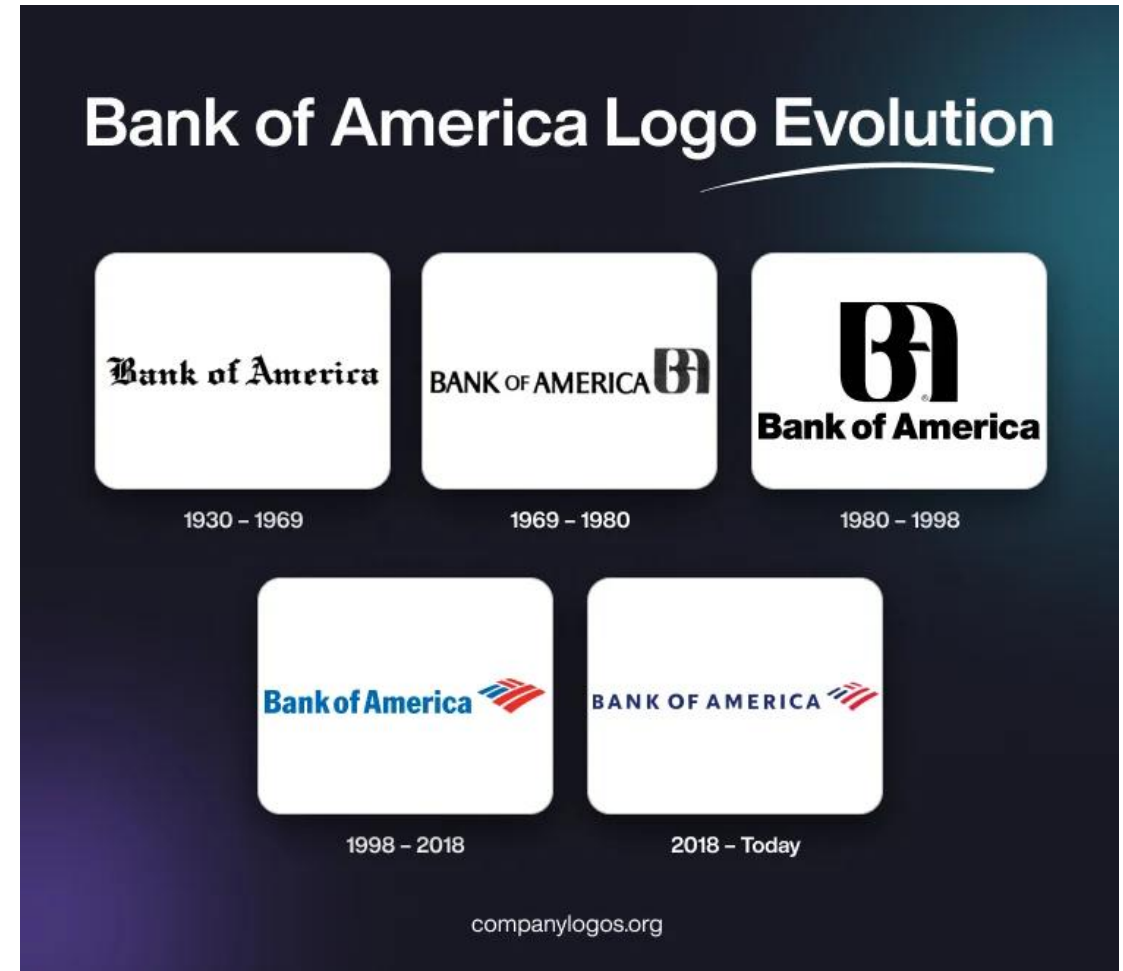- Employment vs Avg Loan
- Loan Term vs Default

Machine Learning Results (Python)

- Models Built:

- ✅ Logistic Regression: 75% Accuracy & Recall

- ❌ XGBoost: 25% Accuracy & Recall

- Key Metrics:

- AUC, Confusion Matrix, Recall

- Used SHAP to analyze feature importance

- Top Risk Factors Identified:

- Loan-to-Income Ratio

- Credit History

- Employment Type

Bank of America

Power BI Dashboard Overview

- **Dashboard Title:** *Loan Risk Monitoring & Strategy Dashboard*
- Visuals Created:
- Bar: Loan Amount by Employment Status
- Bar: Customer ID by Loan Purpose & Default
- Column: Income by Default
- Donut: Default by Loan Term Category

Strategic Business Recommendations

- Based On Findings:

- Flag high-risk applicants using predicted probabilities

- Offer shorter loan terms to risky segments

- Dynamic interest rates based on employment & credit profile

- Launch financial literacy support for low-income, high-default groups

Conclusion & Next Steps

- Built a complete loan risk solution from raw data to strategy

- Combined analytics, ML, and BI for actionable insights

- Next: Integrate model with real-time loan application system via API

Thank You

- Name: Aayush Tiwari

- Email: aayushtiwari55@gmail.com

- LinkedIn: https://www.linkedin.com/in/aayush-tiwari-65528321b/