🏦 AlphaWiz: Enterprise-Grade Financial Intelligence & Risk Platform

📌 Executive Summary

AlphaWiz is a comprehensive banking intelligence platform designed to bridge the gap between **Raw Financial Data** and **Executive Decision-Making**. Developed to simulate a modern fintech environment, the platform provides automated loan underwriting, regulatory stress testing (Basel III), and AI-driven customer retention strategies.

📉 The Problem Landscape

Traditional retail banking often suffers from three core inefficiencies:

1. **Manual Underwriting:** Slow "time-to-decision" for loan applicants.
2. **Regulatory Blindness:** Difficulty in simulating how macro-economic shocks impact capital reserves.
3. **Passive Churn Management:** Reacting to customer departures rather than proactively predicting and preventing them.

🛠️ The Solution: Multi-Module Architecture

1. Smart Loan Origination (Front Office)

- **Feature:** Real-time AI scoring engine.
- **Logic:** Uses **XGBoost** to analyze Income, Credit Score, and DTI ratios.
- **Impact:** Reduces manual review time by providing instant **Approved/Rejected** decisions with risk-based interest rate suggestions.

2. Basel III Stress Testing (Risk Management)

- **Feature:** Macro-economic shock simulator.
- **Logic:** Shocks the portfolio's Probability of Default (PD) to calculate **Expected Loss (EL)**.
- **Impact:** Automatically monitors the **Capital Adequacy Ratio**. If reserves fall below the **10.5% regulatory threshold**, the system triggers an immediate alert.

3. Retention Campaign Manager (Marketing)

- **Feature:** ROI-driven churn prevention.
- **Logic:** Identifies "At-Risk" VIPs based on tenure and product "stickiness."

- **Impact:** Includes a **Campaign Simulator** that calculates the Net ROI of offering loyalty discounts, ensuring retention spending is always profitable.

🔬 Technical Deep Dive

- **Data Science:** Implemented **Explainable AI (SHAP)** to provide transparency for model decisions—a key requirement for GDPR and fair lending audits.
- **Data Engineering:** Built a robust pipeline using **SQLAlchemy** to manage a **100,000-record synthetic "Digital Twin" dataset** that mimics real-world banking correlations.
- **Tech Stack:** Python, Streamlit, XGBoost, SQLAlchemy (PostgreSQL/SQLite), Plotly, SHAP.

📈 Business Results (Simulated)

- **Operational Efficiency:** Automated 85% of standard loan applications.
- **Risk Mitigation:** Identified high-risk exposure in volatile sectors during simulated downturns.
- **Profitability:** Projected a 12% increase in VIP retention through optimized loyalty discount targeting.

🚀 Implementation Steps

1. **Data Generation:** Run generate_data.py to create the 100k record digital twin.
2. **Database Sync:** On first launch, app.py auto-migrates CSV data to an optimized SQL schema.
3. **Model Training:** XGBoost models are trained and cached for sub-second inference.