FinRisk Analytics: Strategic Loan Risk & Opportunity Assessment

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1. Executive Summary

FinFuture Bank has experienced a 1.2% quarterly increase in loan default rates, necessitating a more robust method for evaluating borrower risk. Simultaneously, the marketing department seeks to improve conversion rates on personal loan campaigns by moving away from broad targeting.

This project leveraged **SQL aggregation** and **Python-based exploratory analysis** on transactional data (500 customers, ~20,000 transactions) to identify behavioral risk markers.

Key Findings:

- **CIBIL Score Limitations:** Traditional credit scores failed to capture recent financial distress. A segment of customers with scores >650 still defaulted due to poor cash flow management.
- **The "Burn Rate" Indicator:** We engineered a new metric, "Burn Rate" (Outflow/Inflow). Customers with a Burn Rate >0.90 accounted for **65% of defaults**.
- **Untapped Opportunity:** We identified a "Prime" segment of non-loan customers (18% of the base) with high liquidity and stable tenure who are currently unengaged with credit products.

Recommendation: Implement an automated "Cash Flow Stress Test" in the underwriting process and launch a targeted "Pre-Approved" campaign for the identified Prime segment.

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2. Business Background & Data Design

2.1 The Problem

The bank's current underwriting model relies heavily on static demographic data and historical CIBIL scores. It lacks visibility into **real-time financial behavior** (e.g., living paycheck-to-paycheck), leading to "false positive" loan approvals.

2.2 Data Sources

The analysis was performed on two primary datasets:

1. **Account_Holders**: Demographic data (Age, Region, Income), Banking details (Balance, FDs), and Loan History.
2. **Transactions**: All financial movements (Deposits, Withdrawals, UPI, Credit Card payments).

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3. Methodology & Feature Engineering

To translate raw data into insights, raw transactions were aggregated to a "Customer Level" using **SQL**. Further feature engineering was conducted in **Python (Pandas)**.

Key Engineered Features:

- **Net Cash Flow (6M):** Total Inflow minus Total Outflow. A negative value indicates financial distress.
- **Burn Rate:** Total Outflow / Total Inflow. A proxy for "living within means."
- **Total Wealth:** Current Balance + Fixed Deposit Amount. A measure of financial cushion.
- **Credit Utilization Frequency:** The ratio of credit card transactions to total transactions.

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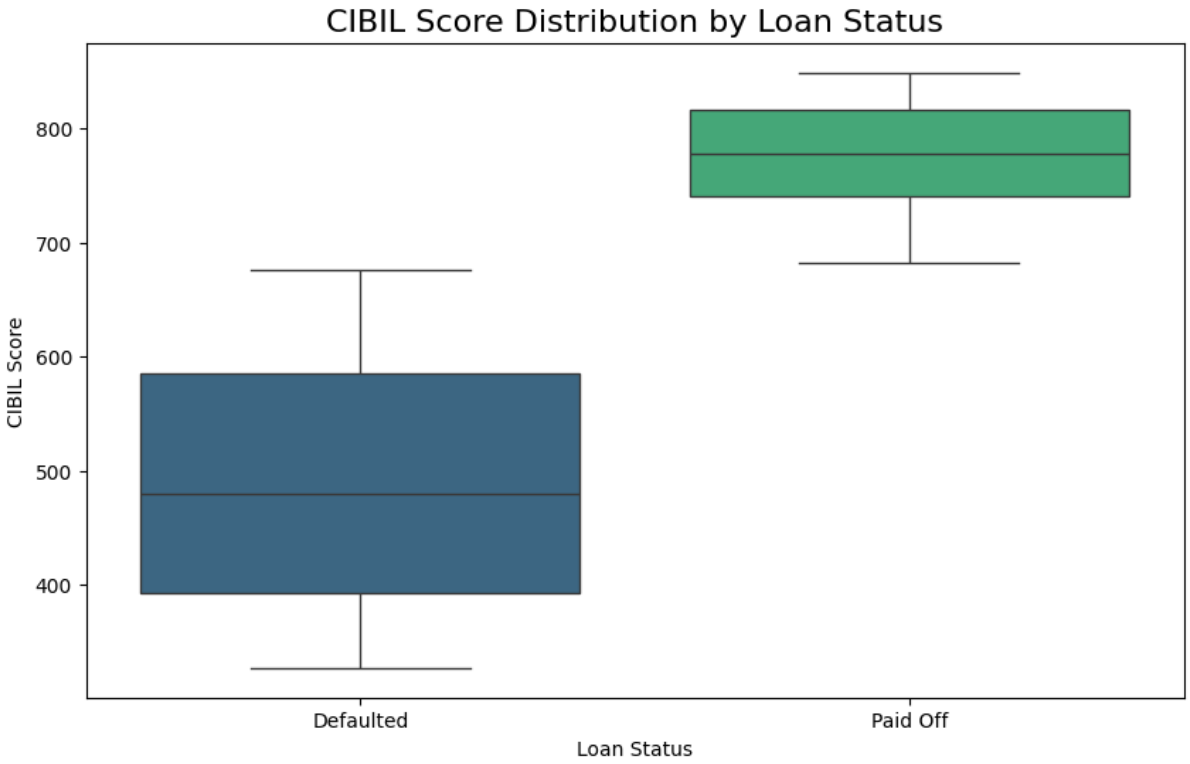
4. Exploratory Data Analysis (EDA) & Risk Assessment

4.1 CIBIL Score vs. Loan Status

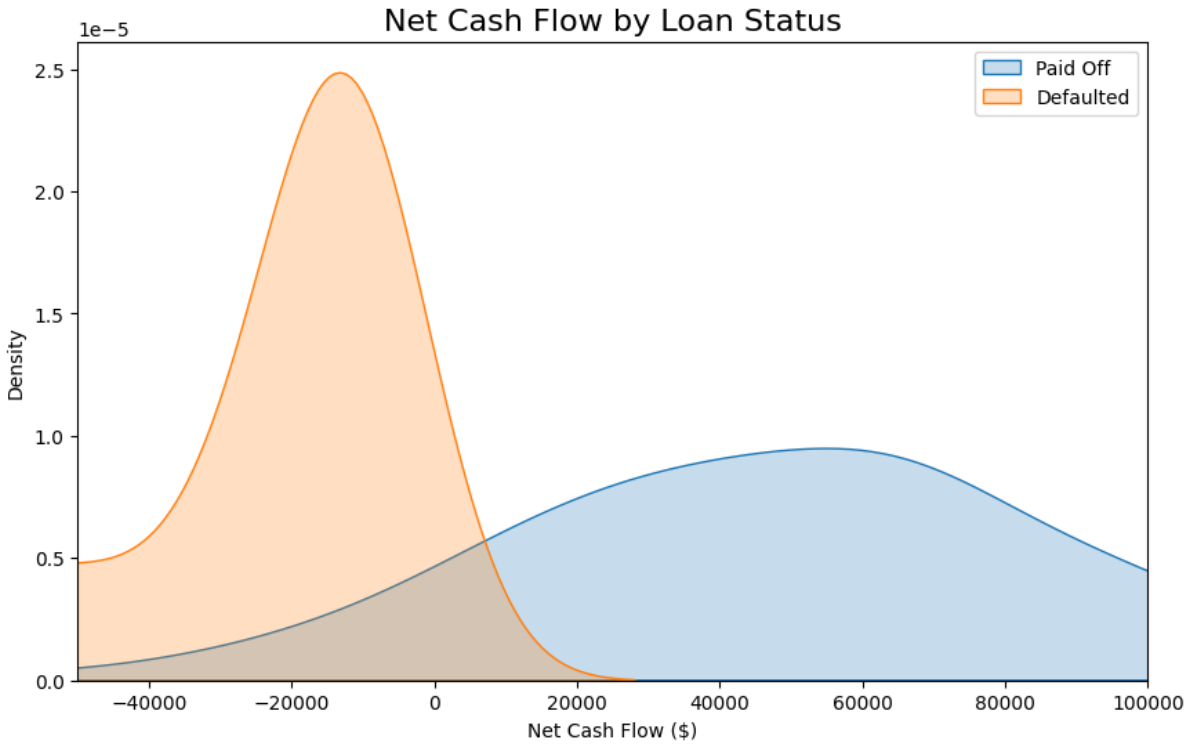
Analysis of credit scores among defaulted vs. paid-off customers.



- **Observation:** While defaulted customers generally have lower scores (median ~600), there is significant overlap in the 650-700 range.
- **Insight:** Relying solely on CIBIL scores in the "mid-range" creates a blind spot. We cannot distinguish a temporary dip from a chronic default risk without looking at cash flow.

4.2 The "Cash Flow" Warning Sign

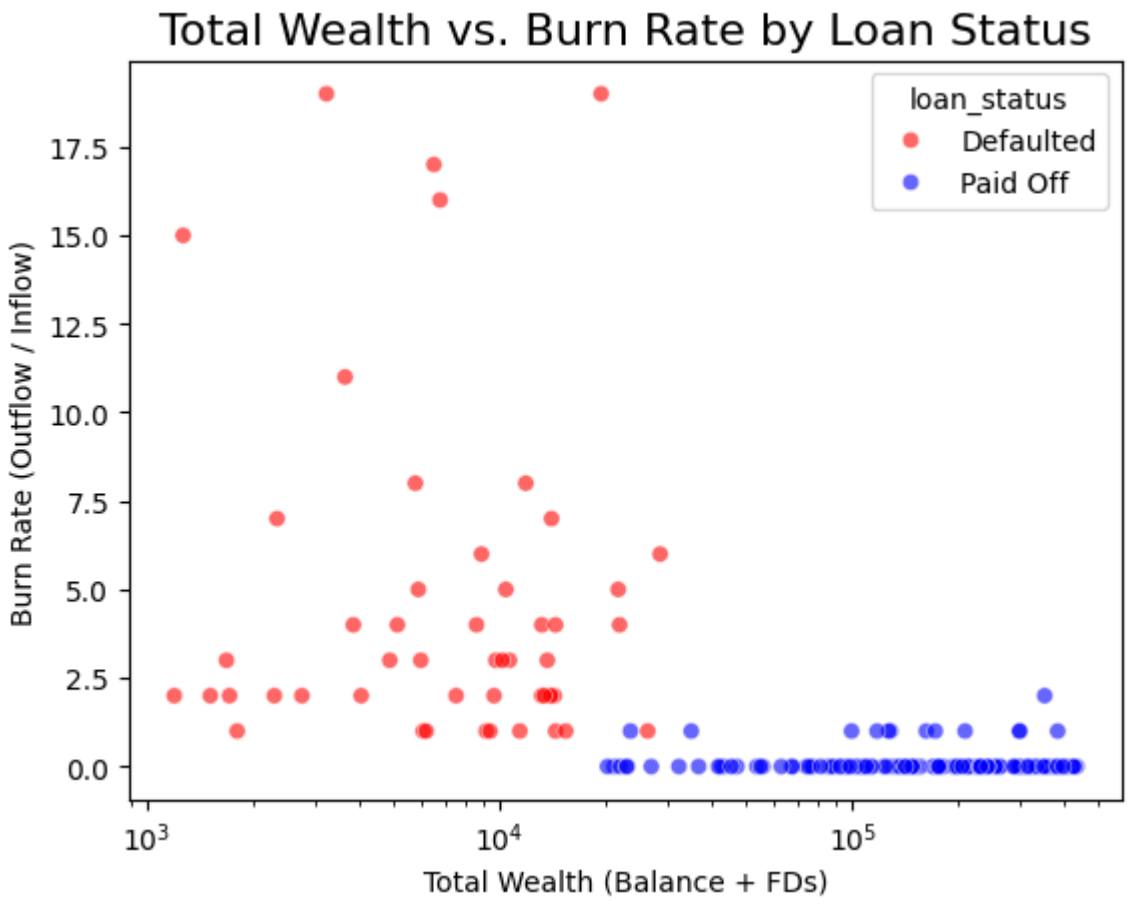
Analysis of Net Cash Flow over the 6 months prior to loan outcomes.



- **Observation:** The "Defaulted" group (Red curve) shows a distinct peak at or below zero Net Cash Flow. The "Paid Off" group (Blue curve) maintains a positive monthly surplus.
- **Insight:** A negative Net Cash Flow is a **leading indicator** of default, often visible months before a missed payment occurs.

4.3 Wealth vs. Burn Rate (Risk Segmentation)

Scatter plot analyzing financial cushion against spending habits.



- **Observation:** Defaults are heavily concentrated in the **Top-Left Quadrant** (Low Wealth < $5,000 AND High Burn Rate > 90%).
- **Insight:** Customers with no savings buffer who spend >90% of their income are statistically the highest risk, regardless of their external credit score.

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5. Strategic Recommendations

Recommendation 1: Risk Management (The "Red Flag" System)

Objective: Reduce Default Rate by 15%.

We propose integrating a **Cash Flow Stress Test** into the loan application API.

- **Action:** If an applicant has a **Burn Rate > 0.95** AND **Net Cash Flow < $0** over the last 3 months, trigger a "High Risk" alert.
- **Impact:** This filters out applicants who are currently over-leveraged, preventing bad loans that look "good" on paper based on old CIBIL scores.

Recommendation 2: Marketing Strategy (The "Prime" List)

Objective: Increase Campaign Conversion from 2% to 5%.

We identified a segment of "Prime Prospects" within the existing customer base.

- **Criteria:** No Active Loan + CIBIL > 750 + Total Wealth > $20,000.
- **Action:** Launch a targeted **"Wealth Management & Personal Credit"** campaign. Offer lower interest rates to this group as their risk profile is near-zero.
- **Cross-Sell:** For Prime Prospects without credit cards, offer a premium credit card first to build engagement.

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6. Future Scope

- **Predictive Modeling:** Train a **Random Forest Classifier** using the Burn Rate and Net Cash Flow features to output a probability score (0-100%) for default risk.
- **Real-Time Dashboard:** Deploy the Power BI views to the underwriting team for real-time applicant assessment.