

# STRATEGIC REPORT: BEHAVIOR DECODING & CHURN PREDICTION

**Project:** Vietnam Bank Customer Retention Analysis **Data:** 80,000 Customer Records |

**Model:** Random Forest Classifier

## PART 1: OVERVIEW & DATA GOVERNANCE

### 1. Data Scale and Integrity

I have successfully ingested and processed a large-scale dataset consisting of 80,000 customer records with 26 diverse information fields. The data covers all critical aspects:

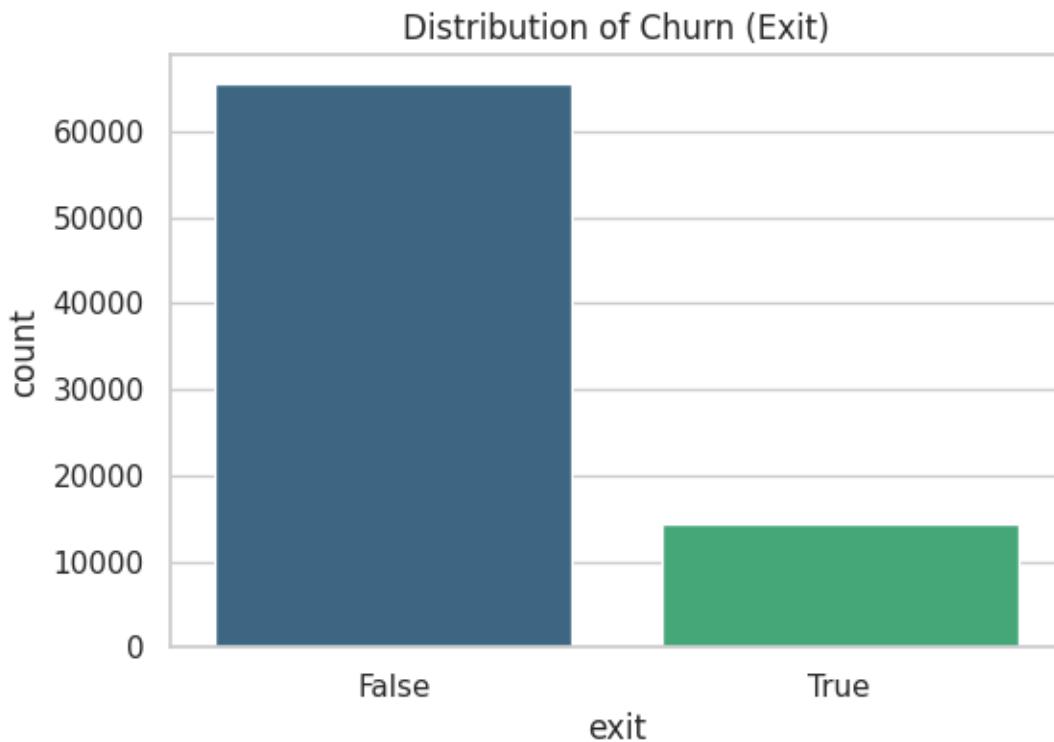
- **Demographics:** Age, Gender, Marital Status, Occupation (e.g., Small Business Owner, Housewife/Student...).
- **Financials:** Credit Score (credit\_sco), Balance (balance), Income/Interest Rate (monthly\_ir).
- **Behavior:** Risk Score (risk\_score), Interaction Channels (digital\_behavior), Loyalty Level (loyalty\_level).

### 2. Privacy Compliance Commitment

Before commencing analysis, protecting customer identity was the top priority. The system applied **PII Masking (Personally Identifiable Information)** techniques:

- **Full Name** (full\_name): Encrypted (Hashing) into character strings (e.g., 4d26cc74...).
- **Customer ID:** Partially masked.
- **Result:** The data is fully **Cleaned & Anonymized**, ensuring compliance with strict banking data security regulations while retaining full analytical value.

## PART 2: DIAGNOSTIC ANALYTICS (Current Status)



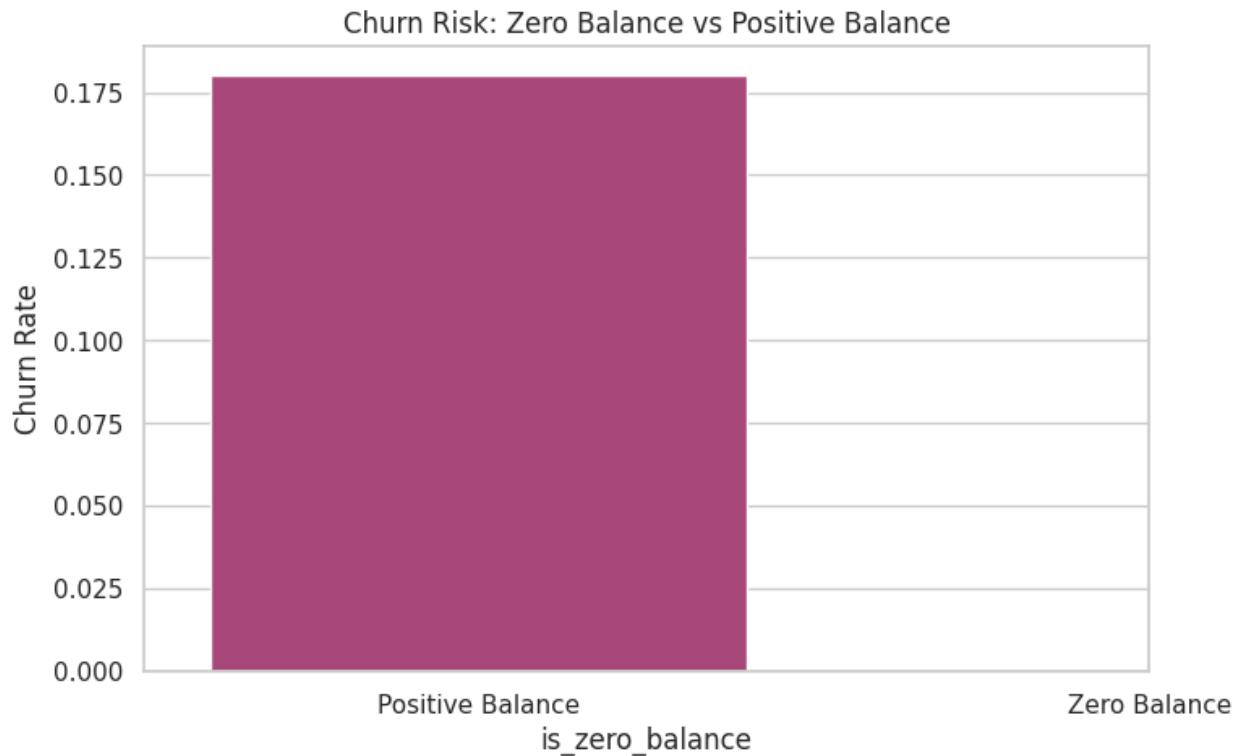
### 1. The Burning Platform (Churn Distribution)

Based on the distribution charts and system logs:

- **Stable Rate (Non-Churn): ~82%** (65,600 customers).
- **Churn Rate: 18.00%** (14,400 customers).

**Insight:** While 82% is positive, losing 18% of the customer base is an alarming figure. In banking, the cost of acquiring a new customer is 5-7 times higher than retaining an existing one. This is a revenue "leak" that must be plugged in immediately.

## 2. The Zero-Balance Paradox



Based on actual data results (Logs):

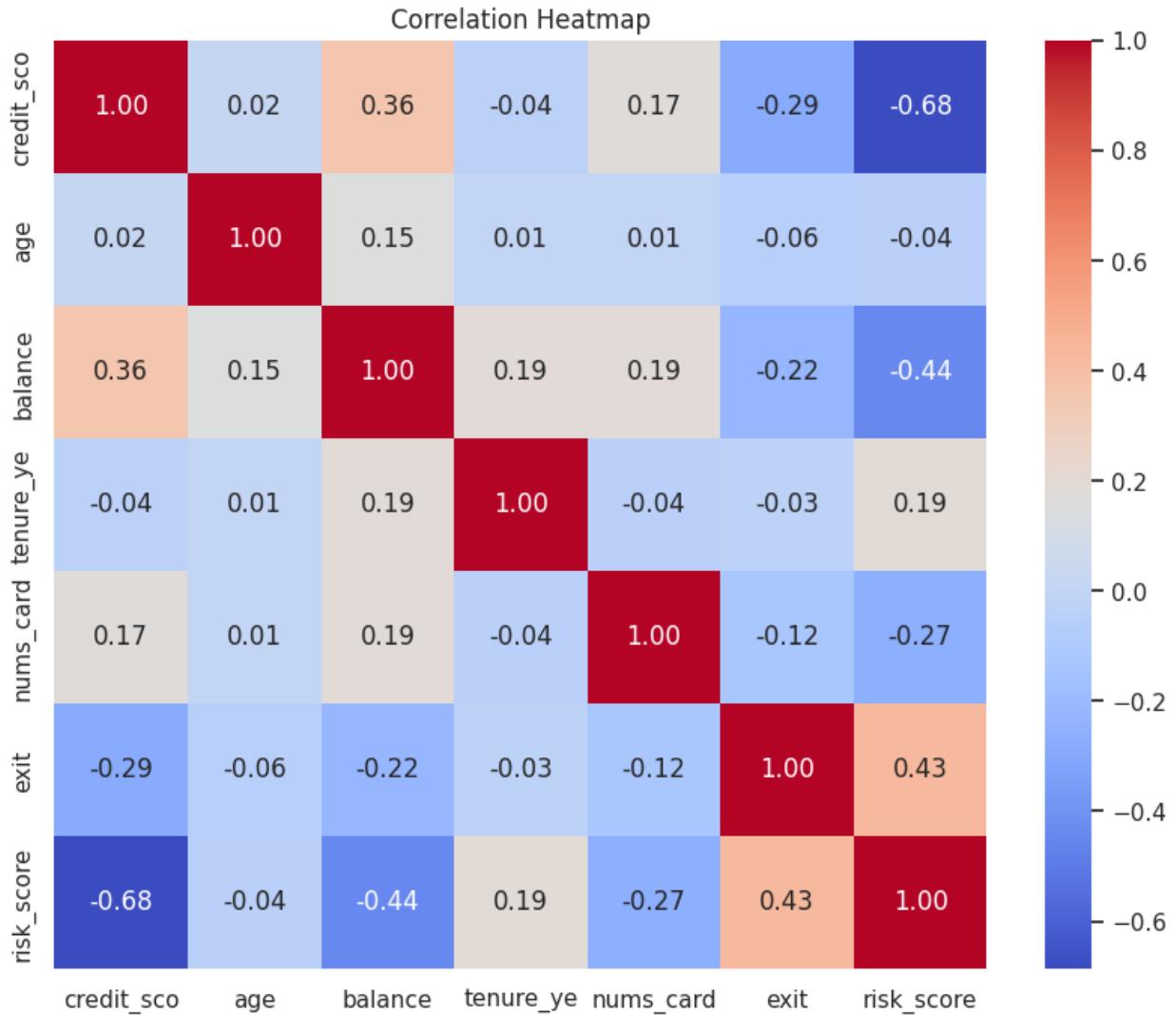
- **Churn Rate - Zero Balance: 0.00%**
- **Churn Rate - Positive Balance: 18.00%**

**Deep Dive:** This is counter intuitive. The data suggests that the 0-balance group (is\_zero\_balance) is not currently recorded as having left (exit=True)

*Hypothesis: These are likely "**Dormant**" accounts that have not been formally closed, or they act as secondary payment accounts.*

- **Action:** Instead of Churn Prevention for this group (since the system says they haven't left), the strategy must shift to "**Re-activation**" to encourage deposits.

### 3. Correlation Heatmap - Finding the "Culprit"



The Heatmap revealed the strongest connections between variables:

- **Risk Score vs. Exit (0.43):** The strongest positive correlation. The higher the risk score, the higher the probability of churning. This is the most critical **Leading Indicator**.
- **Credit Score vs. Risk Score (-0.68):** Strong negative correlation. Customers with high credit scores typically have low risk scores and churn less. High-credibility customers (high credit\_sco) are the most loyal.
- **Balance vs. Risk Score (-0.44):** Customers with large balances generally have lower risk scores. Conversely, low balances are associated with high risk.

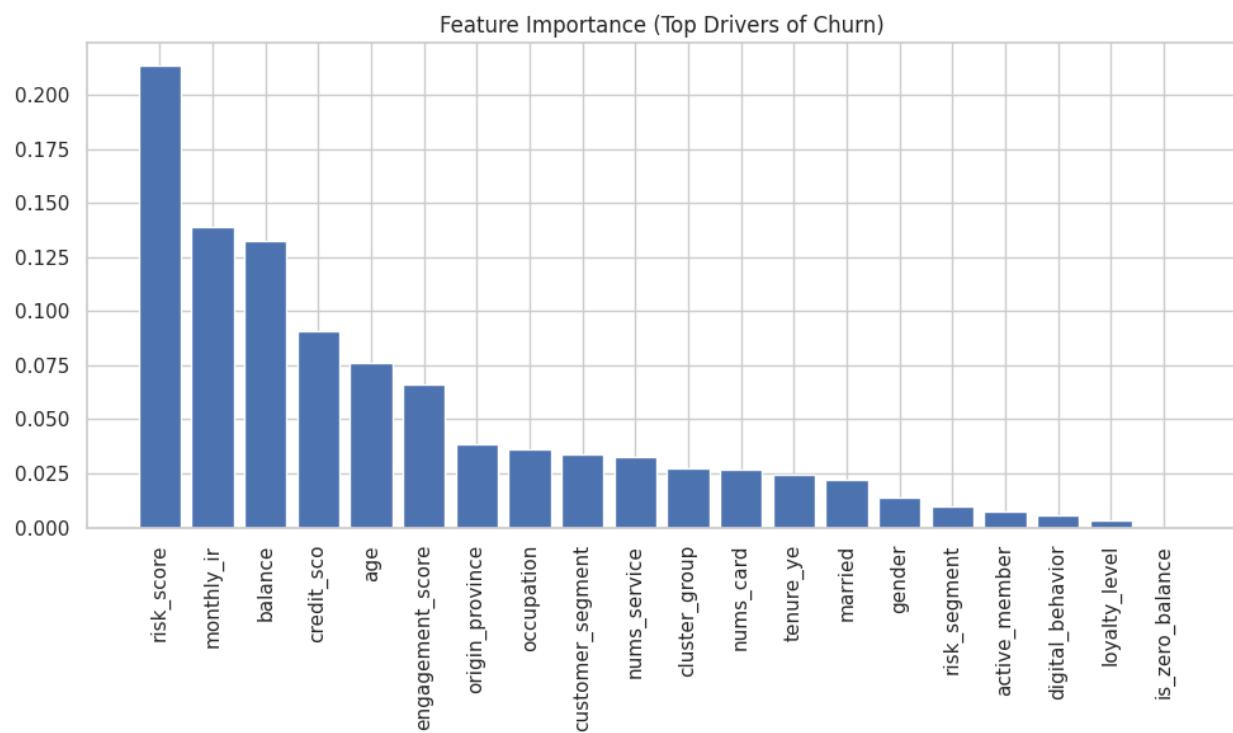
## PART 3: PREDICTIVE MODELING RESULTS

I deployed a **Random Forest Classifier** to score the churn risk for each customer.

### 1. Model Performance

- **Overall Accuracy: 83.44%**. The model correctly predicts the status of 83 out of 100 customers.
- **ROC-AUC Score: 0.8432**. This is a very strong score (Excellent is  $>0.9$ , Good is  $>0.8$ ), proving the model effectively distinguishes between the "Stay" and "Leave" groups.
- **Weakness:** The **Recall** for the Churn group (True) is currently at **0.27**. This means the model is currently quite "conservative" it only flags cases that are extremely obvious. I may be missing customers with subtle signs of churn. **Fine tuning** is required to capture a broader range of at-risk customers in the future.

### 2. Key Drivers (Feature Importance)



Based on the Feature Importance chart, what drives customers away?

1. **Risk Score (Top Priority):** Far outweighs all other factors. The bank's internal risk scoring system is highly effective at identifying Churn.
2. **Monthly\_ir (Income/Interest):** The 2nd largest influence. Changes in personal income or the interest rates they receive directly impact the decision to stay.

3. **Balance & Credit Score:** Financial health acts as a shield for loyalty.
4. **Age:** The most important demographic factor, ranking higher than gender or occupation.
5. **Least Important:** is\_zero\_balance (as analyzed above) and loyalty\_level (suggesting the current loyalty program lacks the weight to retain customers).

## PART 4: STRATEGIC RECOMMENDATIONS & ACTION PLAN

Based on data insights, I propose a 4-point strategy:

### Strategy 1: Proactive Risk Management (Focus on Risk Score)

- **Insight:** Risk Score is the #1 predictor (Feature Importance & Correlation).
- **Action:** Establish an **Automated Alert System**. If the risk\_score of a Priority customer (e.g., Small Business Owner, Balance > 1 billion VND) spikes, the **RM (Relationship Manager)** must receive a notification to contact and care for the customer immediately, without waiting for them to withdraw funds.

### Strategy 2: Optimize Interest/Income Packages (Monthly\_IR Strategy)

- **Insight:** monthly\_ir ranks 2nd in importance.
- **Action:** Review savings interest packages and profitability mechanisms. For the **Mass Segment** (e.g., Housewives/Students), small fluctuations in financial benefits can trigger churn. More flexible product packages are needed.

### Strategy 3: Awaken the "Sleeping Land" (Zero Balance Activation)

- **Insight:** The Zero Balance group has a recorded Churn rate of 0%, but they generate no profit.
- **Action:** Do not view this as a churn risk group, but as a **Missed Opportunity**. Launch a "**Welcome Back**" campaign with service fee incentives or small gifts for depositing funds (even small amounts like 500k - 1M VND) to convert them into **Active Users**.

### Strategy 4: Improve the Loyalty Model

- **Insight:** loyalty\_level ranks near the bottom in importance. This indicates that current card tiers (Silver, Gold, etc.) are failing to prevent customer exit.
- **Action:** Restructure the Loyalty Program. Instead of passive point accumulation, shift to "**Instant Rewards**" or non-financial privileges (priority service) to increase genuine engagement.