PROJECT REPORT

Presented To : Senior Data Analyst partner bank

EXECUTIVE SUMMARY

Customer churn remains a significant challenge for financial institutions, directly impacting revenue, customer lifetime value, and growth. This report presents an end-to-end churn analysis using customer demographic, behavioral, and financial data. Leveraging statistical modeling and data visualization, the study identifies key churn drivers and segments most at risk. It also proposes actionable recommendations to enhance customer retention.

My role is to design and deploy a machine learning model that predicts which customers are likely to churn based on given variables present in the dataset.

1 PROJECT OBJECTIVES

This project set out to answer the following key business questions:

- What are the key factors influencing customer churn?
- How does churn vary by geography (country)?
- Which customer segments are most at risk of churning?
- What is the accuracy of the predictive model?

2. METHODOLOGY & TOOLS USED

- Data Cleaning & Preparation
- Statistical Modeling & Analysis: R Programming
- Visualization & Dashboarding: Tableau
- Model Type: Regression Tree (compared with Decision Tree)

3. DATA OVERVIEW

The dataset includes over 10,000 customer records with the following key features:

- Demographics: Age, Gender, Country
- Financials: Balance, Estimated Salary, Credit Score
- Engagement: Active Member, Credit Card, Number of Products, Tenure
- Target: Churn (binary classification)

No missing values or duplicates were found. The Customer_Id column was dropped to maintain model focus.

Churn Rate: 20.4%

Non-Churn Rate: 79.6%

4. Model Analysis

4.1 Model Comparison

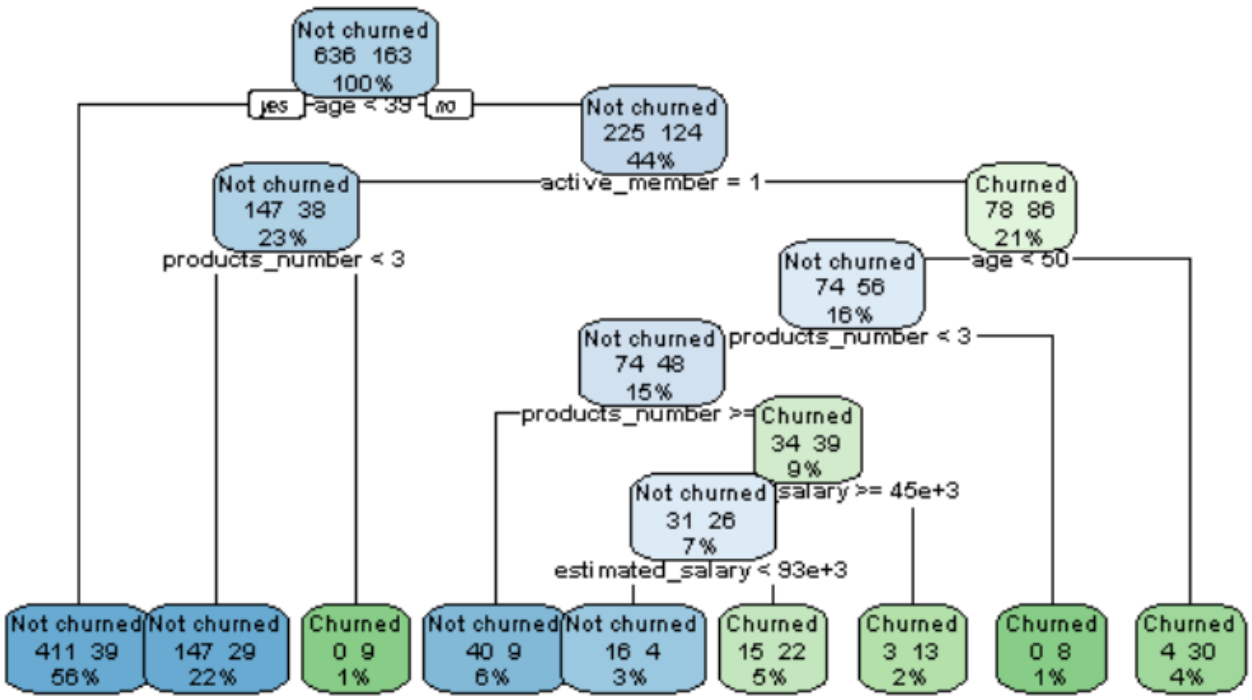
Two models were evaluated:

Model Accuracy Notes

- Regression Tree 86.1% Strong predictive power with probability outputs
- Decision Tree 83.6% Easier interpretability but slightly lower accuracy

The Regression Tree was selected for deployment due to its superior performance.

4.2 Regression Tree



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Key Findings

1. What are the key factors influencing customer churn?

- Age: Customers over 50 are more likely to churn.
- Active Membership: Inactive customers show a higher churn probability.
- Number of Products: Customers with fewer than two products have higher churn risk.
- Estimated Salary: Customers with lower estimated salaries tend to churn more.
- Country: Customers from Germany exhibit a higher churn rate.

2. How does customer churn vary across countries?

- Germany: Highest churn rate, especially among older customers with limited product holdings.
- France & Spain: Lower churn rates, especially for customers with active memberships.

3. Which customer segments are most at risk of churning?

- Customers over 50 years old
- German customers with low salaries and inactive memberships
- Individuals with only 1 or 2 products

CONCLUSION AND RECOMMENDATION

To reduce customer churn, the bank can implement the following strategies:

1. Target Inactive Customers – Launch engagement campaigns for inactive members.
2. Increase Product Adoption – Encourage single-product holders to adopt additional products.
3. Monitor High-Risk Customers – Develop retention programs for customers over 50 years old.
4. Customize Regional Strategies – Focus on Germany with personalized offers.
5. Salary-Based Incentives – Provide special incentives for customers with lower estimated salaries.