Project Title: Bank Customer Exit Modeling

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Introduction

Customer retention is a critical aspect of the banking sector, as retaining existing customers is often more cost-effective than acquiring new ones. This project focuses on predicting customer exit (whether a customer will leave the bank) using machine learning models. The primary goal is to analyze key factors influencing customer exits and develop a predictive model to help the bank proactively reduce attrition rates.

Business Impact

Customer exits can significantly impact a bank's revenue and reputation. Understanding why customers leave allows the bank to implement targeted strategies such as personalized offers, improved customer service, and retention programs. By accurately predicting which customers are likely to exit, the bank can take proactive measures to retain high-value clients and enhance customer satisfaction.

Resources

- **Google Colab Notebook**: Click Here
- **Looker Studio Dashboard**: Click Here

Data

The dataset consists of various features related to bank customers, including demographic information, financial transactions, and account activity. The key attributes include:

- **Row Number**: Index of the customer in the dataset.
- **Customer ID**: Unique identifier for each customer.
- **Surname**: Customer’s last name.
- **Credit Score**: Creditworthiness score of the customer.
- **Geography**: Country where the customer is located.
- **Gender**: Male or Female.
- **Age**: Customer's age.

- **Tenure**: Number of years the customer has been with the bank.
- **Balance**: Customer's bank account balance.
- **Number of Products**: Number of financial products the customer holds.
- **Has Credit Card**: Whether the customer has a credit card (1 = Yes, 0 = No).
- **Is Active Member**: Whether the customer is an active user (1 = Yes, 0 = No).
- **Estimated Salary**: The customer's estimated income.
- **Exited**: The target variable (1 if the customer exited, 0 otherwise).

Dataset Source: [Kaggle - Bank Customer Churn]

Data Analysis & Computation

To understand customer behavior, exploratory data analysis (EDA) was conducted:

- **Feature Selection**: Identified key features influencing customer exits.
- **Age Segmentation**: Customers were categorized into age groups to analyze exit trends.
- **Behavioral Analysis**: Examined spending habits, communication frequency, and product usage to identify patterns.

Key Insights on Customer Churn: Critical Questions Explored

- **What is the relationship between credit score and customer exit?**
  Customers with lower credit scores were more likely to exit.
- **How does geography influence churn rates?**
  Germany had the highest churn rate (32.44%), followed by Spain (16.67%) and France (16.15%).
- **Is there a correlation between the number of products and churn?**
  Customers with only one product had a higher churn rate (27.71%), while those with four products had a 100% churn rate.
- **Does having a credit card impact customer retention?**
  Customers without credit cards were slightly more likely to exit.
- **How does age impact churn?**
  Older customers (above 50) were more likely to exit compared to younger customers.
- **What is the relationship between balance and churn?**
  Customers with lower balances were more likely to exit.
- **How does tenure (number of years with the bank) affect churn?**
  Customers with shorter tenures were more likely to exit.
- **Is there a relationship between estimated salary and churn?**
  Customers with lower estimated salaries were more likely to exit.

Machine Learning Models Used

Three machine learning models were implemented to predict customer exits:

Model	Accuracy
Decision Tree Classifier	78.55%
Logistic Regression	80.35%
Random Forest Classifier	80.45%

Recommendations:

Here are well-structured and actionable recommendations based on the key insights into customer churn:

1.Based on Credit Score:

- **Insight:** Customers with lower credit scores are more likely to churn.
  - **Recommendations:**
    - **Credit Improvement Programs:** Offer financial advisory and training to help customers improve their credit management.
    - **Incentives for Good Credit:** Provide fee discounts or better interest rates for customers with improved credit scores.
    - **Flexible Loan Terms:** Introduce easier repayment options for customers with lower credit scores.

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2. Based on Geography:

- **Insight:** Germany has the highest churn rate (32.44%), followed by Spain (16.67%) and France (16.15%).
  - **Recommendations:**
    - **Germany:**
      - **Investigate Churn Causes:** Conduct surveys and analyze customer feedback.
      - **Enhance Customer Support:** Provide dedicated local-language support and personalized consultations.
      - **Strengthen Loyalty Programs:** Introduce rewards for long-term customers.
    - **Spain:**
      - **Regionalized Offers:** Tailor products and services to meet the needs of specific local communities.

        - **Boost Loyalty Initiatives:** Implement loyalty points, discounts, and special offers.
    - **France:**
        - **Awareness Campaigns:** Educate customers on digital banking services and their benefits.
        - **Focus on Rural Areas:** Improve service availability in less urbanized regions.

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3. Based on Number of Products:

- **Insight:** Customers with only one product have a higher churn rate (27.71%), while those with four products show a 100% churn rate.
    - **Recommendations:**
        - **One Product Customers:**
            - **Encourage Product Diversification:** Offer discounts on additional products like savings accounts or credit cards.
            - **Bundled Services:** Combine products into attractive, cost-saving packages.
        - **Four Product Customers:**
            - **Deep-Dive Analysis:** Identify reasons behind dissatisfaction and tailor solutions to address their needs.
            - **VIP Treatment:** Provide exclusive services like dedicated account managers and premium offers.

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4. Based on Credit Card Ownership:

- **Insight:** Customers without credit cards are slightly more likely to churn.
    - **Recommendations:**
        - **Exclusive Credit Card Benefits:** Introduce cashback, reward points, and flexible installment programs.
        - **Incentives to Obtain Credit Cards:** Offer the first year without fees or reduced interest rates.
        - **Financial Literacy Campaigns:** Educate customers on responsible credit card use and its impact on credit scores.

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5. Based on Age:

- **Insight:** Older customers (50+) are more likely to leave compared to younger customers.
    - **Recommendations:**

- **Senior-Specific Products:** Offer high-interest savings accounts, retirement plans, and low-risk investments.
- **Personalized Financial Planning:** Provide advisory services tailored to retirement and long-term goals.
- **Additional Perks:** Reduce digital banking fees and offer priority customer support.

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6. Based on Balance:

- **Insight:** Customers with lower account balances are more likely to exit.
  - **Recommendations:**
    - **Savings Incentives:** Introduce competitive interest rates on savings accounts.
    - **Wealth-Building Strategies:** Provide investment opportunities suited for various income levels.
    - **Fee Waivers:** Reduce or eliminate fees for customers maintaining lower balances.

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7. Based on Tenure:

- **Insight:** Customers with shorter relationships with the bank tend to churn more frequently.
  - **Recommendations:**
    - **Welcome Packages:** Offer exclusive benefits for new customers within their first six months.
    - **Personalized Onboarding:** Assign financial advisors to help new customers navigate bank services.
    - **Regular Feedback Collection:** Conduct satisfaction surveys and adapt services based on insights.

8.Based on Estimated Salary:

- **Insight:** Customers with lower estimated salaries are more likely to leave.
  - **Recommendations:**
    - **Financial Support Programs:** Offer low-fee accounts and affordable loan options.
    - **Savings and Investment Opportunities:** Provide accessible investment plans with lower entry thresholds.
    - **Reduced Service Fees:** Minimize transaction costs and digital service fees for lower-income clients.

Conclusion & Future Work

The study successfully identified key factors influencing customer exits and developed predictive models to anticipate customer churn. The **Random Forest Classifier** proved to be the most effective in predicting exits, allowing the bank to take proactive measures to retain customers.

Future Work

- Incorporating more customer behavioral data to improve prediction accuracy.
- Applying deep learning techniques for enhanced model performance.
- Developing a real-time dashboard for customer exit prediction and intervention strategies.