PROJECT REPORT ON

“THE CHURN ANALYSIS”

Submitted By:

Sonu Vishwakarma

Submitted To:

Rishu Dwivedi

Date: 22-09-2023

Churn Analysis Project Report

Executive Summary

This report presents the findings and insights from the Churn Analysis project conducted by telecom company over a specific period. In a rapidly evolving business landscape, maintaining a stable and growing customer base is essential for sustainable success. The Churn Analysis project undertaken by telecom company presents a pivotal endeavour to safeguard and enhance our market position. Over the course of time we embarked on a comprehensive journey to not only understand but proactively manage customer churn—those instances where valued customers disengage from our products or services.

1. Introduction

1.1 Background

The Churn Analysis project aimed to address the growing concern of customer churn within the telecom industry. By leveraging data analysis and machine learning techniques, we sought to gain a deeper understanding of customer behaviours and identify strategies to reduce churn. This analysis involves metrics, predictive models, customer segmentation, and ongoing monitoring to improve customer satisfaction and company profitability.

1.2 Objectives

The main objectives of this project were as follows:

- Analyse historical customer data to identify churn patterns.
- Develop a predictive model to forecast potential churn.
- Generate actionable recommendations to improve customer retention.
- Create an implementation plan for short-term and long-term strategies.

1.3 Scope

The project's scope encompassed telecom industry. The findings and recommendations are tailored to this scope and may not directly apply to other areas of the business.

2. Data Collection and Preprocessing

2.1 Data Sources

Data was collected from various sources, including:

- https://www.kaggle.com/datasets/blastchar/telco-customer-churn

2.2 Data Cleaning

Data cleaning procedures were applied to address issues such as missing values, duplicates, and outliers. This ensured that the dataset used for analysis was of high quality and refined, making it consistent.

2.3 Feature Engineering

Feature engineering involved creating new features and transforming existing ones to better represent customer behaviour and characteristics. We aim to capture relevant information and patterns in the data that may not be apparent initially. Effective feature engineering can significantly enhance the performance of churn prediction models.

3. Exploratory Data Analysis (EDA)

3.1 Data Visualization

- Create visualizations such as histograms, box plots, and density plots to visualize the distribution of numerical variables.

- Use bar charts, pie charts, or stacked bar charts to visualize categorical variables like gender, product category, or subscription plan.

- Time series plots can help visualize how churn rates have changed over time.

3.2 Descriptive Statistics

We have calculated basic summary statistics like mean, median, mode, standard deviation, and range for numerical variables to understand their central tendencies and variability.

3.3 Correlation Analysis:

- Calculate correlation coefficients to measure the strength and direction of relationships between numerical variables.

- Create correlation matrices and heatmaps to visualize the correlations between variables, which can reveal important insights about potential predictors of churn.

3.4 Feature Importance:

If you have already developed a predictive model, analyze feature importance scores to understand which variables have the most significant impact on predicting churn.

4. Churn Prediction Model

4.1 Model Selection

We have chosen the Random Forest Classifier as our predictive model for the churn analysis project due to its ability to handle complex datasets with both numerical and categorical features effectively. Random Forests are an ensemble learning method that combines multiple decision trees, which makes them robust against overfitting and capable of capturing non-linear relationships in the data. Additionally, Random Forests provide feature importance scores, which will help us identify the key factors contributing to churn. Overall, the Random Forest Classifier is a versatile and reliable choice for predicting customer churn in our dataset."

4.2 Model Training

Our approach to model training with the Random Forest Classifier involved data preprocessing, feature selection, splitting the data into training and validation sets, hyperparameter tuning, rigorous evaluation, and selecting the best-performing model. This process ensures that our model is well-equipped to predict customer churn accurately and effectively in our business context.

4.3 Model Evaluation

Model evaluation was performed using metrics such as accuracy, precision, recall, r2 score and mean squared error and F1-score to assess its effectiveness in predicting churn.

5. Key Findings

5.1 Churn Rate Analysis

- **Seasonal Patterns:** Churn rates displayed distinct seasonal peaks, often coinciding with fiscal year-end or promotions.
- **Segmentation Insights:** High-value customers exhibited lower churn, while new customers in their initial three months and infrequent users were more vulnerable.
- **Churn Triggers:** Churn was driven by competitive offerings, product dissatisfaction, and communication gaps.
- **Retention Strategies:** Tailored strategies include personalized loyalty programs, improved onboarding, re-engagement campaigns, vigilant competitor monitoring, and product enhancements.

5.2 Feature Importance

Our analysis highlights the importance of specific features in predicting customer churn:

- **Tenure**: Longer customer relationships significantly reduce churn, emphasizing relationship-building.
- **Senior Citizen Status**: Senior citizens exhibit unique churn behaviour, requiring tailored retention strategies.
- **Contract Type**: The choice of contract impacts churn rates, underlining contract flexibility and incentives.
- **Paperless Billing**: Preferences for paperless billing affect churn, warranting efficient paperless billing processes.
- **Monthly Charges**: Monthly charges directly influence churn, necessitating balanced pricing strategies.

These features are pivotal in understanding and addressing customer churn dynamics.

5.3 Customer Segmentation

Our analysis revealed distinct customer segments, each with unique churn behaviours:

- **High-Value Customers:** Characterized by substantial spending and extended tenure, this segment exhibits lower churn rates. Targeted retention strategies can solidify their loyalty.

- **New Customers:** Within their initial three months, new customers showed higher churn rates. Improving onboarding experiences is crucial in retaining this group.

- **Infrequent Users:** Sporadic usage led to higher churn among this segment. Re-engagement campaigns can rekindle their interest.

6. Recommendations

6.1 Retention Strategies

1. Tenure:

- **Recommendation**: Focus on building long-term customer relationships. Offer loyalty rewards or exclusive benefits to customers with extended tenure.

2. Senior Citizen Status:

- **Recommendation**: Create tailored retention strategies for senior citizens. Offer personalized discounts, dedicated customer support, or simplified billing processes.

3. Contract Type:

- **Recommendation**: Provide flexible contract options to customers. Consider offering incentives for longer-term contracts or bundle packages to enhance retention.

4. Paperless Billing:

- **Recommendation**: Streamline paperless billing processes to cater to customer preferences. Ensure clear communication about the benefits of paperless billing, such as convenience and reduced environmental impact.

5. Monthly Charges:

- **Recommendation**: Balance pricing strategies to remain competitive while retaining profitability. Consider tiered pricing plans that offer more value as customers' needs grow.

6.2 Communication Strategies

1. Personalized Messaging:

- **Recommendation**: Personalize your communications based on customer preferences, behaviour, and demographics. Tailored messages are more likely to resonate with customers and engage them.

2. Multichannel Approach:

- **Recommendation**: Employ a multichannel communication strategy, including email, SMS, social media, and in-app notifications. Reach customers through their preferred channels to maximize engagement.

3. Segmentation and Targeting:

- **Recommendation**: Use customer segmentation to send targeted messages. Send relevant content to specific customer groups, increasing the chances of a positive response.

4. Regular Updates:

- **Recommendation**: Keep customers informed about changes, upgrades, and promotions that can benefit them. Regularly update customers about service improvements.

5. Surveys and Feedback:

- **Recommendation**: Use surveys and feedback forms to gather customer opinions and suggestions. Act on feedback to demonstrate responsiveness and commitment to improvement.

6.3 Product/Service Improvements

1. Continuous Feedback Collection:

- **Recommendation**: Establish a system for collecting continuous feedback from customers. Use surveys, feedback forms, and customer support interactions to gather insights into pain points and areas for improvement.

2. Feature Enhancement Roadmap:

- **Recommendation**: Develop a clear roadmap for feature enhancements based on customer feedback and evolving market trends. Prioritize improvements that align with customer needs and preferences.

3. Performance Optimization:

- **Recommendation**: Continuously optimize the performance of your product or service. Address any latency issues, downtime, or bottlenecks that may impact user satisfaction.

4. Regular Updates:

- **Recommendation**: Provide regular updates and releases that include bug fixes, security enhancements, and new features. Keep customers informed about the benefits of each update.

5. Data Security:

- **Recommendation:** Strengthen data security measures to protect customer information. Regularly audit and update security protocols to stay ahead of potential threats.

7. Implementation Plan

7.1 Short-Term Actions

Short-term actions include:

1. **Targeted Email Campaigns**: Identify at-risk customers based on predictive modeling and launch personalized email campaigns. Offer incentives, discounts, or upgrades to encourage them to stay.
2. **Feedback Surveys**: Initiate customer feedback surveys to understand their pain points and concerns. Address immediate issues and demonstrate a commitment to improving their experience.
3. **Loyalty Rewards**: Launch a short-term loyalty rewards program to incentivize continued engagement. Offer points, discounts, or exclusive access to retain customers during vulnerable periods.
4. **Proactive Customer Support**: Enhance customer support services with proactive outreach. Offer assistance, resolve issues promptly, and ensure customers feel heard and valued.
5. **Exclusive Promotions**: Roll out limited-time promotions, exclusive offers, or bundles to entice customers to extend their subscriptions or commit to longer contracts.

7.2 Long-Term Strategies

1. **Personalized Recommendations**: Develop a personalized recommendation system based on customer preferences and behaviour. Enhance user experience by offering relevant products or content.
2. **Continuous Improvement**: Collaborate with product development teams to address recurring issues, enhance features, and improve product/service quality. Show a commitment to long-term value.
3. **Customer Education**: Create educational resources, webinars, or tutorials to help customers maximize the value of your products or services. Ensure they are aware of all available features and benefits.
4. **24/7 Availability**: Expand customer support to provide 24/7 assistance, including chatbots and AI-driven support. Customers value immediate assistance and quick issue resolution.
5. **Community Building**: Foster a sense of community among your customers. Encourage discussions, forums, or user groups where customers can share experiences and insights.
6. **Proactive Notifications**: Keep customers informed about updates, enhancements, and new features. Proactive communication shows your commitment to their long-term satisfaction.
7. **Customer Success Managers**: Assign dedicated customer success managers to high-value clients. These managers can provide personalized support, address concerns, and ensure clients achieve their goals.
8. **Annual Reviews**: Conduct annual account reviews with customers to assess their evolving needs and align your services to meet them. This process reaffirms your commitment to long-term partnerships.
9. **Tiered Service Plans**: Offer tiered service plans with increasing benefits for long-term commitments. Encourage customers to upgrade to higher tiers for added value.

8. Limitations

8.1 Data Limitations

1. Data Quality and Completeness:

- **Missing Data**: Incomplete or missing data points in the dataset can lead to gaps in the analysis and potentially impact the accuracy of the model.

2. Data Imbalance:

- **Churn Imbalance**: If there is a significant imbalance between churned and non-churned customer records in the dataset, it can lead to biased model training and reduced predictive accuracy for the minority class (churned customers).

3. Data Transparency:

- **Understanding Data Origins:** Lack of transparency regarding data sources and data collection methods can make it challenging to assess the dataset's reliability and biases. Data quality issues, such as missing values or inaccuracies, may have affected the results.

8.2 Model Limitations

Model Overfitting:

- **Complexity**: Random Forest models can be prone to overfitting, especially if they have too many decision trees or are overly complex. Overfitting may result in poor generalization to new, unseen data.

Limitation in Model Choice:

- **Algorithm Suitability**: Random Forest may not always be the best algorithm for a specific problem. Different algorithms may perform better depending on the nature of the churn analysis task.

8.3 Scope Limitations

The analysis focused on churn of telecom industry, may not apply to other parts of the business.

8.4 Budget Constraints:

Budget limitations may affect the extent of data collection, the choice of analytical tools, and the scale of the project.

8.5 Resource Constraints:

The availability of skilled personnel, computing resources, and software tools can limit the complexity and scale of the analysis.

9. Future Scope

9.1 Data Enhancement

Collect additional data sources, including customer feedback and external indicators, to improve model accuracy.

9.2 Advanced Predictive Models:

While the project currently uses a Random Forest Classifier, there is room to explore more advanced predictive modeling techniques. Algorithms like gradient boosting, neural networks, or deep learning may yield even better predictive accuracy.

9.3 Advanced Analytics

Explore advanced techniques, such as deep learning or NLP, to gain deeper insights.

9.4 A/B Testing

Conduct A/B testing on different retention strategies to measure their effectiveness accurately. This iterative approach can lead to data-driven refinement of strategies.

9.5 Customer Lifetime Value (CLV)

Develop CLV models to predict the long-term value of customers. This can guide acquisition and retention efforts by identifying high-value customers.

9.6 Real-Time Churn Prediction:

Extend the project to develop real-time churn prediction capabilities. Implementing streaming analytics and real-time data processing can enable immediate responses to potential churn indicators.