## Customer Churn Analysis Report

**Introduction**

**Background** Customer churn, the rate at which customers discontinue their relationship with a company, is a critical business challenge. High churn rates negatively impact revenue, profitability, and overall business growth.

**Objectives** The primary objective of this analysis was to:

* Identify key factors driving customer churn.
* Develop actionable recommendations to reduce churn and improve customer retention.

**Methodology**

**Data Source** The analysis utilized a customer churn dataset containing information on customer demographics, service usage, and churn status.

**Data Cleaning and Preparation** The data underwent a cleaning and preparation process to ensure accuracy and consistency:

* Missing values were identified and handled appropriately.
* Data types were validated and transformed as necessary.
* Outliers were detected and addressed using appropriate techniques.

**Exploratory Data Analysis (EDA)** EDA was conducted to uncover patterns, relationships, and insights within the data:

* Descriptive statistics (mean, median, standard deviation, etc.) were calculated for key variables.
* Data visualizations (histograms, scatter plots, box plots, etc.) were used to explore distributions and relationships.
* Correlation analysis was performed to identify potential dependencies between variables.

**Modeling and Predictions** Several machine learning models were applied to predict customer churn:

* Logistic Regression
* Decision Tree
* K-Nearest Neighbors (KNN)
* Random Forest
* Gradient Boosting
* Support Vector Machines (SVM)

Model performance was evaluated using metrics such as accuracy, precision, recall, and F1-score. Cross-validation and hyperparameter tuning techniques were employed to optimize model accuracy.

**Key Findings**

**Monthly Charges and Churn** There is a significant positive correlation between higher monthly charges and increased churn rates. Customers paying more for services are more likely to discontinue their subscriptions.

**Contract Type and Churn** Customers with month-to-month contracts exhibit a significantly higher churn rate compared to those with longer-term contracts (1-year or 2-year). This suggests a preference for flexibility among churners.

**Internet Service and Churn** Fiber optic internet service is associated with a slightly higher churn rate compared to DSL. This could be attributed to the higher cost of fiber optic or potentially higher expectations regarding its performance.

**Tenure and Churn** As expected, there is an inverse relationship between tenure and churn. Customers with longer tenure (duration of service) are less likely to churn.

**Recommendations**

**Address High Monthly Charges**

* **Offer Incentives:** Provide discounts or promotions to customers with high monthly charges.
* **Review Pricing Strategies:** Analyze pricing plans to ensure competitiveness and value. Consider tiered pricing options.
* **Bundle Services:** Encourage bundling to reduce overall costs and increase perceived value.

**Promote Longer-Term Contracts**

* **Offer Incentives:** Provide discounts or benefits for longer-term contract commitments.
* **Highlight Value:** Emphasize long-term benefits and cost savings.
* **Flexibility Options:** Offer flexible contracts with shorter cancellation periods.

**Improve Fiber Optic Service and Perception**

* **Address Service Issues:** Proactively monitor and address any service-related problems.
* **Manage Expectations:** Clearly communicate features and benefits to ensure customer understanding.
* **Offer Competitive Pricing:** Evaluate pricing strategies for fiber optic services.

**Enhance Customer Loyalty Programs**

* **Reward Loyal Customers:** Implement a rewards program for long-term customers.
* **Personalized Offers:** Provide tailored recommendations and promotions.
* **Proactive Engagement:** Regularly communicate with customers and seek feedback.

**Improve Customer Service**

* **Proactive Support:** Identify and address potential churn risks.
* **Personalized Interactions:** Train customer service representatives for empathetic and tailored solutions.
* **Feedback Mechanisms:** Encourage and actively solicit customer feedback.

**Conclusion**

This analysis has identified key drivers of customer churn and provided actionable recommendations to mitigate this challenge. By implementing these strategies, the company can improve customer retention rates, reduce revenue loss, and foster sustainable business growth. Continued monitoring and refinement of these approaches will be crucial for long-term success in minimizing customer churn.