Telecommunications Churn Analysis Report

1. Project Objective and Background

The objective of this project is to analyze customer churn within a telecommunications dataset, identifying patterns and factors contributing to customer dissatisfaction. By focusing on high-churn likelihood customers, this analysis aims to provide data-driven recommendations for enhancing retention strategies.

The telecommunications industry is highly competitive, with companies vying to retain customers through service quality, pricing, and customer experience. Understanding key factors behind customer churn helps drive targeted actions to improve retention.

2. Data and Methodology

Dataset Overview:

- **Observations:** 7,043
- **Attributes:** 33 (21 categorical, 12 numerical)
- **Target Variable:** "Churn Label"

Data Cleaning and Preparation:
Redundant attributes (e.g., geographic identifiers) were removed, and missing values in total charges were filled with the mean. Monthly charges were binned into four categories to better segment and analyze churn behavior.

Exploratory Data Analysis (EDA):
Using advanced visualization techniques, the data revealed several customer behavior patterns:

- **Service Bundling Patterns:** Customers with high monthly charges and bundled services (e.g., DSL with streaming) show higher churn rates.
- **Contract Duration:** Month-to-month contract holders are more likely to churn compared to those on one or two-year contracts.
- **Demographic Influence:** Older customers (65+) have lower churn rates, indicating a more stable customer base.

3. Predictive Modeling

To predict churn, three machine learning models were explored using SAS:

1. **Decision Tree:**
    - Showed high sensitivity to contract type, revealing that month-to-month contracts have lower retention.
    - Indicated bundling patterns affecting churn, with DSL and streaming services leading to higher dissatisfaction.
    - Model Sensitivity: 83%
2. **Logistic Regression:**
    - Compared churn odds across contract types, internet service (fiber-optic vs. DSL), and monthly charges.
    - Fiber-optic users were less likely to churn compared to DSL users.
    - Model Sensitivity: ~84%
3. **Support Vector Machine (SVM):**
    - Utilized for its robust classification capabilities in high-dimensional spaces.
    - SVM effectively separated high churn customers, especially for those with specific service combinations, such as bundled streaming and DSL services.
    - Model Sensitivity: ~85%, making it the preferred model due to its ability to capture complex relationships.

Chosen Model: Support Vector Machine (SVM) was selected as the final model due to its high sensitivity and ability to effectively classify churn-prone customers.

4. Key Findings

- **High Churn Factors:**
  Month-to-month contracts, high monthly charges, paper billing preferences, and DSL internet service were primary churn drivers. Lack of technical support also contributed to higher dissatisfaction rates.
- **Service Bundling:**
  Customers with DSL and streaming services were more likely to churn due to performance issues and cost considerations.
- **Loyal Customer Segment:**
  Senior customers (65+) exhibited lower churn rates, representing a stable segment that may require fewer retention efforts.

5. Recommendations

Retention Strategies:

1. **Flexible Contract Options:**
   Offer contract flexibility, such as shorter contract terms, particularly for high-churn customer segments.
2. **Service Upgrades:**
   Transition DSL users to fiber-optic services to improve internet speed and reliability, addressing key performance concerns.
3. **Targeted Incentives:**
   Provide personalized incentives based on usage patterns, such as discounts on streaming bundles for high-value customers.
4. **Enhanced Support Services:**
   Improve technical support to address service-related issues promptly, focusing on high-churn segments needing quick resolutions.

Recommended Customer Retention Package:

- **Flexible Monthly Packages**
- **Fiber Optic Internet** with priority support
- **Paperless Billing**
- **Competitive Pricing:** Range between $27.68 - $55.98

6. Conclusion

The analysis highlights actionable insights to mitigate churn, emphasizing flexible contracts, upgraded internet services, and enhanced technical support. The SVM model's classification strength provides a reliable framework for identifying at-risk customers and targeting retention strategies accordingly. Implementing these recommendations can help reduce churn rates and foster stronger customer loyalty.