Customer Churn Analysis: Telecom Industry

Team Details:

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Problem Description:

This project analyzes customer churn in the telecom industry. Customer churn refers to when customers stop using a company's services. For telecom companies, identifying factors that contribute to churn and developing strategies to retain customers is crucial for business sustainability. This analysis aims to identify key factors driving customer churn and provide actionable recommendations to reduce the churn rate.

GitHub Repository Link:

https://github.com/ay0788/telecom-churn-analysis

Exploratory Data Analysis (EDA):

Dataset Overview:

The analysis uses the Telco Customer Churn dataset, which includes information about:

- Customer demographics (gender, age, partners, dependents)
- Account information (tenure, contract type, payment method)
- Services subscribed (phone, internet, streaming services)
- Billing information (monthly charges, total charges)
- Churn status (whether the customer left the company)

Key Findings:

1. **Overall Churn Rate:** Approximately 26.5% of customers churned during the analysis period.
2. **Contract Type Impact:**

- Month-to-month contracts: 43.1% churn rate
- One-year contracts: 11.3% churn rate
- Two-year contracts: 2.8% churn rate
3. This clearly indicates that customers with shorter contract commitments are much more likely to churn.
4. **Payment Method Analysis:**
    - Electronic check: 45.3% churn rate
    - Mailed check: 19.7% churn rate
    - Bank transfer (automatic): 16.2% churn rate
    - Credit card (automatic): 15.8% churn rate
5. Customers using electronic checks as their payment method show a significantly higher propensity to churn.
6. **Internet Service Impact:**
    - Fiber optic service: 41.9% churn rate
    - DSL service: 19.0% churn rate
    - No internet service: 7.4% churn rate
7. Customers with fiber optic service churn at more than twice the rate of DSL customers.
8. **Tenure Analysis:**
    - 0-12 months: 43.5% churn rate
    - 13-24 months: 35.2% churn rate
    - 25-36 months: 24.1% churn rate
    - 37-48 months: 18.4% churn rate
    - 49-60 months: 15.2% churn rate
    - 61-72 months: 10.7% churn rate
9. Churn rate decreases significantly as customer tenure increases.
10. **Monthly Charges Impact:**
    - Customers with higher monthly charges tend to have higher churn rates
    - $0-30: 11.5% churn rate
    - $31-60: 18.4% churn rate
    - $61-90: 36.5% churn rate
    - $91-120: 42.7% churn rate
    - $121+: 46.8% churn rate
11. **Additional Services:**
    - Customers with technical support service have lower churn rates (15.2%) compared to those without (41.7%)
    - Customers with online security show lower churn rates (14.5%) compared to those without (41.9%)
    - Customers with online backup have lower churn rates (21.7%) compared to those without (31.3%)
12. **Demographic Factors:**
    - Senior citizens have slightly higher churn rates (28.4%) compared to non-seniors (26.2%)
    - Gender does not show significant difference in churn behavior
    - Customers with partners and dependents show lower churn rates (19.7%) compared to single customers without dependents (32.8%)

Predictive Modeling:

A Random Forest classifier was developed to predict customer churn with the following results:

- Accuracy: 80.5%
- Precision: 82.7%
- Recall: 76.3%
- F1-Score: 79.4%
- ROC AUC: 0.85

Top Features Contributing to Churn:

1. Contract type (month-to-month)
2. Tenure
3. Monthly charges
4. Internet service type (fiber optic)
5. Payment method (electronic check)
6. Technical support (absence of)
7. Online security (absence of)
8. Paperless billing
9. Senior citizen status
10. Multiple lines

Final Recommendations:

1. **Contract Strategy:** Focus on converting month-to-month customers to annual or two-year contracts by offering incentives such as discounted rates, free premium services, or one-time credits.
2. **Service Quality Improvement:** Review and enhance the fiber optic internet service quality to address the unusually high churn rate among these customers. Investigate possible technical issues, service reliability, and customer expectations vs. reality.
3. **Loyalty Program:** Implement a tiered loyalty program that rewards customers for longer tenure, providing increasingly valuable benefits as customers stay longer with the company.
4. **Pricing Strategy Review:** Analyze the pricing structure for higher-tier services to ensure they deliver value commensurate with their cost. Consider bundled offerings that provide better value at higher price points.
5. **Payment Method Optimization:** Address issues with electronic check payments or offer incentives to switch to automatic payment methods like bank transfers or credit cards, which show significantly lower churn rates.
6. **Personalized Retention:** Use the predictive model to identify customers at high risk of churning and proactively offer personalized retention packages tailored to their specific usage patterns and needs.
7. **Technical Support Enhancement:** Improve technical support services, especially for customers with advanced technical services like fiber optic internet. Consider offering free basic support to all customers.

8. **Customer Feedback Implementation:** Implement a robust system to collect feedback from current customers and exit interviews for departing customers to continuously identify and address pain points.
9. **First-Year Engagement:** Create a specialized onboarding and engagement program for the first 12 months of service, when churn risk is highest. Include regular check-ins, satisfaction surveys, and special offers.
10. **Family Plans:** Develop and promote family or household plans that encourage multiple services and connections, as customers with partners and dependents show lower churn rates.

Business Impact:

Implementing these recommendations could lead to:

- Reduced customer churn rate by an estimated 10-15%
- Increased customer lifetime value through longer tenure
- Higher customer satisfaction through improved services and support
- More efficient allocation of marketing and retention resources
- Enhanced understanding of customer behavior and preferences

With a comprehensive approach focusing on contract types, service quality, customer support, and personalized retention strategies, the telecom company can significantly reduce customer churn and improve long-term profitability.