

TELECOM CHURN CASE STUDY

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Problem Statement & Expected Outcome:

****Background:****

Customers in the telecom business can choose from various providers, leading to an annual churn rate of 15-25% in a highly competitive market. Retaining customers has become more critical than acquiring new ones due to cost considerations.

****Problem Statement:****

Evaluate customer-level data, develop predictive models to identify high-risk churn customers, and pinpoint main churn indicators.

****Expected Outcome:****

The primary company goal is to retain high-profitable clients by predicting and reducing customer churn.

Steps Taken for Analysis:

1. ****Understanding Data:****

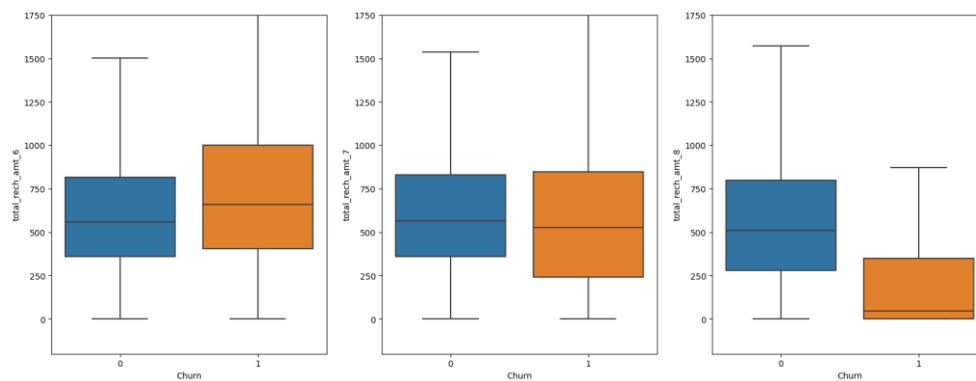
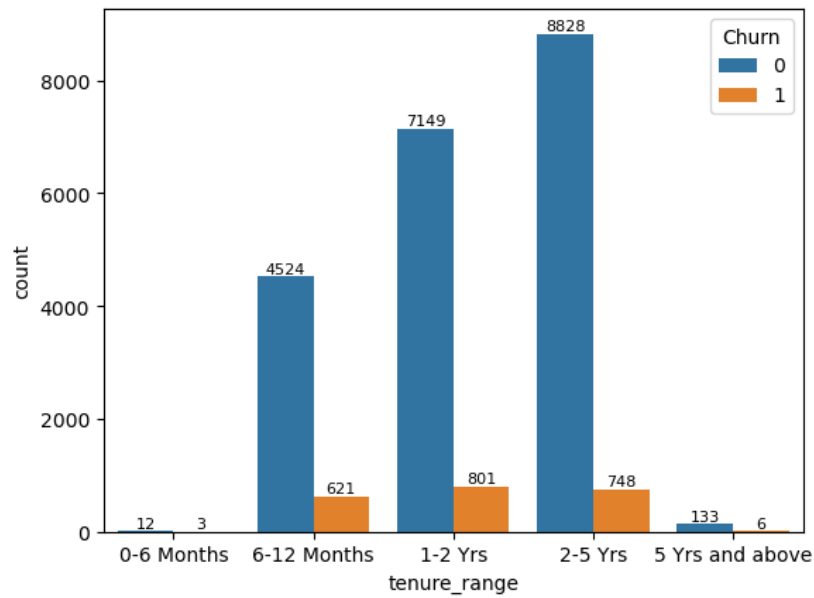
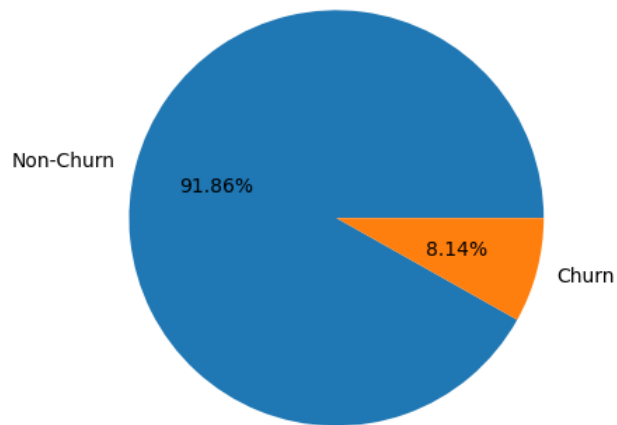
- Telecom industry churn rate: 15-25% annually.
- Customer retention is more cost-effective than acquisition.

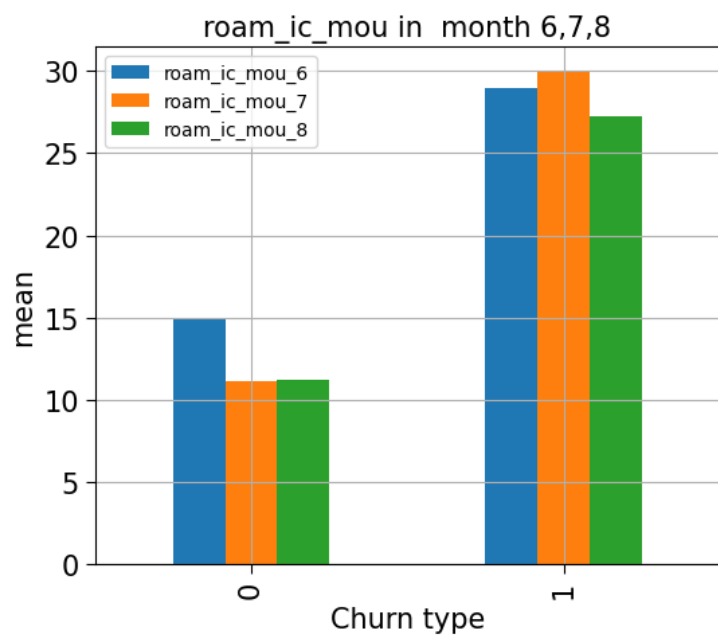
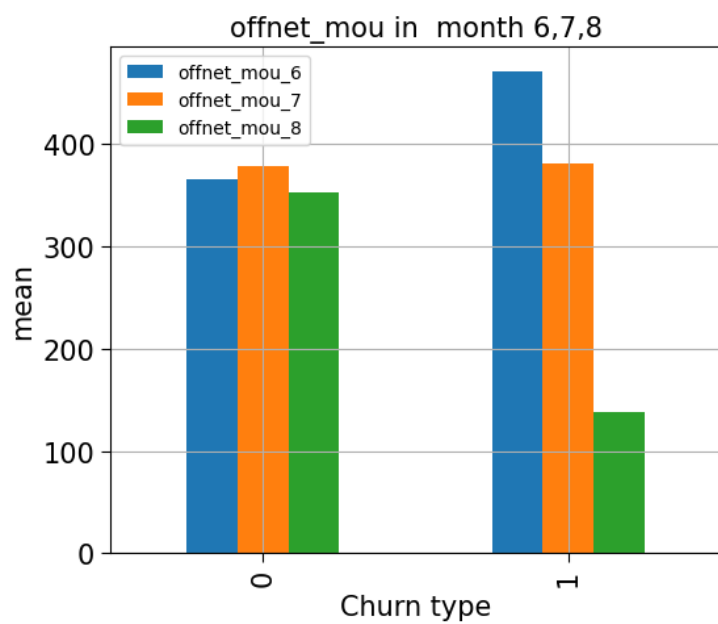
2. ****Data Cleaning:****

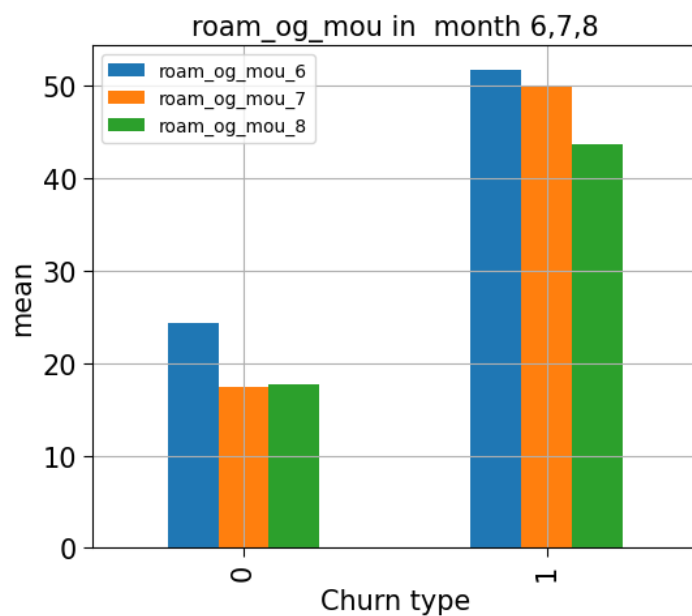
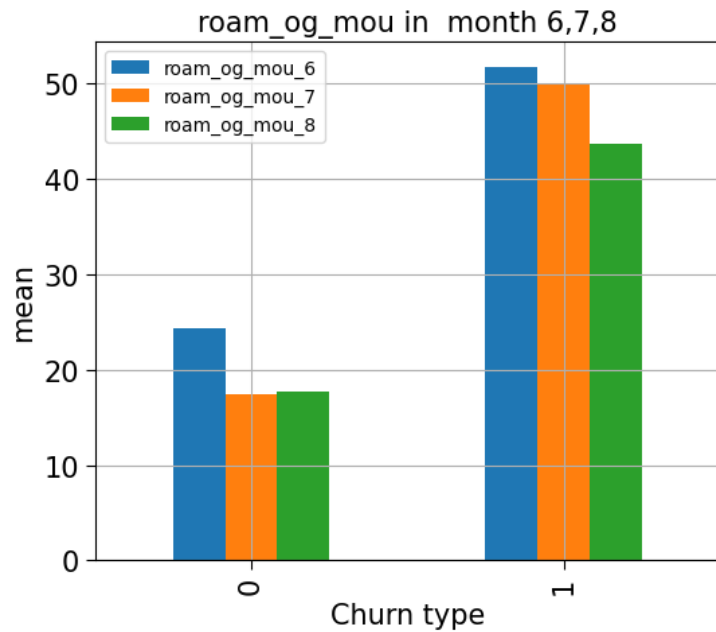
- Removed columns with single unique values or irrelevant data.
- Replaced missing values in recharge and usage-related columns with zeros.

3. ****EDA (Exploratory Data Analysis):****

- Explored the distribution of tenure, total recharge amount, average revenue per user, roaming minutes, and more.







4. **Data Preparation:**

- Focused analysis on High-Value customers (top 30% by average recharge amount in the first two months).
- Tagged churners based on call and internet usage during the churn period.
- Dropped columns belonging to the ninth month.

5. **Feature Selection:**

- Identified important features such as total recharge amount, average revenue per user, roaming minutes, and usage outside the operator's network.

6. ****Model Evaluation:****

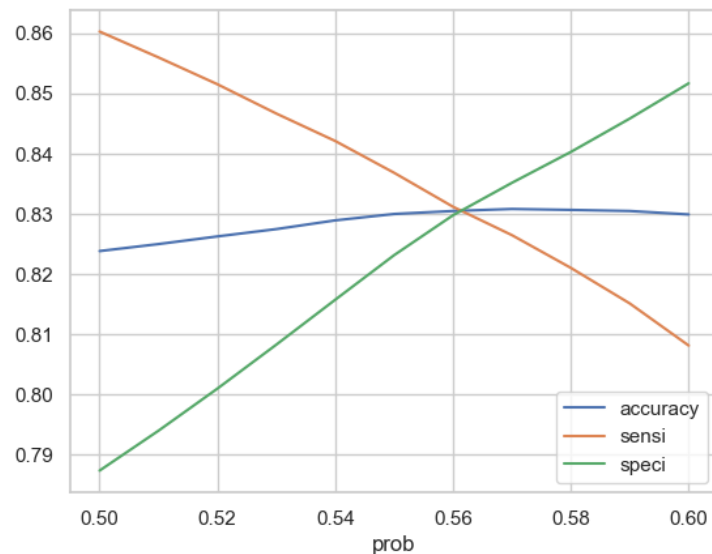
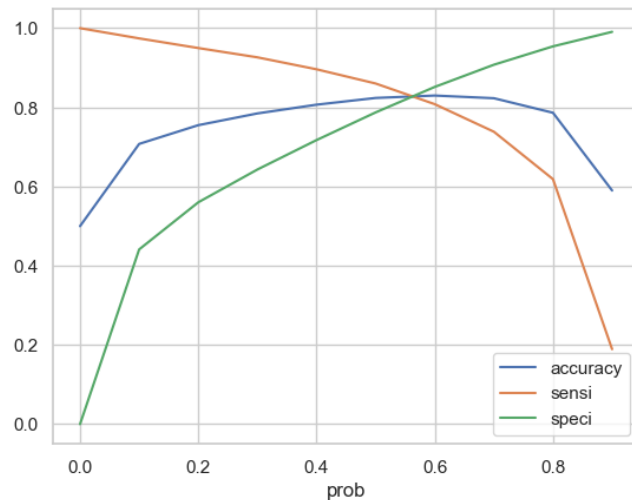
- Used Logistic Regression with PCA, Random Forest, Decision Tree, and Logistic Regression with RFE.
- Applied a cutoff of 0.5 for Logistic Regression and observed accuracy, sensitivity, specificity, and recall.
- Adjusted cutoff to 0.56 for better model performance.

7. ****Prediction on Test Dataset:****

- Split train and test sets (70:30 ratio) with stratification.
- Handled class imbalance using SMOTE.
- Scaled numerical variables using MinMaxScaler.
- Evaluated models on the test dataset.

Model Evaluation Results:

- ****Logistic Regression (Cutoff: 0.56):****
 - Accuracy: 0.83
 - Sensitivity: 0.83
 - Specificity: 0.83
 - Recall: 0.83
- ****Prediction on Test Dataset:****
 - Accuracy: 0.82
 - Sensitivity: 0.78
 - Specificity: 0.83
 - Recall: 0.78



Recommendations:

1. **Tenure:**

- Customers with less than 4 years are more likely to churn. The company should focus on this segment.

2. **Network Coverage:**

- Improve 2G/3G coverage in areas with poor service as it strongly correlates with churn.

3. **Recharge Amount:**

- Drop in recharge amount and volume-based cost for the 8th month indicates potential churn.

4. **Roaming Calls:**

- Incoming and outgoing calls on roaming in the 8th month are strong indicators of churn.

5. **Average Revenue per User:**

- This feature is crucial in determining churn prediction.

Additional Recommendations:

6. **Segment-Specific Schemes:**

- Introduce new schemes specifically targeting customers with less than 4 years of tenure.

7. **Improved 2G/3G Services:**

- Enhance 2G/3G services in areas with reported issues to prevent churn.

8. **Monitor Recharge Patterns:**

- Keep a close eye on recharge amount and volume-based costs for early indications of potential churn.

9. **Roaming Call Optimization:**

- Optimize services for incoming and outgoing calls on roaming to enhance customer satisfaction.

10. **Focus on Average Revenue per User:**

- Continuously analyze and improve strategies based on changes in average revenue per user trends.

Conclusion:

The analysis provides valuable insights into customer behaviors and identifies critical features for predicting churn. Recommendations focus on specific customer segments, network coverage, recharge patterns, and average revenue per user to effectively reduce customer churn. Continuous monitoring and strategic adjustments are recommended for sustained customer retention.