Telecom Customer Churn Analysis

Assignment Overview

A telecommunications company is experiencing a steady rise in **customer churn**, which is negatively affecting revenue and customer lifetime value. Management wants to **understand churn patterns, identify risky customer segments, and improve customer retention strategies** using historical customer usage and service interaction data.

As a **Data Analyst**, your responsibility is to analyze customer behavior, track churn-related KPIs, and provide **data-driven insights and recommendations** that business and operations teams can act upon.

Primary Business Question

> "What customer behaviors and service factors are most strongly associated with churn, and how can the company reduce churn using data-driven insights?"

Dataset Description

The dataset includes:

- **Customer Information**
    - State
    - Account length
    - Subscription plans (International Plan, Voicemail Plan)
- **Usage Metrics**
    - Day, Evening, Night, and International minutes & calls
    - Associated charges

- **Customer Support Data**

    - Number of customer service calls

- **Outcome Variable**

    - Churn (Yes / No)

Key Objectives (Data Analyst Focused)

1. Measure and monitor **churn KPIs**

2. Identify **high-risk customer segments**

3. Analyze **customer usage and service behavior**

4. Provide **actionable retention recommendations**

5. Communicate insights via **dashboards and reports**

Key Tasks

1. Data Cleaning & Validation

Objective: Ensure data accuracy and reliability

Tasks

- Check for:

    - Missing values

    - Duplicate records

    - Invalid or extreme values

- Validate consistency between:

    - Minutes and corresponding charges

- Flag unusual usage patterns for review

📌 *Why this matters:*

Data Analysts are expected to ensure **trustworthy reporting** before analysis.

2. Churn KPI Analysis

Objective: Establish baseline churn performance

Tasks

- Calculate:
    - Overall churn rate
    - Monthly / segment-level churn (if time proxy exists)
- Analyze churn by:
    - International plan
    - Voicemail plan
    - State
- Identify top 5 churn-heavy segments

📌 *Deliverable:*

Clear KPIs for leadership review.

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3. Customer Usage Behavior Analysis

Objective: Understand how customers use telecom services

Tasks

- Compare churned vs retained customers across:
    - Total usage minutes
    - Call volume
    - International usage
- Identify usage thresholds associated with high churn
- Visualize distributions using:
    - Bar charts
    - Boxplots

📌 *Example Insight:*

> Low-usage customers churn more frequently than high-usage customers.

4. Customer Service Impact Analysis

Objective: Evaluate support experience impact on churn

Tasks

- Analyze churn rate by number of customer service calls
- Identify a service-call threshold where churn spikes
- Compare average service calls for churned vs retained users

📌 *Business Impact:*

Helps prioritize customer support interventions.

5. Plan & Feature Effectiveness Analysis

Objective: Evaluate product offerings

Tasks

- Compare churn between:
  - International plan users vs non-users
  - Voicemail plan users vs non-users
- Analyze whether higher charges correlate with churn
- Identify plans contributing to dissatisfaction

📌 *Outcome:*

Product team insights for plan redesign.

6. Customer Segmentation (Rule-Based)

Objective: Group customers for targeted action

Tasks

- Segment customers using business rules:
  - High vs low usage

- High vs low service calls
- Create customer personas:
  - "Low Usage – High Complaints"
  - "High Usage – Loyal Customers"

📌 *Data Analyst Standard:*

Rule-based segmentation is preferred over ML clustering.

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7. Trend & Comparative Analysis

Objective: Identify patterns across regions and behaviors

Tasks

- Compare churn across:
  - States
  - Usage levels
  - Service call frequency
- Rank states by churn rate
- Identify geographic churn hotspots

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8. Business Insight & Recommendation Development

Objective: Convert analysis into decisions

Tasks

- Summarize key churn drivers
- Recommend retention strategies such as:
  - Proactive outreach after multiple service calls
  - Plan optimization for international users
- Define churn-risk signals for monitoring

📌 *Example:*

> Customers with ≥4 service calls should be flagged for immediate retention action.

9. Dashboard Development

Objective: Enable decision-making through visualization

Tasks

- Build a dashboard showing:
    - Overall churn rate
    - Churn by state
    - Churn by plan type
    - Service calls vs churn
- Tools:
    - Power BI / Tableau / Excel

📌 *Audience:*

Business managers, customer support leaders

Deliverables

1. **Data Analysis Report**
    - Business problem
    - KPIs
    - Key insights
    - Recommendations
2. **Interactive Dashboard**
    - Churn metrics
    - Segment comparisons
    - High-risk indicators

3. **Supporting Files**

   - SQL queries / Excel formulas / Python notebooks

   - Data cleaning documentation

Evaluation Criteria

- Accuracy of KPIs

- Business relevance of insights

- Quality of visualizations

- Clarity of storytelling

- Actionability of recommendations