Assignment 1: Customer Churn Prediction for Tele Company

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Introduction

In today's competitive telecommunications industry, retaining existing customers is as crucial as acquiring new ones. Customer churn, the rate at which customers discontinue their service, presents a significant challenge for Tele, a telecommunications company seeking to improve customer loyalty and reduce turnover.

Business Scenario

A Tele company, has been facing high customer churn rates and wants to understand the main factors causing customers to leave. As a junior data scientist, you've been given a dataset with customer information, including demographics, account details, services used, and churn status.

Your Task

Mention the Data Science workflow with your takes in each step to likely reduce a customer churn in the next 3 months.

1. Understanding the Problem

Objective : Reduce customer churn by identifying key factors and implementing strategies to retain customers.

Stakeholders : Collaborate with marketing, customer service, and management teams to understand their perspectives and requirements.

2. Data Collection

Gather Data: Collect data on customer demographics, account details, services used, and churn status. Ensure data is comprehensive and up-to-date.

Sources: CRM systems, billing systems, customer feedback, and interaction logs.

3. Data Preprocessing

Data Cleaning: Handle missing values, correct errors, and remove duplicates.

Feature Engineering: Create new features from existing data, such as tenure, average monthly charges, and service usage patterns.

Normalization: Scale numerical features to ensure uniformity.

4. Exploratory Data Analysis (EDA)

Visualizations: Use histograms, box plots, and scatter plots to understand data distributions and relationships.

Correlation Analysis: Identify correlations between features and churn status.

Insights: Discover patterns and trends, such as higher churn rates among certain demographics or service plans.

5. Model Building

Train-Test Split: Divide the data into training and testing sets.

Model Selection: Choose appropriate models like Logistic Regression, Decision Trees, Random Forest, or Gradient Boosting.

Hyperparameter Tuning: Optimize model parameters using techniques like Grid Search or Random Search.

6. Model Evaluation

Metrics: Evaluate models using metrics like accuracy, precision, recall, F1-score, and ROC-AUC.

Validation : Use cross-validation to ensure model robustness and avoid overfitting.

7. Model Interpretation

Feature Importance : Identify which features are most influential in predicting churn.

SHAP Values: Use SHAP (SHapley Additive exPlanations) to understand the impact of each feature on individual predictions.

8. Deployment

Integration : Deploy the model into the company's CRM system to predict churn in real-time.

Automation : Set up automated alerts for high-risk customers.

9. Actionable Insights

Retention Strategies: Develop targeted retention strategies based on model insights, such as personalized offers, loyalty programs, or proactive customer service.

Customer Feedback : Implement feedback loops to continuously improve services based on customer input.

10. Monitoring and Maintenance

Performance Tracking : Regularly monitor model performance and update it with new data.

A/B Testing: Test different retention strategies to determine their effectiveness.

11. Reporting

Dashboards : Create dashboards to visualize key metrics and track progress.

Communication: Regularly update stakeholders on findings and progress.