ML Problem Statement

Mentorness Internship Program

Project Name: Customer Churn Prediction

Welcome to the Machine Learning Internship program, focused on Customer Churn Prediction. In this project, you will dive into the world of classification tasks and gain hands-on experience in data analysis, preprocessing, and machine learning model development. Customer churn, the discontinuation of business with a company, is a critical challenge in various industries, and your task is to predict it accurately.

Problem Statement:

Customer churn is a crucial concern for businesses across sectors. Understanding customer behaviors, identifying key factors contributing to churn, and predicting when customers are likely to churn are vital for reducing revenue loss and enhancing customer retention strategies.

Your Mission:

Your mission in this internship is to leverage machine learning to predict customer churn. You will follow these key steps:

1. **Exploratory Data Analysis (EDA):** Dive into the dataset, conduct comprehensive EDA, and unveil valuable insights about customer behaviors. EDA will involve data visualization, summary statistics, and identifying patterns in the data.

2. **Feature Engineering:** If requires create new features or transform existing ones that can provide additional insights or improve model performance. Feature engineering might involve aggregating information, creating interaction terms, or applying domain-specific knowledge.

3. **Data Preprocessing:** Prepare the data for model training. This includes handling missing values, encoding categorical variables, and scaling or normalizing features as needed.

4. **Machine Learning Model Development:** Train various machine learning models for classification, such as logistic regression, decision trees, random forests, Boosting Algorithms. Experiment with different algorithms to find the best-performing model.

5. **Model Evaluation:** Assess the performance of your models using appropriate evaluation metrics like accuracy, precision, recall, F1-score, confusion matrix and ROC AUC. Identify the model that provides the most accurate predictions of customer churn.

6. **Predicting Churn:** Once you've built and validated your model, use it to predict customer churn. Understand the importance of feature importance scores in interpreting the model's predictions.

7. **Recommendations:** Based on your findings, provide actionable recommendations to the business. These recommendations should help reduce churn and improve customer retention strategies.

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Dataset Overview:

The dataset contains the following columns:

- `customerID`: Customer ID
- `gender`: Customer's gender
- `SeniorCitizen`: Whether the customer is a senior citizen (1 for yes, 0 for no)
- `Partner`: Whether the customer has a partner
- `Dependents`: Whether the customer has dependents
- `tenure`: Number of months the customer has stayed with the company
- `PhoneService`: Whether the customer has phone service
- `MultipleLines`: Whether the customer has multiple phone lines
- `InternetService`: Type of internet service
- `OnlineSecurity`: Whether the customer has online security
- `OnlineBackup`: Whether the customer has online backup
- `DeviceProtection`: Whether the customer has device protection
- `TechSupport`: Whether the customer has tech support
- `StreamingTV`: Whether the customer streams TV
- `StreamingMovies`: Whether the customer streams movies
- `Contract`: Type of contract (e.g., month-to-month, one year, two years)
- `PaperlessBilling`: Whether the customer uses paperless billing
- `PaymentMethod`: Payment method (e.g., electronic check, mailed check)
- `MonthlyCharges`: Monthly charges
- `TotalCharges`: Total charges
- `Churn`: Target variable, indicating whether the customer churned (1 for yes, 0 for no)

Conclusion:

This internship offers an exciting opportunity to apply machine learning techniques to a real-world problem. By the end of the internship, you will have gained valuable skills in data analysis, preprocessing, model development, and recommendation generation. Your work will contribute to improving customer retention and business success.

Are you ready to embark on this exciting journey in predicting customer churn and helping businesses thrive? Let's get started!