**Assignment 1:**

Introduction: Customer churn refers to the process by which customers stop using a company’s products or services. In the telecommunications industry, high customer churn is a significant challenge. Retaining customers is crucial to the company's growth and profitability, especially in a highly competitive market. The objective of this project is to predict which customers are likely to churn and identify the main factors behind their decision to leave, so the company can take preventive actions.

The Data Science workflow in each step to likely reduce a customer churn in the next 3 months:

1.Business understanding:

Objective: The primary goal is to reduce customer churn within the next three months by identifying the main reasons behind customer departures.

Business Impact: Reducing churn can save the company from losing valuable revenue. Retaining a customer is often more cost-effective than acquiring a new one.

Actionable Insights: If we can predict which customers are likely to leave, we can intervene with offers or better services to improve retention.

2.Problem Understanding: We need to reduce customer churn within the next 3 months by analyzing available data to identify factors causing customers to leave.

3**.** Data Preparation**:** 1.Data collection: The dataset includes:

* Demographics (e.g., age, gender).
* Account details (e.g., tenure, monthly charges).
* Service information (e.g., internet, phone services).
* Payment behavior (e.g., on-time payments).
* Churn status (whether a customer left or stayed).

2. Data cleaning: Remove duplicate entries. Handle missing values.

3. Exploratory Data Analysis:

Create visualizations to identify trends and correlations.

Do customers with shorter tenures churn more frequently?

Are customers using internet services more likely to churn?

Check correlations between variables to select important features for modeling.

4.Modeling: Try different machine learning models:

1. Logistic Regression: For binary classification problems.
2. Decision Tree: To provide clear decision paths for churn reasons.
3. Random Forest: To enhance performance through multiple decision trees.

5.Evaluation: Use metrics to evaluate model performance:

1.Accuracy: How many predictions were correct.

**2.**Precision: How many predicted churns were actual churns.

**3.**Recall: How well the model identified all actual churns.

6.Deployment: Deploy the model to identify customers at high risk of churning. Recommendations for the company:

1. Offer discounts or special packages to at-risk customers.
2. Improve customer service or provide faster technical support.