Customer Churn Analysis for Telecom Industry

Introduction:

This project focuses on understanding customer churn in the telecom industry. Churn means when a customer leaves the service. The goal was to analyze patterns in customer behavior and predict who is likely to churn so that the company can take steps to retain them.

Abstract:

I worked on a dataset that included details like tenure, internet service, contract type, and charges for each customer. I cleaned the data, explored it using Python, and found that customers with short tenures and month-to-month contracts were more likely to churn.

I built a classification model using Logistic Regression and Random Forest to predict churn. I also used SHAP to understand which features were most important in the prediction. Then I created a Power BI dashboard to visualize churn trends and customer segments in a business-friendly way.

Tools Used:

- Python – For data cleaning, analysis, and machine learning
- Scikit-learn – For model building
- SHAP – For model explainability
- Power BI – For dashboard and visualization
- Jupyter Notebook – To write and run Python code

Steps Followed:

1. **Cleaned the dataset** – fixed missing values and converted data types.
2. **Exploratory Data Analysis** – checked trends using graphs and summaries.
3. **Model Building** – used Scikit-learn to train a classifier on churn column.
4. **SHAP Explainability** – used SHAP plots to explain which features mattered most.
5. **Customer Segmentation** – grouped customers into *Loyal*, *At Risk*, and *Dormant*.
6. **Dashboard** – created Power BI visuals for churn rate, contracts, and segments.

Conclusion:

Based on the analysis, the following key recommendations were identified to reduce churn and improve customer retention:

1. **Encourage Annual Plans**: Customers on month-to-month contracts show higher churn; offering discounts for switching to longer plans can improve retention.
2. **Improve Fiber Service Experience**: Fiber optic users churn more than DSL, indicating a need for service quality improvements.
3. **Activate Dormant Users**: A large portion of users are inactive; targeted offers or loyalty programs can convert them into loyal users.
4. **Promote Online Backup Services**: Churners often do not use this service — bundling it can increase value perception.
5. **Target At-Risk Segment**: Users with high churn probability can be retained through personalized offers and proactive engagement.