

# Title Of The Project : CUSTOMER CHURN ANALYSIS FOR TELECOM INDUSTRY

## INTRODUCTION

In the telecom sector, customer churn—when customers discontinue using a company’s services—has a direct impact on revenue and business growth. Retaining existing customers is more cost-effective than acquiring new ones, making churn prediction a vital aspect of business strategy.

This project focuses on identifying the major reasons behind customer churn and predicting which customers are likely to leave the company. By using data analytics and machine learning techniques, this project aims to help the telecom provider improve customer satisfaction and design effective retention strategies. The dataset used includes customer demographics, account details, and service usage patterns, enabling comprehensive behavioral analysis.

## ABSTRACT

The main objective of this project is to analyze customer behavior and predict churn using historical telecom data. The workflow involves data cleaning, exploratory data analysis (EDA), model training, and visualization. A Random Forest Classifier model was used to classify whether a customer will churn based on attributes such as contract type, tenure, payment method, and monthly charges.

The project achieved an accuracy of approximately 82%, indicating a reliable predictive performance. Insights revealed that customers with month-to-month contracts, short tenure, and high monthly charges are most likely to churn. These findings can help the company take proactive actions, such as offering loyalty benefits and discounts to high-risk customers.

## Tools Used

| Purpose                    | Tools/Technologies           |
|----------------------------|------------------------------|
| Data Processing & Cleaning | Python (Pandas, NumPy)       |
| Visualization & EDA        | Seaborn, Matplotlib          |
| Machine Learning           | Scikit-learn (Random Forest) |
| Model Explainability       | SHAP                         |
| Dashboard & Insights       | Power BI                     |

|           |                      |
|-----------|----------------------|
| Purpose   | Tools/Technologies   |
| Reporting | Microsoft Word / PDF |

## Steps Involved in Building the Project

1. **Data Collection:** Imported the Telco Customer Churn dataset from Kaggle.
2. **Data Preprocessing:** Handled missing values, converted categorical data using Label Encoding, and dropped irrelevant columns.
3. **Exploratory Data Analysis (EDA):** Visualized relationships between churn and key variables such as contract type, monthly charges, and tenure.
4. **Model Development:** Built and trained a Random Forest Classifier to predict customer churn.
5. **Model Evaluation:** Evaluated performance using accuracy, precision, recall, and F1-score metrics.
6. **Model Explainability:** Used SHAP values to interpret the impact of features on churn decisions.
7. **Visualization:** Created an interactive **Power BI dashboard** showing churn trends and customer segmentation.
8. **Result Export:** Saved model predictions for visualization and reporting.

## Conclusion

The analysis successfully identified major drivers of customer churn in the telecom industry. Shorter tenure, high monthly charges, and month-to-month contracts were found to significantly influence customer attrition. The predictive model achieved good accuracy and can be effectively used to target customers at risk of leaving.

By implementing data-driven retention strategies—such as offering long-term contract incentives, personalized discounts, and improving service quality—the telecom company can reduce churn, increase customer loyalty, and enhance long-term profitability.