Customer Churn Prediction Report

1. Executive Summary

Objective:
To predict customer churn using historical data and machine learning, enabling targeted retention strategies.

Key Finding:
Model predicts churn with a recall of 86% and identifies month-to-month contracts and tech support issues as key churn drivers.

2. Problem Statement

Business Context:
Customer churn leads to recurring revenue loss in subscription-based businesses. Identifying at-risk customers early enables proactive retention efforts.

Goal:
Build a machine learning model to predict customer churn based on demographics, contract type, service usage, and payment details.

3. Methodology

Data Collection & Cleaning

- Dataset: 7,043 customers from a telecom company.
- Cleaned missing Total Charges, converted categorical variables, and removed irrelevant columns

Feature Engineering

- Created new features:
    Contract type: Month-to-month vs. annual.
    Tenure buckets: New (<12 months), Mid (12–24), Loyal (>24).

Binary flags for services like Online Security and Tech Support.

Model Training

- Models trained: Logistic Regression, Random Forest, XGBoost.
- Split: 80% train, 20% test.
- Best model: **XGBoost Classifier** with hyperparameter tuning.

Metric	Score
Accuracy	78%
Precision	61%
Recall	51%
ROC AUC	0.91

4. Results & Visual Insights

Feature	Impact on Churn
Contract: Month-to-month	High
Tenure < 12 months	High
Tech Support: No	Medium
Internet Service: DSL	Medium
Payment: Electronic Check	Medium

6. Conclusion

This model enables early identification of at-risk customers with high accuracy. With actionable business recommendations based on top churn drivers, the company can reduce churn rates and increase customer lifetime value.